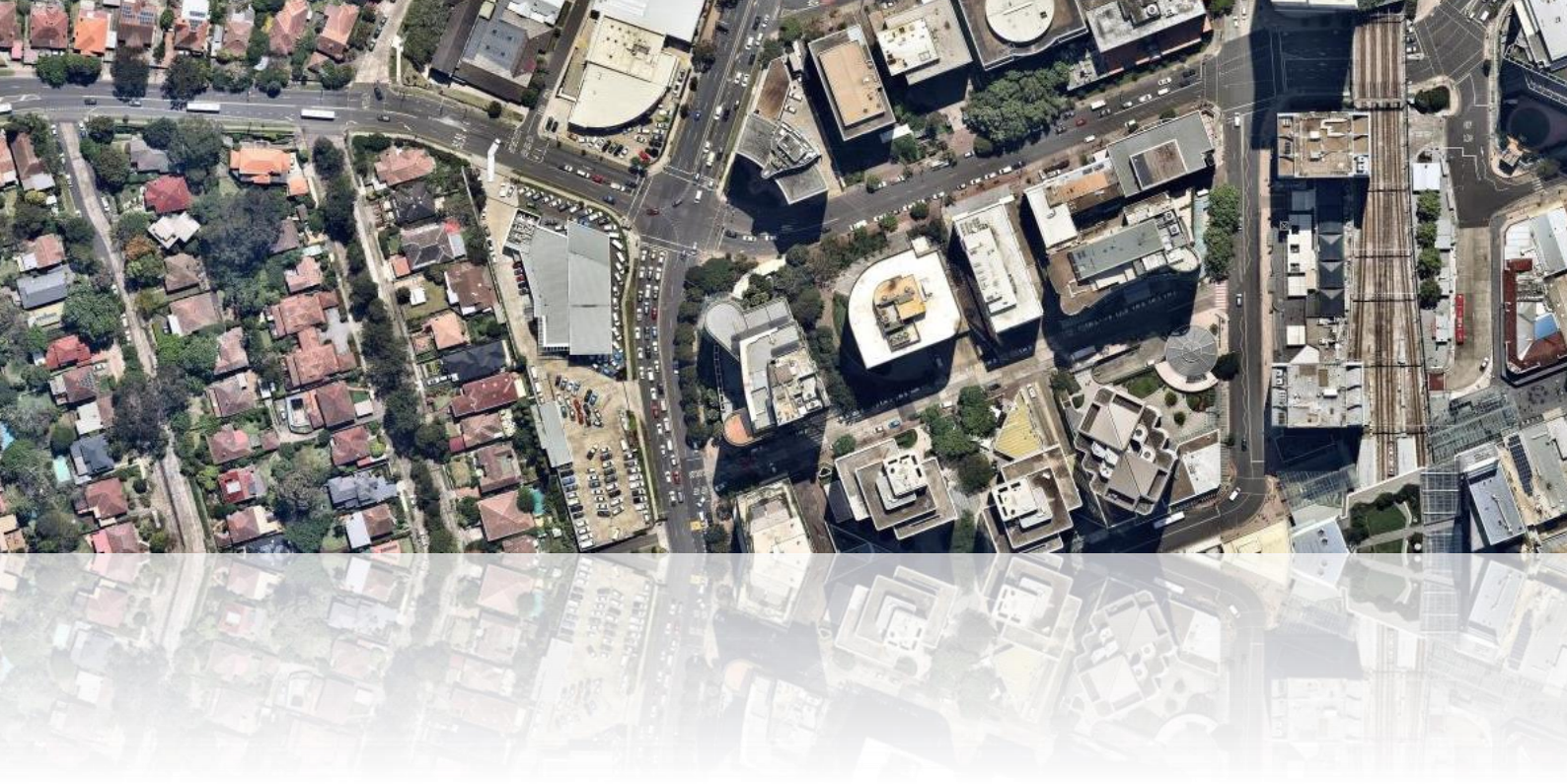




TRAFFIC AND PARKING IMPACT ASSESSMENT

MIXED USE PLANNING PROPOSAL

815 PACIFIC HIGHWAY, CHATSWOOD & 15 HELP STREET, CHATSWOOD



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Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

Development Type: **Mixed Use Planning Proposal**

Site Address: **815 Pacific Highway, Chatswood & 15 Help Street, Chatswood**

Prepared for: **A+ Design Group**

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TABLE OF CONTENTS

1	INTRODUCTION.....	1
1.1	Description and Scale of Development.....	1
1.2	State Environmental Planning Policy (Infrastructure) 2007.....	1
1.3	Site Description.....	2
1.3.1	Existing Conditions.....	2
1.4	Site Context.....	2
2	EXISTING TRAFFIC AND PARKING CONDITIONS	4
2.1	Road Network.....	4
2.2	Existing Traffic Environment	5
2.3	Existing Traffic Management	6
2.3.1	Intersection Performances.....	6
2.4	Public Transport.....	8
2.5	Future Infrastructure Changes	10
2.5.1	Western Harbour Tunnel and Beaches Link	10
2.5.2	Sydney Metro – Chatswood Station	11
3	PARKING ASSESSMENT	12
3.1	Parking Quantum.....	12
3.1.1	Council Parking Requirement.....	12
3.1.2	Retail and Café Parking Requirement	13
3.1.3	Commercial Office Parking Requirement.....	13
3.1.4	Recommended Parking Requirement.....	14
3.2	Disabled Parking.....	14
3.3	Servicing & Loading	15
3.4	Bicycle and Motorcycle Parking	15
3.5	Access Arrangements.....	16
3.6	Car Park Design & Compliance	16
4	TRAFFIC ASSESSMENT	19
4.1	Commercial Office Traffic Generation.....	19
4.1.1	RMS Surveys	19
4.1.2	Journey to Work Data.....	19
4.1.3	Existing Site Traffic	20
4.1.4	Additional Site Traffic	21
4.2	Traffic Distribution.....	23
4.3	Traffic Impact.....	23
4.4	Potential for Reduction in Traffic Generation	26
4.4.1	Cyclist/Active Transport Facilities	26
4.4.2	Journey to Work Data.....	26
4.4.3	Limitations to Car Parking Provision.....	26
5	CONCLUSION.....	27

1 INTRODUCTION

McLaren Traffic Engineering (MTE) was commissioned by *A+ Design Group* to prepare a Traffic and Parking Impact Assessment of the proposed Mixed Use Planning Proposal at 815 Pacific Highway, Chatswood & 15 Help Street, Chatswood. The relevant plans and schedule of areas are reproduced in **Annexure A** for reference.

1.1 Description and Scale of Development

The planning proposal includes the amalgamation of two sites (815 Pacific Highway & 15 Help Street) and the implementation of a mixed-use development comprising retail and commercial and basement car parking. The proposed building has a height up to 142m above ground level. The proposed mixed-use development consists of the following scale relevant to traffic and parking and assuming approval of the proposal, would comprise the following:

- Café – 312m² GFA;
- Retail – 2,755m² GFA;
- Commercial Office – 57,457m² GFA.

Vehicular access to the proposed development will be available through a single two-way driveway from McIntosh Street. The first basement level will provide some car parking, but also loading facilities for vehicles up to an 8.8m length Medium Rigid Vehicle (MRV). Multiple levels of basement parking are provided below basement 1.

1.2 State Environmental Planning Policy (Infrastructure) 2007

If the planning proposal were approved, the subsequent development application would qualify as a traffic generating development with relevant size and/or capacity under Clause 104 of the SEPP (Infrastructure) 2007. Formal referral to the Roads and Maritime Services (RMS) would be necessary.

1.3 Site Description

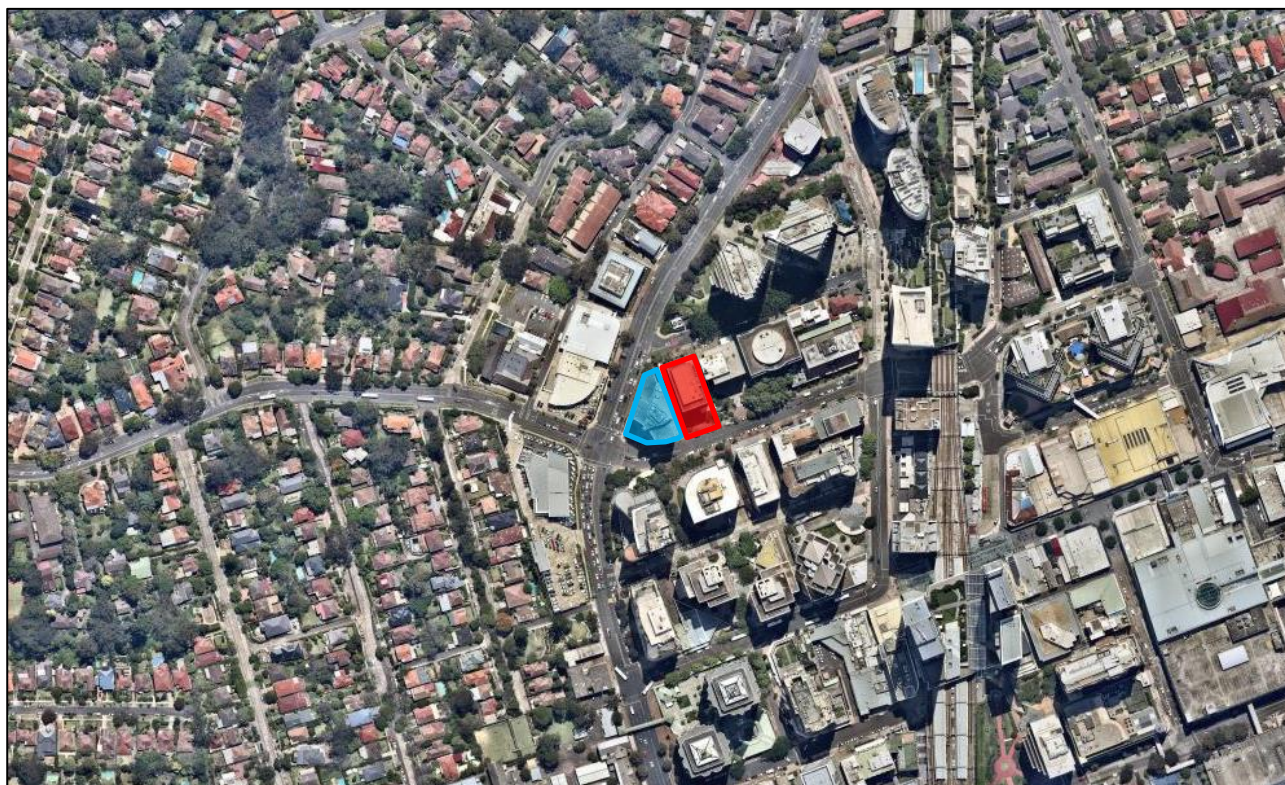
1.3.1 Existing Conditions

The subject site situated at 815 Pacific Highway, Chatswood has a total area of approximately 1,657m² and at 15 Help Street, which has an approximate site area of 1,863m². The site is surrounded by a mix of commercial, residential and retail developments with generally higher density developments along The Pacific Highway and lower density residential developments to the west of site. The site at 815 Pacific Highway fronts Pacific Highway on its western boundary and gains vehicular access via a two-way driveway on the southern boundary to Help Street. The site at 15 Help Street is bounded by commercial developments and gains vehicular access via a two-way driveway on the northern boundary to McIntosh Street.

The subject site is currently zoned B3 – Commercial Core Use under the *Willoughby LEP 2012 (WLEP)*.

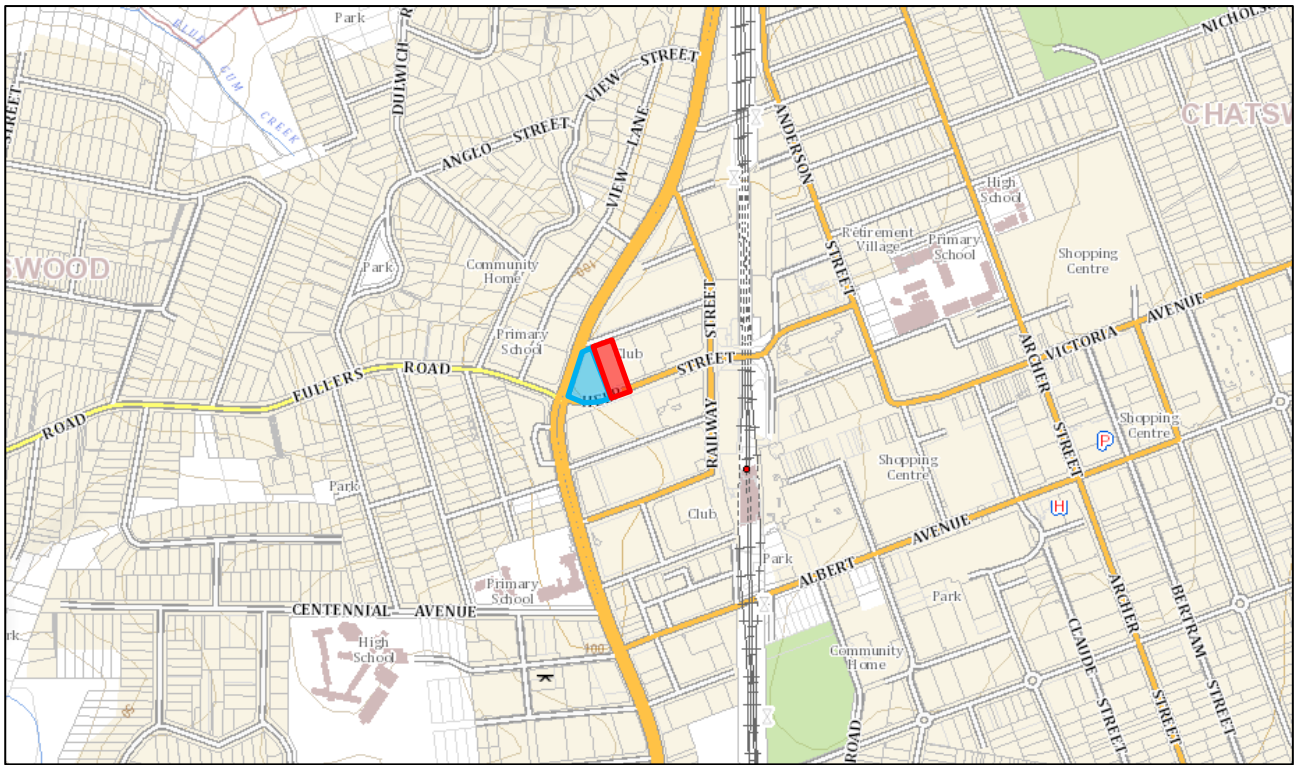
1.4 Site Context

The location of the site is shown on aerial imagery and on a map in **Figure 1** and **Figure 2** and respectively.



815 Pacific Highway 15 Help Street

FIGURE 1: SITE CONTEXT – AERIAL PHOTO



815 Pacific Highway
15 Help Street

FIGURE 2: SITE CONTEXT – STREET MAP

2 EXISTING TRAFFIC AND PARKING CONDITIONS

2.1 Road Network

The road network surrounding the site has the following characteristics within close proximity to the site:

Pacific Highway

- RMS Classified STATE Road (HW 10);
- Approximately 22m wide carriageway facilitating 3 lanes in each direction and a raised median, separating traffic flow directions with breaks in the median at intersections;
- Signposted 60km/h speed limit;
- Various parking zones including “*1-hour parking*” between 8:30am to 3pm Mon to Fri and 8:30am to 12:30pm Saturday, and “*No Stopping*” signs along the site’s frontage.

Help Street

- Unclassified LOCAL Road;
- Approximately 14m wide carriageway facilitating two traffic lanes in both directions;
- Signposted 40km/h speed limit due to high pedestrian activity area;
- Signposted “*No Parking*” on both sides of the street near the site frontage, time restricted parking to the east of the site frontage.

Victoria Avenue

- Unclassified LOCAL Road;
- Approximately 13m wide carriageway facilitating two traffic lanes in both directions;
- Signposted 40km/h speed limit due to high pedestrian activity area;
- Time restricted parking along both sides of the street between 9:30am-3:30pm on weekdays and 8:30am-4:30pm on Saturdays, unrestricted parking on Sundays.

Railway Street

- Unclassified LOCAL Road;
- Approximately 12m wide carriageway facilitating two traffic lanes in both directions;
- Signposted 40km/h speed limit due to high pedestrian activity area;
- Bus Zones along the eastern side of the street, time restricted parking along the west side of the street between 9:30am-6pm on weekdays and 8:30am-4:30pm on Saturdays, unrestricted parking on Sundays.

McIntosh Street

- Unclassified LOCAL Road;
- Approximately 10m wide carriageway facilitating one traffic lanes in each direction;
- Signposted 40km/h speed limit due to high pedestrian activity area;
- Signposted “*Motorbike Parking*” on both sides of the street near the site frontage, time restricted parking to the east of the site frontage.

2.2 Existing Traffic Environment

Traffic counts were completed at the following intersections of Chatswood during the AM and PM peak periods on Thursday 15th November 2018.

- Pacific Highway / Help Street / Fullers Road
- Pacific Highway / Victoria Avenue
- Help Street / Railway Street

Counts at the above intersections were undertaken prior to the involvement of the site at 15 Help Street, Chatswood. Once this site was included, MTE engaged traffic counts at the following intersections during both the AM and PM peak periods on Thursday 27th July 2019.

- Railway Street / McIntosh Street
- Pacific Highway / McIntosh Street
- Pacific Highway / Railway Street

It is evident from the traffic surveys that the AM peak hour within the surrounding road network occurs between 7:15am-8:45am, whilst the PM peak hour occurs at some hour period between 3:45pm-5:30pm. The peak hour differs slightly between intersections. As a conservative assessment, each intersections’ peak volumes are assumed to occur concurrently. Full results of the traffic surveys are reproduced in **Annexure B**.

2.3 Existing Traffic Management

- Signal controlled intersection of Pacific Highway / Help Street / Fullers Road;
- Signal controlled intersection of Help Street / Railway Street;
- Signal controlled intersection of Pacific Highway / Victoria Avenue;
- Signal controlled intersection of Pacific Highway / Railway Street;
- Signal controlled intersection of McIntosh Street / Railway Street.

2.3.1 Intersection Performances

Existing intersection performances have been assessed using SIDRA INTERSECTION 7.0, the results of this analysis are summarised in **Table 1**, with full results reproduced in **Annexure C**.

TABLE 1: EXISTING INTERSECTION PERFORMANCES (SIDRA INTERSECTION 8)

Intersection	Peak Hour	Degree of Saturation ⁽¹⁾	Average Delay ⁽²⁾ (sec/veh)	Level of Service ⁽³⁾⁽⁴⁾	Control Type	Worst Movement	95th Percentile Queue
EXISTING PERFORMANCE							
Pacific Hwy Site / Help St	AM	0.20	0.8 (Worst: 11.9)	NA (Worst: A)	Give Way	RT from Site Road	0.3 veh (2.2m) Help Street
	PM	0.30	0.7 (Worst: 15.1)	NA (Worst: B)		RT from Site Road	0.3 veh (2.1m) Site Road
Railway St / Help St	AM	0.67	16.4	B	Signals	RT from Help Street	4.5 veh (33m) Help Street
	PM	0.63	17.9	B		RT from Help Street	5.1 veh (36.7m) Help Street
Help St Site / McIntosh St	AM	0.03	2.7 (Worst: 5.7)	NA (Worst: A)	Give Way	RT from Site Road	0 veh (0.2m) Site Road
	PM	0.06	1.4 (Worst: 5.9)	NA (Worst: A)		RT from Site Road	0.1 veh (0.7m) Site Road
Railway St / McIntosh St	AM	0.22	2.1 (Worst: 7.9)	NA (Worst: A)	Give Way	RT from McIntosh Street	0.7 veh (4.8m) Railway Street
	PM	0.18	2.1 (Worst: 8.5)	NA (Worst: A)		RT from McIntosh Street	0.7 veh (4.6m) McIntosh Street
Pacific Hwy / Victoria Ave	AM	0.69	11.8	A	Give Way	RT from Victoria Avenue	14.8 veh (106m) Pacific Highway
	PM	0.65	9	A		RT from Victoria Avenue	9.7 veh (70.3m) Pacific Highway
Pacific Hwy / Fullers Rd	AM	0.93	35.2	C	Give Way	T from Help Street	12.3 veh (91.5m) Pacific Highway
	PM	0.83	21.7	B		RT from Fullers Road	13.1 veh (95.2m) Pacific Highway
Pacific Hwy / McIntosh St	AM	0.44	3.9 (Worst: 7.4)	N/A (Worst: A)	Give Way	LT from McIntosh Street	19.7 veh (140.9m) st: Pacific Highway
	PM	0.46	3.7 (Worst: 6.5)	N/A (Worst: A)		LT from st: Pacific Highway	1 veh (7.2m) st: Pacific Highway
Railway St / Pacific Hwy	AM	0.92	25.1	B	Signals	LT from Railway Street	31.2 veh (223.3m) st: Pacific Highway
	PM	0.81	12.3	A		LT from Railway Street	20.3 veh (144.2m)

NOTES:

(1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.

(2) The average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.

(3) The level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.

(4) 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.

As shown, the relevant intersections are currently performing at an acceptable level of efficiency, all with a level of service “A”, “B”, or “C” conditions in both the AM & PM peak hours. The level of service “A” performance is characterised by low approach delays and spare capacity.

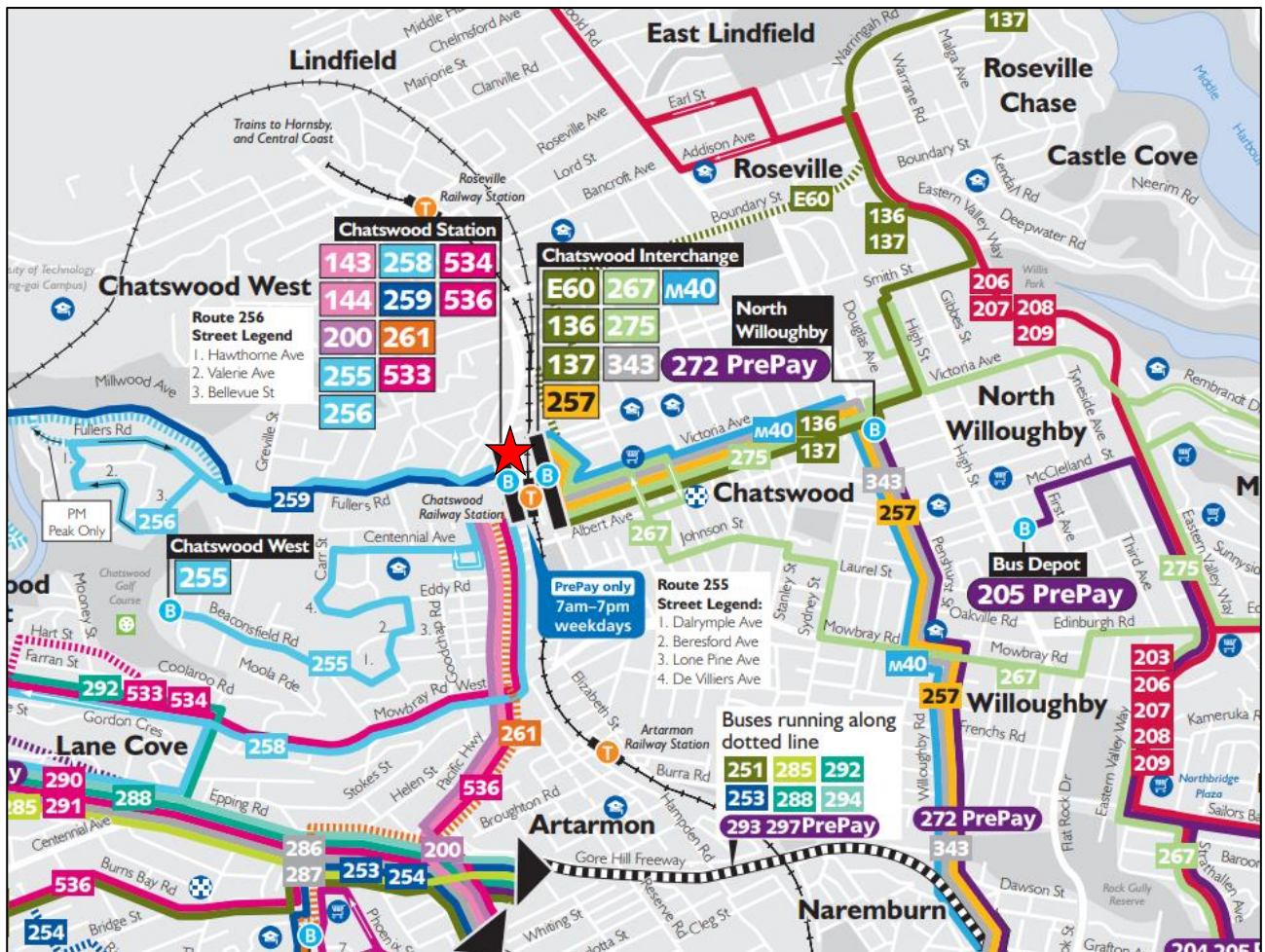
2.4 Public Transport

The subject site is very well located for public transport accessibility based on current provision. It is known that there will be new provisions in the medium term with the likely approval of the Chatswood Metro Station some 350m southeast of the site.

Existing public transport accessibility of the site is described by:

- 350m from Chatswood Railway Station with bi-directional servicing at 5 to 10-minute intervals throughout each weekday on the T1 Northern Line, connecting the site in all cardinal directions to commercial, recreation and residential uses and the wider public transport network.
- Within 400m walking distance to Chatswood Station Bus Stops with bi-directional services at 1 to 5-minute intervals throughout each weekday, connecting the site in all cardinal directions to commercial, recreation and residential uses and the wider public transport network. The site is serviced by bus routes 100, 143, 144, 200, 255, 256, 258, 259, 261, 530, 533, 534, 536, 558, 565, 627, 628, N90, N91, SL1, SL2, 21T1, 22T1, 23T1, and 24T1. A bus stops on the western side of the Pacific Highway is located approximately 120m to the south of the subject site and is therefore highly accessible for pedestrians.

The public transport network map within closer proximity to the site is shown in **Figure 3** below



★ Site Location

FIGURE 3: CONTEXT MAP – NETWORK MAP

2.5 Future Infrastructure Changes

2.5.1 Western Harbour Tunnel and Beaches Link

The NSW Government is currently in the planning process for the Western Harbour Tunnel and Beaches Link project which provides a link between the Western Suburbs and the Northern Beaches. The Western Harbour Tunnel is expected to create a western bypass of the Sydney CBD, and more specifically the Sydney Harbour Bridge and Tunnel. The proposal will change the way people move around Sydney and how people travel between the north Shore, CBD and western and southern Sydney. The indicative plan is shown in **Figure 4** below.

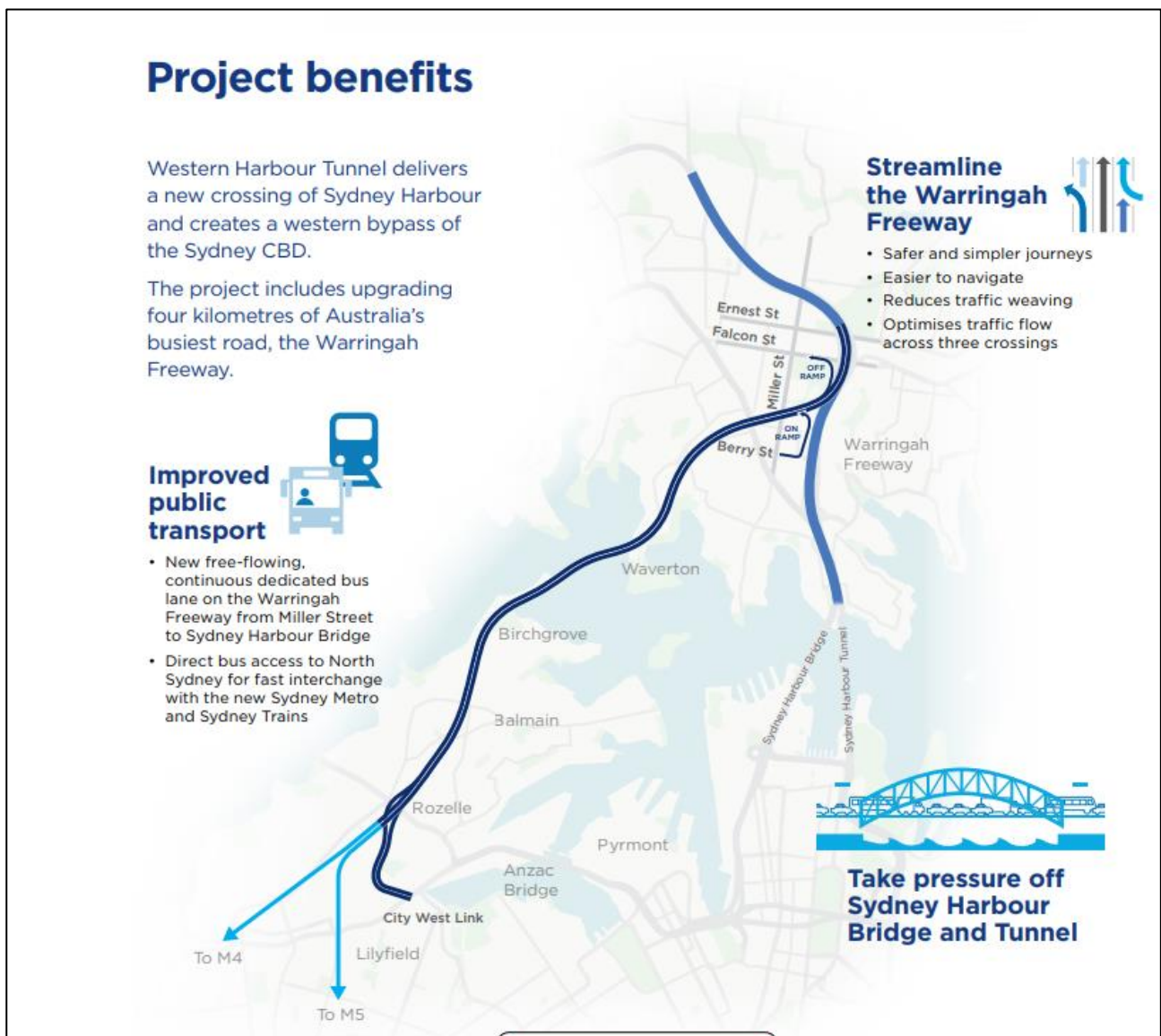


FIGURE 4: WESTERN HARBOUR TUNNEL

2.5.2 Sydney Metro – Chatswood Station

As part of the eight new metro railway stations currently under construction as part of the Sydney Metro Northwest (Stage 1, due to open in the first half of 2019), Chatswood will be provided with a Metro Train Station as part of the Stage 2 works (expected to open in 2024), connecting Chatswood to Sydenham. Further, the Sydney Metro will be connected between Sydenham to Bankstown. The project will provide Metro trains between Rouse Hill, Chatswood, North Sydney, Sydney CBD, Sydenham and Bankstown. The facility will provide high frequency trains to major employment, retail and education centres for the region. **Figure 5** below indicates the extent of the Sydney Metro project.



FIGURE 5: SYDNEY METRO NORTHWEST LINK

Chatswood Station will provide access to the Sydney Metro Line. The Sydney Metro line will reduce private car dependency for residents of the subject proposal and therefore will lessen the traffic impact on the surrounding road network, by providing alternative modes of travel for residents and visitors.

3 PARKING ASSESSMENT

The proposal will generate demand for parking by residents, visitors and staff. Estimation of the likely demand for parking at the site should be considered in conjunction with local planning policies, contextual effects such as regional location and individual land uses. For the purpose of the assessment, reference is made to the Willoughby Council Development Control Plan 2016 (WDCP).

3.1 Parking Quantum

3.1.1 Council Parking Requirement

Reference is made to Willoughby Council's DCP 2016: Chapter C.4 which outlines a range of controls that need to be considered in terms of design and implementation of off-street parking facilities to support developments within Willoughby Council area. The relevant parking requirements are outlined below:

Office/Business premises within Railway Precincts (besides those mentioned below) and Major Public Transport Corridors as defined in Clause C.4.1-E

1 / 110m²

Office/Business premises in Chatswood (Zone B3 under WLEP 2012) where access is only available from Pacific Highway, Albert Avenue, Victoria Avenue, Help or Railway Streets

1 / 200m²

Shops

1 space / 25m²

Restaurants (within railway precincts)

1 space per 25m² plus 1 space per 2 employees

Where the amount of parking required is not a whole number, the number of spaces required will be rounded down to the nearest whole number.

The existing site at 815 Pacific Highway has access only to Help Street. Therefore, the parking rate of 1 per 200m² applies to this site in the existing condition. However, the amalgamated site proposes access off McIntosh Street. It follows that the parking rate of 1 per 110m² applies to the proposed site by strict application of the WDCP. The above car parking requirements are summarised in **Table 2** below.

TABLE 2: COUNCIL DCP CAR PARKING REQUIREMENTS

Land Use	Type	Scale	Rate	Parking Provision
Commercial	Office	57,457m ²	1 per 110m ²	522.3
Retail	Specialty Shop	2,755m ²	1 per 25m ²	110.2
Restaurant	Cafe	312m ²	1 per 25m ² Plus 1 per 2 employees	12.5
		10		5
Total				650

As shown above, based upon Council's DCP car parking requirements the proposed development is required to provide a minimum of **650** total car parking spaces (522 commercial office car parking spaces and 128 retail car parking spaces).

3.1.2 Retail and Café Parking Requirement

The WDCP rate of 1 space per 25m² is intended for a standalone site and does not specify the location of the site in terms of zoning. The site is located within the Chatswood CBD area; thus, the retail portion of the development is intended to serve the existing locality only and no visitor parking should be provided. Visitors to the ground floor retail use are expected to already be in the surrounding area and will access the site on foot or via public transportation.

The cafés should therefore provide staff parking at a rate of 1 space per 2 employees. It is expected that there will be a maximum of 10 staff on site at any one time between the two sites, resulting in the requirement of five (5) spaces.

The retail tenancy should only provide staff parking at a rate of 1 space per 80m², which results in a parking requirement of 35 spaces between the two sites. Applying a rate of 1 space per 2 staff results in a maximum of 70 staff on site at any one time, which is considered more than reasonable to operate the retail premises.

Therefore, the retail and staff components of the proposal should only require a total of **40** spaces (5 for café, and 35 for retail).

3.1.3 Commercial Office Parking Requirement

The WDCP rate of 1 space per 200m² is intended for office/business premises in Chatswood where access is only available from Pacific Highway, Albert Avenue, Victoria Avenue, Help of Railway Streets. The intention of this reduced rate is to limit the volume of traffic traveling to / from sites within Chatswood CBD along the heavily trafficked roads referenced within the quoted parking requirement.

Although the proposed access point is off McIntosh Street, the site is bounded by Pacific Highway and Help Street. Vehicles traveling to the site must utilise the Pacific Highway, Help Street, Railway Street and/or Victoria Avenue within very close proximity to the site.

Chatswood is a “Strategic Centre” as defined by *A Plan for Growing Sydney*. Therefore, the intention of the Chatswood CBD is to provide jobs and transport (including the North West Rail Link) for the surrounding community. It would be beneficial to the objectives of the B3 zone and the strategic centre to promote public transportation usage and limit vehicular traffic to the site where possible, in accordance with the WDCP rate for office/business premises in the Chatswood CBD.

The site is very well serviced by public transportation being located within Chatswood CBD approximately 300m walking distance to Chatswood Train Station and 175m walking distance to the Chatswood Bus Interchange. With consideration for the above, it is appropriate to apply the parking requirement of 1 space per 200m², in accordance with the WDCP rate for office/business premises in Chatswood CBD.

3.1.4 Recommended Parking Requirement

Taking the above parking rate analysis into consideration, the recommended car parking requirement is outlined in **Table 3** below.

TABLE 3: RECOMMENDED CAR PARKING REQUIREMENT

Land Use	Type	Scale	Rate	Parking Provision
Commercial	Office	57,457m ²	1 per 200m ²	287.3
Retail	Specialty Shop	2,755m ²	1 per 80m ²	34.4
Restaurant	Cafe	10 staff	1 per 2 employees	5
Total				327

As shown above, the recommended car parking requirement is **327** spaces, including 287 commercial spaces, 35 retail staff spaces and 5 café staff retail spaces. The subject proposal shall provide sufficient parking to satisfy the above demand in accordance with the relevant Australian Standards.

3.2 Disabled Parking

The WDCP does not provide disabled parking rates for commercial and retail developments, thus the disabled parking requirement is taken from the Building Code of Australia (BCA). Based upon the BCA, office buildings require the provision of 1% of all parking to be provided as disabled parking, resulting in a requirement of four (4) disabled spaces.

Retail / shopping centre developments require the provision of 2% of all parking to be provided as disabled parking, resulting in a requirement of one (1) disabled space. Detailed design of the basement car parking for the provision of disabled car parking and parking provision will be undertaken during DA stage.

3.3 Servicing & Loading

Council's DCP stipulates the following servicing / loading requirements applicable to the subject development:

Off-street loading and unloading facilities must be provided for all businesses, commercial, office and retail as required by Council. The size and number of loading bays provided will be determined by Council having regard to the:

- *Frequency of deliveries;*
- *Size and bulk of goods;*
- *Size of trucks;*
- *Availability of on-street loading zones; and*
- *Intended use of the premises.*

Based upon the above requirements and the proposed scale, a loading bay sufficient for a Medium Rigid Vehicle (MRV) would be adequate to cater for the proposed development. The proposed plans include a ramp which provides satisfactory access for MRVs to the basement 1 level. The plans must provide a minimum 4.5m headroom clearance for MRVs, as specified by AS2890.2:2018. If this is not practical, an alternative loading vehicle can be specified at the DA stage. The detailed design of waste collection and delivery vehicle access into the basement will be undertaken at the DA stage, although, a typical swept path arrangement is provided in **Annexure D**.

3.4 Bicycle and Motorcycle Parking

Council outlines the following bicycle parking rates applicable to the proposed development.

Commercial Office

Lockers - 1 per 600m² GFA

Rail / Racks – 1 space per 2500m² GFA

Retail / Restaurant

Lockers - 1 per 450m² GFA

Rail / Racks – 1 space per 150m² GFA

The above bicycle parking rates are summarised in **Table 4** below.

TABLE 4: DCP BICYCLE PARKING REQUIREMENTS

Land Use	Type	Scale	Rate	Bicycle Spaces Required
Commercial	Lockers	57,457m ²	1 per 600m ²	96
	Rail / Racks		1 per 2,500m ²	23
Retail - Shops	Lockers	3,067m ²	1 per 450m ²	7
	Rail / Racks		1 per 150m ²	20
Total	Lockers	-	-	103
	Rail / Racks	-	-	43

As shown above, the site requires the provision of **103** bicycle lockers for staff, and **43** bicycle rails / racks for visitors based upon the requirements of Council's DCP which shall be provided to promote sustainable transport methods.

Bicycle facilities are to be provided in accordance with the 3 classes set out in the DCP (Class 1 for residents, Class 2 for staff/employees and Class 3 for visitors of any land use).

Willoughby Council also specifies a generic motorcycle parking rate for non-residential developments with a minimum provision of 1 space per 25 cars or part thereof. Applying this rate, and adopting a parking provision of 327, **13-14** motorcycle spaces are required for the proposed development.

As per the DCP requirements, showers and change facilities must be provided where more than three bicycle lockers are provided and must be located close to the secure bicycle parking.

3.5 Access Arrangements

The proposal represents the amalgamation of two (2) adjacent sites and the elimination of one (1) access point from Help Street. All access to the site will be provided via a two-way driveway ramp connecting the site to McIntosh Street along the northern frontage. The elimination of the Help Street access driveway will improve both pedestrian and vehicular traffic flows along the Help Street corridor, which is one of the highest trafficked roadways in the Chatswood CBD.

3.6 Car Park Design & Compliance

The car parking layout and access thereto, shall be assessed for compliance against the relevant sections of *AS2890.1:2004*, *AS2890.2:2002* and *AS2890.6:2009*. A detailed assessment of this requirement is expected to be undertaken during detailed DA stage. The design is to achieve the following:

- **Parking Aisle width:** Minimum 5.8 metres. However, it is recommended that all ramp widths which service visitor parking exceed the minimum width requirement to facilitate circulation.

- **Ramp widths:** A minimum of 6.1m width is to be provided along ramps between walls and a minimum of 5.5m between kerbs. Where heavy vehicle access is required (to the first basement level), the ramp should be wide enough to accommodate passing of the heavy vehicle and a B85.
- **Parking bays:** Minimum 2.4m width and a minimum 5.4m bay length for employees. A 300mm widening of the parking space is required for each side wall obstruction for car door opening effects. A minimum parking bay length of 5.4 metres is required, unless a small bay which can have the dimensions of 5.0 metres long by 2.3 metres wide
- **Access Driveway Widths:** A driveway servicing between 301-600 Class 1 and 1A (i.e. all day parkers including employees) parking spaces from a local road is a Category 3 driveway. Therefore, the driveway must be 10-12m in width, and separated exit and entry by 1-3m. Justification of a reduced access driveway width can be considered on a case by case basis based upon the traffic generation of the site.
- **Driveway Gradient for User Class 1 and 1A (i.e. all-day parkers including employees):** To satisfy sight lines to pedestrians on footpaths and to comply with under carriage clearance and overhang checks. In this regard driveways need to achieve acceptable performance as follows:
 - Provide a 2m by 2.5m sight triangle upon departure to the road boundary to provide adequate sight lines to pedestrians. See Figure 3.3 of AS2890.1-2004.
 - 1:20 for the first 6 metres from the property boundary however this can be reduced if necessary based on individual assessments.
 - **Headroom:** Minimum of 2.2m EXCEPT for the area directly above disabled parking spaces (including shared spaces) where minimum headroom of 2.5m is required in accordance with Clause 2.4 of AS2890.6:2009.
- **Driveway Gradient for Heavy Vehicles (including delivery and waste collection):** To satisfy sight lines to pedestrians on footpaths and to comply with under carriage clearance and overhang checks. In this regard driveways need to achieve acceptable performance as follows:
 - Provide a 2m by 2.5m sight triangle upon departure to the road boundary to provide adequate sight lines to pedestrians. See Figure 3.3 of AS2890.1-2004.
 - Max 1:6.5 gradient.
 - Maximum rate of change for heavy vehicles as below:
 - SRV: 1:12 (8.3%) in 4.0m of travel
 - MRV: 1:16 (6.25%) in 7.0m of travel
 - HRV: 1:16 (6.25%) in 10m of travel.
 - **Headroom:** Minimum of 3.5m for SRVs, and 4.5m for MRVs and HRVs.

- **Shared Zone:** A shared zone must be located adjacent to the parking bay on either side. A Shared zone must also be included at the front and rear of the parking bay. It should be noted that the aisle can be deemed a shared zone for the front or rear of the parking bay. Where a shared zone separates two parking bays or separates the disabled space and a wall, a Bollard is to be installed in accordance to *Figure 2.3* of *AS2890.6 2009*.
- **Disabled Space:** Non-residential disabled car parking spaces are to be designed in accordance with *AS2890.6:2009*, requiring a 2.4m wide spaces by 5.4m in length with adjacent shared space of the same dimensions.

The detailed design and review of the basement carpark is subject to further DA assessment.

4 TRAFFIC ASSESSMENT

The impact of the expected traffic generation levels associated with the subject proposal is discussed in the following sub-sections.

4.1 Commercial Office Traffic Generation

Reference is made to the RMS Guide Technical Direction (TDT2013/04a) which provides the following average generation rates for commercial office buildings.

AM Peak – 1.6 per 100m² GFA

PM Peak – 1.2 per 100m² GFA

4.1.1 RMS Surveys

These rates are based off surveys from ten (10) office buildings in the Sydney Metropolitan Area which were completed in 2010. One of the surveyed sites is an office building located at 9 Help Street, Chatswood, which is approximately 75m walking distance from the subject site. It is reasonable to assume that the subject proposal will operate similarly to the surveyed site at 9 Help Street, Chatswood. The 2010 peak hour traffic generation data for the site is:

AM peak hour - 1.03 trips / 100m²;

PM peak hour – 0.84 trips / 100m².

4.1.2 Journey to Work Data

The above rates are based on surveys from 2010. Reference is made to Journey to Work Data, which is summarised in **Table 5**, and shown in full in **Annexure E**.

TABLE 5: JOURNEY TO WORK DATA – CHATSWOOD CBD

Mode of Transport	2011	2016
Car as driver	51.21%	43.67%
Train	29.39%	33.83%
Bus	5.48%	6.35%
Car as passenger	4.26%	3.38%

The data between 2011 and 2016 shows a decline in reliance on private vehicles. The percentage of employees who drive to work in the Chatswood CBD area dropped from 51.21% in 2011 to 43.67% in 2016. Assuming a linear relationship between trip generation rates and car driver percentage, the following traffic generation rates apply based on the 2016 JTW data.

AM peak hour – 0.88 trips / 100m²;

PM peak hour – 0.72 trips / 100m².

There were no major public transportation projects completed between 2011 and 2016, thus it is reasonable to assume that the decline in private vehicle usage is a natural trend and

will likely continue in the future. The addition of the Sydney Metro service to Chatswood Station in 2024 is likely to further reduce reliance on private vehicles. The rates above can therefore be considered conservative traffic generation rates in the future.

4.1.3 Existing Site Traffic

The existing retail use on the site would be expected to generate traffic according to the RMS Guide Technical Direction (TDT2013/04a), whilst the existing commercial office use would be expected to generate traffic according to the rates calculated in **Section 4.1.2**.

Retail:

Shops - 5.6 trips per 100sqm of GFA in the Friday PM peak hour

Commercial:

AM Peak – 0.88 per 100m² GFA

PM Peak – 0.72 per 100m² GFA

The existing traffic generation of each existing site is summarised in **Table 6**.

TABLE 6: EXISTING TRAFFIC GENERATION

Land Use	Scale	Rate ⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾⁽⁵⁾ (Trips per 100m²)		Generated Trips	
		AM	PM	AM	PM
815 Pacific Highway					
Office	6,367.4m²	0.88	0.72	-56 (45 in, 11 out)	-45 (9 in, 36 out)
Retail	400m²	5.6	5.6	-22 (11 in, 11 out)	-22 (11 in, 11 out)
Subtotal				-78 (56 in, 22 out)	-67 (20 in, 47 out)
15 Help Street					
Office	5,334m²	0.88	0.72	-47 (38 in, 9 out)	-39 (8 in, 31 out)
Retail	73m²	5.6	5.6	-4 (2 in, 2 out)	-4 (2 in, 2 out)
Subtotal				-51 (40 in, 11 out)	-43 (10 in, 33 out)
Total				-129 (96 in, 33 out)	-110 (30 in, 80 out)

Notes:

- (1) AM Retail traffic generation is conservatively assumed to be 50% of the PM generation rate.
- (2) PM Café traffic generation is conservatively assumed to be 50% of the AM generation rate
- (3) Residential assumes 20% inbound & 80% outbound during AM peak for commercial: Vice versa for PM.
- (4) Commercial assumes 90% inbound & 10% outbound during AM peak for commercial: Vice versa for PM.
- (5) Retail traffic split of 50% inbound and outbound during the AM and PM period.

As shown, the existing buildings on site generate a total of 129 trips and 110 trips in the AM and PM peak hours respectively. This traffic has been discounted from the proposed traffic generation to estimate the additional trips along the road network for the proposal.

4.1.4 Additional Site Traffic

The estimated traffic generation level for the proposed mixed-use development, based upon the RMS Guide Technical Direction (TDT2013/04a) and the calculated commercial rates is shown below:

Commercial

AM Peak – 0.88 per 100m² GFA

PM Peak – 0.72 per 100m² GFA

Retail

Shops - 5.6 trips per 100sqm of GFA in the Friday PM peak hour

Restaurant

Café – 5 trips per 100sqm of GFA

A summary of the traffic generation is shown in **Table 7** below.

TABLE 7: ESTIMATED TRAFFIC GENERATION

Land Use	Scale	Rate ⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾⁽⁵⁾ (Trips per 100m²)		Generated Trips	
		AM	PM	AM	PM
Proposed Traffic Generation					
Office	57,457m²	0.88	0.72	+506 (455 in, 51 out)	+414 (41 in, 373 out)
Retail	2,755m²	5.6	5.6	+154 (77 in, 77 out)	+154 (77 in, 77 out)
Café	312m²	5	2.5	+16 (8 in, 8 out)	+8 (4 in, 4 out)
Subtotal				+676 (540 in, 136 out)	+576 (122 in, 454 out)
Existing Traffic Generation					
Office 815 Pacific Hwy	5,334m²	0.88	0.72	-47 (42 in, 5 out)	-38 (4 in, 34 out)
Office 15 Help Street	6,367.4m²	0.88	0.72	-56 (50 in, 6 out)	-46 (5 in, 41 out)
Retail 815 Pacific Hwy	400m²	5.6	5.6	-22 (11 in, 11 out)	-22 (11 in, 11 out)
Retail 15 Help Street	73m²	5.6	5.6	-4 (2 in, 2 out)	-4 (2 in, 2 out)
Subtotal				-129 (105 in, 24 out)	-108 (21 in, 87 out)
Total				+547 (435 in, 112 out)	+468 (101 in, 367 out)

Notes:

- (1) AM Retail traffic generation is conservatively assumed to be 50% of the PM generation rate.
- (2) PM Café traffic generation is conservatively assumed to be 50% of the AM generation rate
- (3) Residential assumes 20% inbound & 80% outbound during AM peak for commercial: Vice versa for PM.
- (4) Commercial assumes 90% inbound & 10% outbound during AM peak for commercial: Vice versa for PM.
- (5) Retail traffic split of 50% inbound and outbound during the AM and PM period.

As shown above the proposed planning proposal is expected to generate 676 vehicle trips (540 in, 136 out) during the AM peak hour period and 576 vehicle trips (122 in, 454 out) in the PM peak hour period. Discounting the existing traffic generation from the existing development results in an additional **547** trips (435 in, 112 out) during the AM and **468** vehicle trips (101 in, 367 out) in the PM peak hour period.

It is noted that the standard café and retail traffic generation rates have been applied to the subject development. These rates include both staff and visitor vehicular traffic. The café and retail sites should not be provided with any dedicated visitor car parking spaces,

therefore the traffic generation rates used in **Table 7** are expected to be overestimated, resulting in a conservative traffic assessment.

4.2 Traffic Distribution

Both site accesses are serviced by two-way driveways allowing both right turns and left turns. Traffic will arrive to the site from the north/south along the Pacific Highway, from the west along Fullers Road, and from the east along Help Street/McIntosh Street. The assignment of the additional traffic generated by the site will follow that of the existing trip percentage splits taken from the existing traffic surveys. A diagram showing the traffic distribution throughout the surrounding road network is provided in **Annexure F**.

4.3 Traffic Impact

The traffic generation outlined in **Section 4.1** and **4.2** above has been added to the existing traffic volumes recorded. SIDRA INTERSECTION 8 was used to assess the intersections performance. The purpose of this assessment is to compare the existing intersection operations to the future scenario under the increased traffic load. The results of the existing SIDRA assessment are shown in **Table 8**, whilst the future SIDRA results (post development) are shown in **Table 9**. Full results of the future SIDRA analysis for the proposed access arrangement is reproduced in **Annexure G**:

TABLE 8: EXISTING INTERSECTION PERFORMANCES (SIDRA INTERSECTION 8)

Intersection	Peak Hour	Degree of Saturation ⁽¹⁾	Average Delay ⁽²⁾ (sec/veh)	Level of Service ⁽³⁾⁽⁴⁾	Control Type	Worst Movement	95th Percentile Queue
EXISTING PERFORMANCE							
Pacific Hwy Site / Help St	AM	0.20	0.8 (Worst: 11.9)	NA (Worst: A)	Give Way	RT from Site Road	0.3 veh (2.2m) Help Street
	PM	0.30	0.7 (Worst: 15.1)	NA (Worst: B)		RT from Site Road	0.3 veh (2.1m) Site Road
Railway St / Help St	AM	0.50	27.6	B	Signals	RT from Help Street	8.6 veh (61m) Help Street
	PM	0.55	27.5	B		RT from Help Street	10 veh (72.3m) Help Street
Help St Site / McIntosh St	AM	0.03	2.7 (Worst: 5.7)	NA (Worst: A)	Give Way	RT from Site Road	0 veh (0.2m) Site Road
	PM	0.06	1.5 (Worst: 5.9)	NA (Worst: A)		RT from Site Road	0.1 veh (0.7m) Site Road
Railway St / McIntosh St	AM	0.22	2.1 (Worst: 7.9)	NA (Worst: A)	Give Way	RT from McIntosh Street	0.7 veh (4.8m) Railway Street
	PM	0.18	2.1 (Worst: 8.5)	NA (Worst: A)		RT from McIntosh Street	0.7 veh (4.6m) McIntosh Street
Pacific Hwy / Victoria Ave	AM	0.69	11.8	A	Signals	RT from Victoria Avenue	14.8 veh (106m) Pacific Highway
	PM	0.65	9	A		RT from Victoria Avenue	9.7 veh (70.3m) Pacific Highway
Pacific Hwy / Fullers Rd	AM	0.93	34.6	C	Signals	T from Help Street	12.3 veh (91.5m) Pacific Highway
	PM	0.83	21.7	B		RT from Fullers Road	13.1 veh (95.2m) Pacific Highway
Pacific Hwy / McIntosh St	AM	0.44	3.9 (Worst: 7.5)	N/A (Worst: A)	Give Way	LT from McIntosh Street	20.7 veh (148.3m) st: Pacific Highway
	PM	0.46	3.7 (Worst: 6.5)	N/A (Worst: A)		LT from st: Pacific Highway	1 veh (7.2m) st: Pacific Highway
Railway St / Pacific Hwy	AM	0.83	12.6	A	Signals	LT from Railway Street	22.5 veh (160.8m) st: Pacific Highway
	PM	0.81	12.3	A		LT from Railway Street	20.3 veh (144.2m)

Notes: See notes for **Table 1**

TABLE 9: FUTURE INTERSECTION PERFORMANCES (SIDRA INTERSECTION 8)

Intersection	Peak Hour	Degree of Saturation ⁽¹⁾	Average Delay ⁽²⁾ (sec/veh)	Level of Service ⁽³⁾⁽⁴⁾	Control Type	Worst Movement	95th Percentile Queue
FUTURE PERFORMANCE – Proposed Arrangements (Post Development)							
Railway St / Help St	AM	0.83	34.4	C	Signals	RT from Railway Street	11.4 veh (81.2m) Help Street
	PM	0.75	28	B		RT from Help Street	10.1 veh (72.9m) Help Street
Help St Site / McIntosh St	AM	0.28	5.4 (Worst: 7)	NA (Worst: A)	Give Way	RT from Site Road	0.5 veh (3.4m) Site Road
	PM	0.40	5.1 (Worst: 6.5)	NA (Worst: A)		RT from Site Road	1.9 veh (13.4m) Site Road
Railway St / McIntosh St	AM	0.39	4.8 (Worst: 11)	NA (Worst: A)	Give Way	RT from McIntosh Street	3 veh (21.4m) Railway Street
	PM	0.47	4.3 (Worst: 10.7)	NA (Worst: A)		RT from McIntosh Street	3.1 veh (21.4m) McIntosh Street
Pacific Hwy / Victoria Ave	AM	0.90	14.4	A	Signals	RT from Pacific Highway	15.1 veh (108.3m) Pacific Highway Railway Street
	PM	0.70	8.6	A		RT from Victoria Avenue	10.3 veh (74.4m) Pacific Highway McIntosh Street
Pacific Hwy / Fullers Rd	AM	0.97	38.4	C	Signals	T from Help Street	13 veh (96.8m) Pacific Highway
	PM	0.79	22.8	B		RT from Fullers Road	13.7 veh (99.8m) Pacific Highway
Pacific Hwy / McIntosh St	AM	0.44	4 (Worst: 7.2)	N/A (Worst: A)	Give Way	LT from McIntosh Street	22.3 veh (160m) st: Pacific Highway
	PM	0.53	3.9 (Worst: 7.6)	N/A (Worst: A)		LT from McIntosh Street	2.1 veh (14.9m) st: Pacific Highway
Railway St / Pacific Hwy	AM	0.89	19.4	B	Signals	LT from Railway Street	29.8 veh (213.1m) st: Pacific Highway
	PM	0.84	15	B		LT from Railway Street	21.4 veh (152.6m) st: Pacific Highway

Notes: See notes for **Table 1**

As shown in **Table 8** and **Table 9** above, the nearby intersections remain relatively unaltered under the future scenario with the additional traffic generated by the proposal. The existing driveway for 815 Pacific highway has been eliminated from the future analysis. The existing LoS has generally been retained with the intersections experiencing minimal delays and spare capacity. All changes to intersection LoS are acceptable and are summarised in **Table 10**.

TABLE 10: CHANGES TO LEVEL OF SERVICE

Intersection	Peak Hour	Existing Level of Service / Avg. Delay	Future Level of Service / Avg. Delay
Railway Street / Help Street	AM	B / 27.6 sec	C / 34.4 sec
Railway Street / Pacific Highway	AM	A / 12.6 sec	B / 19.4 sec
	PM	A / 12.3 sec	B / 15 sec

The addition of the development traffic results in only moderately low increases to the average delay at the nearby intersections. Changes in LoS from “A” to “B” and “B” to “C” are acceptable changes, therefore, the proposal does not adversely impact the surrounding road network. The proposal is supported in terms of its potential traffic impacts from a traffic flow efficiency and a road safety perspective.

4.4 Potential for Reduction in Traffic Generation

Although the traffic generated by the proposal has not been found to have an adverse impact on the surrounding road network, it is beneficial to outline potential traffic generation reduction strategies which could be employed at the DA stage. These strategies include, but are not limited to, the discussion within the following subsections.

4.4.1 Cyclist/Active Transport Facilities

Cyclists often cite safety, lack of facilities and lack of familiarity with an area as reasons to avoid commuting via bicycle. The subsequent design could include a safe and convenient access to the bike storage area, which is well signposted. End of trip facilities may include bike servicing tools, towel service, spacious change facilities, lockers, bubblers and laundry services to encourage alternative transport to the site. An increase in cyclist / active transport would theoretically reduce the traffic generation of the proposal.

4.4.2 Journey to Work Data

In **Table 5**, MTE demonstrated that “car as driver” commuters have decreased between the 2011 and 2016 census data. A subsequent DA, if undertaken after the 2021 census, could investigate how this trend has continued after 2016. Should the reduction in “car as driver” commuter mode of transport continue, the expected traffic generation would likely be less than what is estimated in **Table 7**.

4.4.3 Limitations to Car Parking Provision

Although the Council’s DCP outlines a rate of 1 space per 110m² for this site, and 1 space per 200m² for sites with direct access to particular streets within the Chatswood CBD, Willoughby Council has the ability to support a lesser car parking provision should they wish to further reduce the traffic generation potential of the subject proposal.

5 CONCLUSION

In view of the foregoing, the planning proposal for a mixed-use development (as depicted in **Annexure A**) is supportable in terms of its traffic and parking impacts subject to the provision of the required compliant parking, and further DA assessment of the traffic impact on the surrounding road network. The following outcomes of this traffic impact assessment are relevant to note:

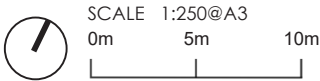
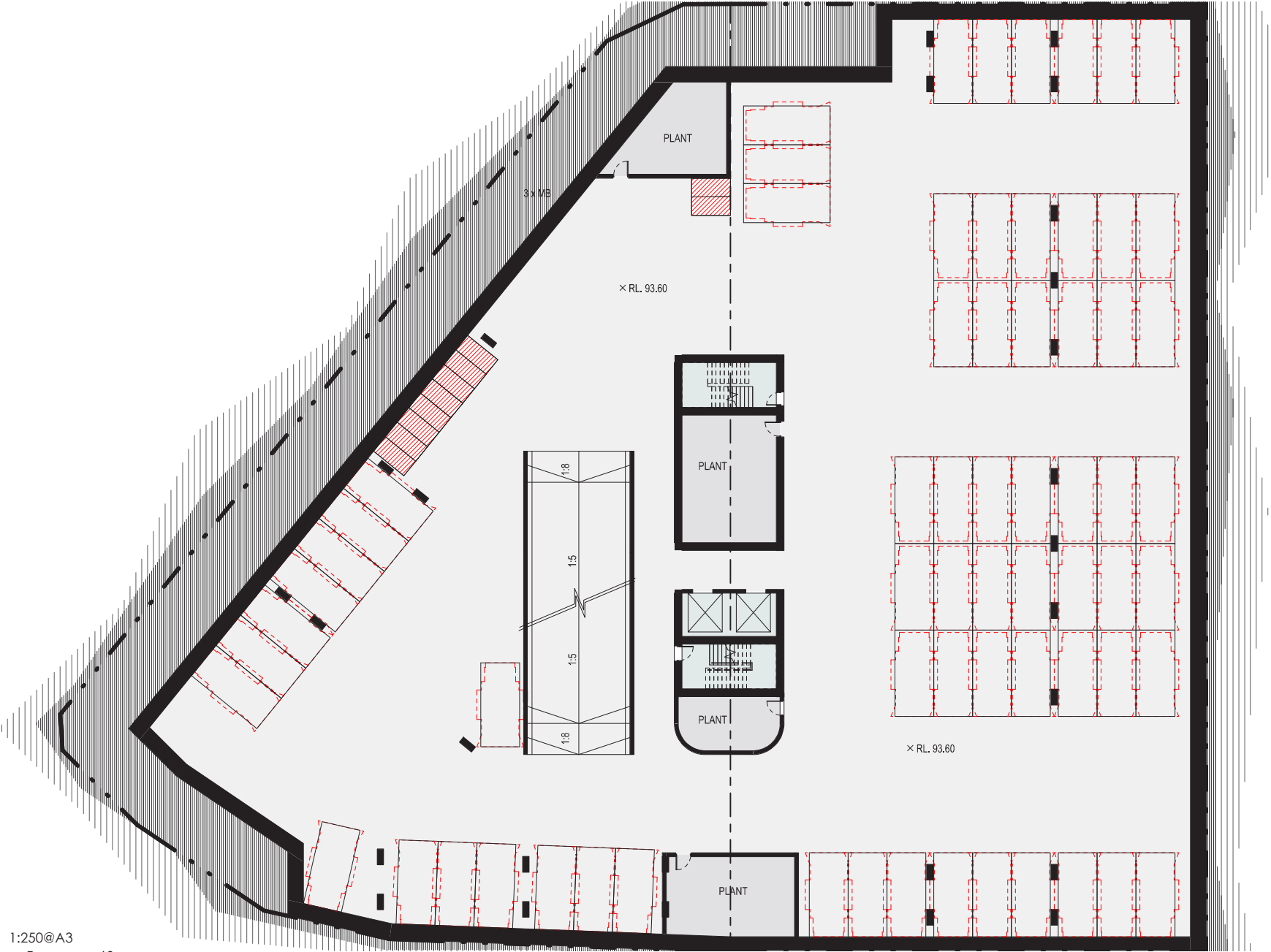
- The proposed development would require **327** car parking spaces for the development based upon Council's DCP and a reasonable assessment of retail / commercial parking demand within the Chatswood CBD.
- A subsequent compliant development application would require approximately **103** secure bicycle lockers and **43** visitor bicycle rails / racks according to Council DCP rates.
- **13-14** motorcycle spaces are required as a part of the development.
- A subsequent compliant development application would generate a net maximum of **547** movements in the AM (435 in, 112 out) peak hour and **468** trips in the PM (101 in, 367 out) peak hour.
- The proposed development at 815 Pacific Highway and 15 Help Street requires the provision of multiple 8.8m length Medium Rigid Vehicle loading bays for waste collection within the basement.
- Council and the BCA requires that a minimum of 2% the retail spaces and 1% of the commercial spaces must be disabled spaces. Given the scale of the development, a total of five (5) disabled parking spaces are required, four (4) for the commercial portion, and (1) for the retail portion. Disabled spaces are to be designed in accordance with AS2890.6.
- The car park layout is to be designed in accordance with AS2890.1:2004, AS2890.6:2009 and AS2890.2002. The detailed design of the basement car park will be reviewed during the development application stage.

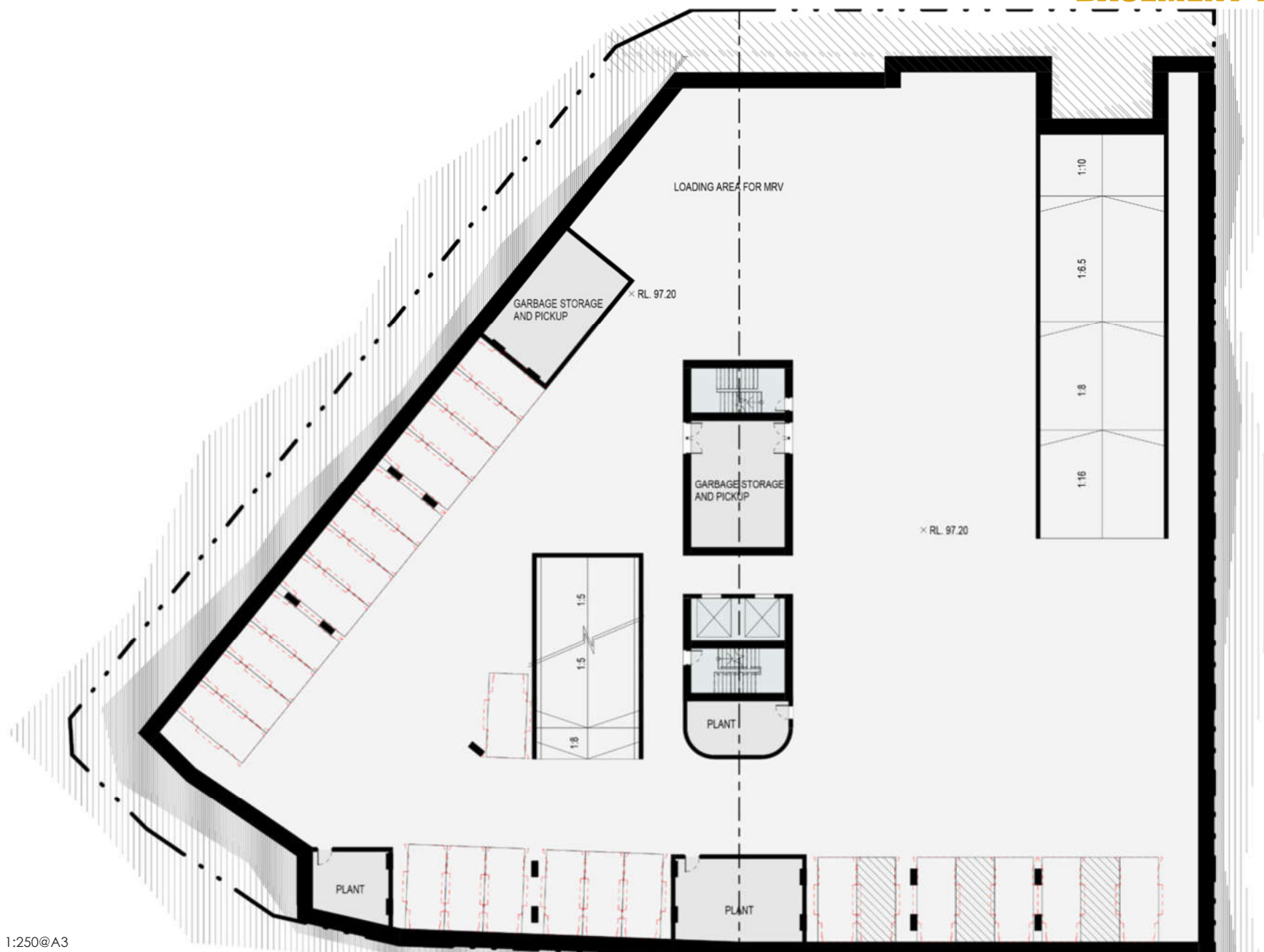


ANNEXURE A: PROPOSED PLANS

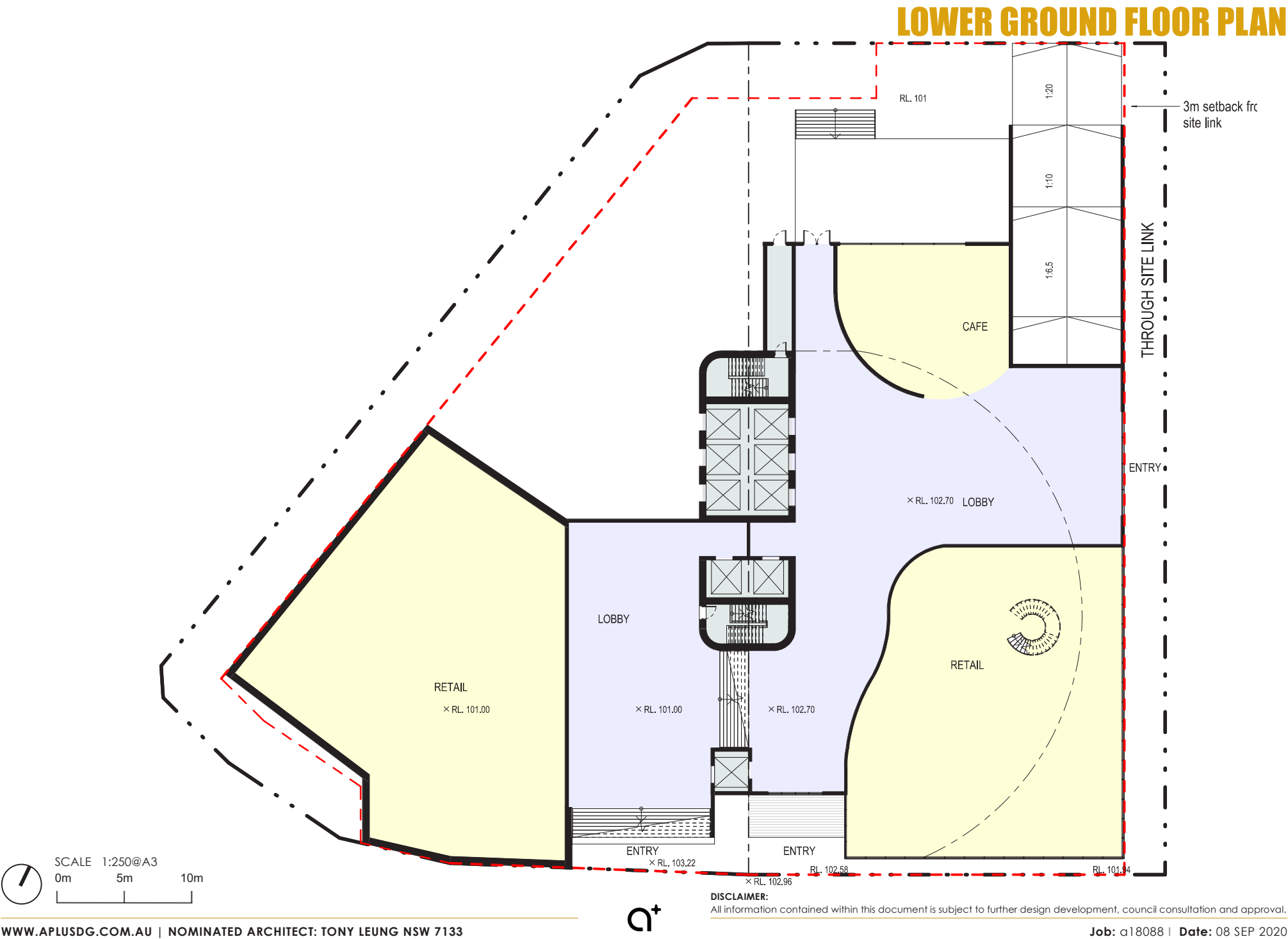
(5 SHEETS)

TYPICAL BASEMENT PLAN





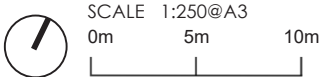
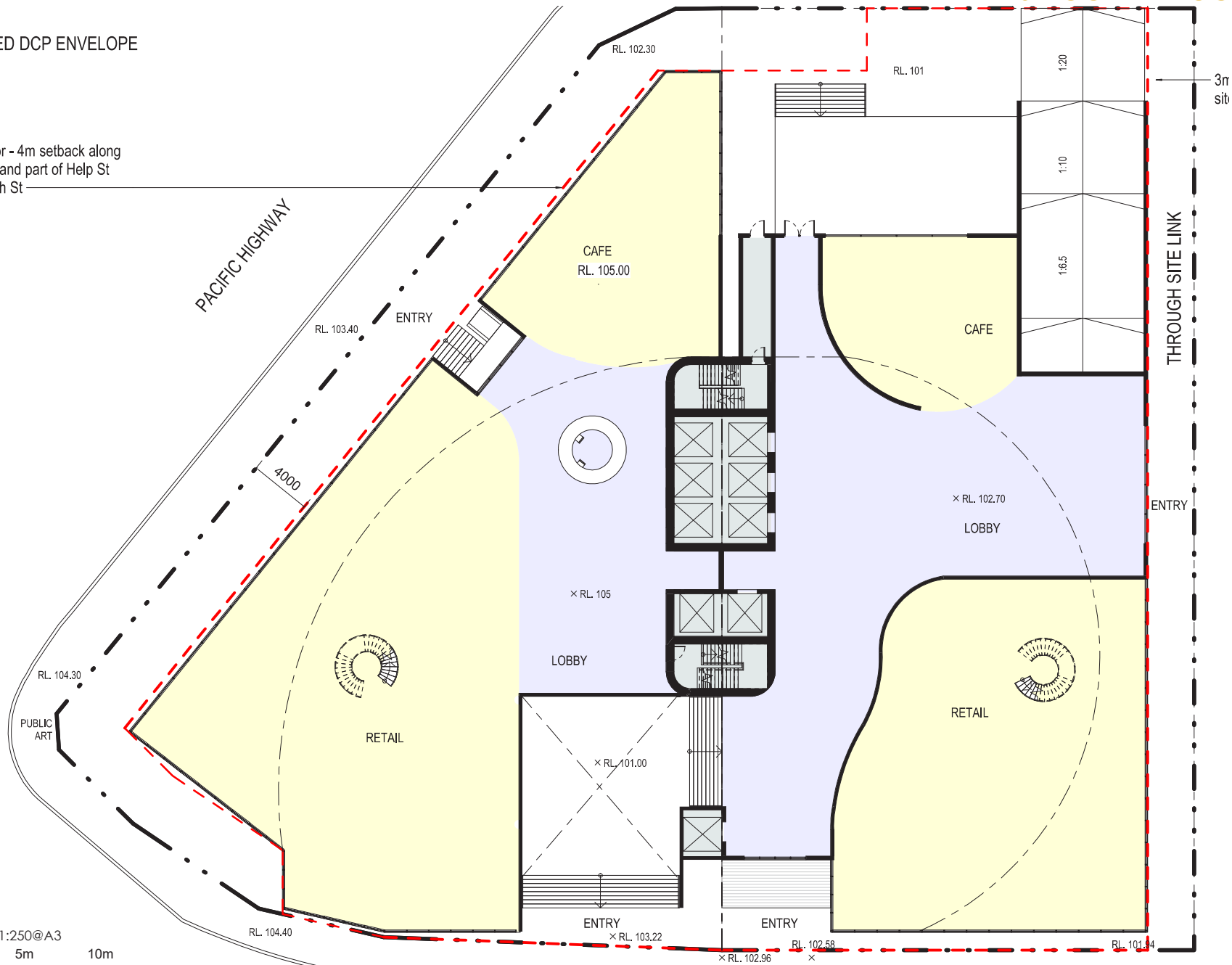
All information contained within this document is subject to further design development, council consultation and approval.



GROUND FLOOR PLAN

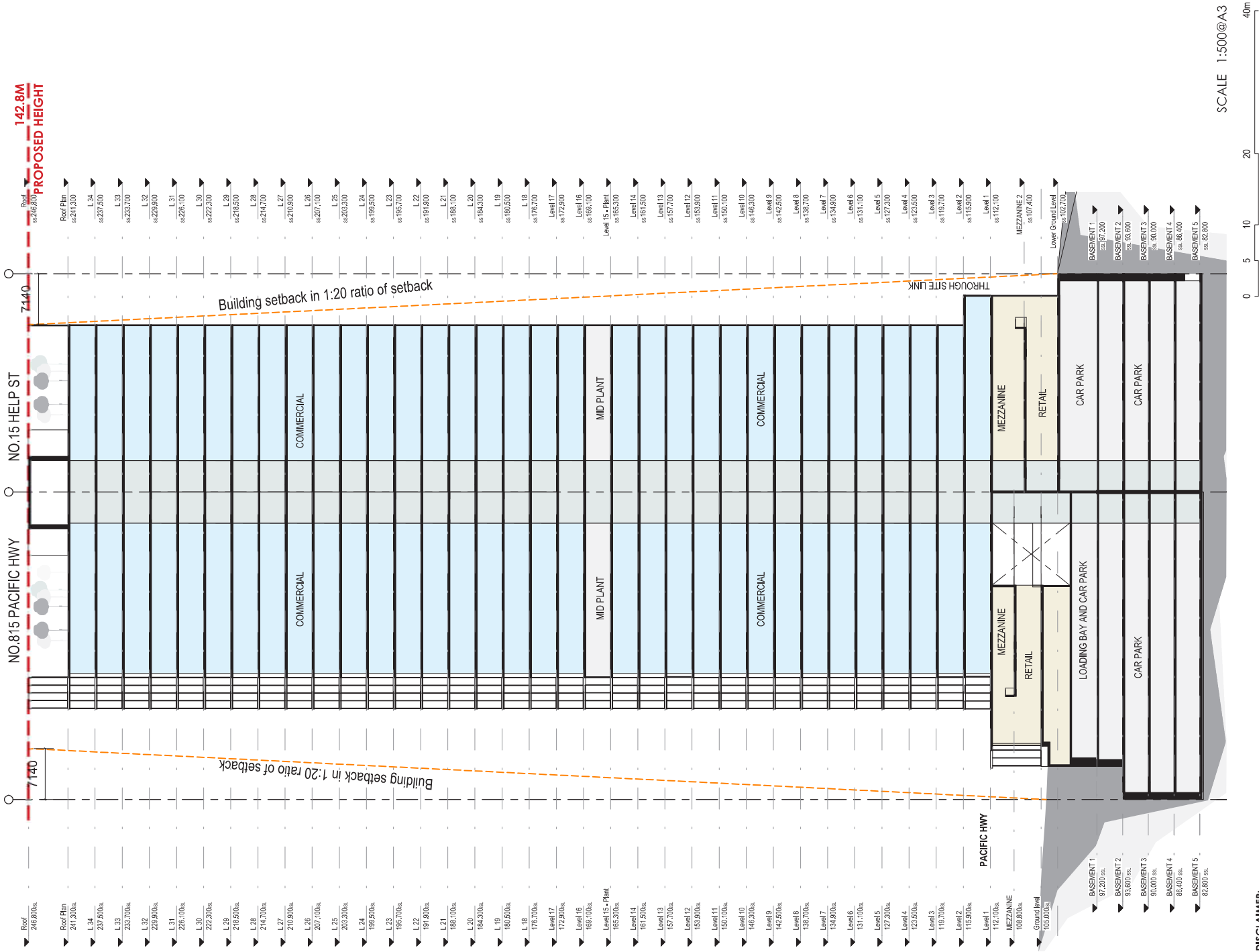
PROPOSED DCP ENVELOPE

Ground Floor - 4m setback along Pacific Hwy and part of Help St and McIntosh St



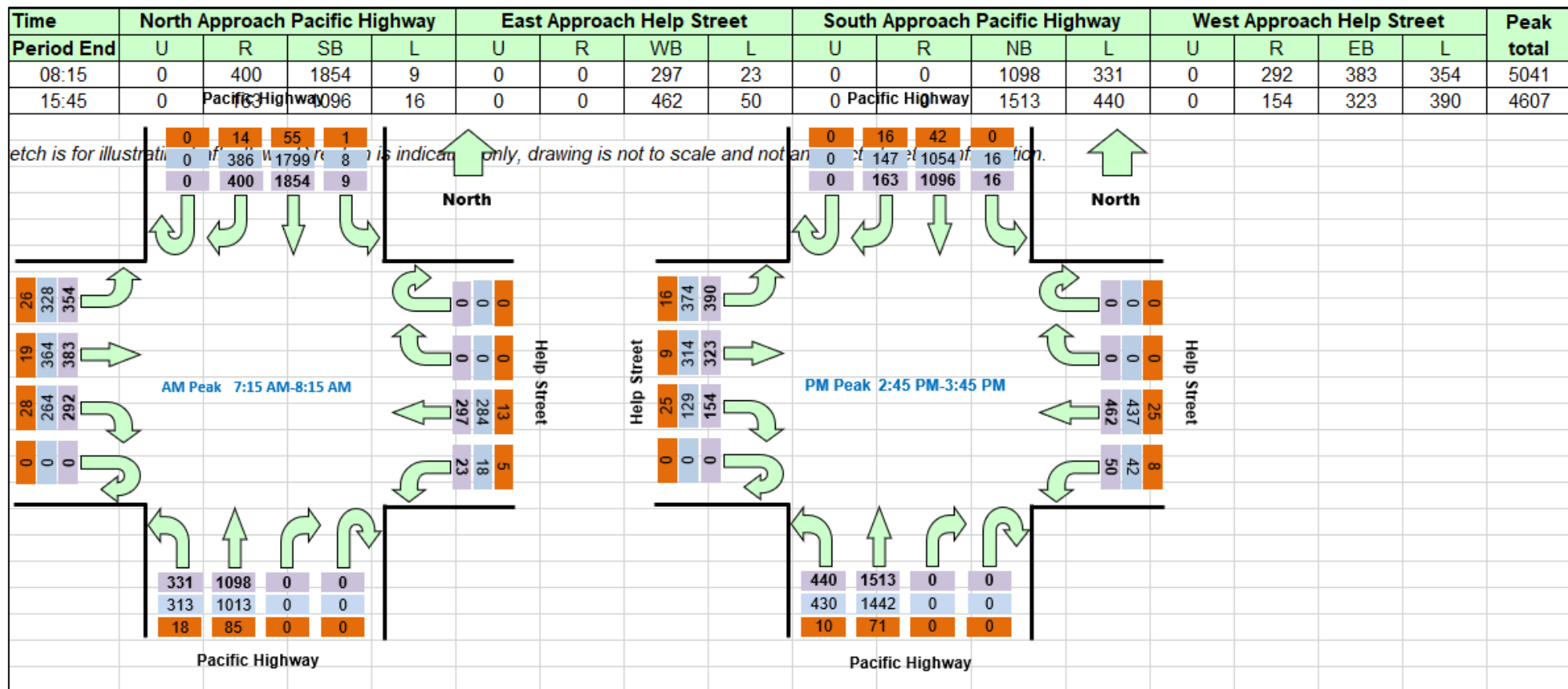
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SECTION



ANNEXURE B: TRAFFIC SURVEYS

(SHEET 1 OF 6)



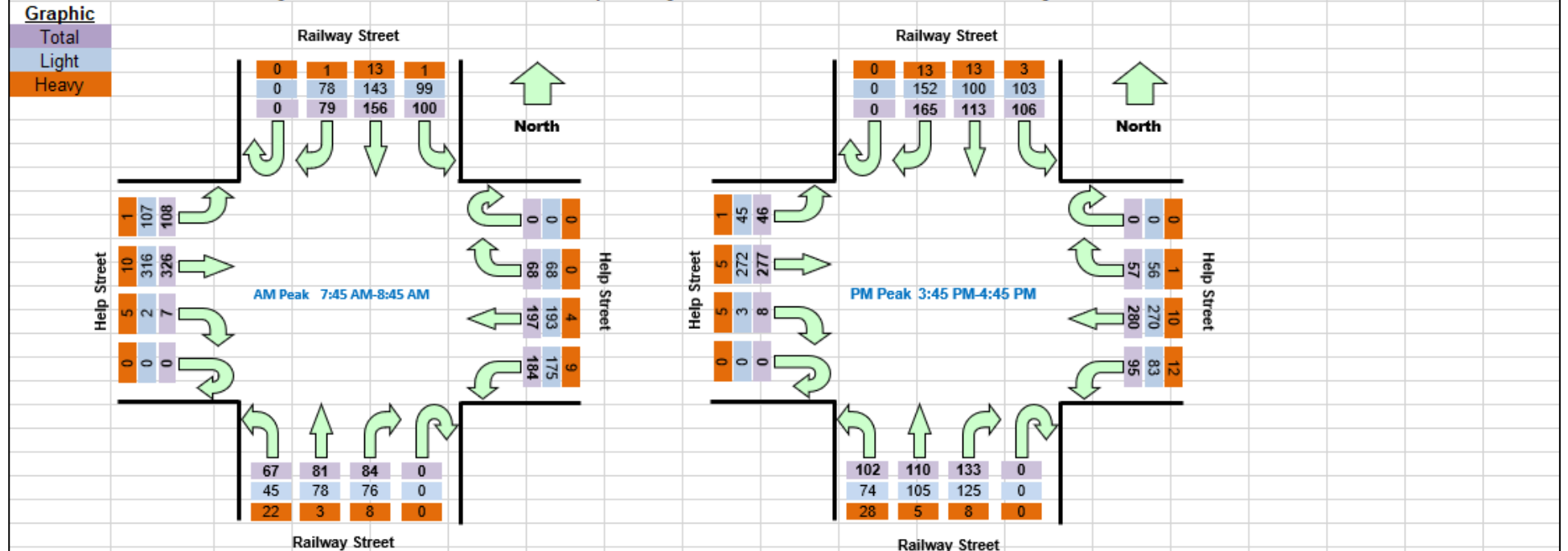
HELP STREET / RAILWAY STREET / PACIFIC HIGHWAY

ANNEXURE B: TRAFFIC SURVEYS

(SHEET 2 OF 6)

Peak Time		North Approach Railway Street				East Approach Help Street				South Approach Railway Street				West Approach Help Street				Peak total
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	
07:45	08:45	0	79	156	100	0	68	197	184	0	84	81	67	0	7	326	108	1457
15:45	16:45	0	165	113	106	0	57	280	95	0	133	110	102	0	8	277	46	1492

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.



RAILWAY STREET / HELP STREET

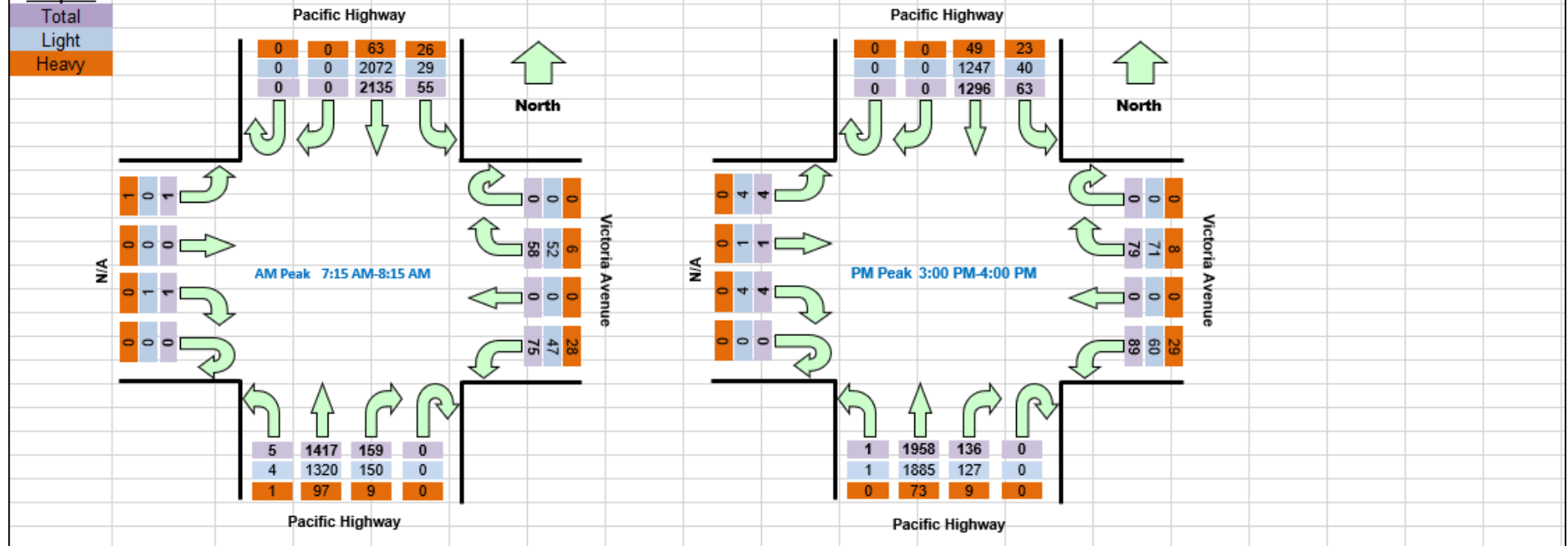
ANNEXURE B: TRAFFIC SURVEYS

(SHEET 3 OF 6)

Peak Time		North Approach Pacific Highway				East Approach Victoria Avenue				South Approach Pacific Highway				West Approach N/A				Peak total
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	
07:15	08:15	0	0	2135	55	0	58	0	75	0	159	1417	5	0	1	0	1	3906
15:00	16:00	0	0	1296	63	0	79	0	89	0	136	1958	1	0	4	1	4	3631

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic



VICTORIA AVENUE / PACIFIC HIGHWAY

ANNEXURE B: TRAFFIC SURVEYS

(SHEET 4 OF 6)

Peak Time		North Approach Railway St			South Approach Railway St			West Approach McIntosh St			Peak total
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	
07:45	08:45	0	80	286	0	88	128	0	12	11	605
16:30	17:30	0	24	281	0	221	32	0	79	80	717

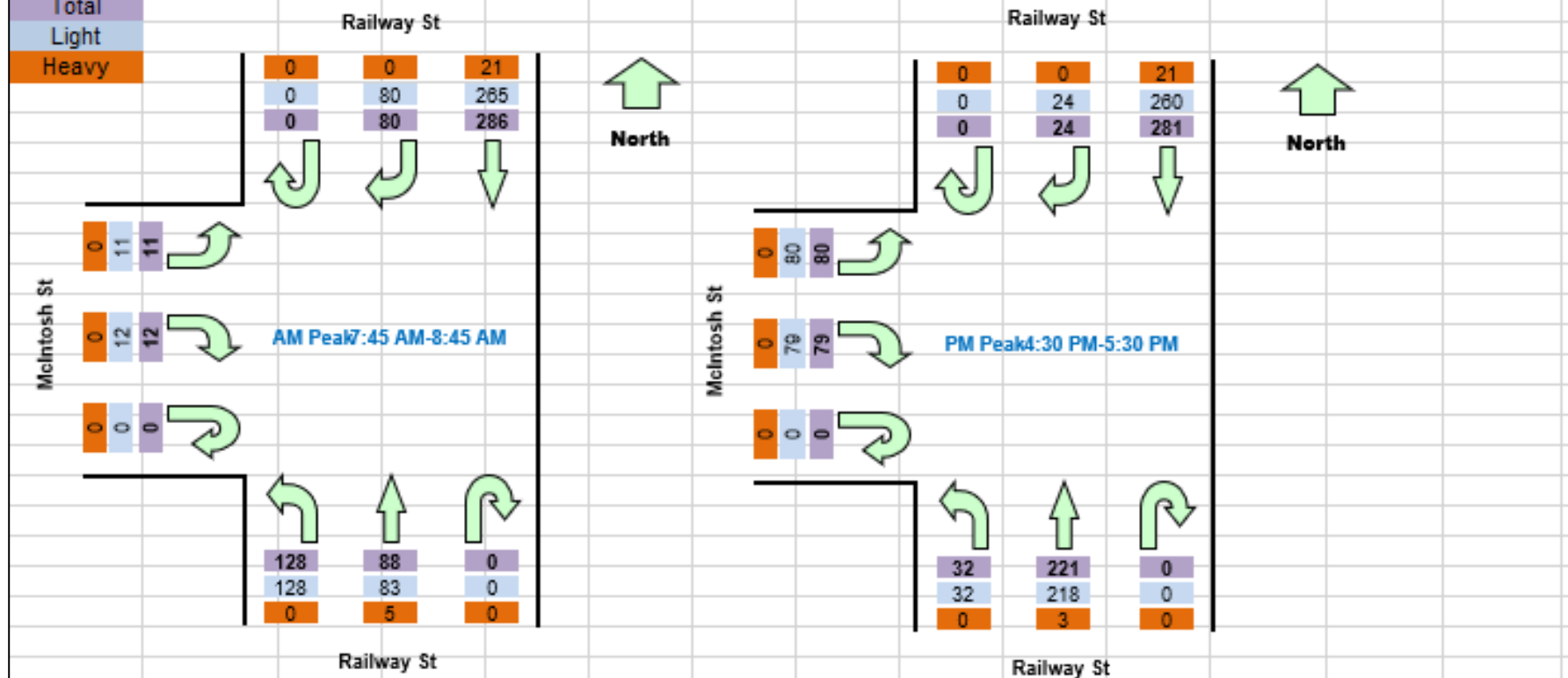
Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

Total

Light

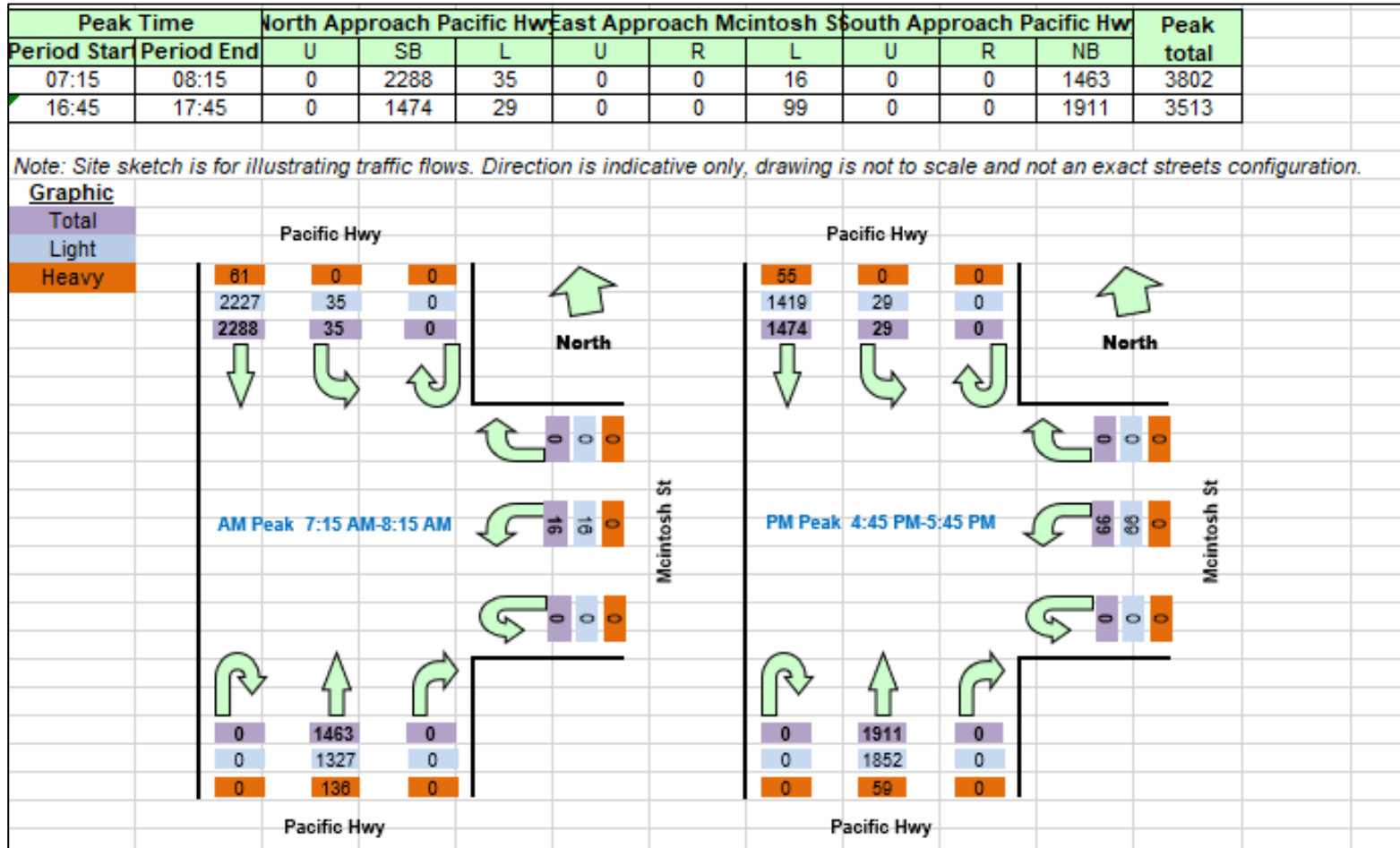
Heavy



RAILWAY STREET / MCINTOSH STREET

ANNEXURE B: TRAFFIC SURVEYS

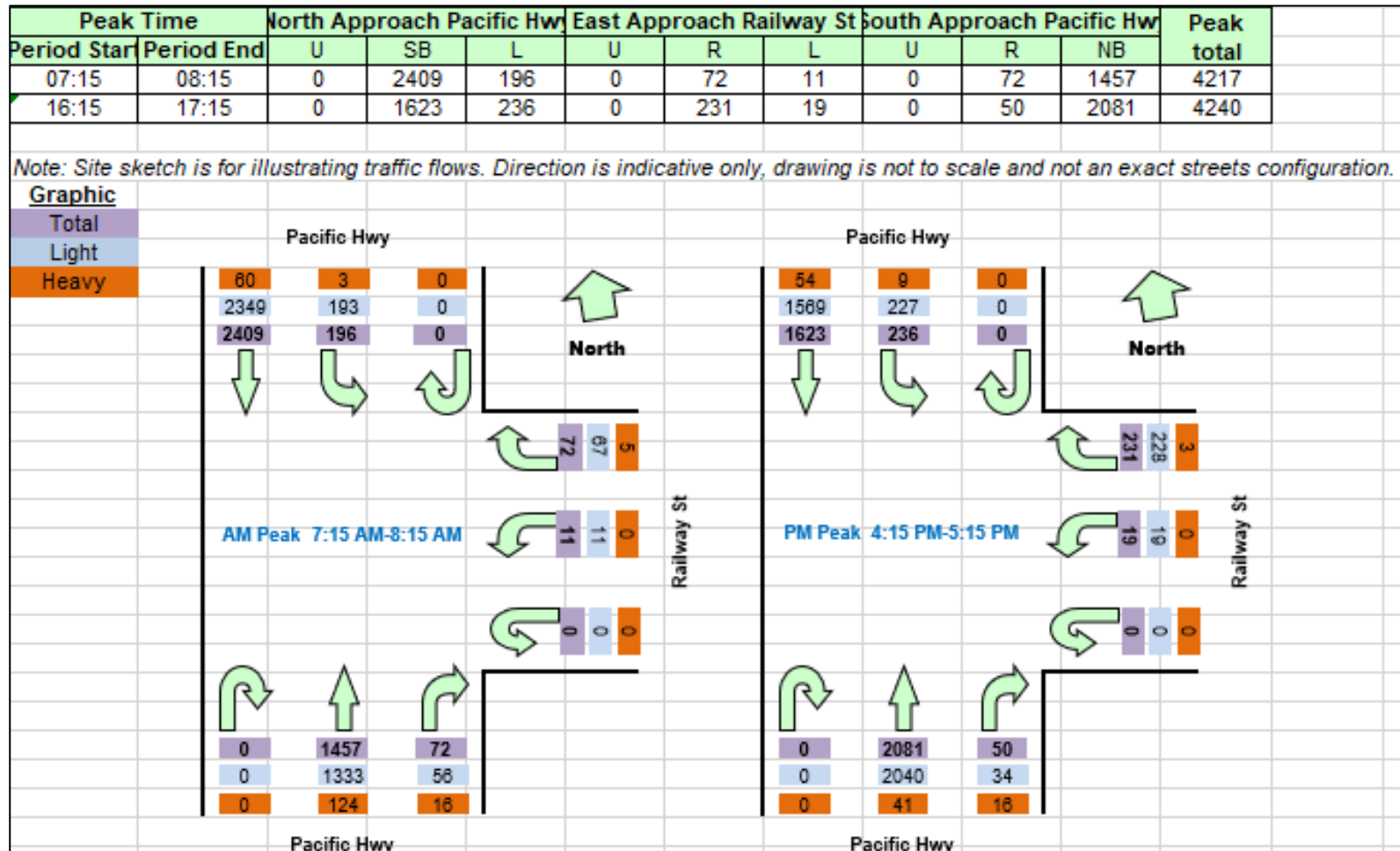
(SHEET 5 OF 6)



MCINTOSH STREET / PACIFIC HIGHWAY

ANNEXURE B: TRAFFIC SURVEYS

(SHEET 6 OF 6)



RAILWAY STREET / PACIFIC HIGHWAY



ANNEXURE C: EXISTING SIDRA RESULTS

(20 SHEETS)

MOVEMENT SUMMARY

 **Site: 101 [Help Street / Railway Street Existing AM]**

Help Street / Railway Street

Existing Conditions

AM Peak Period

Site Category: (None)

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway Street												
1	L2	67	32.8	0.115	19.2	LOS B	2.1	18.0	0.57	0.64	0.57	44.9
2	T1	81	3.7	0.385	24.0	LOS B	5.1	37.9	0.77	0.72	0.77	41.5
3	R2	84	9.5	0.385	33.8	LOS C	5.1	37.9	0.84	0.75	0.84	38.9
Approach		232	14.2	0.385	26.2	LOS B	5.1	37.9	0.74	0.71	0.74	41.4
East: Help Street												
4	L2	184	4.9	0.271	26.5	LOS B	5.6	40.9	0.73	0.76	0.73	40.9
5	T1	197	2.0	0.271	20.9	LOS B	6.0	42.6	0.73	0.61	0.73	44.7
6	R2	68	0.0	0.220	34.0	LOS C	2.4	16.9	0.87	0.75	0.87	37.8
Approach		449	2.9	0.271	25.2	LOS B	6.0	42.6	0.75	0.69	0.75	42.0
North: Railway Street												
7	L2	100	1.0	0.169	17.5	LOS B	3.7	26.8	0.56	0.62	0.56	46.8
8	T1	156	8.3	0.498	22.8	LOS B	6.4	46.7	0.75	0.70	0.75	42.2
9	R2	79	1.3	0.498	35.6	LOS C	6.4	46.7	0.87	0.76	0.87	38.3
Approach		335	4.5	0.498	24.2	LOS B	6.4	46.7	0.72	0.69	0.72	42.4
West: Help Street												
10	L2	108	0.9	0.487	37.5	LOS C	8.6	61.0	0.91	0.78	0.91	37.6
11	T1	328	3.0	0.487	32.0	LOS C	8.6	61.0	0.91	0.77	0.91	38.9
12	R2	5	100.0	0.487	38.1	LOS C	8.3	61.0	0.91	0.76	0.91	37.5
Approach		441	3.6	0.487	33.5	LOS C	8.6	61.0	0.91	0.77	0.91	38.6
All Vehicles		1457	5.3	0.498	27.6	LOS B	8.6	61.0	0.79	0.72	0.79	40.9

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P1	South Full Crossing	53	24.3	LOS C	0.1	0.1	0.73	0.73	
P2	East Full Crossing	53	19.4	LOS B	0.1	0.1	0.66	0.66	
P3	North Full Crossing	53	33.9	LOS D	0.1	0.1	0.87	0.87	
P4	West Full Crossing	53	17.5	LOS B	0.1	0.1	0.62	0.62	
All Pedestrians		211	23.7	LOS C			0.72	0.72	

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

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MOVEMENT SUMMARY

▽ Site: 101 [Pacific Highway Site / Help Street Existing AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Help Street												
5	T1	337	5.6	0.204	0.3	LOS A	0.3	2.2	0.09	0.04	0.09	56.0
6	R2	23	0.0	0.204	7.9	LOS A	0.3	2.2	0.09	0.04	0.09	55.5
Approach		360	5.3	0.204	0.8	NA	0.3	2.2	0.09	0.04	0.09	55.9
North: Site Road												
7	L2	14	0.0	0.033	6.9	LOS A	0.1	0.8	0.51	0.68	0.51	47.2
9	R2	9	0.0	0.033	11.9	LOS A	0.1	0.8	0.51	0.68	0.51	42.8
Approach		23	0.0	0.033	8.9	LOS A	0.1	0.8	0.51	0.68	0.51	45.5
West: Help Street												
10	L2	36	0.0	0.037	3.3	LOS A	0.0	0.0	0.00	0.29	0.00	54.3
11	T1	377	5.6	0.183	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.1
Approach		413	5.1	0.183	0.3	NA	0.0	0.0	0.00	0.05	0.00	58.0
All Vehicles		796	5.0	0.204	0.8	NA	0.3	2.2	0.06	0.06	0.06	55.9

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

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

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

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

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MOVEMENT SUMMARY

▽ Site: 101 [Mcintosh Street / Help Street Site Existing AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Site Road												
1	L2	5	0.0	0.009	5.6	LOS A	0.0	0.2	0.07	0.57	0.07	46.0
3	R2	7	0.0	0.009	5.7	LOS A	0.0	0.2	0.07	0.57	0.07	49.7
Approach		13	0.0	0.009	5.6	LOS A	0.0	0.2	0.07	0.57	0.07	48.3
East: RoadName												
4	L2	38	0.0	0.029	5.5	LOS A	0.0	0.0	0.00	0.41	0.00	52.6
5	T1	17	0.0	0.029	0.0	LOS A	0.0	0.0	0.00	0.41	0.00	43.9
Approach		55	0.0	0.029	3.8	NA	0.0	0.0	0.00	0.41	0.00	51.5
West: Mcintosh Street												
11	T1	37	0.0	0.021	0.0	LOS A	0.0	0.2	0.03	0.05	0.03	58.5
12	R2	4	0.0	0.021	2.4	LOS A	0.0	0.2	0.03	0.05	0.03	55.4
Approach		41	0.0	0.021	0.3	NA	0.0	0.2	0.03	0.05	0.03	57.6
All Vehicles		108	0.0	0.029	2.7	NA	0.0	0.2	0.02	0.29	0.02	52.0

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

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

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

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

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MOVEMENT SUMMARY

▽ Site: 101 [Railway Street / McIntosh Street Existing AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway Street												
1	L2	135	0.0	0.122	4.1	LOS A	0.0	0.0	0.00	0.34	0.00	45.2
2	T1	93	5.7	0.122	0.0	LOS A	0.0	0.0	0.00	0.34	0.00	50.2
Approach		227	2.3	0.122	2.4	NA	0.0	0.0	0.00	0.34	0.00	47.1
North: Railway Street												
8	T1	301	7.3	0.219	0.3	LOS A	0.7	4.8	0.18	0.14	0.18	51.6
9	R2	84	0.0	0.219	6.4	LOS A	0.7	4.8	0.18	0.14	0.18	48.2
Approach		385	5.7	0.219	1.6	NA	0.7	4.8	0.18	0.14	0.18	50.6
West: McIntosh Street												
10	L2	12	0.0	0.025	5.8	LOS A	0.1	0.6	0.21	0.59	0.21	40.7
12	R2	13	0.0	0.025	7.9	LOS A	0.1	0.6	0.21	0.59	0.21	34.2
Approach		24	0.0	0.025	6.9	LOS A	0.1	0.6	0.21	0.59	0.21	37.6
All Vehicles		637	4.3	0.219	2.1	NA	0.7	4.8	0.12	0.23	0.12	48.6

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

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

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

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

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MOVEMENT SUMMARY



Site: 101 [Pacific Highway / Victoria Avenue Existing AM]



Network: N101 [Existing AM]

Pacific Highway / Victoria Avenue

Existing Conditions

AM Peak Period

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		veh/h	%	veh/h	%	v/c	sec		veh	m			km/h	
South: Pacific Highway														
2	T1	1417	6.8	1417	6.8	0.534	6.4	LOS A	8.8	65.0	0.50	0.46	0.50	49.7
3	R2	159	5.7	159	5.7	0.614	22.7	LOS B	3.1	22.5	0.99	0.86	1.02	42.9
Approach		1576	6.7	1576	6.7	0.614	8.1	LOS A	8.8	65.0	0.55	0.50	0.56	48.3
East: Victoria Avenue														
4	L2	75	37.3	75	37.3	0.164	30.5	LOS C	1.5	13.7	0.76	0.74	0.76	38.6
6	R2	58	10.3	58	10.3	0.192	40.5	LOS C	1.4	10.4	0.89	0.74	0.89	26.1
Approach		133	25.6	133	25.6	0.192	34.8	LOS C	1.5	13.7	0.82	0.74	0.82	34.0
North: Pacific Highway														
7	L2	55	47.3	55	47.3	0.693	16.4	LOS B	10.2	75.2	0.57	0.54	0.57	43.8
8	T1	2135	3.0	2135	3.0	0.693	13.0	LOS A	14.8	106.1	0.68	0.63	0.68	45.3
Approach		2190	4.1	2190	4.1	0.693	13.1	LOS A	14.8	106.1	0.68	0.62	0.68	45.2
All Vehicles		3899	5.9	3899	5.9	0.693	11.8	LOS A	14.8	106.1	0.63	0.58	0.64	45.6

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Prop. Queued	Effective Stop Rate		
P1	South Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P2	East Full Crossing	53	13.9	LOS B	0.1	0.1	0.56	0.56	
P3	North Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
All Pedestrians		158	30.8	LOS D			0.81	0.81	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

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

MOVEMENT SUMMARY

 Site: 101 [Pacific Highway / Help Street / Fullers Road
Existing AM]

 Network: N101 [Existing AM]

Pacific Highway / Help Street / Fullers Road

Existing Conditions

AM Peak Period

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Pacific Highway														
1	L2	331	5.4	331	5.4	0.861	29.0	LOS C	11.5	84.6	0.91	0.96	1.25	34.9
2	T1	1098	7.7	1098	7.7	0.861	27.7	LOS B	12.3	91.5	0.94	0.92	1.09	16.2
Approach		1429	7.2	1429	7.2	0.861	28.0	LOS B	12.3	91.5	0.93	0.93	1.13	22.8
East: Help Street														
4	L2	23	21.7	23	21.7	0.080	37.2	LOS C	0.5	4.4	0.86	0.70	0.86	4.5
5	T1	297	4.4	297	4.4	0.931	58.1	LOS E	10.1	73.4	1.00	1.14	1.54	21.9
Approach		320	5.6	320	5.6	0.931	56.6	LOS E	10.1	73.4	0.99	1.11	1.49	21.4
North: Pacific Highway														
7	L2	9	11.1	9	11.1	0.877	38.2	LOS C	7.7	55.0	1.00	1.00	1.10	7.6
8	T1	1854	3.0	1854	3.0	0.877	35.5	LOS C	7.7	55.0	1.00	1.00	1.10	6.7
9	R2	400	3.5	400	3.5	0.876	40.5	LOS C	7.6	55.0	1.00	1.02	1.41	27.3
Approach		2263	3.1	2263	3.1	0.877	36.4	LOS C	7.7	55.0	1.00	1.00	1.15	12.7
West: Fullers Road														
10	L2	354	7.3	354	7.3	0.550	26.1	LOS B	8.3	61.7	0.80	0.80	0.80	33.1
11	T1	383	5.0	383	5.0	0.550	26.8	LOS B	8.3	61.7	0.87	0.76	0.87	32.9
12	R2	292	9.6	292	9.6	0.680	50.1	LOS D	4.2	32.2	1.00	0.94	1.47	23.0
Approach		1029	7.1	1029	7.1	0.680	33.2	LOS C	8.3	61.7	0.88	0.82	1.02	29.4
All Vehicles		5041	5.2	5041	5.2	0.931	34.6	LOS C	12.3	91.5	0.96	0.95	1.14	20.3

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Pedestrian	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	
P1	South Full Crossing	32	39.3	LOS D	0.1	0.1	0.93	0.93	
P2	East Full Crossing	32	15.0	LOS B	0.0	0.0	0.58	0.58	
P3	North Full Crossing	32	34.7	LOS D	0.1	0.1	0.88	0.88	
P4	West Full Crossing	32	33.0	LOS D	0.1	0.1	0.86	0.86	
All Pedestrians		126	30.5	LOS D			0.81	0.81	

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

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MOVEMENT SUMMARY

Site: 101 [Pacific Highway / McIntosh Street Existing AM]

Network: N101 [Existing AM]

New Site

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Arrival Flows HV	Flows Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. of Queue Distance	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		veh/h	%	veh/h	%	v/c	sec		veh	m			km/h	
South: Pacific Highway														
3a	R1	1540	9.3	1540	9.3	0.347	3.0	LOS A	0.0	0.0	0.00	0.45	0.00	35.6
Approach		1540	9.3	1540	9.3	0.347	3.0	NA	0.0	0.0	0.00	0.45	0.00	35.6
East: McIntosh Street														
4	L2	17	0.0	17	0.0	0.058	7.5	LOS A	0.0	0.3	0.59	0.74	0.59	14.2
Approach		17	0.0	17	0.0	0.058	7.5	LOS A	0.0	0.3	0.59	0.74	0.59	14.2
NorthEast: Pacific Highway														
24b	L3	37	0.0	37	0.0	0.435	6.5	LOS A	20.2	144.6	0.00	0.51	0.00	43.2
24a	L1	2408	2.7	2408	2.7	0.435	4.5	LOS A	20.7	148.3	0.00	0.50	0.00	45.4
Approach		2445	2.6	2445	2.6	0.435	4.5	NA	20.7	148.3	0.00	0.50	0.00	45.3
All Vehicles		4002	5.2	4002	5.2	0.435	3.9	NA	20.7	148.3	0.00	0.48	0.00	43.2

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

Vehicle movement LOS values are based on average delay per movement.

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

MOVEMENT SUMMARY



Site: 101 [Pacific Highway / Railway Street Existing AM]



Network: N101 [Existing AM]

New Site

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Arrival Flows HV	Flows Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		veh/h	%	veh/h	%	v/c	sec		veh	m			km/h	
South: Railway Street														
1b	L3	12	0.0	12	0.0	0.374	53.3	LOS D	1.2	8.5	0.99	0.73	0.99	9.4
3a	R1	76	6.9	76	6.9	0.374	51.3	LOS D	1.3	9.4	0.99	0.74	0.99	25.5
Approach		87	6.0	87	6.0	0.374	51.5	LOS D	1.3	9.4	0.99	0.74	0.99	24.0
NorthEast: Pacific Highway														
24a	L1	206	1.5	206	1.5	0.833	21.9	LOS B	19.8	141.5	0.81	0.82	0.87	39.6
25	T1	2536	2.5	2536	2.5	0.833	17.3	LOS B	22.5	160.8	0.83	0.82	0.89	38.1
Approach		2742	2.4	2742	2.4	0.833	17.6	LOS B	22.5	160.8	0.83	0.82	0.89	38.2
SouthWest: Pacific Highway														
31	T1	1534	8.5	1534	8.5	0.485	0.7	LOS A	3.0	22.2	0.10	0.09	0.10	59.1
32b	R3	76	22.2	76	22.2	0.249	27.8	LOS B	1.7	14.1	0.84	0.79	0.84	25.5
Approach		1609	9.2	1609	9.2	0.485	2.0	LOS A	3.0	22.2	0.14	0.13	0.14	57.2
All Vehicles		4439	4.9	4439	4.9	0.833	12.6	LOS A	22.5	160.8	0.58	0.57	0.62	44.1

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate		
		ped/h	sec		ped				
P1	South Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P8	SouthWest Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
All Pedestrians		105	39.3	LOS D			0.94	0.94	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

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

MOVEMENT SUMMARY

 **Site: 101 [Help Street / Railway Street Existing PM]**

Help Street / Railway Street

Existing Conditions

AM Peak Period

Site Category: (None)

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway Street												
1	L2	102	27.5	0.136	16.1	LOS B	2.5	21.2	0.51	0.66	0.51	46.4
2	T1	110	4.5	0.453	21.5	LOS B	7.6	55.9	0.76	0.74	0.76	42.6
3	R2	133	6.0	0.453	29.3	LOS C	7.6	55.9	0.81	0.75	0.81	40.8
Approach		345	11.9	0.453	22.9	LOS B	7.6	55.9	0.70	0.72	0.70	42.9
East: Help Street												
4	L2	95	12.6	0.179	30.2	LOS C	3.1	23.7	0.77	0.74	0.77	39.2
5	T1	280	3.6	0.472	27.2	LOS B	10.0	72.3	0.86	0.73	0.86	41.5
6	R2	57	1.8	0.209	37.4	LOS C	2.1	15.1	0.90	0.74	0.90	36.5
Approach		432	5.3	0.472	29.2	LOS C	10.0	72.3	0.84	0.73	0.84	40.2
North: Railway Street												
7	L2	106	2.8	0.188	14.7	LOS B	4.0	29.5	0.49	0.57	0.49	48.8
8	T1	113	11.5	0.553	12.0	LOS A	6.5	48.5	0.55	0.61	0.55	47.9
9	R2	165	7.9	0.553	30.8	LOS C	6.5	48.5	0.82	0.78	0.82	39.2
Approach		384	7.6	0.553	20.8	LOS B	6.5	48.5	0.65	0.67	0.65	43.9
West: Help Street												
10	L2	46	2.2	0.505	42.6	LOS D	7.0	49.6	0.95	0.78	0.95	36.1
11	T1	280	1.8	0.505	37.1	LOS C	7.0	49.6	0.95	0.78	0.95	37.0
12	R2	5	100.0	0.505	43.3	LOS D	6.6	47.9	0.95	0.77	0.95	35.6
Approach		331	3.3	0.505	38.1	LOS C	7.0	49.6	0.95	0.78	0.95	36.9
All Vehicles		1492	7.0	0.553	27.5	LOS B	10.0	72.3	0.79	0.72	0.79	40.9

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P1	South Full Crossing	53	28.9	LOS C	0.1	0.1	0.80	0.80	
P2	East Full Crossing	53	15.6	LOS B	0.1	0.1	0.59	0.59	
P3	North Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P4	West Full Crossing	53	13.9	LOS B	0.1	0.1	0.56	0.56	
All Pedestrians		211	24.4	LOS C			0.72	0.72	

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

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MOVEMENT SUMMARY

▽ Site: 101 [Pacific Highway Site / Help Street Existing PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Help Street												
5	T1	539	6.4	0.296	0.1	LOS A	0.1	0.8	0.02	0.01	0.02	59.0
6	R2	8	0.0	0.296	7.8	LOS A	0.1	0.8	0.02	0.01	0.02	56.3
Approach		547	6.3	0.296	0.2	NA	0.1	0.8	0.02	0.01	0.02	58.9
North: Site Road												
7	L2	31	0.0	0.084	6.7	LOS A	0.3	2.1	0.53	0.71	0.53	46.2
9	R2	20	0.0	0.084	15.1	LOS B	0.3	2.1	0.53	0.71	0.53	41.8
Approach		51	0.0	0.084	10.0	LOS A	0.3	2.1	0.53	0.71	0.53	44.5
West: Help Street												
10	L2	13	0.0	0.031	3.3	LOS A	0.0	0.0	0.00	0.12	0.00	55.9
11	T1	344	2.8	0.155	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.4
Approach		357	2.7	0.155	0.1	NA	0.0	0.0	0.00	0.02	0.00	59.1
All Vehicles		955	4.6	0.296	0.7	NA	0.3	2.1	0.04	0.05	0.04	56.2

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

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

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

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

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MOVEMENT SUMMARY

▽ Site: 101 [Mcintosh Street / Help Street Site Existing PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Site Road												
1	L2	12	0.0	0.032	5.8	LOS A	0.1	0.7	0.20	0.56	0.20	45.5
3	R2	27	0.0	0.032	5.9	LOS A	0.1	0.7	0.20	0.56	0.20	49.2
Approach		39	0.0	0.032	5.9	LOS A	0.1	0.7	0.20	0.56	0.20	48.2
East: RoadName												
4	L2	5	0.0	0.056	5.5	LOS A	0.0	0.0	0.00	0.03	0.00	57.1
5	T1	104	0.0	0.056	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	58.5
Approach		109	0.0	0.056	0.3	NA	0.0	0.0	0.00	0.03	0.00	58.2
West: McIntosh Street												
11	T1	31	0.0	0.016	0.0	LOS A	0.0	0.0	0.02	0.02	0.02	59.4
12	R2	1	0.0	0.016	2.5	LOS A	0.0	0.0	0.02	0.02	0.02	55.6
Approach		32	0.0	0.016	0.1	NA	0.0	0.0	0.02	0.02	0.02	59.0
All Vehicles		180	0.0	0.056	1.5	NA	0.1	0.7	0.05	0.14	0.05	53.1

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

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

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

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

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MOVEMENT SUMMARY

▽ Site: 101 [Railway Street / McIntosh Street Existing PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway Street												
1	L2	34	0.0	0.138	4.1	LOS A	0.0	0.0	0.00	0.07	0.00	51.0
2	T1	233	1.4	0.138	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	57.6
Approach		266	1.2	0.138	0.5	NA	0.0	0.0	0.00	0.07	0.00	56.6
North: Railway Street												
8	T1	296	7.5	0.177	0.1	LOS A	0.2	1.6	0.08	0.05	0.08	56.5
9	R2	25	0.0	0.177	6.5	LOS A	0.2	1.6	0.08	0.05	0.08	51.0
Approach		321	6.9	0.177	0.6	NA	0.2	1.6	0.08	0.05	0.08	55.8
West: McIntosh Street												
10	L2	84	0.0	0.176	6.4	LOS A	0.7	4.6	0.39	0.67	0.39	40.0
12	R2	83	0.0	0.176	8.5	LOS A	0.7	4.6	0.39	0.67	0.39	33.4
Approach		167	0.0	0.176	7.4	LOS A	0.7	4.6	0.39	0.67	0.39	37.0
All Vehicles		755	3.3	0.177	2.1	NA	0.7	4.6	0.12	0.20	0.12	49.6

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

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

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

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

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MOVEMENT SUMMARY



Site: 101 [Pacific Highway / Victoria Avenue Existing PM]



Network: N101 [Existing PM]

Pacific Highway / Victoria Avenue

Existing Conditions

AM Peak Period

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		veh/h	%	veh/h	%	v/c	sec		veh	m			km/h	
South: Pacific Highway														
2	T1	1958	3.7	1958	3.7	0.496	6.2	LOS A	8.0	57.5	0.48	0.44	0.48	50.0
3	R2	136	6.6	136	6.6	0.439	15.5	LOS B	1.5	11.3	0.73	0.76	0.73	46.6
Approach		2094	3.9	2094	3.9	0.496	6.8	LOS A	8.0	57.5	0.50	0.46	0.50	49.6
East: Victoria Avenue														
4	L2	89	32.6	89	32.6	0.190	30.6	LOS C	1.8	15.9	0.77	0.75	0.77	38.6
6	R2	79	10.1	79	10.1	0.280	41.2	LOS C	1.9	14.5	0.91	0.76	0.91	25.8
Approach		168	22.0	168	22.0	0.280	35.6	LOS C	1.9	15.9	0.83	0.75	0.83	33.4
North: Pacific Highway														
7	L2	63	36.5	63	36.5	0.651	13.0	LOS A	7.0	51.8	0.42	0.41	0.42	47.1
8	T1	1296	3.8	1296	3.8	0.651	9.0	LOS A	9.7	70.3	0.50	0.47	0.50	48.8
Approach		1359	5.3	1359	5.3	0.651	9.2	LOS A	9.7	70.3	0.50	0.46	0.50	48.7
All Vehicles		3621	5.3	3621	5.3	0.651	9.0	LOS A	9.7	70.3	0.51	0.47	0.51	47.9

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Prop. Queued	Effective Stop Rate		
P1	South Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P2	East Full Crossing	53	13.9	LOS B	0.1	0.1	0.56	0.56	
P3	North Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
All Pedestrians		158	30.8	LOS D			0.81	0.81	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

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

MOVEMENT SUMMARY

 **Site: 101 [Pacific Highway / Help Street / Fullers Road Existing PM]**

 **Network: N101 [Existing PM]**

Pacific Highway / Help Street / Fullers Road

Existing Conditions

PM Peak Period

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Pacific Highway														
1	L2	440	2.3	440	2.3	0.760	21.0	LOS B	11.2	80.6	0.74	0.83	0.99	39.5
2	T1	1513	4.7	1513	4.7	0.760	17.9	LOS B	13.1	95.2	0.77	0.72	0.82	21.7
Approach		1953	4.1	1953	4.1	0.760	18.6	LOS B	13.1	95.2	0.76	0.75	0.85	28.5
East: Help Street														
4	L2	50	16.0	50	16.0	0.169	37.9	LOS C	1.2	9.3	0.88	0.73	0.88	4.5
5	T1	462	5.4	462	5.4	0.730	40.3	LOS C	6.8	47.9	0.99	0.88	1.10	27.2
Approach		512	6.4	512	6.4	0.730	40.1	LOS C	6.8	47.9	0.98	0.87	1.08	25.9
North: Pacific Highway														
7	L2	16	0.0	16	0.0	0.516	16.3	LOS B	7.6	55.0	0.64	0.58	0.64	13.1
8	T1	1096	3.8	1096	3.8	0.516	12.5	LOS A	7.6	55.0	0.63	0.57	0.63	15.8
9	R2	163	9.8	163	9.8	0.833	20.3	LOS B	2.4	18.2	0.90	0.83	1.01	36.7
Approach		1275	4.5	1275	4.5	0.833	13.5	LOS A	7.6	55.0	0.66	0.60	0.68	22.5
West: Fullers Road														
10	L2	390	4.1	390	4.1	0.524	25.8	LOS B	7.9	57.4	0.78	0.81	0.78	32.9
11	T1	323	2.8	323	2.8	0.524	27.5	LOS B	7.9	57.4	0.87	0.75	0.87	32.9
12	R2	154	16.2	154	16.2	0.623	46.2	LOS D	4.0	32.2	0.98	0.88	1.24	24.2
Approach		867	5.8	867	5.8	0.623	30.0	LOS C	7.9	57.4	0.85	0.80	0.90	30.9
All Vehicles		4607	4.8	4607	4.8	0.833	21.7	LOS B	13.1	95.2	0.78	0.73	0.84	27.8

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Pedestrian	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	
P1	South Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P2	East Full Crossing	53	16.2	LOS B	0.1	0.1	0.60	0.60	
P3	North Full Crossing	53	34.7	LOS D	0.1	0.1	0.88	0.88	
P4	West Full Crossing	53	22.1	LOS C	0.1	0.1	0.70	0.70	
All Pedestrians		211	28.1	LOS C			0.78	0.78	

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

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MOVEMENT SUMMARY

Site: 101 [Pacific Highway / McIntosh Street Existing PM]

Network: N101 [Existing PM]

New Site

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Arrival Flows HV	Flows Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Queue	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		veh/h	%	veh/h	%	v/c	sec		veh	m			km/h	
South: Pacific Highway														
3a	R1	2012	3.1	2012	3.1	0.459	3.1	LOS A	0.0	0.0	0.00	0.45	0.00	35.6
Approach		2012	3.1	2012	3.1	0.459	3.1	NA	0.0	0.0	0.00	0.45	0.00	35.6
East: McIntosh Street														
4	L2	104	0.0	104	0.0	0.253	5.4	LOS A	0.2	1.4	0.50	0.70	0.50	18.1
Approach		104	0.0	104	0.0	0.253	5.4	LOS A	0.2	1.4	0.50	0.70	0.50	18.1
NorthEast: Pacific Highway														
24b	L3	31	0.0	31	0.0	0.284	6.5	LOS A	1.0	7.2	0.00	0.51	0.00	43.1
24a	L1	1552	3.7	1552	3.7	0.284	4.5	LOS A	1.0	7.2	0.00	0.51	0.00	45.4
Approach		1582	3.7	1582	3.7	0.284	4.5	NA	1.0	7.2	0.00	0.51	0.00	45.3
All Vehicles		3698	3.2	3698	3.2	0.459	3.7	NA	1.0	7.2	0.01	0.48	0.01	41.6

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

Vehicle movement LOS values are based on average delay per movement.

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

MOVEMENT SUMMARY



Site: 101 [Pacific Highway / Railway Street Existing PM]

Network: N101 [Existing PM]

New Site

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Railway Street														
1b	L3	20	0.0	20	0.0	0.372	41.6	LOS C	3.1	22.1	0.92	0.78	0.92	11.5
3a	R1	243	1.3	243	1.3	0.372	39.7	LOS C	3.2	22.7	0.92	0.78	0.92	29.3
Approach		263	1.2	263	1.2	0.372	39.8	LOS C	3.2	22.7	0.92	0.78	0.92	28.4
NorthEast: Pacific Highway														
24a	L1	248	3.8	248	3.8	0.614	18.6	LOS B	11.4	82.2	0.70	0.70	0.70	41.2
25	T1	1708	3.3	1708	3.3	0.614	14.2	LOS A	11.7	84.6	0.72	0.67	0.72	40.5
Approach		1957	3.4	1957	3.4	0.614	14.8	LOS B	11.7	84.6	0.72	0.67	0.72	40.7
SouthWest: Pacific Highway														
31	T1	2191	2.0	2191	2.0	0.813	6.7	LOS A	20.3	144.2	0.55	0.52	0.55	52.0
32b	R3	53	32.0	53	32.0	0.261	12.4	LOS A	0.4	3.1	0.26	0.66	0.26	35.2
Approach		2243	2.7	2243	2.7	0.813	6.8	LOS A	20.3	144.2	0.54	0.52	0.55	51.7
All Vehicles		4463	2.9	4463	2.9	0.813	12.3	LOS A	20.3	144.2	0.64	0.60	0.64	45.0

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate		
		ped/h	sec		Pedestrian				
					ped	Distance m			
P1	South Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P8	SouthWest Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
All Pedestrians		105	39.3	LOS D			0.94	0.94	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

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

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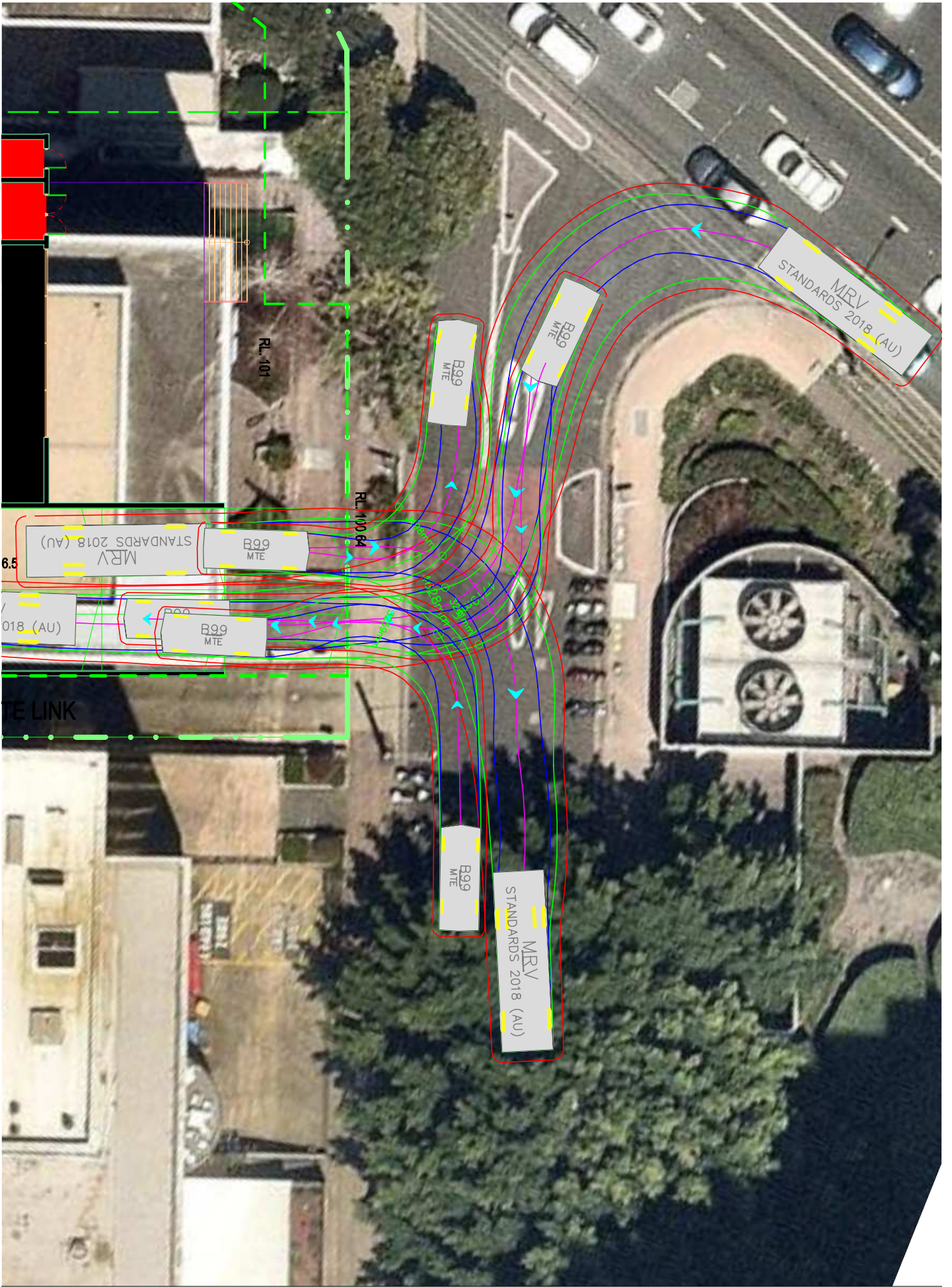
Organisation: MCLAREN TRAFFIC ENGINEERING | Processed: Tuesday, 8 September 2020 1:44:54 PM

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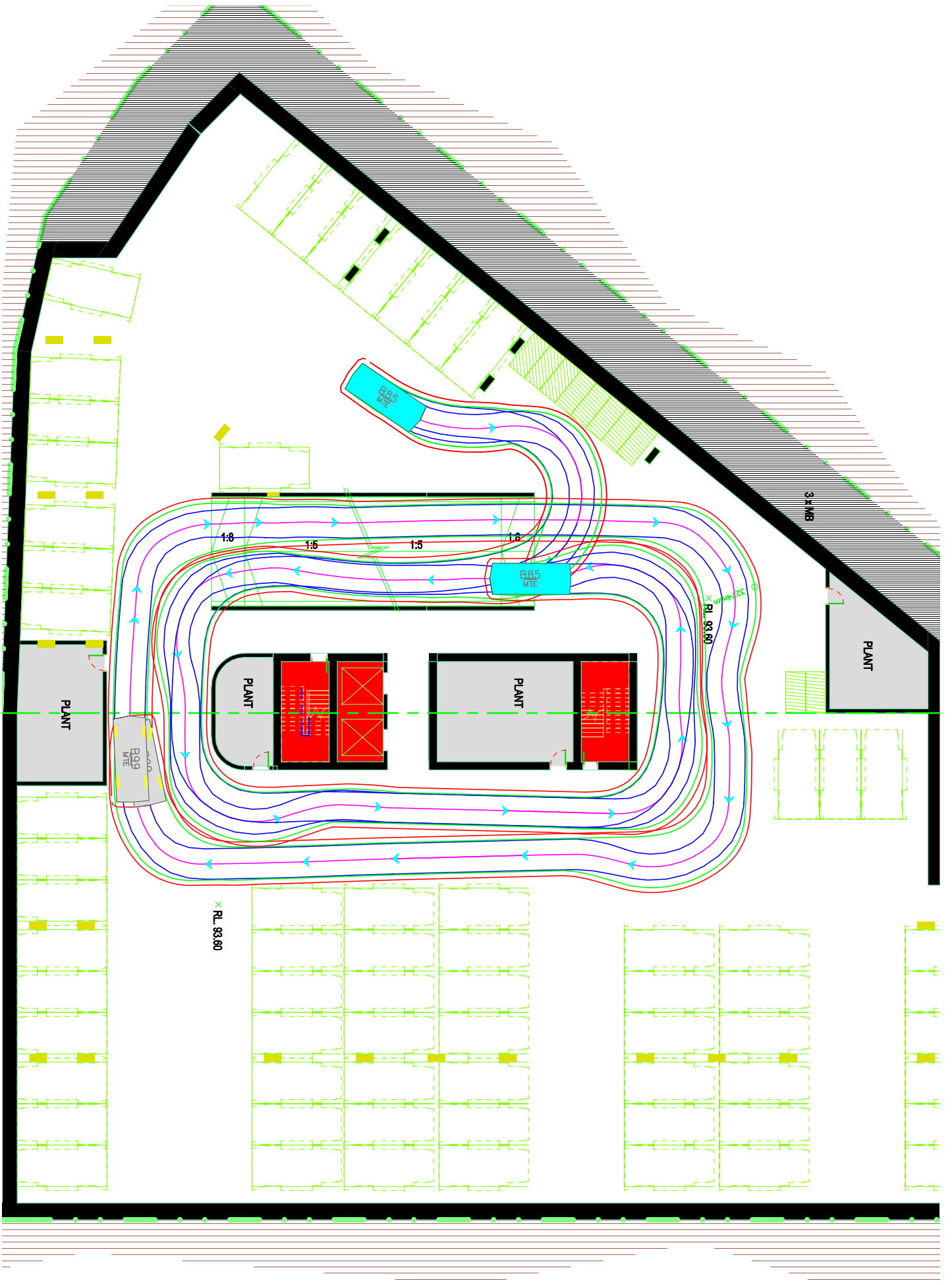


ANNEXURE D: SWEPT PATH ANALYSIS

(3 SHEETS)







ANNEXURE E: JOURNEY TO WORK DATA

(SHEET 1 OF 1)

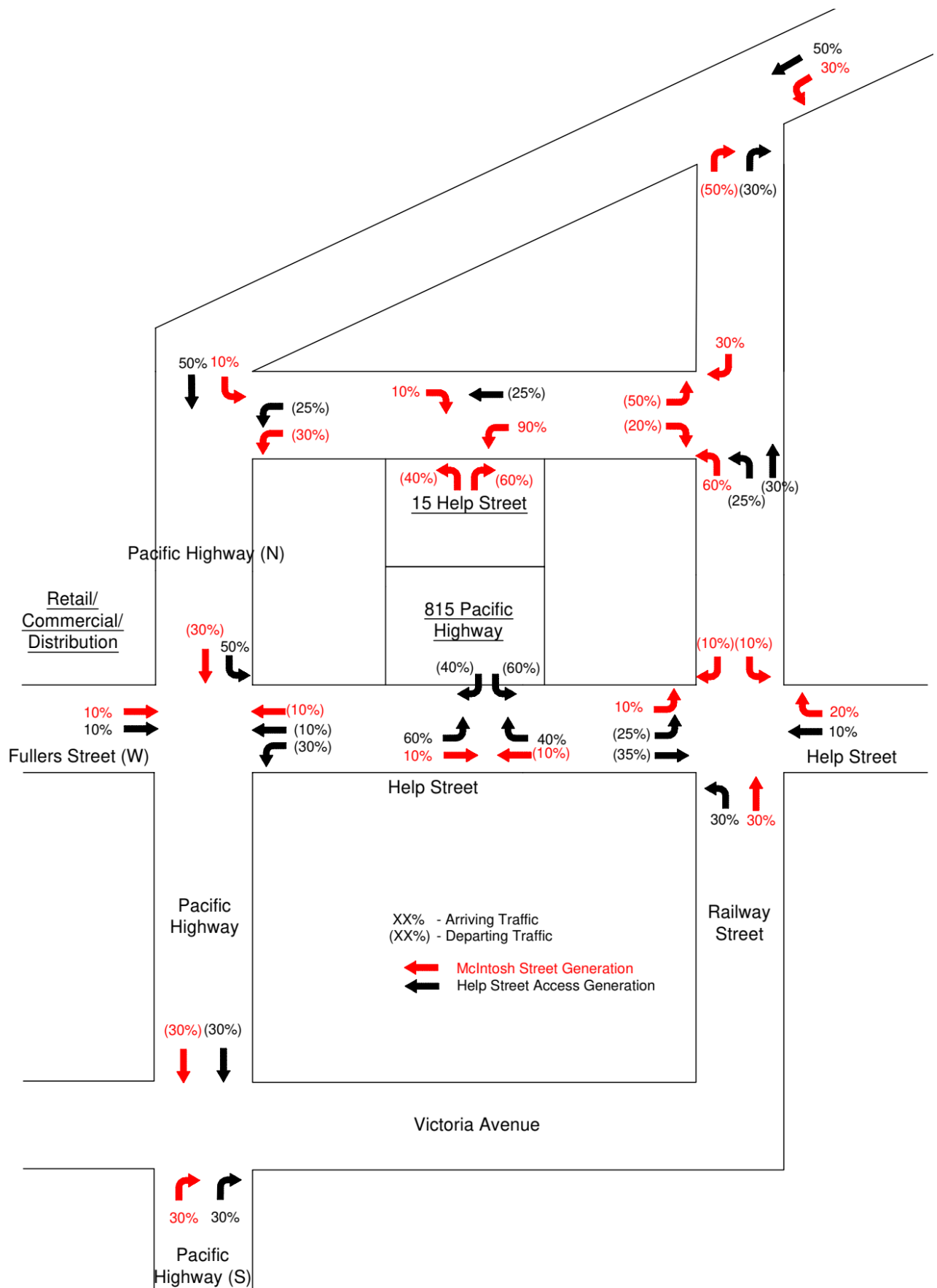
Sum of EMPLOYED_PERSONS	Column Labels	
Row Labels	2011	2016
Bicycle	0.67%	0.53%
Bus	5.48%	6.35%
Car as driver	51.21%	43.67%
Car as passenger	4.26%	3.38%
Motorbike	0.68%	0.71%
Other mode	0.29%	0.33%
Taxi	0.32%	0.20%
Train	29.39%	33.83%
Tram	0.06%	0.02%
Truck	0.26%	0.20%
Walked only	7.39%	7.47%
Grand Total	1	

2011 VS 2016 JOURNEY TO WORK DATA FOR CHATSWOOD (EAST) – ARTARMON SA2 AREA



ANNEXURE F: TRAFFIC DISTRIBUTION

(1 SHEET)





ANNEXURE G: FUTURE SIDRA RESULTS – PROPOSED ACCESS

(18 SHEETS)

MOVEMENT SUMMARY

▽ Site: 101 [Mcintosh Street / Help Street Site Future AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Site Road												
1	L2	43	0.0	0.134	5.6	LOS A	0.5	3.4	0.06	0.59	0.06	45.1
3	R2	99	0.0	0.134	7.0	LOS A	0.5	3.4	0.06	0.59	0.06	48.9
Approach		142	0.0	0.134	6.6	LOS A	0.5	3.4	0.06	0.59	0.06	47.8
East: RoadName												
4	L2	512	0.0	0.282	5.5	LOS A	0.0	0.0	0.00	0.56	0.00	50.8
5	T1	13	0.0	0.282	0.0	LOS A	0.0	0.0	0.00	0.56	0.00	39.6
Approach		524	0.0	0.282	5.4	NA	0.0	0.0	0.00	0.56	0.00	50.7
West: McIntosh Street												
11	T1	37	0.0	0.074	1.9	LOS A	0.4	2.5	0.50	0.40	0.50	45.0
12	R2	57	0.0	0.074	4.4	LOS A	0.4	2.5	0.50	0.40	0.50	50.7
Approach		94	0.0	0.074	3.4	NA	0.4	2.5	0.50	0.40	0.50	49.6
All Vehicles		760	0.0	0.282	5.4	NA	0.5	3.4	0.07	0.55	0.07	50.1

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

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

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

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

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MOVEMENT SUMMARY

▽ Site: 101 [Railway Street / McIntosh Street Future AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway Street												
1	L2	443	0.0	0.285	4.1	LOS A	0.0	0.0	0.00	0.47	0.00	42.8
2	T1	87	6.0	0.285	0.0	LOS A	0.0	0.0	0.00	0.47	0.00	47.2
Approach		531	1.0	0.285	3.4	NA	0.0	0.0	0.00	0.47	0.00	43.5
North: Railway Street												
8	T1	301	7.3	0.394	2.7	LOS A	3.0	21.4	0.57	0.39	0.72	41.5
9	R2	241	0.0	0.394	9.0	LOS A	3.0	21.4	0.57	0.39	0.72	41.5
Approach		542	4.1	0.394	5.5	NA	3.0	21.4	0.57	0.39	0.72	41.5
West: McIntosh Street												
10	L2	79	0.0	0.130	5.8	LOS A	0.5	3.3	0.20	0.59	0.20	39.8
12	R2	40	0.0	0.130	11.0	LOS A	0.5	3.3	0.20	0.59	0.20	33.3
Approach		119	0.0	0.130	7.6	LOS A	0.5	3.3	0.20	0.59	0.20	37.8
All Vehicles		1192	2.3	0.394	4.8	NA	3.0	21.4	0.28	0.45	0.35	41.8

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

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

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

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

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MOVEMENT SUMMARY

 **Site: 101 [Help Street / Railway Street Future AM]**

Help Street / Railway Street

Existing Conditions

AM Peak Period

Site Category: (None)

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway Street												
1	L2	49	44.9	0.219	16.8	LOS B	4.8	36.5	0.54	0.52	0.54	47.7
2	T1	230	1.3	0.732	19.8	LOS B	6.8	49.8	0.66	0.62	0.71	44.5
3	R2	84	9.5	0.732	49.9	LOS D	6.8	49.8	1.00	0.89	1.18	33.2
Approach		363	9.1	0.732	26.4	LOS B	6.8	49.8	0.72	0.67	0.80	41.6
East: Help Street												
4	L2	184	4.9	0.330	31.4	LOS C	6.3	45.6	0.81	0.78	0.81	38.8
5	T1	191	2.1	0.319	25.7	LOS B	6.4	46.0	0.81	0.67	0.81	42.2
6	R2	167	0.0	0.721	47.5	LOS D	7.3	50.9	1.00	0.93	1.36	33.2
Approach		542	2.4	0.721	34.3	LOS C	7.3	50.9	0.87	0.79	0.98	37.9
North: Railway Street												
7	L2	113	0.9	0.280	15.4	LOS B	5.1	37.1	0.52	0.57	0.52	48.6
8	T1	156	8.3	0.824	16.8	LOS B	5.8	41.9	0.60	0.64	0.67	45.3
9	R2	92	1.1	0.824	55.1	LOS D	5.8	41.9	1.00	0.96	1.40	31.4
Approach		361	4.2	0.824	26.1	LOS B	5.8	41.9	0.68	0.70	0.81	41.5
West: Help Street												
10	L2	148	0.7	0.833	50.6	LOS D	11.4	80.8	1.00	0.98	1.28	32.9
11	T1	318	3.1	0.833	45.2	LOS D	11.4	80.8	1.00	0.98	1.28	34.1
12	R2	7	100.0	0.833	51.4	LOS D	11.0	81.2	1.00	0.98	1.29	33.0
Approach		473	3.8	0.833	47.0	LOS D	11.4	81.2	1.00	0.98	1.28	33.7
All Vehicles		1739	4.5	0.833	34.4	LOS C	11.4	81.2	0.83	0.80	0.99	38.0

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P1	South Full Crossing	53	28.9	LOS C	0.1	0.1	0.80	0.80	
P2	East Full Crossing	53	15.6	LOS B	0.1	0.1	0.59	0.59	
P3	North Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P4	West Full Crossing	53	13.9	LOS B	0.1	0.1	0.56	0.56	
All Pedestrians		211	24.4	LOS C			0.72	0.72	

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

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MOVEMENT SUMMARY

 **Site: 101 [Pacific Highway / Victoria Avenue Future AM]**

 **Network: N101 [Future AM]**

Pacific Highway / Victoria Avenue

Existing Conditions

AM Peak Period

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		veh/h	%	veh/h	%	v/c	sec		veh	m			km/h	
South: Pacific Highway														
2	T1	1417	6.8	1417	6.8	0.523	5.1	LOS A	8.1	59.9	0.45	0.41	0.45	40.1
3	R2	289	3.1	289	3.1	0.895	58.1	LOS E	8.2	59.2	1.00	1.14	1.74	24.2
Approach		1706	6.2	1706	6.2	0.895	14.1	LOS A	8.2	59.9	0.55	0.54	0.67	31.1
East: Victoria Avenue														
4	L2	75	37.3	75	37.3	0.164	30.5	LOS C	1.5	13.7	0.76	0.74	0.76	32.1
6	R2	58	10.3	58	10.3	0.249	43.9	LOS D	1.4	11.0	0.93	0.75	0.93	24.9
Approach		133	25.6	133	25.6	0.249	36.3	LOS C	1.5	13.7	0.83	0.74	0.83	29.0
North: Pacific Highway														
7	L2	55	47.3	55	47.3	0.704	16.5	LOS B	10.5	77.7	0.58	0.55	0.58	43.7
8	T1	2169	2.9	2169	2.9	0.704	13.2	LOS A	15.1	108.3	0.69	0.63	0.69	35.8
Approach		2224	4.0	2224	4.0	0.704	13.2	LOS A	15.1	108.3	0.69	0.63	0.69	36.1
All Vehicles		4063	5.6	4063	5.6	0.895	14.4	LOS A	15.1	108.3	0.63	0.60	0.69	33.7

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Prop. Queued	Effective Stop Rate		
P1	South Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P2	East Full Crossing	53	13.9	LOS B	0.1	0.1	0.56	0.56	
P3	North Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
All Pedestrians		158	30.8	LOS D			0.81	0.81	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

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

MOVEMENT SUMMARY

 Site: 101 [Pacific Highway / Help Street / Fullers Road Future AM]  Network: N101 [Future AM]

Pacific Highway / Help Street / Fullers Road

Existing Conditions

AM Peak Period

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Pacific Highway														
1	L2	331	5.4	331	5.4	0.861	36.5	LOS C	12.2	90.0	0.95	0.99	1.31	31.5
2	T1	1098	7.7	1098	7.7	0.861	35.0	LOS C	13.0	96.8	0.97	0.97	1.17	13.6
Approach		1429	7.2	1429	7.2	0.861	35.4	LOS C	13.0	96.8	0.96	0.98	1.20	19.6
East: Help Street														
4	L2	23	21.7	23	21.7	0.080	37.2	LOS C	0.5	4.4	0.86	0.70	0.86	4.5
5	T1	310	4.2	310	4.2	0.970	70.1	LOS E	11.7	84.8	1.00	1.24	1.70	19.4
Approach		333	5.4	333	5.4	0.970	67.8	LOS E	11.7	84.8	0.99	1.20	1.65	19.0
North: Pacific Highway														
7	L2	1	100.0	1	100.0	0.890	40.0	LOS C	7.7	55.0	1.00	1.01	1.12	7.3
8	T1	1890	2.9	1890	2.9	0.890	37.6	LOS C	7.7	55.0	1.00	1.01	1.12	6.4
9	R2	398	3.5	398	3.5	0.872	40.0	LOS C	7.6	55.0	1.00	1.02	1.40	27.5
Approach		2289	3.1	2289	3.1	0.890	38.0	LOS C	7.7	55.0	1.00	1.01	1.17	12.2
West: Fullers Road														
10	L2	354	7.3	354	7.3	0.594	28.0	LOS B	9.1	67.1	0.83	0.81	0.83	32.2
11	T1	426	4.5	426	4.5	0.594	27.4	LOS B	9.1	67.1	0.89	0.78	0.89	32.5
12	R2	292	9.6	292	9.6	0.709	51.4	LOS D	4.3	32.8	1.00	0.95	1.56	22.6
Approach		1072	6.8	1072	6.8	0.709	34.1	LOS C	9.1	67.1	0.90	0.84	1.05	29.0
All Vehicles		5123	5.2	5123	5.2	0.970	38.4	LOS C	13.0	96.8	0.97	0.98	1.18	19.0

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P1	South Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P2	East Full Crossing	53	15.1	LOS B	0.1	0.1	0.58	0.58	
P3	North Full Crossing	53	34.7	LOS D	0.1	0.1	0.88	0.88	
P4	West Full Crossing	53	33.0	LOS D	0.1	0.1	0.86	0.86	
All Pedestrians		211	30.5	LOS D			0.81	0.81	

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

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MOVEMENT SUMMARY

Site: 101 [Pacific Highway / McIntosh Street Future AM]

Network: N101 [Future AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Arrival Flows HV	Flows Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Queue	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		veh/h	%	veh/h	%	v/c	sec		veh	m			km/h	
South: Pacific Highway														
3a	R1	1540	9.3	1540	9.3	0.347	3.0	LOS A	0.0	0.0	0.00	0.45	0.00	35.6
Approach		1540	9.3	1540	9.3	0.347	3.0	NA	0.0	0.0	0.00	0.45	0.00	35.6
East: McIntosh Street														
4	L2	53	0.0	53	0.0	0.167	7.2	LOS A	0.1	0.9	0.58	0.77	0.58	14.6
Approach		53	0.0	53	0.0	0.167	7.2	LOS A	0.1	0.9	0.58	0.77	0.58	14.6
NorthEast: Pacific Highway														
24b	L3	89	0.0	89	0.0	0.440	6.5	LOS A	20.8	148.3	0.00	0.52	0.00	42.9
24a	L1	2376	2.7	2376	2.7	0.440	4.5	LOS A	22.3	160.0	0.00	0.51	0.00	45.3
Approach		2465	2.6	2465	2.6	0.440	4.5	NA	22.3	160.0	0.00	0.51	0.00	45.2
All Vehicles		4058	5.1	4058	5.1	0.440	4.0	NA	22.3	160.0	0.01	0.49	0.01	43.0

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

Vehicle movement LOS values are based on average delay per movement.

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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MOVEMENT SUMMARY

 Site: 101 [Pacific Highway / Railway Street Future AM]

 Network: N101 [Future AM]

New Site

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Railway Street														
1b	L3	12	0.0	12	0.0	0.619	54.8	LOS D	2.1	15.0	1.00	0.80	1.11	9.1
3a	R1	138	3.8	138	3.8	0.619	52.8	LOS D	2.2	15.9	1.00	0.80	1.10	25.2
Approach		149	3.5	149	3.5	0.619	52.9	LOS D	2.2	15.9	1.00	0.80	1.10	24.3
NorthEast: Pacific Highway														
24a	L1	363	0.9	363	0.9	0.892	30.5	LOS C	26.2	186.6	0.86	0.93	1.02	34.2
25	T1	2503	2.5	2503	2.5	0.892	26.7	LOS B	29.8	213.1	0.90	0.97	1.06	31.8
Approach		2866	2.3	2866	2.3	0.892	27.2	LOS B	29.8	213.1	0.90	0.96	1.05	32.2
SouthWest: Pacific Highway														
31	T1	1534	8.5	1534	8.5	0.485	0.7	LOS A	3.0	22.2	0.10	0.09	0.10	59.1
32b	R3	76	22.2	76	22.2	0.250	38.7	LOS C	2.1	17.3	1.00	0.81	1.00	21.2
Approach		1609	9.2	1609	9.2	0.485	2.5	LOS A	3.0	22.2	0.14	0.13	0.14	56.5
All Vehicles		4625	4.7	4625	4.7	0.892	19.4	LOS B	29.8	213.1	0.64	0.67	0.74	38.7

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate		
		ped/h	sec		Pedestrian				
					ped	Distance m			
P1	South Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P8	SouthWest Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
All Pedestrians		105	39.3	LOS D			0.94	0.94	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

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

MOVEMENT SUMMARY

▽ Site: 101 [Mcintosh Street / Help Street Site Future PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Site Road												
1	L2	143	0.0	0.400	5.9	LOS A	1.9	13.4	0.29	0.60	0.29	45.1
3	R2	334	0.0	0.400	6.5	LOS A	1.9	13.4	0.29	0.60	0.29	48.9
Approach		477	0.0	0.400	6.3	LOS A	1.9	13.4	0.29	0.60	0.29	47.9
East: RoadName												
4	L2	116	0.0	0.109	5.5	LOS A	0.0	0.0	0.00	0.33	0.00	53.5
5	T1	91	0.0	0.109	0.0	LOS A	0.0	0.0	0.00	0.33	0.00	46.2
Approach		206	0.0	0.109	3.1	NA	0.0	0.0	0.00	0.33	0.00	52.1
West: McIntosh Street												
11	T1	31	0.0	0.024	0.3	LOS A	0.1	0.5	0.19	0.15	0.19	54.5
12	R2	13	0.0	0.024	2.8	LOS A	0.1	0.5	0.19	0.15	0.19	54.2
Approach		43	0.0	0.024	1.0	NA	0.1	0.5	0.19	0.15	0.19	54.3
All Vehicles		726	0.0	0.400	5.1	NA	1.9	13.4	0.20	0.50	0.20	48.9

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

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

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

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

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MOVEMENT SUMMARY

▽ Site: 101 [Railway Street / McIntosh Street Future PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway Street												
1	L2	94	0.0	0.162	4.1	LOS A	0.0	0.0	0.00	0.18	0.00	48.7
2	T1	216	1.5	0.162	0.0	LOS A	0.0	0.0	0.00	0.18	0.00	54.6
Approach		309	1.0	0.162	1.2	NA	0.0	0.0	0.00	0.18	0.00	52.6
North: Railway Street												
8	T1	296	7.5	0.205	0.3	LOS A	0.5	3.9	0.18	0.11	0.18	52.6
9	R2	62	0.0	0.205	6.7	LOS A	0.5	3.9	0.18	0.11	0.18	48.8
Approach		358	6.2	0.205	1.5	NA	0.5	3.9	0.18	0.11	0.18	51.7
West: McIntosh Street												
10	L2	303	0.0	0.470	7.3	LOS A	3.1	21.4	0.44	0.73	0.58	38.4
12	R2	171	0.0	0.470	10.7	LOS A	3.1	21.4	0.44	0.73	0.58	31.9
Approach		474	0.0	0.470	8.5	LOS A	3.1	21.4	0.44	0.73	0.58	36.3
All Vehicles		1141	2.2	0.470	4.3	NA	3.1	21.4	0.24	0.39	0.30	43.3

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

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

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

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

MOVEMENT SUMMARY

 **Site: 101 [Help Street / Railway Street Future PM]**

Help Street / Railway Street

Existing Conditions

AM Peak Period

Site Category: (None)

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway Street												
1	L2	97	28.9	0.143	15.7	LOS B	2.7	22.5	0.50	0.62	0.50	47.0
2	T1	145	3.4	0.479	20.6	LOS B	8.4	61.1	0.74	0.73	0.74	43.2
3	R2	133	6.0	0.479	29.7	LOS C	8.4	61.1	0.82	0.76	0.82	40.8
Approach		375	10.9	0.479	22.6	LOS B	8.4	61.1	0.71	0.71	0.71	43.2
East: Help Street												
4	L2	95	12.6	0.186	31.0	LOS C	3.1	24.2	0.78	0.75	0.78	38.8
5	T1	278	3.6	0.486	28.1	LOS B	10.1	72.9	0.87	0.74	0.87	41.1
6	R2	80	1.3	0.294	38.0	LOS C	3.1	21.6	0.92	0.76	0.92	36.3
Approach		453	5.1	0.486	30.4	LOS C	10.1	72.9	0.86	0.74	0.86	39.7
North: Railway Street												
7	L2	148	2.0	0.254	14.4	LOS A	4.9	36.0	0.49	0.60	0.49	48.7
8	T1	113	11.5	0.747	12.0	LOS A	8.9	66.0	0.54	0.64	0.57	47.7
9	R2	207	6.3	0.747	35.9	LOS C	8.9	66.0	0.85	0.87	1.01	37.1
Approach		468	6.2	0.747	23.3	LOS B	8.9	66.0	0.66	0.73	0.74	42.6
West: Help Street												
10	L2	29	3.4	0.488	43.4	LOS D	6.4	45.4	0.95	0.78	0.95	36.0
11	T1	253	2.0	0.488	38.3	LOS C	6.4	45.4	0.96	0.77	0.96	36.6
12	R2	8	100.0	0.488	44.9	LOS D	5.6	42.1	0.96	0.77	0.96	35.0
Approach		290	4.8	0.488	39.1	LOS C	6.4	45.4	0.96	0.77	0.96	36.5
All Vehicles		1586	6.7	0.747	28.0	LOS B	10.1	72.9	0.78	0.74	0.81	40.6

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P1	South Full Crossing	53	29.7	LOS C	0.1	0.1	0.81	0.81	
P2	East Full Crossing	53	15.1	LOS B	0.1	0.1	0.58	0.58	
P3	North Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P4	West Full Crossing	53	13.4	LOS B	0.1	0.1	0.55	0.55	
All Pedestrians		211	24.3	LOS C			0.72	0.72	

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

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MOVEMENT SUMMARY

 **Site: 101 [Pacific Highway / Victoria Avenue Future PM]**

 **Network: N101 [Future PM]**

Pacific Highway / Victoria Avenue

Existing Conditions

AM Peak Period

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		veh/h	%	veh/h	%	v/c	sec		veh	m			km/h	
South: Pacific Highway														
2	T1	1958	3.7	1958	3.7	0.513	6.3	LOS A	8.4	60.5	0.49	0.45	0.49	49.9
3	R2	166	5.4	166	5.4	0.558	17.1	LOS B	2.3	16.9	0.83	0.80	0.83	45.7
Approach		2124	3.9	2124	3.9	0.558	7.1	LOS A	8.4	60.5	0.52	0.47	0.52	49.2
East: Victoria Avenue														
4	L2	89	32.6	89	32.6	0.190	30.6	LOS C	1.8	15.9	0.77	0.75	0.77	38.6
6	R2	79	10.1	79	10.1	0.297	41.5	LOS C	1.9	14.5	0.91	0.76	0.91	25.7
Approach		168	22.0	168	22.0	0.297	35.7	LOS C	1.9	15.9	0.83	0.75	0.83	33.4
North: Pacific Highway														
7	L2	63	36.5	63	36.5	0.702	11.0	LOS A	7.0	51.8	0.39	0.39	0.39	48.9
8	T1	1405	3.5	1405	3.5	0.702	7.6	LOS A	10.3	74.4	0.48	0.45	0.48	50.3
Approach		1468	4.9	1468	4.9	0.702	7.7	LOS A	10.3	74.4	0.48	0.45	0.48	50.3
All Vehicles		3760	5.1	3760	5.1	0.702	8.6	LOS A	10.3	74.4	0.52	0.48	0.52	48.4

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Prop. Queued	Effective Stop Rate		
P1	South Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P2	East Full Crossing	53	13.9	LOS B	0.1	0.1	0.56	0.56	
P3	North Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
All Pedestrians		158	30.8	LOS D			0.81	0.81	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

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

MOVEMENT SUMMARY

 Site: 101 [Pacific Highway / Help Street / Fullers Road Future PM]  Network: N101 [Future PM]

Pacific Highway / Help Street / Fullers Road

Existing Conditions

PM Peak Period

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Pacific Highway														
1	L2	440	2.3	440	2.3	0.779	22.5	LOS B	12.0	86.1	0.77	0.86	1.03	38.6
2	T1	1513	4.7	1513	4.7	0.779	19.4	LOS B	13.7	99.8	0.79	0.76	0.86	20.6
Approach		1953	4.1	1953	4.1	0.779	20.1	LOS B	13.7	99.8	0.79	0.78	0.90	27.4
East: Help Street														
4	L2	50	16.0	50	16.0	0.169	37.9	LOS C	1.2	9.3	0.88	0.73	0.88	4.5
5	T1	504	5.0	504	5.0	0.794	42.9	LOS D	7.8	54.5	1.00	0.94	1.19	26.3
Approach		554	6.0	554	6.0	0.794	42.4	LOS C	7.8	54.5	0.99	0.92	1.16	25.2
North: Pacific Highway														
7	L2	8	0.0	8	0.0	0.565	17.0	LOS B	7.6	55.0	0.67	0.61	0.67	12.8
8	T1	1213	3.5	1213	3.5	0.565	13.1	LOS A	7.6	55.0	0.65	0.59	0.65	15.3
9	R2	158	10.1	158	10.1	0.742	20.8	LOS B	2.2	17.0	0.89	0.83	0.99	36.4
Approach		1379	4.2	1379	4.2	0.742	14.0	LOS A	7.6	55.0	0.68	0.62	0.69	21.5
West: Fullers Road														
10	L2	390	4.1	390	4.1	0.529	25.8	LOS B	8.1	58.5	0.79	0.81	0.79	32.9
11	T1	333	2.7	333	2.7	0.529	27.4	LOS B	8.1	58.5	0.87	0.75	0.87	32.8
12	R2	154	16.2	154	16.2	0.648	47.7	LOS D	4.1	32.5	0.99	0.91	1.33	23.7
Approach		877	5.7	877	5.7	0.648	30.3	LOS C	8.1	58.5	0.85	0.80	0.92	30.8
All Vehicles		4763	4.7	4763	4.7	0.794	22.8	LOS B	13.7	99.8	0.79	0.75	0.87	27.0

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Prop. Queued	Effective Stop Rate		
P1	South Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P2	East Full Crossing	53	16.2	LOS B	0.1	0.1	0.60	0.60	
P3	North Full Crossing	53	34.7	LOS D	0.1	0.1	0.88	0.88	
P4	West Full Crossing	53	22.8	LOS C	0.1	0.1	0.71	0.71	
All Pedestrians		211	28.3	LOS C			0.78	0.78	

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

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MOVEMENT SUMMARY

Site: 101 [Pacific Highway / McIntosh Street Future PM]

Network: N101 [Future PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Arrival Flows HV	Flows Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		veh/h	%	veh/h	%	v/c	sec		veh	m			km/h	
South: Pacific Highway														
3a	R1	2012	3.1	2012	3.1	0.470	3.1	LOS A	0.0	0.0	0.00	0.45	0.00	35.6
Approach		2012	3.1	2012	3.1	0.470	3.1	NA	0.0	0.0	0.00	0.45	0.00	35.6
East: McIntosh Street														
4	L2	222	0.0	222	0.0	0.531	7.6	LOS A	0.7	4.8	0.53	0.83	0.77	13.9
Approach		222	0.0	222	0.0	0.531	7.6	LOS A	0.7	4.8	0.53	0.83	0.77	13.9
NorthEast: Pacific Highway														
24b	L3	43	0.0	43	0.0	0.285	6.5	LOS A	1.8	12.8	0.00	0.51	0.00	43.0
24a	L1	1543	3.8	1543	3.8	0.285	4.5	LOS A	2.1	14.9	0.00	0.51	0.00	45.3
Approach		1586	3.6	1586	3.6	0.285	4.5	NA	2.1	14.9	0.00	0.51	0.00	45.3
All Vehicles		3820	3.1	3820	3.1	0.531	3.9	NA	2.1	14.9	0.03	0.50	0.04	40.6

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

Vehicle movement LOS values are based on average delay per movement.

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

MOVEMENT SUMMARY

 Site: 101 [Pacific Highway / Railway Street Future PM]

 Network: N101 [Future PM]

New Site

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Railway Street														
1b	L3	20	0.0	20	0.0	0.844	50.8	LOS D	6.7	46.9	0.97	0.96	1.29	9.7
3a	R1	446	0.7	446	0.7	0.844	48.8	LOS D	6.7	47.2	0.97	0.96	1.29	26.3
Approach		466	0.7	466	0.7	0.844	48.9	LOS D	6.7	47.2	0.97	0.96	1.29	25.9
NorthEast: Pacific Highway														
24a	L1	285	3.3	285	3.3	0.624	18.7	LOS B	11.6	83.5	0.71	0.71	0.71	41.0
25	T1	1700	3.3	1700	3.3	0.624	14.4	LOS A	12.0	86.7	0.73	0.67	0.73	40.4
Approach		1985	3.3	1985	3.3	0.624	15.0	LOS B	12.0	86.7	0.73	0.68	0.73	40.5
SouthWest: Pacific Highway														
31	T1	2191	2.0	2191	2.0	0.826	7.9	LOS A	21.4	152.6	0.58	0.55	0.59	50.7
32b	R3	53	32.0	53	32.0	0.284	12.8	LOS A	0.4	3.3	0.27	0.66	0.27	34.8
Approach		2243	2.7	2243	2.7	0.826	8.1	LOS A	21.4	152.6	0.57	0.55	0.58	50.5
All Vehicles		4695	2.8	4695	2.8	0.844	15.0	LOS B	21.4	152.6	0.68	0.65	0.71	42.7

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate		
		ped/h	sec		Pedestrian				
					ped	Distance m			
P1	South Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P8	SouthWest Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
All Pedestrians		105	39.3	LOS D			0.94	0.94	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

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

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