



10-16 Seven Hills Road, Baulkham Hills Traffic and Parking Assessment

Prepared for:
Think Planners

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The Transport Planning Partnership

10-16 Seven Hills Road, Baulkham Hills

Traffic and Parking Assessment

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APPENDICES

- A. TRAFFIC SURVEY
- B. DESIGN PLANS
- C. SIDRA OUTPUT

1 Introduction

1.1 Background

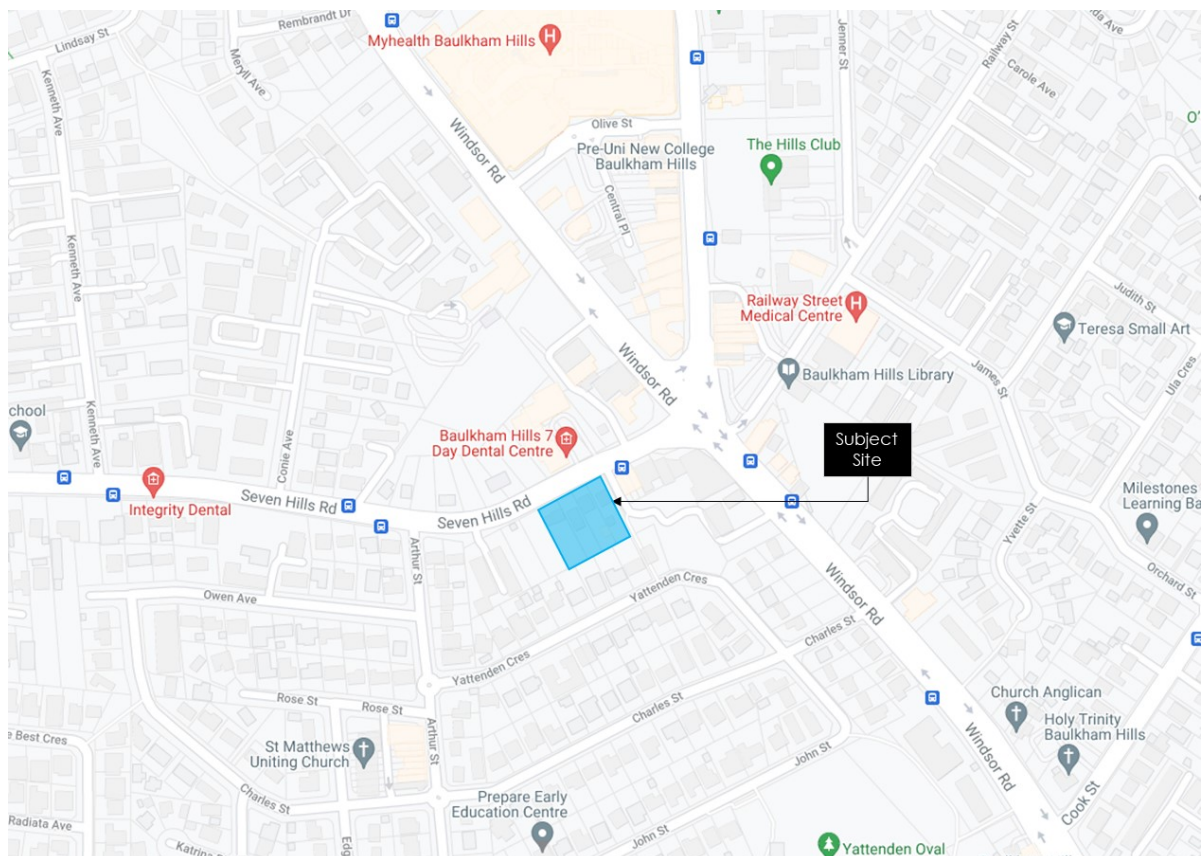
This traffic and parking assessment relates to a proposed high density residential development at 10-16 Seven Hills Road, Baulkham Hills. Locality of the subject site is shown in Figure 1.1.

The Planning Proposal seeks an uplift from The Hills Shire Council's planning controls for the maximum allowable floor space area and gross floor area. This would result in an increase from 50 residential units to 66 residential units in the seven-storey buildings. The development is located in Zone R4 where high density residential developments are permitted, but outside the boundary of Baulkham Hills town centre.

The proposed development includes a two-level basement car park with a vehicular access located on the south side of Seven Hills Road.

Traffic impact associated with the complying design yield and the proposed uplift has been assessed in this traffic assessment.

Figure 1.1: Locality Map



1.2 Structure of the Report

The layout of the report is set out as follows:

- Section 2 discusses the existing conditions including a description of the site.
- Section 3 provides a brief description of the proposed development.
- Section 4 assesses the parking implications and requirements.
- Section 5 assesses the traffic generation and its implications.
- Section 6 presents the conclusion of the assessment.

1.3 References

In preparing this report, reference has been made to the following:

- An inspection of the site and surrounds
- Australian Standards AS2890 series for parking facilities
- The Hills Development Control Plan 2012 (DCP2012)
- The Guide to Traffic Generating Developments V2.2, October 2002 (The Guide)
- The Guide to Traffic Generating Developments – Updated traffic surveys TDT 2013/04a (TDT2013/04a)
- Architectural plans prepared for the development proposal
- Other documents as referenced in this report.

1.4 TfNSW Comments

This assessment responded to the following TfNSW queries:

Traffic and Parking Assessment

- The Traffic and Parking Assessment prepared by The Transport Planning Partnership (TPPP) dated 7 October 2021 needs to be updated as it still refers to the uplift from 50 apartment units to 91 units while the Addendum Traffic Assessment also prepared by TPPP dated 28 November 2022 and the Planning Proposal states that the proposed uplift is proposed to be 66 apartments.
- The updated Traffic and Parking Assessment must also include amended parking rates that reflect the correct proposed number of apartments and scale of the development and referred to TfNSW for review prior to the making of the Plan.
- Even though the Addendum Traffic Assessment was submitted with the documentation for review and includes information that was not included in the previous traffic report it would have been beneficial if the whole Traffic and Parking Assessment was updated instead.

Addendum Traffic Assessment

- Section 4: Existing Traffic Volumes, noting the survey was completed on Tuesday, however traffic counts should be performed on Thursday (Tuesday has usually lowest volume). This will provide TfNSW with an accurate understanding of the existing traffic conditions and the actual impact of this planning proposal and future development application to the surrounding network.
- Page 5: States that *"for consistency purposes, the SCATS 2019 and 2022 data was used to derive adjustment factors for each approach at each intersection respectively for the AM and PM peak hours."* The following questions require clarification:
 - Was each approach adjusted to replicate the same volumes as what SCATS reports?
 - Did the model only include SCATS volumes?
 - Show the adjustment factors used and the unadjusted existing traffic volumes.
- Figures of the SIDRA models were not provided. We are unable to discern whether what has been modelled adequately represents existing or post-development scenario.
- Degree of Saturation and 95 % back of queue distance were also not provide for us to gauge potential capacity or storage issues. Please provide the SIDRA models.

Loading Docks and Driveway Requirements

- All loading/unloading to be fully within the Site.
- No roller door directly at entry on site frontage.
- There shall be sufficient space for private vehicles to exit Seven Hills Rd, turn around, then re-enter Seven Hills Rd in a forward direction.
- Exit Driveway should support Left-turn only signage to Seven Hills Rd.

This traffic and parking assessment has amalgamated the previous traffic and parking assessment (21118-L01V03-211007-Traffic Statement) and addendum (21118-L02V06-221128-Addendum for Traffic Modelling) into a single report for TfNSW approval.

Refer to Section 4 for the updated parking assessment.

Refer to Section 2.4 for the justification the Tuesday traffic volume data.

Refer to Section 2.3 for the Covid adjustment factors applied to the individual traffic movements on the surveyed traffic volumes.

Refer to Section 5.7.2 for the modelling results including the degree of saturation and 95% back of queue lengths.

Given the development is currently at the planning proposal stage, matters in relation to loading docks and driveway will be considered at Development Application (DA) stage when detailed plans are prepared however these matters are readily achievable.

2 Existing Conditions

2.1 Surrounding Road Network

Access to the subject site is via a number of state and local roads, including Windsor Road, Seven Hills Road and Arthur Street. A brief description of these roads is provided below.

Windsor Road is a State Road that connects Wilberforce Road to the north and James Ruse Drive to the south. In the vicinity of the site, Windsor Road provides three travel lanes in each direction separated by a median. There is a 24-hour bus lane on Windsor Road southbound. Clearways have recently been extended and operate at all times in both directions of Windsor Road. The posted speed limit is 60km/h on Windsor Road.

Windsor Road intersects with Seven Hills Road at a signalised intersection. It is understood that The Hills Shire Council historically suggested grade separation of the intersection, but Transport for NSW (TfNSW) is of the view that it is unlikely to be viable due to construction constraints and significant costs involved, and recommends that augmentation of the existing transport infrastructure is more viable to improve intersection capacity, and setback of the development frontages be allowed for future road widening to accommodate potential upgrades.

Seven Hills Road is a regional road that connects Windsor Road to the east and Prospect Highway to the west. In the vicinity of the site, Seven Hills Road provides two travel lanes in each direction separated by a median that was installed in year 2020.

“No Parking” signs have been installed on both sides of the road, and is operational 6:30am-9:30am and 3:30pm-6:30pm on the south side of the road, and 3pm-6pm on the north side of the road. The posted speed limit is 60km/h on Seven Hills Road.

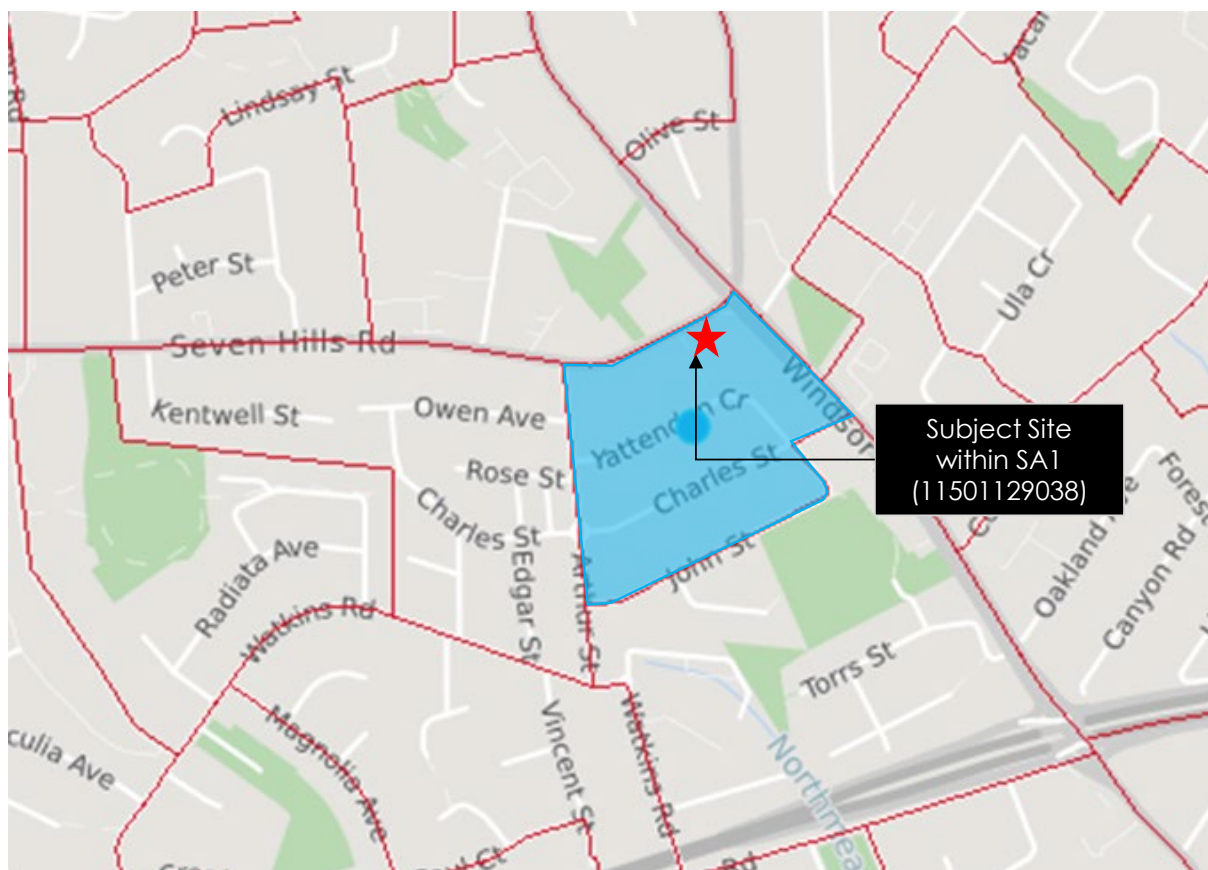
Arthur Street is a two-lane two-way local road that connects Seven Hills Road to the north and Watkins Road to the south. “No Stopping” signs are provided between Seven Hills Road and Owen Avenue to increase intersection capacity, but parking is permitted to the south of Owen Avenue. The posted speed limit is 50km/h on Seven Hills Road.

A roundabout is located at the Arthur Street – Yattenden Crescent intersection to accommodate U-turn movements from Seven Hills Road due to the recent installation of traffic median that prevents right turn movements to/from the properties. Arthur Street – Seven Hills Road intersection has been signalised recently to better accommodate the right turn movements from Arthur Street onto Seven Hills Road.

2.2 Journey to Work

Journey to Work (JTW) data from the Bureau of Transport Statistics (BTS), derived from the 2016 Census, has been obtained to understand existing transportation modes to and from the subject site located within SA1 (11501129038) as shown in Figure 2.1.

Figure 2.1: SA1 Usual Residence



A summary of the top destinations for employed residents from this SA1 is presented in Table 2.1.

Table 2.1: Top Work Destinations

Top Destinations for Workplace	Percentage
Baulkham Hills	29%
Parramatta	15%
Chatswood - Lane Cove	14%
Strathfield - Burwood - Ashfield	11%
Auburn	9%
Merrylands - Guildford	6%
Blacktown	6%

Fairfield	5%
Sydney Inner City	5%
Total	100%

Reference: Census 2016

A summary of the existing mode splits of transportation is presented in Table 2.2 for the associated SA1 and compared with those across Baulkham Hills referenced from with Profile.ID.

Table 2.2: Mode Share

Transport Mode	Mode Share at the Associated SA1	Mode Share Across Baulkham Hills
Train	0%	5%
Bus	36%	19%
Car (as driver or passenger)	61%	74%
Truck	0%	1%
Motorbike	0%	0%
Bicycle	0%	0%
Walk Only	3%	1%
Total	100%	100%

Reference: Census 2016 and Profile ID (<https://profile.id.com.au/the-hills/travel-to-work?WebID=110>)

Table 2.2 indicates 36% of the employed residents surrounding the subject site would take public transport to work while 61% would travel by cars. The take up of public transport (36%) is considered high as it is located away from train stations, and it is also much higher than the figure across Baulkham Hills (24%).

Notwithstanding the above, the take up of public transport is expected to have increased since 2016 with the operation of the Sydney Metro North West Line which provides frequent services between Tallawong and Chatswood, and direct connection at Epping and Chatswood stations to other train lines. Bus Routes 600 and 610X provide services between Old Northern Road (4 minute walk from the site) and Castle Hills Metro Station.

2.3 Existing Traffic Volumes

TTPP commissioned traffic movement counts at key intersections in the vicinity of the site on Tuesday, 21 June 2022 between 7:00am-9:00am and between 4:00pm-6:00pm.

The key intersections are:

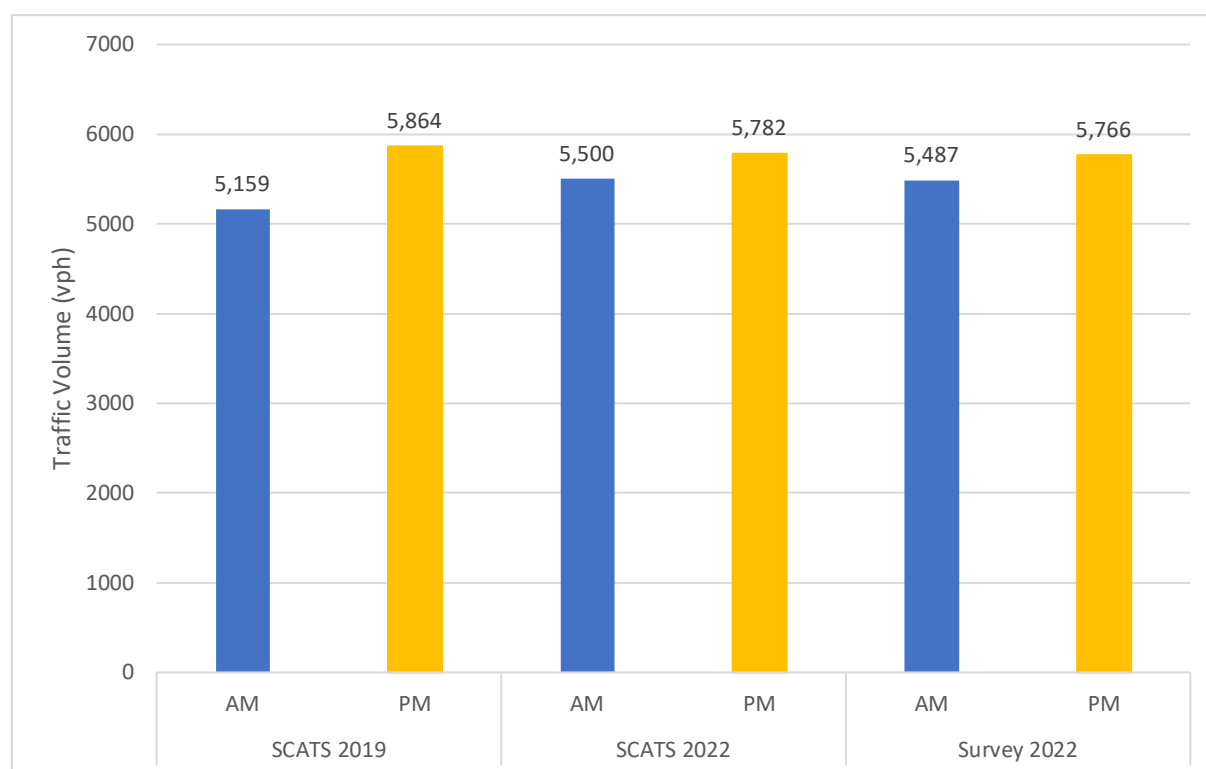
- Windsor Road – Seven Hills Road – Old Northern Road (traffic signals)
- Seven Hills Road – Arthur Street (traffic signals)
- Arthur Street – Yattenden Crescent (roundabout).

The weekday AM peak and PM peak hours are 8:00am to 9:00am and 4:45pm to 5:45pm respectively.

To confirm whether the surveyed traffic volumes collected in June 2022 have resumed to pre-Covid conditions, TTPP has reviewed historical 2019 (pre-Covid) SCATS count data to quantify the traffic fluctuation. SCATS traffic count data at the Windsor Road-Seven Hills Road-Old Northern Road intersection was obtained from TfNSW for a typical Tuesday in June 2019 and the same survey day on 21 June 2022.

Figure 2.2 shows the difference in the total traffic movement volumes at the Windsor Road-Seven Hills Road-Old Northern Road intersection between Year 2019 and Year 2022 for the weekday AM and PM peak hours.

Figure 2.2: Comparison of Total Traffic Volumes at the Windsor Road-Seven Hills Road-Old Northern Road Intersection in 2019 and 2022



From Figure 2.2, the SCATS 2019 data shows that there was a total traffic volume of 5,159 vehicles per hour (vph) in the AM peak and 5,864 vph in the PM peak at the Windsor Road-Seven Hills Road-Old Northern Road intersection.

The 2019 and 2022 SCATS data shows an increase of 341 vph during the AM peak and a decrease of 82 vph during the PM peak, indicating the traffic volume in the PM peak has not fully recovered to the year 2019 level. For consistency purposes, the SCATS 2019 and 2022 data was used to derive adjustment factors for each approach at each intersection respectively for the AM and PM peak hours.

TTPP applied the Covid adjustment factors to the 2022 surveyed traffic volume based on individual traffic movements shown in Table 2.3 and Table 2.4.

Table 2.3: Covid Adjustment Factors for Windsor Rd, Seven Hills Rd, Old Northern Rd Intersection (TCS 322)

Approach	Movement	Adjustment Factor	
		AM Peak	PM Peak
Windsor Road	Westbound Through	1.02	1.06
	Westbound Right Turn	1.00	1.14
	Westbound Left Turn	1.00	1.05
	Eastbound Through	1.00	1.06
	Eastbound Left Turn	1.00	1.13
Old Northern Road	Southbound Through	1.01	1.00
	Southbound Left Turn	1.37	1.01
Seven Hills Road	Northbound Left Turn/Through	1.00	1.00
	Northbound Right Turn	1.00	1.00

Table 2.4: Covid Adjustment Factors for Seven Hills Rd and Arthur St Intersection (TCS 4634)

Approach	Movement	Adjustment Factor	
		AM Peak	PM Peak
Seven Hills Road	Eastbound Through	1.00	1.00
	Eastbound Right Turn	1.00	1.00
	Westbound Through	1.01	1.05
	Westbound Left Turn	1.01	1.05
Arthur Street	Left Turn	1.01	1.05
	Right Turn	1.00	1.00

Note: if the adjustment factor is lower than 1.00, no reduction is made to the 2022 survey traffic volume to enable a conservative estimate.

Based on the above, the adjusted 2022 traffic volumes are shown in Figure 2.3 and Figure 2.4.

Figure 2.3: Adjusted Existing AM Traffic Volumes

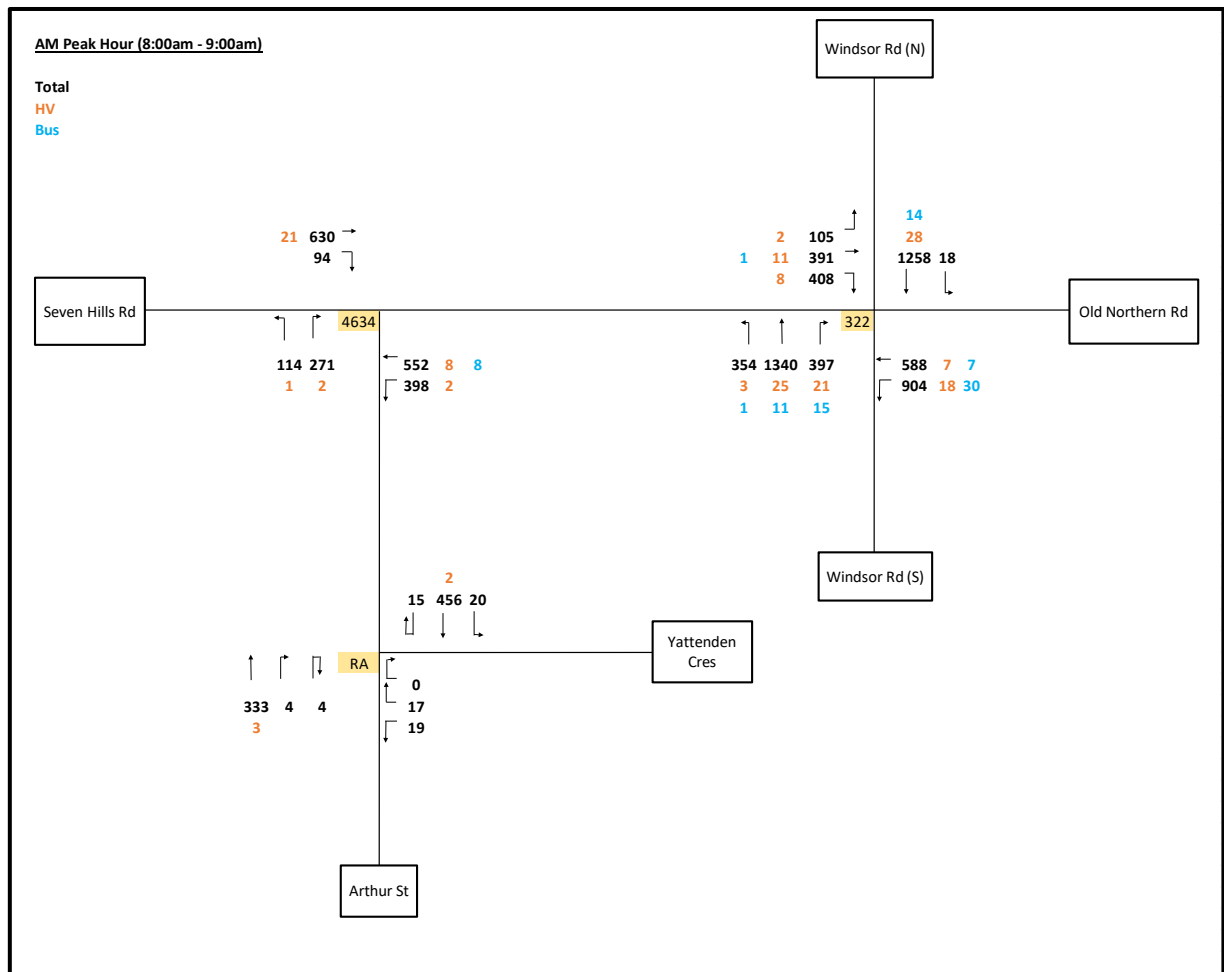
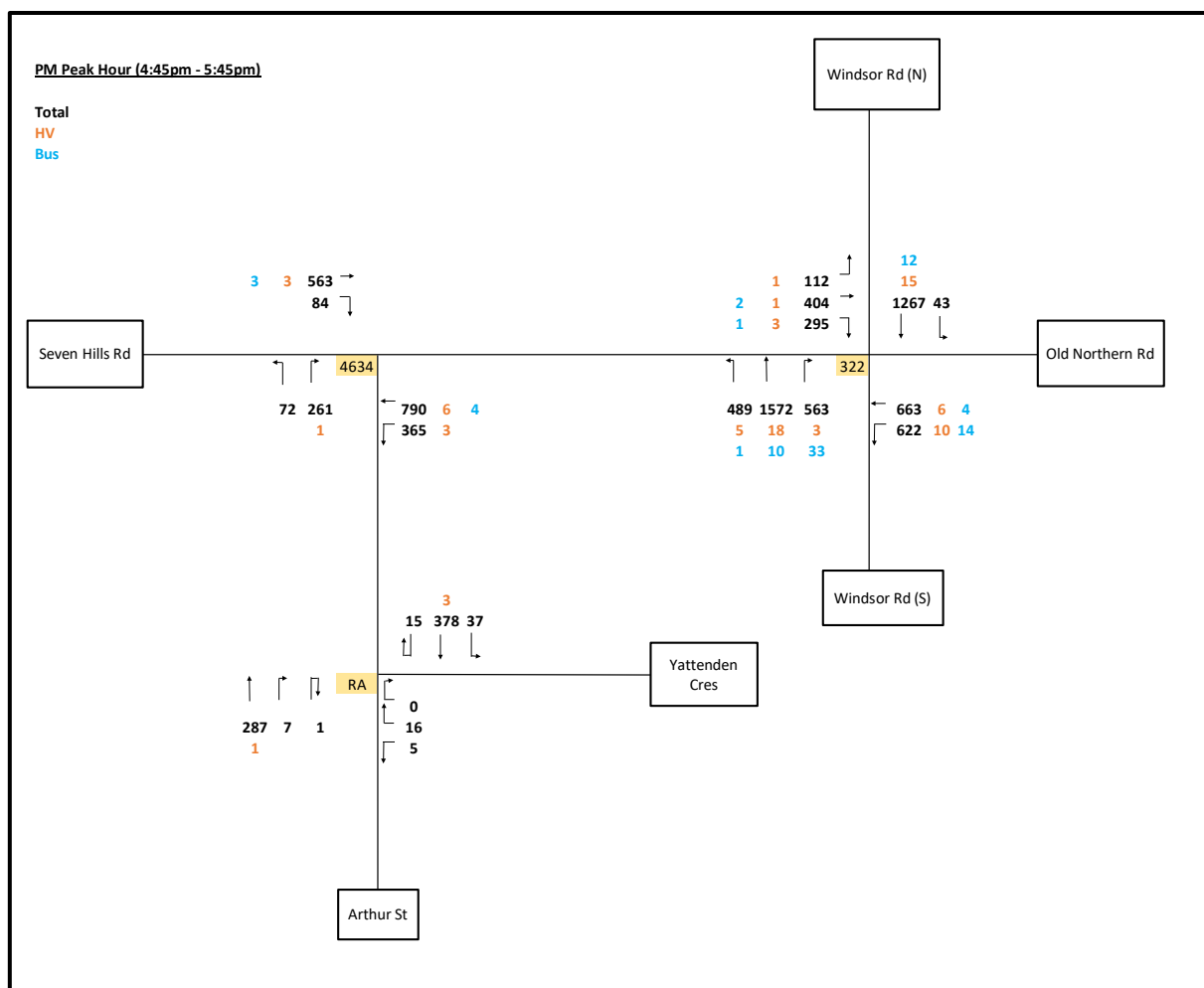


Figure 2.4: Adjusted Existing PM Traffic Volumes



2.4 Justification of Tuesday Traffic Volume Counts

Transport for NSW advised that the existing traffic volumes survey should be performed on Thursday with the justification that Tuesday usually has the lowest volumes. However, given that the proposed development is a residential development, traffic surveys are not necessary to be collected on Thursday to take into account shopping nights.

TTPP has conducted a review of TfNSW traffic data to compare Tuesday and Thursday traffic volumes based on TfNSW's closest permanent count station located on Old Northern Road (72026). The traffic volume was recorded for the third week in June 2018 as shown in Table 2.5, which aligns with the TTPP traffic survey undertaken on Tuesday 21 June 2022 (i.e., the third week in June).

Table 2.5: Traffic Volumes in June 2018

Third Week in June 2018	TfNSW Traffic Volume (Count Station 72026)	
	8-9am	5-6pm
Tuesday 19/6/2018	2,564	2,241
Thursday 21/6/2018	2,522	2,210
Difference (Thursday minus Tuesday)	-42	-31

Source: TfNSW Traffic Volume Viewer. The above peak hours are to best match with 8-9am and 4:45-5:45pm as identified in the 2022 traffic survey.

The above TfNSW data indicates that the peak hour traffic volume is marginally higher on Tuesday as compared with Thursday, but it is not expected to make any material difference in traffic modelling results.

TTPP has also conducted a review of TfNSW traffic data based on another permanent count station which is located on Windsor Road (72027). The traffic volumes for all Tuesdays and Thursdays (school days only) were recorded for year 2023 and averaged.

Table 2.6: Average Traffic Volumes in 2023

All school days in 2023	Average TfNSW Traffic Volume (Count Station 72027)	
	8-9am	5-6pm
Tuesdays	3,524	3,722
Thursdays	3,477	3,695
Difference (Thursday minus Tuesday)	-47	-27

Source: TfNSW Traffic Volume Viewer. The above peak hours are to best match with 8-9am and 4:45-5:45pm as identified in the 2022 traffic survey.

Table 2.6 indicates that the average peak hour traffic volume throughout the year is higher on Tuesdays as compared with Thursdays. Hence, using traffic volume data from the survey conducted on Tuesday, 21 June 2022 is a valid method for traffic modelling.

It should be emphasised that the proposed uplift of 16 units would generate an addition of 5 vehicles per hour in the road network as further discussed in Table 5.4. The development as a minor traffic contributor is not expected to impose any adverse traffic impact on the road network, whether the traffic model was developed based upon the Tuesday or Thursday traffic volume.

3 Proposed Development

3.1 Development Description

The proposed high density residential development consists of 50 units based on The Hills Shire Council's planning controls for the maximum allowable floor space area and gross floor area.

This Planning Proposal seeks an uplift to 66 units with one to three bedrooms.

3.2 Vehicular Access and Parking

Vehicle access to the car park will be provided via a driveway on the south side of Seven Hills Road. The car park would provide two basement levels with parking provision generally in accordance with The Hills Development Control Plan. Design drawings of the basement car park is provided in Appendix A.

3.3 Waste Collection

Waste collection will take place in Basement level 1, where the bins will be stored in two bin rooms. The basement has been designed to allow for a garbage truck to enter and exit in a forward direction using the turntable, in accordance with the Hills Shire DCP.

4 Parking and Loading Assessment

4.1 Car Parking Requirements

The car parking requirements for the residents of the proposed high density residential development has been assessed against The Hills Development Control Plan (DCP) 2012. The DCP sets out the following minimum car parking rates (round up) for the development:

- 1 space per 1 bedroom
- 2 spaces per 2 or 3 bedroom unit

For visitor parking, The Hills DCP requires two spaces per five units which is considered excessive as compared with the DCPs of most surrounding Councils. A comparison is shown in Table 4.1.

Table 4.1: Visitor Parking Rates in Surrounding DCPs

Land Use	DCP	Minimum Parking Rate
High Density Residential	The Hills 2012	2 spaces per 5 dwellings
	Parramatta 2011	1 space per 4 dwellings
	Draft Cumberland Part G	1 space per 4 dwellings
	Auburn DCP 2010	1 space per 5 dwellings
	Hornsby 2013	1 space per 5 dwellings
	Blacktown 2015	1 space per 2.5 dwellings
Average of Other DCPs	-	1 space per 4.1 dwellings

Visitor parking rate in The Hills DCPs is considered an outlier in this analysis with most surrounding Councils require lower rates. Given there are reasonable bus services located immediately adjacent to the Baulkham Hills town centre, it is reasonable to adopt an average of these surrounding DCPs, namely, 1 space per 4.1 dwellings.

For the 66 units in the uplift design, application of The Hills DCP would require 26 visitor spaces which are considered excessive. Application of the average rate from these surrounding Councils would be 17 visitor spaces which are considered more reasonable and aligned with other Councils' DCPs.

On this basis, the car parking requirements for the proposed development is summarised in Table 4.2.

Table 4.2: Car Parking Assessment

Land Use	Type	Yield	Reference	Minimum Parking Rate	Minimum Parking Requirement (Rounded up)	Proposed Provision
High Density Residential	1-bedroom	12 units	The Hills DCP	1 space per dwelling	12.0	147
	2-bedroom	44 units	The Hills DCP	2 space per dwelling	88.0	
	3-bedroom	10 units	The Hills DCP	2 space per dwelling	20.0	
	Visitor	-	Average of other DCPs	1 spaces per 4.1 dwellings	16.1	
Total	-	66 units		-	136.1	147
Rounded	-	-		-	137	147

Based on the DCP parking rate for residents and average DCP parking rate for visitors, the minimum parking requirement would be 137 spaces. As such, the uplift design with 147 spaces would satisfy these requirements with a surplus of 10 spaces.

On the other hand, had The Hills DCP visitor parking rate was applied instead of the average rate of surrounding Councils, the minimum parking requirement would have been 147 spaces. This means the uplift design is exactly compliant with the DCP.

Regardless, it is considered that the 10 surplus parking spaces would accommodate accessible parking spaces and shared spaces for adaptable units which would be detailed in the subsequent DA stage.

4.2 Bicycle Parking Requirements

The Hills DCP does not stipulate any requirements for bicycle parking for residential developments.

4.3 Motorcycle Parking Requirements

The Hills DCP stipulates that motorcycle parking for all developments be provided at a rate of 1 motorcycle space per 50 spaces or part thereof. Given there are 201 car parking spaces, four motorcycle parking spaces are required.

4.4 Car Wash

The Hills DCP also requires a car wash bay to be provided and this may be a visitor space when it is not in use. The uplift design proposes the car wash bay to be provided in one of the surplus spaces.

4.5 Car Park Access and Layout

A car park layout, the access ramps, access ramp gradients, headroom clearance etc will be designed in accordance with AS2890.1, AS2890.2 and AS2890.6. It is presumed that a condition of consent will be imposed to ensure compliance.

A review of the following design elements will be provided in the next stage of the project to ensure compliance:

- The basement car park spaces will be designed in compliance with AS2890.1 for Class 1A residential parking facilities with dimensions of 2.4m wide by 5.4m long and 5.8m parking aisles.
- Accessible parking spaces will be designed in accordance with AS2890.6 with a 2.4m width and 5.4m length, and adjacent shared area of the same dimensions to enable side ramp access. Bollards would be placed in shared areas as per AS2890.6.
- A minimum aisle width of 5.8m will be provided. An additional 300mm will be provided in front of car spaces with columns or walls on the opposite side. Sufficient aisle width will be provided to accommodate the Council waste vehicle to and from the loading area.
- The ramp will be designed to meet AS2890.2 requirements on gradient and ground clearance suitable for waste vehicle to the loading area where a turntable is provided to facilitate turnaround movement.
- A minimum clear head height of 2.2m will be provided for all circulation areas within the basement car park as required by AS2890.1. A clear head height of 2.5m is also provided above all the accessible parking spaces as required by AS2890.6.
- All columns will be located outside of the parking space design envelope as specified in Figure 5.2 of AS 2890.1.
- Dead-end aisles will provide with the required 1.0m aisle extension in accordance with Figure 2.3 of AS2890.1, except for those aisles where accessible parking spaces are located at the end where a 1.0m extension is not required.
- Appropriate splays will be provided in accordance with the requirements of Figure 3.3 of AS2890.1 at the access driveway.

5 Traffic Assessment

5.1 Target Mode Share

Mode share of the future residents associated with the subject development is expected to be similar to those recorded in SA1 in Census 2016, as shown in Figure 2.1. Census data was collected in 2016 prior to the opening of Sydney Metro North West Line which provides frequent services between Tallawong and Chatswood, with peak services once every four minutes. As such, residents would have an option to drive or take a bus to the nearest Metro station at Norwest or Castle Hill.

On this basis, the target mode share, as shown in Table 5.1, allows for an assumed 10% take up of metro with less dependency on private vehicles, especially for those destinations along the metro/ train lines as shown in Table 2.1. The assumption of 10% is indicatively only for analytical purposes.

Table 5.1: Target Mode Share

Transport Mode	Existing Mode Share at SA1 11501129038	Target Mode Share
Metro/Train	0%	10%
Bus	36%	32%
Car (as driver or passenger)	61%	55%
Truck	0%	0%
Motorbike	0%	0%
Bicycle	0%	0%
Walk Only	3%	3%
Total	100%	100%

5.2 STFM Traffic Growth

The Sydney's Strategic Travel Forecast Model (STFM) provided by TfNSW is a strategic transport planning model that considers population and employment growths and is used for high level of assessment of major infrastructure proposals, transport strategies and policy decision making.

The STFM provides future year traffic volumes to determine the relative traffic growth between baseline traffic and future year traffic conditions. These rates have been adopted to determine the future base traffic volumes.

5.3 Surrounding Approved Developments

A review of approved developments near the site was carried out as shown in Table 5.2. These developments are likely to share common vehicular routes with the subject DA, and thus, a cumulative traffic assessment was undertaken.

Table 5.2: Approved Developments

Development	Yield
2-4 Seven Hills Road, Baulkham Hills (Modena Apartments)	233 residential apartment units and 4,263m ² retail area
2-4 Old Northern Road, Baulkham Hills	44 residential apartment units, 591.5m ² retail area, 452m ² of commercial area

5.4 Traffic Generation

5.4.1 Existing Traffic Generation

The RMS Technical Direction TDT2013/04a has been the source for determining the traffic generation associated with the existing site.

There are currently four single dwelling houses at the subject site. Based on the RMS trip rates for low-density dwellings in urban areas, which is 0.95 trips per dwelling in the AM peak and 0.99 trips per dwelling in the PM peak, the existing dwellings are estimated to generate approximately four trips in each peak period.

5.4.2 Potential Traffic Generation of the Surrounding Approved Developments

The vehicle trips to be generated from the approved developments at 2-4 Seven Hills Road, Baulkham Hills (Modena Apartments) and 2-4 Old Northern Road, Baulkham Hills have been considered in the future base case in a cumulative traffic assessment.

The trip rates for 2-4 Old Northern Road, Baulkham Hills were obtained from the Varga Traffic Planning Traffic and Parking Assessment Report.

The DA traffic report for 2-4 Seven Hills Road, Baulkham Hills could not be obtained. Therefore, the trip generation has been estimated for the residential and retail components.

The high-density residential development is located at a distance greater than 800m from the closest train station or metro station. Typical traffic generation estimates for the approved high density residential development have been sourced from the RMS (now TfNSW) Guide to Traffic Generating Developments (2002), as follows:

- AM peak hour vehicle trips = 0.29 trips/ unit

- PM peak hour vehicle trips = 0.29 trips/ unit.

Based on site observations and driveway counts undertaken at the Modena Apartment on the same survey day (21 June 2022), it is understood that apartments are starting to be occupied. Based on the driveway counts, it is expected that the existing traffic volumes possibly involving residents, fitout workers and deliveries etc. recorded at the Yattenden Crescent driveway which is 10% of total potential traffic generation. This level of traffic generation is equivalent to 23 units out of 233 units for analytical purposes.

Trip generation rates for the retail component have been sourced from TfNSW's Trip Generation Surveys – NSW Small Suburban Shopping Centres report (November 2018). The following rates have been used based on the conversion of exponential models with the GLFA of the survey sites ranging from 1,000m² to 6,000m² for the AM and PM peak periods on Wednesday/ Thursday:

- AM peak hour: 0.066GLFA + 126 during the morning peak hour
- PM peak hour: 0.089GLFA + 170 during the afternoon peak hour.

Notwithstanding this, a 15% factor for the linked trips has been applied to retail traffic to account for those who live in the apartments above and are able to walk to the shops, and hence would not generate vehicular traffic.

The peak hourly trip generation associated with each of these developments has been summarised in Table 5.3.

Table 5.3: Potential Trip Generation of the Surrounding Approved Developments

Development	Land Use	Yield	Trip Rate		Trip Generation	
			AM Peak	PM Peak	AM Peak	PM Peak
2-4 Seven Hills Road, Baulkham Hills (Modena Apartments)	Residential	Approximately 210 unoccupied apartment units *	0.29 trips per unit	0.29 trips per unit	61 trips	61 trips
	Retail	4,263m ² (3,197.3m ² GLFA) **	0.066GLFA + 126 (with a 15% discount for linked trips)	0.089GLFA + 170 (with a 15% discount for linked trips)	286 trips	386 trips
2-4 Old Northern Road, Baulkham Hills	Residential	44 apartment units	0.19 trips per unit	0.15 trips per unit	8 trips	7 trips
	Retail	591.5m ²	1.6 trips per 100m ² GFA	1.2 trips per 100m ² GFA	10 trips	7 trips
	Commercial	452m ²			7 trips	5 trips

* Potential trip generation calculated for unoccupied units, estimated to be approximately 90% of total yield (i.e. 210 apartments)

** GLFA is 75% of GFA in accordance with the TfNSW Guide 2002

The surrounding developments are expected to generate a total of 372 trips in the AM peak hour and 466 trips in the PM peak hour.

5.4.3 Potential Traffic Generation of the Subject Development

The subject high density residential development is located at a distance greater than 800m from the closest train station or metro station. Typical traffic generation estimates for the proposed high density residential development have been sourced from the RMS (now TfNSW) Guide to Traffic Generating Developments (2002), as follows:

- AM peak hour vehicle trips = 0.29 trips/ unit
- PM peak hour vehicle trips = 0.29 trips/ unit.

A summary of the traffic generation estimate is shown in Table 5.4 for the complying yield and the proposed uplift. For the trips generated from the residential area, it has been assumed 20% of trips are inbound and 80% of trips are outbound in the AM peak hour, and these have been reversed in the PM peak hour.

Table 5.4: Traffic Generation Estimates

Design	Land Use	Yield	TfNSW Trip Rate		AM Traffic Generation		PM Traffic Generation	
			AM Peak	PM Peak	Inbound	Outbound	Inbound	Outbound
Existing	Low Density Residential	4 dwellings	0.95 trips per dwelling	0.99 trips per dwelling	1	3	3	1
Based on Council Planning Control	High Density Residential	50 units	0.29 trips per unit	0.29 trips per unit	3	12	12	3
Net Increase from existing traffic generation	-	-	-	-	2	9	9	2
Proposed Uplift	High Density Residential	+ 16 units	0.29 trips per unit	0.29 trips per unit	1	4	4	1
Net Increase from Planning Proposal	-	-	-	-	1	4	4	1
Total Development	High Density Residential	66 units	0.29 trips per unit	0.29 trips per unit	4	15	15	4
Net Increase from existing traffic generation	-	-	-	-	3	13	13	3

Note: Numbers may not add up due to rounding

The development with a complying yield of 50 units is estimated to generate 15 trips in the AM and PM peak hours. This is a net increase of 11 trips in the AM and PM peak hours from the existing use of the site.

The proposed uplift with an increase of 16 units is estimated to generation an additional of 5 trips in the AM and PM peak hours from the complying yield of 50 units.

Overall, the proposed development of 66 units is estimated to generate 19 trips in the AM and PM peak hours, with a net increase of 16 vehicle trips in both AM peak and PM peak hours from the existing use of the site. This addendum assessed the traffic impact arising from 19 trips associated with the total traffic generation of the proposed development.

5.5 Traffic Distribution

Review of the Journey to Work data indicates the directional distributions of trips to/from the associated SA1 are shown in Table 5.5. It has been assumed a 10% shift of driving to the north to Castle Hill Metro Station for analytical purposes.

Table 5.5: Traffic Distribution

Route	Directional Split (Based on Census 2016)	Directional Split (with 10% Shift to Metro Station Located North of the Subject Site)
To/from north via Windsor Road	15%	15%
To/from north via Old Northern Road	15%	25%
To/from south via Windsor Road	48%	48%
To/from east via the M2 motorway	18%	8%
To/from west via the M2 motorway	2%	2%
To/from west via Seven Hills Road	2%	2%
Total	100%	100%

Reference: Census 2016

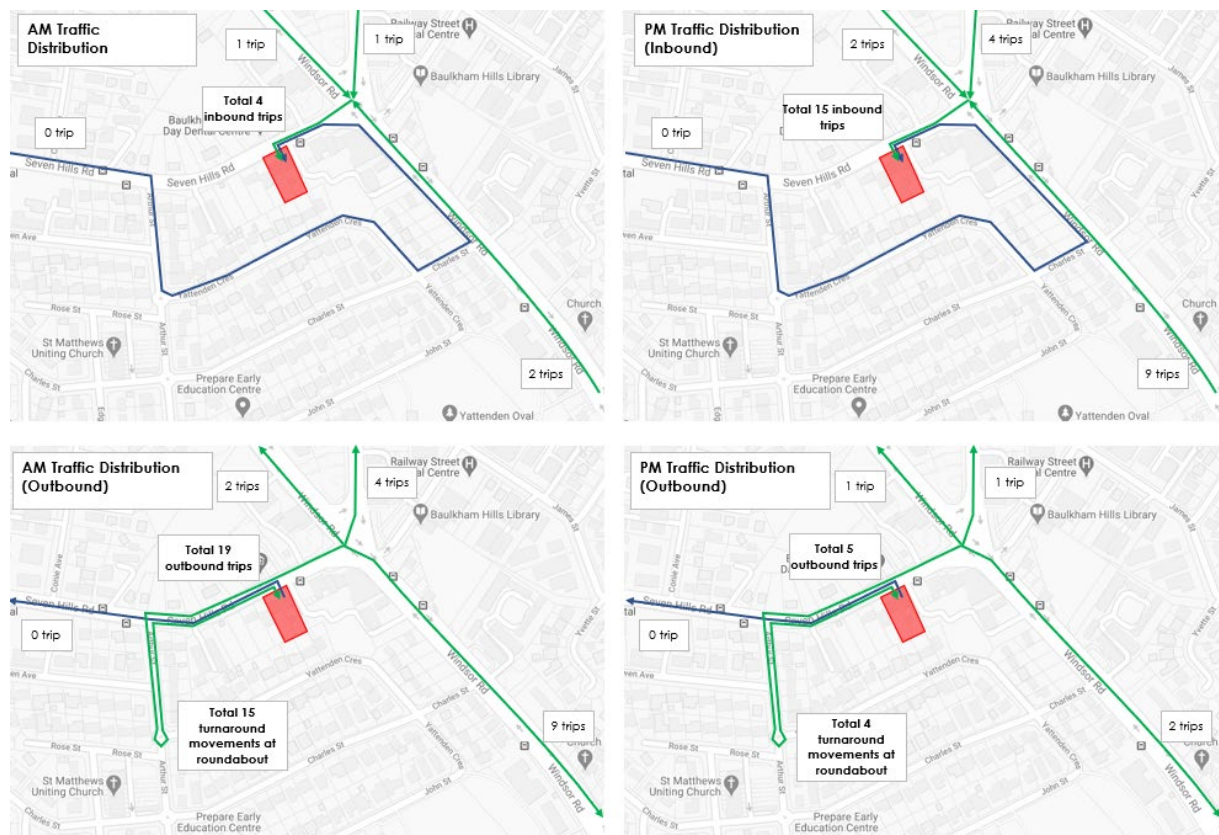
The traffic median on Seven Hills Road prevents right turn movements to/from the proposed car park access, and therefore a left-in left-out arrangement will be required at the car park access.

For vehicles accessing the site, eastbound vehicles are expected to travel via Seven Hills Road, turn right onto Arthur Street, turn left onto Yattenden Crescent, turn left onto Charles Street, turn left onto Windsor Road, turn left onto Seven Hills Road, and subsequently left turn towards the site. Vehicles coming from Windsor Road and Old Northern Road would directly turn left from Seven Hills Road towards the site.

All vehicles exiting the site would turn left onto Seven Hills Road. For those wishing to reach Windsor Road and Old Northern Road, they are expected to turn left onto Arthur Street, make a U-turn movement at the roundabout at the Yattenden Crescent intersection, turn right onto Seven Hills Road, and subsequently disperse to other roads at the Windsor Road intersection.

Figure 5.1 depicts distribution of the site traffic based on the above descriptions for the proposed uplift scheme.

Figure 5.1: Traffic Distribution



5.6 Traffic Assessment

Some vehicles would make a U-turn movement at the Arthur Street - Yattenden Crescent intersection due to the left-in left-out arrangement at the site access. It is expected the proposed uplift would generate 15 turnaround movements in the AM peak hour and four turnaround movements in the PM peak hour. Again, this low level of traffic volumes would not affect the performance of the roundabout on Arthur Street.

Overall, the proposed development of 66 units is estimated to generate 19 trips in the AM and PM peak hours, with a net increase of 16 vehicle trips in both AM peak and PM peak hours from the existing use of the site. The low level of traffic generation is not anticipated to result in any material difference on the road network performance.

5.7 SIDRA Modelling

The operation of the key intersections within the study area have been assessed using SIDRA INTERSECTION 9 (SIDRA), a computer-based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by the TfNSW, is vehicle delay. SIDRA determines the average delay that vehicles encounter and provides a measure of the level of service. Table 5.6 shows the criteria that SIDRA adopts in assessing the level of service.

Table 5.6: SIDRA Level of Service Criteria

Level of Service (LoS)	Average Delay per vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode.
F	Greater than 70	Unsatisfactory, requires additional capacity	Unsatisfactory, requires other control mode or major treatment

Reference: TfNSW Traffic Modelling Guidelines 2013, Table 14.4

5.7.1 Assessed Scenarios

The following scenarios have been considered to assess the potential traffic impact of the proposed development on the surrounding road network:

- Scenario 1 (S1): 2022 Existing Base Case including the Modena development (partially occupied)
- Scenario 2 (S2): 2032 Future Base Case with background traffic growth, the Modena development (completely occupied) and 2-4 Old Northern Road development (completely occupied)
- Scenario 3 (S3): Scenario 2, plus the development traffic.

5.7.2 Modelling Results

A summary of the traffic modelling results of the intersections in each scenario is presented in Table 5.7.

Table 5.7: SIDRA Modelling Results

Scenario	Intersection	AM Peak				PM Peak			
		DoS	Delay (s)	LoS	95 th %-tile Queue	DoS	Delay (s)	LoS	95 th %-tile Queue
Existing Base (S1)	Windsor Road – Seven Hills Road – Old Northern Road	0.985	59	E	472	1.044	93	F	878
	Seven Hills Rd – Arthur Street	0.785	29	C	175	0.953	26	B	150
	Arthur Street – Yattenden Crescent	0.326	10	A	13	0.280	9	A	11
Future Base (S2)	Windsor Road – Seven Hills Road – Old Northern Road	0.994	72	F	533	1.118	112	F	953
	Seven Hills Rd – Arthur Street	0.867	31	C	173	0.919	37	C	199
	Arthur Street – Yattenden Crescent	0.359	11	A	16	0.376	10	A	14
Future + Development (S3)	Windsor Road – Seven Hills Road – Old Northern Road	0.997	73	F	534	1.088	114	F	979
	Seven Hills Rd – Arthur Street	0.841	32	C	185	0.930	39	C	209
	Arthur Street – Yattenden Crescent	0.411	11	A	17	0.396	10	A	14

The existing base case (S1) has been calibrated to reasonably reflect the surveyed queue lengths. SCATS history timings and TCS plans for lane widths and gradients have been utilised in the coding and calibration of the model. Additionally, based on the traffic count data it was observed that a low number of general vehicles (light vehicle and heavy vehicle) were utilising the kerbside bus lane on Old Northern Road and Windsor Road exiting onto Windsor Road south east. This has also been accounted for in the model. Furthermore, the Degree of Saturation (DoS) is greater than 1.0 at the Windsor Road – Seven Hills Road – Old Northern Road intersection during the PM peak as additional vehicle volumes have been added to the intersection to reflect the surveyed queue lengths in the existing base case.

In Scenario 1, the Windsor Road – Seven Hills Road – Old Northern Road intersection is operating over capacity at Level of Service (LOS) E and F in the AM peak and PM peak respectively. The Seven Hills Road – Arthur Street intersection and the Arthur Street – Yattenden Crescent intersection are operating satisfactorily at LOS C or better during both AM and PM peaks.

In Scenario 2 for year 2032 base case, modelling results indicate that the Windsor Road – Seven Hills Road – Old Northern Road intersection would continue to operate over capacity (LoS F) in Year 2032 due to the increase in background traffic of the surrounding area and when the nearby future developments are fully occupied, regardless of the proposed

development. The intersection would experience an increase in delay of 13 seconds and 19 seconds AM peak and PM Peak respectively, regardless of the proposed development.

Average delay at the Seven Hills Road – Arthur Street intersection is expected to increase by 2 second in the AM peak and 11 seconds in the PM peak, however, would continue to operate satisfactorily at LoS C. The performance levels of the Arthur Street – Yattenden Crescent intersection would maintain with minimal increase in delay.

In Scenario 3, the additional traffic generated from the proposed development is anticipated to slightly increase the average delay of the Windsor Road – Seven Hills Road – Old Northern Road intersection by 1 second in the AM peak and 2 seconds in the PM peak. The performance levels of the intersection would continue to operate at LOS F in the AM peak and PM peak. The Seven Hills Road – Arthur Street intersection and Arthur Street – Yattenden Crescent intersection would experience little to no change in delays and maintain the same level of service as Scenario 2.

Hence, the proposed development which would generate in the order of 20 vehicle trips (or a net increase of 9 vehicle trips from the complying yield) in both AM and PM peak hours is not anticipated to impose any adverse traffic impact on the surrounding road network.

6 Conclusion

The proposed high density residential development involving 50 units is expected to generate up to 15 vehicles in the AM and PM peak hours, based on the complying planning controls.

The proposed uplift involving 66 units is estimated to generate 19 vehicles in both AM and PM peak hours. The additional yield would result in a net increase of 16 vehicles per peak hour compared to the existing use of the site. The low level of traffic generation is not anticipated to impose material difference on the road network performance.

The proposed basement car park provides 147 car parking spaces which would satisfy the DCP requirement for resident parking, and the derived average DCP requirement for visitor parking.

The Hills DCP's visitor parking rate is two visitor spaces per five dwellings resulting in 26 visitor parking spaces for a 66-unit apartment and is considered excessive as compared with the DCP requirement of surrounding Councils which averaged one visitor space per 4.1 dwellings. Therefore, this Planning Proposal requests reduction of the visitor parking from 26 to 16 spaces. This is considered a reasonable approach given bus services are available nearby and the provision of 16 spaces is considered adequate and aligned with other surrounding Councils.

Traffic modelling results indicate that the Windsor Road – Seven Hills Road – Old Northern Road intersection is anticipated to operate over capacity in Year 2032 due to the increase in background traffic of the surrounding area to the site. The additional traffic generated by the proposed development is not considered to impose any adverse impact on the road network.

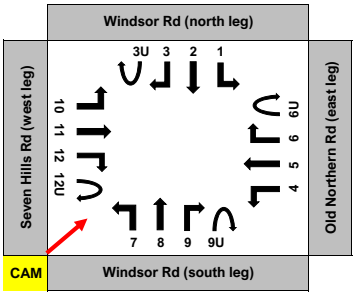
The traffic implications on the Seven Hills Road – Arthur Street intersection and the Arthur Street – Yattenden Crescent intersection are considered to be minimal and continue to operate at satisfactory level of service.

Overall, there will be no adverse traffic implications associated with the Planning Proposal.

Appendix A

Traffic Survey

Report Type:	Classified Intersection Data - 15min
Geocounts Job ID:	1654999917600
Client Job Number:	n/a
Client Name:	TTPP
Location:	Baulkham Hills
Survey Site:	Site 1 - Windsor Rd/Seven Hills Rd/Old Northern Rd
Survey Date:	Tuesday, 21st June 2022
Site Coordinates:	-33.7619085, 150.9929812



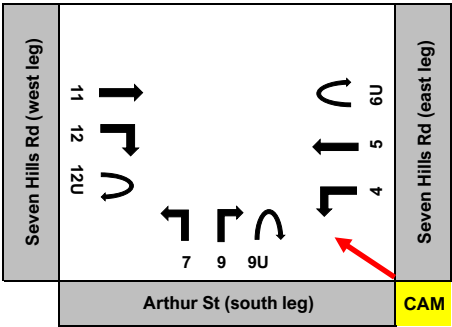
Vehicle Classes:	Cars	Trucks	Buses	HV%
Total Vehicles AM:	10,094	268	170	4.2%
Total Vehicles PM:	11,107	146	171	2.8%



Approach	Windsor Rd (north leg)																Old Northern Rd (east leg)																Windsor Rd (south leg)																Seven Hills Rd (west leg)															
Movement	Movement 1 (Left Turn)				Movement 2 (Through)				Movement 3 (Right Turn)				Movement 3U (U Turn)				Movement 4 (Left Turn)				Movement 5 (Through)				Movement 6 (Right Turn)				Movement 6U (U Turn)				Movement 7 (Left Turn)				Movement 8 (Through)				Movement 9 (Right Turn)				Movement 9U (U Turn)				Movement 10 (Left Turn)				Movement 11 (Through)				Movement 12 (Right Turn)				Movement 12U (U Turn)			
Time Interval	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total								
7:00 to 7:15	2	0	0	2	364	12	4	380	0	0	0	0	0	0	0	0	143	4	10	157	68	1	1	70	0	0	0	0	0	0	0	0	48	3	3	54	171	7	4	182	66	9	9	84	0	0	0	0	15	0	0	15	65	1	2	68	91	1	0	92	0	0	0	0
7:15 to 7:30	1	0	0	1	395	5	1	401	0	0	0	0	0	0	0	0	196	8	7	211	83	3	0	86	0	0	0	0	0	0	0	0	60	0	0	60	249	7	3	259	79	10	6	95	0	0	0	0	20	2	0	22	64	2	1	67	80	1	0	81	0	0	0	0
7:30 to 7:45	4	0	0	4	383	10	4	397	0	0	0	0	0	0	0	0	204	6	9	219	117	2	0	119	0	0	0	0	0	0	0	0	60	1	0	61	244	7	1	252	65	5	6	76	0	0	0	0	15	0	0	15	76	2	1	79	74	0	0	74	0	0	0	0
7:45 to 8:00	2	1	0	3	368	9	1	378	0	0	0	0	0	0	0	0	186	8	11	205	129	1	1	131	0	0	0	0	0	0	0	0	61	2	1	64	313	5	2	320	75	5	2	82	0	0	0	0	15	3	0	18	78	2	1	81	80	0	0	80	0	0	0	0
8:00 to 8:15	1	0	0	1	302	7	3	312	0	0	0	0	0	0	0	0	142	8	8	158	113	3	1	117	0	0	0	0	0	0	0	0	75	0	0	75	308	5	3	316	73	6	6	85	0	0	0	0	18	0	0	18	96	5	1	102	106	3	0	109	0	0	0	0
8:15 to 8:30	5	0	0	5	348	8	8	364	0	0	0	0	0	0	0	0	140	4	8	152	139	3	3	145	0	0	0	0	0	0	0	0	68	2	1	71	328	4	5	337	104	6	2	112	0	0	0	0	24	1	0	25	90	1	0	91	81	2	0	83	0	0	0	0
8:30 to 8:45	5	0	0	5	272	6	2	280	0	0	0	0	0	0	0	0	181	2	6	189	162	0	1	163	0	0	0	0	0	0	0	0	107	1	0	108	322	7	1	330	89	8	3	100	0	0	0	0	31	0	0	31	105	3	0	108	119	1	0	120	0	0	0	0
8:45 to 9:00	7	0	0	7	294	7	1	302	0	0	0	0	0	0	0	0	149	4	8	161	154	1	2	157	0	0	0	0	0	0	0	0	100	0	0	100	320	9	2	331	95	1	4	100	0	0	0	0	30	1	0	31	88	2	0	90	94	2	0	96	0	0	0	0
AM Total	27	1	0	28	2,726	64	24	2,814	0	0	0	0	0	0	0	0	1,341	44	67	1,452	965	14	9	988	0	0	0	0	0	0	0	0	579	9	5	593	2,255	51	21	2,327	646	50	38	734	0	0	0	0	168	7	0	175	662	18	6	686	725	10	0	735	0	0	0	0
16:00 to 16:15	9	0	0	9	223	5	5	233	0	0	0	0	0	0	0	0	164	8	5	177	140	5	3	148	0	0	0	0	0	0	0	0	110	2	0	112	389	4	3	396	128	6	9	143	0	0	0	0	23	0	0	23	88	1	1	90	73	0	2	75	0	0	0	0
16:15 to 16:30	10	0	0	10	245	4	3	252	0	0	0	0	0	0	0	0	156	6	6	168	169	1	0	170	0	0	0	0	0	0	0	0	107	1	0	108	368	8	5	381	119	2	9	130	0	0	0	0	27	0	1	28	96	0	0	96	75	1	0	76	0	0	0	0
16:30 to 16:45	5	0	0	5	252	3	6	261	0	0	0	0	0	0	0	0	167	7	5	179	142	2	2	146	0	0	0	0	0	0	0	0	104	0	0	104	372	3	0	375	126	3	6	135	0	0	0	0	29	0	0	29	111	1	0	112	80	0	0	80	0	0	0	0
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17:15 to 17:30	12	0	0	12	292	1	2	295	0	0	0	0	0	0	0	0	148	0	4	152	185	0	1	186	0	0	0	0	0	0	0	0	104	1	0	105	356	1	2	359	136	2	7	145	0	0	0	0	28	0	0	28	99	0	1	100	77	0	0	77	0	0	0	0
17:30 to 17:45	9	0	0	9	324	6	5	335	0	0	0	0	0	0	0	0	148	2	4	154	165	3	1	169	0	0	0	0	0	0	0	0	132	1	0	133	376	5	1	382	101	0	9	110	0	0	0	0	28	1	0	29	89	0	0	89	73	1	1	75	0	0	0	0
17:45 to 18:00	13	0	0	13	273	0	0	273	0	0	0	0	0	0	0	0	154	2	4	160	153	2	0	155	0	0	0	0	0	0	0	0	100	1	0	101	365	3	6	374	111	3	10	124	0	0	0	0	29	0	0	29	97	0	2	99	78	0	1	79	0	0	0	0
PM Total	75	0	0	75	2,161	27	26	2,214	0	0	0	0	0	0	0	0	1,233	33	34	1,300	1,257	16	9	1,282	0	0	0	0	0	0	0	0	881	9	1	891	2,949	36	24	3,009	942	17	67	1,026	0	0	0	0	219	1	1	221	793	3	5	801	597	4	4	605	0	0	0	0

Pedestrian Counts					
Leg	North	East	South	West	Total
7:00 to 8:00	17	9	64	18	108
7:15 to 8:15	31	16	65	27	139
7:30 to 8:30	34	22	70	28	154
7:45 to 8:45	30	23	61	25	139
8:00 to 9:00	36	23	45	25	129
16:00 to 17:00	36	13	40	17	106
16:15 to 17:15	35	12	28	18	93
16:30 to 17:30	34	15	28	16	93
16:45 to 17:45	28	12	25	19	84
17:00 to 18:00	33	10	24	18	85

Report Type:	Classified Intersection Data - 15min
Geocounts Job ID:	1654999917600
Client Job Number:	n/a
Client Name:	TTPP
Location:	Baulkham Hills
Survey Site:	Site 2 - Seven Hills Rd/Arthur St
Survey Date:	Tuesday, 21st June 2022
Site Coordinates:	-33.7628708, 150.9901893



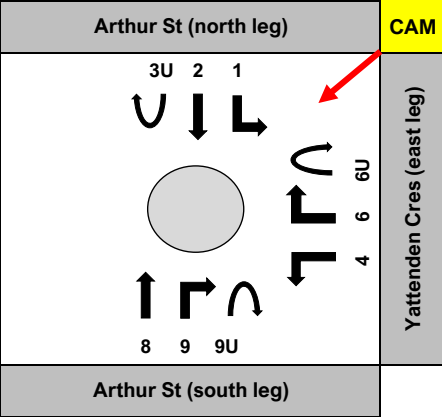
Vehicle Classes:	Cars	Trucks	Buses	HV%
Total Vehicles AM:	3,445	68	21	2.5%
Total Vehicles PM:	4,051	34	17	1.2%



Approach	Seven Hills Rd (east leg)												Arthur St (south leg)												Seven Hills Rd (west leg)											
Movement	Movement 4 (Left Turn)				Movement 5 (Through)				Movement 6U (U Turn)				Movement 7 (Left Turn)				Movement 9 (Right Turn)				Movement 9U (U Turn)				Movement 11 (Through)				Movement 12 (Right Turn)				Movement 12U (U Turn)			
Time Interval	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total
7:00 to 7:15	34	0	0	34	82	4	2	88	0	0	0	0	5	0	0	5	37	0	0	37	0	0	0	0	129	2	2	133	10	0	0	10	0	0	0	0
7:15 to 7:30	41	0	0	41	100	2	1	103	0	0	0	0	16	1	0	17	44	2	0	46	0	0	0	0	124	4	1	129	20	0	0	20	0	0	0	0
7:30 to 7:45	59	1	0	60	107	2	1	110	0	0	0	0	14	0	0	14	57	0	0	57	0	0	0	0	147	2	1	150	15	1	0	16	0	0	0	0
7:45 to 8:00	79	2	1	82	107	3	2	112	0	0	0	0	13	1	0	14	42	0	0	42	0	0	0	0	134	7	2	143	17	0	0	17	0	0	0	0
8:00 to 8:15	90	0	0	90	105	1	1	107	0	0	0	0	30	0	0	30	67	1	0	68	0	0	0	0	154	8	0	162	14	0	0	14	0	0	0	0
8:15 to 8:30	85	2	0	87	116	5	3	124	0	0	0	0	28	0	0	28	41	0	0	41	0	0	0	0	150	6	0	156	19	0	0	19	0	0	0	0
8:30 to 8:45	113	0	0	113	150	1	1	152	0	0	0	0	32	1	0	33	89	0	0	89	0	0	0	0	151	2	0	153	24	0	0	24	0	0	0	0
8:45 to 9:00	108	0	0	108	160	1	3	164	0	0	0	0	23	0	0	23	72	1	0	73	0	0	0	0	154	5	0	159	37	0	0	37	0	0	0	0
AM Total	609	5	1	615	927	19	14	960	0	0	0	0	161	3	0	164	449	4	0	453	0	0	0	0	1,143	36	6	1,185	156	1	0	157	0	0	0	0
16:00 to 16:15	76	2	0	78	183	4	3	190	0	0	0	0	18	1	0	19	50	0	0	50	0	0	0	0	136	1	2	139	12	0	0	12	0	0	0	0
16:15 to 16:30	94	1	0	95	184	1	0	185	0	0	0	0	14	0	0	14	72	0	0	72	0	0	0	0	134	1	1	136	12	0	0	12	0	0	0	0
16:30 to 16:45	81	1	0	82	148	1	2	151	0	0	0	0	20	0	0	20	81	1	0	82	0	0	0	0	155	1	0	156	13	0	0	13	0	0	0	0
16:45 to 17:00	84	1	0	85	175	4	0	179	0	0	0	0	25	0	0	25	63	0	0	63	0	0	0	0	155	1	1	157	19	0	0	19	0	0	0	0
17:00 to 17:15	82	0	0	82	169	1	1	171	0	0	0	0	13	0	0	13	61	0	0	61	0	0	0	0	127	1	1	129	16	0	0	16	0	0	0	0
17:15 to 17:30	106	0	0	106	195	1	2	198	0	0	0	0	17	0	0	17	63	0	0	63	0	0	0	0	150	1	0	151	20	0	0	20	0	0	0	0
17:30 to 17:45	90	2	0	92	203	0	1	204	0	0	0	0	17	0	0	17	73	1	0	74	0	0	0	0	125	0	1	126	29	0	0	29	0	0	0	0
17:45 to 18:00	77	3	0	80	179	2	0	181	0	0	0	0	16	0	0	16	53	0	0	53	0	0	0	0	151	1	2	154	15	0	0	15	0	0	0	0
PM Total	690	10	0	700	1,436	14	9	1,459	0	0	0	0	140	1	0	141	516	2	0	518	0	0	0	0	1,133	7	8	1,148	136	0	0	136	0	0	0	0

Pedestrian Counts				
Leg	East	South	West	Total
7:00 to 7:15	3	2	0	5
7:15 to 7:30	1	2	1	4
7:30 to 7:45	0	0	0	0
7:45 to 8:00	3	1	5	9
8:00 to 8:15	2	4	1	7
8:15 to 8:30	3	5	3	11
8:30 to 8:45	9	2	4	15
8:45 to 9:00	5	1	2	8
16:00 to 16:15	0	1	1	2
16:15 to 16:30	6	1	1	8
16:30 to 16:45	2	0	6	8
16:45 to 17:00	3	1	0	4
17:00 to 17:15	1	1	3	5
17:15 to 17:30	5	0	0	5
17:30 to 17:45	0	0	1	1
17:45 to 18:00	1	0	1	2

Report Type:	Classified Intersection Data - 15min
Geocounts Job ID:	1654999917600
Client Job Number:	n/a
Client Name:	TTPP
Location:	Baulkham Hills
Survey Site:	Site 3 - Arthur St/Yattenden Cres
Survey Date:	Tuesday, 21st June 2022
Site Coordinates:	-33.7628708, 150.9901893



Vehicle Classes:	Cars	Trucks	Buses	HV%
Total Vehicles AM:	1,356	13	0	0.9%
Total Vehicles PM:	1,417	14	0	1.0%



Approach	Arthur St (north leg)												Yattenden Cres (east leg)												Arthur St (south leg)											
Movement	Movement 1 (Left Turn)				Movement 2 (Through)				Movement 3U (U Turn)				Movement 4 (Left Turn)				Movement 6 (Right Turn)				Movement 6U (U Turn)				Movement 8 (Through)				Movement 9 (Right Turn)				Movement 9U (U Turn)			
Time Interval	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total	Cars	Trucks	Buses	Total
7:00 to 7:15	3	0	0	3	38	0	0	38	0	0	0	0	2	0	0	2	7	0	0	7	0	0	0	0	31	1	0	32	1	0	0	1	1	0	0	1
7:15 to 7:30	2	0	0	2	53	0	0	53	2	0	0	2	2	0	0	2	7	0	0	7	0	0	0	0	48	2	0	50	0	0	0	0	0	0	0	0
7:30 to 7:45	2	0	0	2	70	1	0	71	2	0	0	2	3	0	0	3	2	0	0	2	0	0	0	0	60	0	0	60	0	0	0	0	1	0	0	1
7:45 to 8:00	3	0	0	3	91	3	0	94	0	0	0	0	2	0	0	2	5	0	0	5	0	0	0	0	55	1	0	56	0	0	0	0	0	0	0	0
8:00 to 8:15	5	0	0	5	100	0	0	100	0	0	0	0	6	0	0	6	3	0	0	3	0	0	0	0	86	1	0	87	0	0	0	0	0	0	0	0
8:15 to 8:30	2	0	0	2	103	2	0	105	2	0	0	2	7	0	0	7	4	0	0	4	0	0	0	0	73	0	0	73	1	0	0	1	0	0	0	0
8:30 to 8:45	5	0	0	5	120	0	0	120	7	0	0	7	4	0	0	4	4	0	0	4	0	0	0	0	93	1	0	94	3	0	0	3	2	0	0	2
8:45 to 9:00	8	0	0	8	131	0	0	131	6	0	0	6	2	0	0	2	6	0	0	6	0	0	0	0	78	1	0	79	0	0	0	0	2	0	0	2
AM Total	30	0	0	30	706	6	0	712	19	0	0	19	28	0	0	28	38	0	0	38	0	0	0	0	524	7	0	531	5	0	0	5	6	0	0	6
16:00 to 16:15	8	0	0	8	75	3	0	78	3	0	0	3	0	0	0	0	2	0	0	2	0	0	0	0	57	1	0	58	2	0	0	2	1	0	0	1
16:15 to 16:30	7	0	0	7	92	1	0	93	3	0	0	3	3	0	0	3	3	0	0	3	0	0	0	0	82	0	0	82	3	0	0	3	1	0	0	1
16:30 to 16:45	12	0	0	12	74	1	0	75	3	0	0	3	1	0	0	1	4	0	0	4	0	0	0	0	82	1	0	83	2	0	0	2	2	0	0	2
16:45 to 17:00	6	0	0	6	91	1	0	92	2	0	0	2	1	0	0	1	5	0	0	5	0	0	0	0	79	0	0	79	2	0	0	2	0	0	0	0
17:00 to 17:15	9	0	0	9	80	0	0	80	5	0	0	5	2	0	0	2	3	0	0	3	0	0	0	0	60	0	0	60	3	0	0	3	0	0	0	0
17:15 to 17:30	10	0	0	10	108	0	0	108	2	0	0	2	1	0	0	1	5	0	0	5	0	0	0	0	75	0	0	75	1	0	0	1	1	0	0	1
17:30 to 17:45	12	0	0	12	96	2	0	98	6	0	0	6	1	0	0	1	3	0	0	3	0	0	0	0	72	1	0	73	1	0	0	1	0	0	0	0
17:45 to 18:00	11	0	0	11	72	3	0	75	5	0	0	5	1	0	0	1	4	0	0	4	0	0	0	0	56	0	0	56	3	0	0	3	1	0	0	1
PM Total	75	0	0	75	688	11	0	699	29	0	0	29	10	0	0	10	29	0	0	29	0	0	0	0	563	3	0	566	17	0	0	17	6	0	0	6

Pedestrian Counts

Leg	North	South	East	Total
7:00 to 8:00	1	5	8	14
7:15 to 8:15	0	6	6	12
7:30 to 8:30	3	7	7	17
7:45 to 8:45	3	6	8	17
8:00 to 9:00	3	6	5	14
16:00 to 17:00	2	5	3	10
16:15 to 17:15	1	5	2	8
16:30 to 17:30	3	10	3	16
16:45 to 17:45	3	8	1	12
17:00 to 18:00	4	7	2	13

Report Type:	Queue Length
Geocounts Job ID:	1654999917600
Client Name:	TIPP
Location:	Baulkham Hills
Survey Site:	IC01 (Windsor Rd/Old Northern Rd/Seven Hills Rd)
Coordinates:	-33.7619085, 150.9929812
Survey Date:	Tuesday, 21st June 2022
Survey Time(s):	07:00-09:00

Queue (number of vehicles) recorded at start of green light phase for each lane

Report Type:	Queue Length
Geocounts Job ID:	165499917600
Client Name:	TPP
Location:	Baulkham Hills
Survey Site:	IC01 (Windsor Rd/Old Northern Rd/Seven Hills Rd)
Coordinates:	-33.7619085, 150.9929812
Survey Date:	Tuesday, 21st June 2022
Survey Time(s):	16:00-18:00



Queue (number of vehicles) recorded at start of green light phase for each lane

PM	Windsor Rd (NW)				Approach	Old Northern Rd (N)					Approach	Windsor Rd (S)				Approach	Seven Hills Rd (W)		
Time	Lane 1 (thru bus)	Lane 2 (thru)	Lane 3 (thru)	Time	Lane 1 (left bus)	Lane 2 (left)	Lane 3 (left)	Time	Lane 4 (thru)	Lane 5 (thru)	Time	Lane 1 (thru)	Lane 2 (thru)	Lane 3 (right)	Lane 4 (right)	Time	Lane 1 (left/thru)	Lane 2 (right/thru)	Lane 3 (right)
16:01:39	1	14	8	16:00:20	1	10	4	16:00:50	13	12	16:00:20			18	15	16:00:50	10		
16:03:50	2	16	14	16:02:32	0	0	1	16:03:04	15	14	16:01:39	40+	40+			16:01:19		4	1
16:06:05	4	21	20	16:04:43	0	6	4	16:05:13	9	12	16:02:32			18	20	16:03:04	10		
16:08:13	5	9	7	16:06:51	2	1	1	16:07:25	8	8	16:03:50	40+	40+			16:03:35		13	6
16:10:19	1	21	18	16:08:59	0	8	7	16:09:36	8	8	16:04:43			20	20	16:05:13	15		
16:12:36	2	13	5	16:11:12	1	2	2	16:11:50	9	11	16:06:05	40+	40+			16:05:45		16	6
16:14:36	1	14	15	16:13:17	2	13	9	16:13:45	14	13	16:06:51			25	25	16:07:25	16		
16:16:50	2	21	19	16:15:31	0	15	12	16:16:01	12	13	16:08:13	40+	40+			16:07:54		13	7
16:19:01	0	21	18	16:17:43	0	1	2	16:18:14	14	11	16:08:59			10	14	16:09:36	14		
16:21:07	6	15	15	16:19:52	2	6	5	16:20:21	14	13	16:10:19	40+	40+			16:10:11		14	3
16:23:24	1	22	21	16:22:07	2	6	5	16:22:33	13	12	16:11:12			7	5	16:11:50	11		
16:25:32	3	20	18	16:24:14	2	6	6	16:24:46	14	12	16:12:36	40+	40+			16:12:15		7	6
16:27:44	1	16	12	16:26:22	0	2	2	16:26:51	12	12	16:13:17			6	4	16:13:45	12		
16:29:53	5	20	18	16:28:31	0	3	2	16:29:00	8	12	16:14:36	40+	40+			16:14:17		8	1
16:32:04	2	18	16	16:30:39	0	15	9	16:31:07	9	10	16:15:31			4	4	16:16:01	10		
16:34:05	3	22	20	16:32:45	0	6	5	16:33:12	10	11	16:16:50	40+	40+			16:16:33		6	2
16:36:20	2	18	14	16:35:01	0	6	3	16:35:30	12	7	16:17:43			14	15	16:18:14	14		
16:38:27	2	14	16	16:37:12	2	7	3	16:37:40	10	7	16:19:01	40+	40+			16:18:44		5	3
16:40:40	0	16	15	16:39:26	2	9	8	16:39:54	10	10	16:19:52			12	13	16:20:21	13		
16:42:57	2	16	14	16:41:34	2	6	2	16:42:05	10	10	16:21:07	40+	40+			16:20:52		5	3
16:45:03	2	18	19	16:43:39	2	12	6	16:44:10	12	13	16:22:07			15	15	16:22:33	17		
16:47:12	1	23	20	16:45:47	0	8	4	16:46:15	13	13	16:23:24	40+	40+			16:23:03		7	7
16:49:19	5	24	27	16:47:54	0	9	8	16:48:22	11	13	16:24:14			15	18	16:24:46	5		
16:51:28	0	21	22	16:50:06	0	4	5	16:50:32	14	13	16:25:33	40+	40+			16:25:16		12	6
16:53:37	1	27	25	16:52:19	0	7	3	16:52:45	12	10	16:26:22			14	15	16:26:51	12		
16:55:48	4	27	26	16:54:33	2	9	7	16:54:58	11	11	16:27:44	40+	40+			16:27:36		11	3
16:58:08	2	16	17	16:56:46	0	7	4	16:57:16	9	8	16:28:31			12	15	16:29:00	15		
17:00:06	4	25	21	16:58:49	2	7	4	16:59:18	8	7	16:29:53	40+	40+			16:29:32		9	4
17:02:19	0	20	13	17:01:17	0	4	3	17:01:36	10	12	16:30:39			16	7	16:31:07	13		
17:04:32	3	24	23	17:03:19	0	7	5	17:03:46	12	13	16:32:04	40+	40+			16:31:44		3	3
17:06:40	0	25	19	17:05:28	4	7	4	17:05:53	11	12	16:32:45			10	10	16:33:12	13		
17:08:48	2	16	12	17:07:38	0	12	10	17:08:04	14	11	16:34:05	40+	40+			16:33:43		5	1
17:11:05	2	18	14	17:09:51	1	8	7	17:10:18	13	13	16:35:01			12	10	16:35:30	20		
17:13:14	1	17	18	17:11:59	0	5	1	17:12:26	10	9	16:36:20	40+	40+			16:36:04		14	3
17:15:23	1	17	18	17:14:02	1	6	4	17:14:32	11	10	16:37:12			15	12	16:37:40	30		
17:17:25	2	23	25	17:16:05	0	9	5	17:16:36	14	11	16:38:27	40+	40+			16:38:09		20	6
17:19:36	1	19	24	17:18:19	0	4	4	17:18:44	12	11	16:39:26			11	13	16:39:54	20		
17:21:49	3	19	21	17:20:32	0	9	4	17:20:58	16	14	16:40:40	40+	40+			16:40:20		25	7
17:24:04	3	18	18	17:22:40	1	4	6	17:23:09	15	15	16:41:34			15	15	16:42:05	Max		
17:26:08	4	19	20	17:24:45	2	2	1	17:25:15	14	12	16:42:57	40+	40+			16:42:32		19	6
17:28:14	0	23	21	17:26:55	0	6	5	17:27:23	14	14	16:43:39			14	16	16:44:10	Max		
17:30:31	4	22	21	17:29:08	0	5	2	17:29:42	13	12	16:45:03	40+	40+			16:44:41		16	8
17:32:40	2	18	20	17:31:16	0	2	2	17:31:46	14	13	16:45:47			10	7	16:46:15	Max		
17:34:42	0	25	23	17:33:25	0	1	1	17:33:55	13	14	16:47:12	40+	40+			16:46:50		8	6
17:36:56	0	20	24	17:35:41	0	12	9	17:36:06	14	13	16:47:54			12	10	16:48:22	Max		
17:39:09	3	24	22	17:37:51	0	4	4	17:38:17	15	15	16:49:19	40+	40+			16:48:54		7	3
17:41:14	2	28	25	17:40:01	0	10	7	17:40:26	13	12	16:50:06			8	8	16:50:32	Max		
17:43:27	0	29	30	17:42:15	0	10	1	17:42:40	11	10	16:51:28	40+	40+			16:51:06		3	0
17:45:40	1	21	12	17:44:27	2	7	5	17:44:56	10	10	16:52:19			3	4	16:52:45	Max		
17:47:49	2	23	21	17:46:34	2	8	7	17:47:01	12	11	16:53:37	40+	40+			16:53:17		8	5
17:50:01	0	23	23	17:48:45	3	7	6	17:49:10	12	12	16:54:33			5	8	16:54:58	Max		
17:52:12	1	19	16	17:50:53	0	8	10	17:51:17	13	13	16:55:48	40+	40+			16:55:27		10	8
17:54:16	0	25	18	17:52:58	0	6	3	17:53:25	10	11	16:56:46			12	14	16:57:16	Max		
17:56:31	2	16	12	17:55:11	0	9	7	17:55:43	9	9	16:58:08	40+	40+			16:57:43		9	6
17:58:37	0	17	21	17:57:18	1	8	5	17:57:51	12	12	16:58:49			20	20	16:59:18	20		
				17:59:32	2	4	5	17:58:19	5	9	17:00:06	40+	40+			16:59:43		7	2
											17:01:17			16	18	17:01:36	23		
											17:02:19	40+	40+			17:01:59		6	4
											17:03:19			15	25	17:03:46	21		
											17:04:32	40+	40+			17:04:14		6	4
											17:05:28			25	25	17:05:53	29		
											17:06:40	40+	40+			17:06:26		8	4
											17:07:38			20	30	17:08:04	26		
											17:08:48	40+	40+			17:08:33		8	7
											17:09:51			28	20	17:10:18	27		
											17:11:05	40+	40+			17:10:45		6	7
											17:11:59			18	22	17:12:26	26		
											17:13:14	40+	40+			17:12:52		6	6
											17:14:02			16	20	17:14:32	28		
											17:15:23	40+	40+			17:14:58		4	4
											17:16:05			15	15	17:16:36	24		
											17:17:25	40+	40+			17:17:05		7	2
											17								

Report Type:	Queue Length
Geocounts Job ID:	1654999917600
Client Name:	TPP
Location:	Baulkham Hills
Survey Site:	KC02 (Seven Hills Rd/Arthur St)
Coordinates:	-33.7628708, 150.9901893
Survey Date:	Tuesday, 21st June 2022
Survey Time(s):	07:00-09:00 & 16:00-18:00



Queue (number of vehicles) recorded at start of green light phase for each lane

AM	Seven Hills Rd (east)				Seven Hills Rd (west)		Approach	Arthur St (south)		PM	Seven Hills Rd (east)		Seven Hills Rd (west)		Approach	Arthur St (south)	
Time	Lane 1 (left/thru)	Lane 2 (thru)	Lane 1 (thru)	Lane 2 (right/thru)	Time	Lane 1 (left)	Lane 2 (right)	Time	Lane 1 (left/thru)	Lane 2 (thru)	Lane 1 (thru)	Lane 2 (right/thru)	Time	Lane 1 (left)	Lane 2 (right)		
7:00:35	2	5	3	1	7:00:19	0	2	16:01:03	0	3	3	2	16:00:30	1	6		
7:01:33	1	2	1	2	7:01:20	0	1	16:02:07	7	13	0	0	16:01:29	1	3		
7:02:41	1	2	0	2	7:02:27	0	1	16:03:19	0	4	2	1	16:02:56	0	0		
7:04:40	3	1	2	0	7:05:15	0	1	16:04:43	0	2	4	3	16:04:08	4	10		
7:06:06	8	5	1	1	7:05:50	1	1	16:05:37	8	7	1	4	16:05:12	1	2		
7:07:16	1	6	0	2	7:06:12	0	2	16:07:01	0	3	5	3	16:06:25	1	3		
7:08:29	2	2	0	1	7:07:08	0	2	16:07:56	0	8	0	0	16:07:33	0	1		
7:10:26	8	5	1	0	7:07:59	0	3	16:09:08	0	2	2	2	16:08:31	3	5		
7:11:29	1	2	1	1	7:08:49	0	2	16:10:08	7	8	0	0	16:09:52	0	3		
7:12:35	0	1	1	2	7:09:32	0	1	16:11:08	0	1	4	0	16:10:45	0	1		
7:13:47	1	1	1	1	7:10:16	0	1	16:11:51	1	2	0	1	16:11:25	0	2		
7:14:57	5	3	0	1	7:11:15	0	4	16:13:12	0	1	0	2	16:12:59	0	1		
7:15:45	1	1	1	1	7:12:10	0	3	16:13:49	1	5	0	0	16:13:37	0	1		
7:16:46	1	2	2	4	7:13:02	1	0	16:15:35	0	3	0	2	16:15:13	0	5		
7:18:01	2	2	0	2	7:13:57	1	0	16:16:36	3	9	4	1	16:16:03	1	5		
7:18:32	1	1	2	2	7:14:10	0	3	16:17:44	1	5	5	2	16:17:14	1	3		
7:20:22	0	1	1	2	7:14:54	0	1	16:19:13	9	8	3	0	16:18:24	1	8		
7:21:24	1	5	2	1	7:15:28	1	2	16:20:34	6	6	0	3	16:19:52	1	7		
7:22:16	3	5	1	1	7:17:19	1	1	16:22:05	3	5	2	3	16:21:27	1	7		
7:23:30	2	4	1	0	7:18:29	0	4	16:23:20	6	7	1	3	16:22:55	0	5		
7:24:26	2	3	3	0	7:19:26	0	3	16:24:49	1	3	2	1	16:24:22	0	7		
7:25:18	2	8	1	3	7:20:17	0	1	16:25:49	11	10	7	5	16:25:28	0	3		
7:26:39	0	3	1	0	7:20:59	0	3	16:27:07	3	5	3	2	16:26:45	0	5		
7:27:11	1	0	1	4	7:21:58	0	7	16:28:39	5	6	0	1	16:28:04	1	6		
7:29:07	1	4	1	2	7:23:01	0	3	16:29:23	1	4	2	1	16:29:10	0	1		
7:30:11	0	1	4	1	7:24:23	0	1	16:30:59	8	10	2	2	16:30:15	1	10		
7:31:03	0	1	2	0	7:24:57	1	5	16:32:14	6	9	3	0	16:31:49	0	5		
7:31:42	2	0	0	1	7:26:08	1	1	16:33:41	1	0	1	2	16:32:52	0	0		
7:32:37	2	2	0	1	7:26:52	1	3	16:35:23	0	4	4	1	16:34:45	0	12		
7:33:28	1	5	3	4	7:28:14	0	4	16:36:35	8	9	4	4	16:35:56	1	5		
7:34:26	0	10	2	0	7:28:46	1	2	16:38:05	5	6	7	4	16:37:24	2	5		
7:35:19	0	3	0	1	7:29:48	0	1	16:39:34	1	5	6	5	16:38:47	3	4		
7:36:17	9	6	1	1	7:30:33	0	4	16:40:31	6	8	4	2	16:39:58	2	0		
7:37:30	3	5	0	3	7:31:38	0	2	16:42:01	0	5	4	5	16:41:23	1	5		
7:38:31	13	9	1	2	7:32:36	0	4	16:43:26	10	13	8	4	16:43:00	0	8		
7:39:55	1	2	1	1	7:33:11	1	1	16:44:46	4	10	1	1	16:44:20	0	6		
7:41:00	10	11	2	2	7:34:05	1	2	16:46:00	1	2	2	1	16:45:43	0	4		
7:42:40	1	0	1	2	7:35:03	1	5	16:46:59	2	11	0	3	16:46:25	1	3		
7:44:01	1	4	2	6	7:36:25	0	1	16:48:26	1	5	0	1	16:47:46	2	4		
7:44:58	10	12	0	3	7:38:20	0	8	16:50:07	3	5	1	1	16:49:25	2	6		
7:47:28	12	16	6	4	7:39:36	1	1	16:51:07	5	7	4	2	16:50:31	2	2		
7:49:37	15	12	2	6	7:40:37	1	3	16:52:49	3	4	2	5	16:51:53	1	9		
7:51:18	1	0	3	2	7:42:17	1	5	16:54:34	0	3	1	2	16:53:47	1	4		
7:51:48	0	6	4	6	7:43:57	0	7	16:55:48	7	9	2	2	16:55:04	1	7		
7:53:14	0	5	4	4	7:45:16	0	2	16:57:11	1	4	1	0	16:56:52	0	1		
7:55:27	17	12	7	3	7:46:27	0	5	16:58:31	2	1	1	2	16:58:08	1	2		
7:58:19	2	9	6	6	7:47:54	0	5	16:59:17	2	2	1	0	16:59:04	0	2		
7:59:40	1	0	9	6	7:49:40	0	6	17:00:19	9	5	1	0	17:00:08	0	1		
8:00:39	6	8	3	5	7:51:22	1	8	17:01:23	0	4	3	1	17:00:45	1	5		
8:01:40	18	10	0	4	7:54:33	0	4	17:02:33	6	10	2	0	17:01:58	3	4		
8:04:24	8	10	4	6	7:55:23	0	6	17:03:50	2	5	4	2	17:03:18	2	4		
8:06:09	2	0	0	2	7:57:58	0	6	17:05:21	1	4	1	3	17:04:48	1	1		
8:06:41	4	6	5	5	7:59:23	1	10	17:06:28	2	8	1	2	17:05:59	1	4		
8:07:50	8	13	5	6	8:01:56	0	11	17:07:54	3	7	5	2	17:07:28	0	6		
8:10:04	0	3	3	8	8:02:34	0	15	17:09:11	13	10	0	0	17:08:53	0	3		
8:11:09	6	6	0	2	8:03:58	1	18	17:10:31	1	2	3	1	17:10:04	0	2		
8:14:11	2	0	11	8	8:05:54	5	13	17:11:18	4	8	3	1	17:11:00	0	2		
8:14:23	2	1	2	10	8:08:05	0	18	17:12:24	2	8	1	3	17:11:58	1	7		
8:15:02	2	0	3	9	8:10:01	0	18	17:14:02	0	5	1	1	17:13:33	0	7		
8:15:34	0	1	1	1	8:10:53	2	18	17:15:10	5	11	3	1	17:14:51	0	2		
8:16:24	2	7	2	5	8:12:40	0	9	17:16:55	4	8	0	1	17:16:24	0	8		
8:17:31	1	0	1	2	8:14:01	0	8	17:18:39	0	2	4	2	17:17:50	1	8		
8:17:48	0	5	0	4	8:14:37	1	6	17:19:34	9	13	1	0	17:19:14	0	5		
8:18:42	1	0	6	5	8:15:53	1	2	17:20:56	4	7	0	1	17:20:18	1	3		
8:18:56	0	1	1	2	8:17:03	1	2	17:22:48	1	6	1	1	17:22:06	4	3		
8:19:52	0	12	2	2	8:18:10	2	3	17:23:47	5	7	0	2	17:23:34	0	2		
8:21:52	1	12	4	0	8:19:42	0	4	17:25:03	4	7	3	2	17:24:30	1	5		
8:23:26	16	13	9	5	8:21:07	3	10	17:26:15	5	10	5	4	17:25:46	1	5		
8:26:00	14	12	4	5	8:23:12	1	12	17:27:52	7	7	2	2	17:27:29	0	5		
8:27:50	14	17	1	2	8:25:22	3	13	17:29:25	6	8	2	2	17:29:03	1	1		
8:29:45	16	14	7	5	8:27:19	1	14	17:30:38	8	12	2	2	17:30:06	0	3		
8:32:01	14	17	5	6	8:29:28	3	18	17:32:00	8	11	2	1	17:31:23	1	2		
8:33:58	2	2	4	5	8:31:42	1	17	17:33:35	0	7	1	1	17:33:18	0	8		
8:34:57	10	8	2	2	8:33:46	2	3	17:34:51	7	10	1	1	17:34:07	1	11		
8:36:04	1	7	2	2	8:34:38	3	3	17:36:34	2	14	2	2	17:35:51	1	7		
8:37:07	16	12	2	2	8:36:00	0	4	17:37:50	1	2	2	3	17:37:34	0	2		
8:39:13	14	15	3	1	8:37:23	0	4	17:38:52	1	7	0	1	17:38:32	0	2		
8:41:05	19	16	5	1	8:38:49	1	9	17:40:14	4	6	2	2	17:39:43	3	4		
8:43:13	2	9	1	0	8:40:42	6	12	17:41:04	0	5	1	1	17:40:44	2	1		
8:44:34	9	15	5	3	8:42:56	1	11	17:42:32	7	12	2	0	17:42:02	0	8		
8:46:56	2	3	2	3	8:44:42	0	10	17:43:48	9	6	4	2	17:43:33	0	3		
8:47:45	12	15	4	3	8:46:17	4	5	17:45:07	1	18	1	1	17:44:25	2	6		
8:49:11	14	13	4	4	8:47:41	0	2	17:46:26	1	6	4	2	17:45:53	1	4		
8:51:36	1	5	7	7	8:48:49	2	8	17:47:18	0	1	1	1	17:47:08	0	2		
8:53:18	7	5	2	1	8:51:14	2	18	17:48:42	2	3	3	2	17:48:05	1</			

Report Type:	Queue Length
Geocounts Job ID:	1654999917600
Client Name:	TTPP
Location:	Baulkham Hills
Survey Site:	IC03 (Arthur St/Yattenden Cres)
Coordinates:	-33.7641998, 150.9903789
Survey Date:	Tuesday, 21st June 2022
Survey Time(s):	07:00-09:00 & 16:00-18:00



Maximum queue (number of vehicles) recorded for each 5 minute interval

North approach = Arthur St

South approach = Arhtur St

East approach = Yattenden Cres

AM				PM			
Approach	NORTH	SOUTH	EAST	Approach	NORTH	SOUTH	EAST
Interval	Lane 1	Lane 1	Lane 1	Interval	Lane 1	Lane 1	Lane 1
07:00-07:05	0	0	0	16:00-16:05	1	0	0
07:05-07:10	0	0	0	16:05-16:10	0	0	1
07:10-07:15	1	0	0	16:10-16:15	1	0	0
07:15-07:20	0	0	0	16:15-16:20	0	1	1
07:20-07:25	1	0	0	16:20-16:25	0	0	1
07:25-07:30	0	0	0	16:25-16:30	0	0	1
07:30-07:35	0	0	0	16:30-16:35	0	0	0
07:35-07:40	0	0	0	16:35-16:40	2	0	1
07:40-07:45	0	0	0	16:40-16:45	0	1	0
07:45-07:50	0	0	0	16:45-16:50	0	1	0
07:50-07:55	1	0	1	16:50-16:55	0	0	1
07:55-08:00	0	0	0	16:55-17:00	0	1	1
08:00-08:05	0	0	0	17:00-17:05	0	0	0
08:05-08:10	2	0	2	17:05-17:10	1	0	1
08:10-08:15	9	0	0	17:10-17:15	0	0	0
08:15-08:20	1	0	1	17:15-17:20	4	1	0
08:20-08:25	2	0	1	17:20-17:25	1	0	0
08:25-08:30	6	0	1	17:25-17:30	0	0	1
08:30-08:35	1	0	1	17:30-17:35	1	0	1
08:35-08:40	1	2	1	17:35-17:40	0	0	0
08:40-08:45	1	1	1	17:40-17:45	1	0	0
08:45-08:50	0	0	1	17:45-17:50	0	0	1
08:50-08:55	11	2	0	17:50-17:55	1	0	0
08:55-09:00	0	2	1	17:55-18:00	1	0	0
Max AM	11	2	2	Max PM	4	1	1

From: NSW GEOCOUNTS <nsw.au@geocounts.com>
Sent: Wednesday, January 24, 2024 12:59 PM
To: Doris Lee <Doris.Lee@tttp.net.au>
Subject: Re: Re Quote - Baulkham Hills [Filed 24 Jan 2024 13:41]

Hi Doris,

Here is the bus lane data.

1654999917600

Baulkham Hills

Bus Lane Data

IC01 Windsor Road/Old Northern Road

Time AM	Windsor Road			Old Northern Road		
	Bus	Light	Heavy	Bus	Light	Heavy
8:00-8:15	3	1	0	8	0	0
8:15-8:30	7	6	1	8	1	0
8:30-8:45	2	3	0	6	1	0
8:45-9:00	1	7	1	8	6	0
Time PM	Bus	Light	Heavy	Bus	Light	Heavy
16:45-17:00	3	8	0	3	2	0
17:00-17:15	1	4	0	3	3	0
17:15-17:30	2	5	0	4	2	0
17:30-17:45	2	4	0	4	1	0

Kind regards,

Paul

Paul Parsakia

GEOCOUNTS NSW

(A division of Transmetric Pty Ltd)

ABN: 31 101 320 709

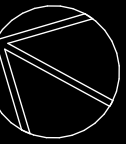
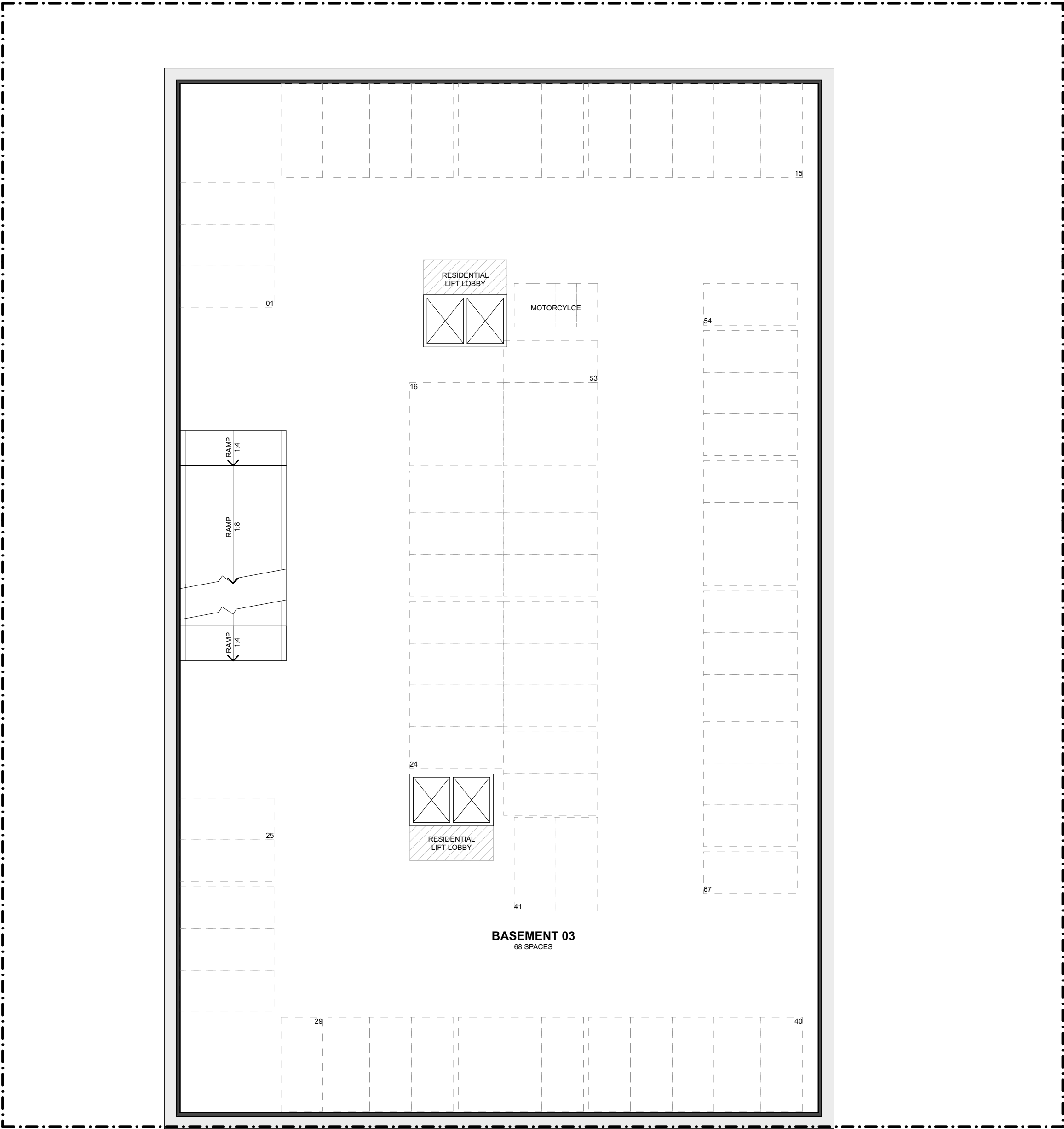
Phone: **0491 687 461**

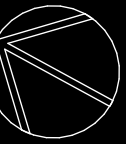
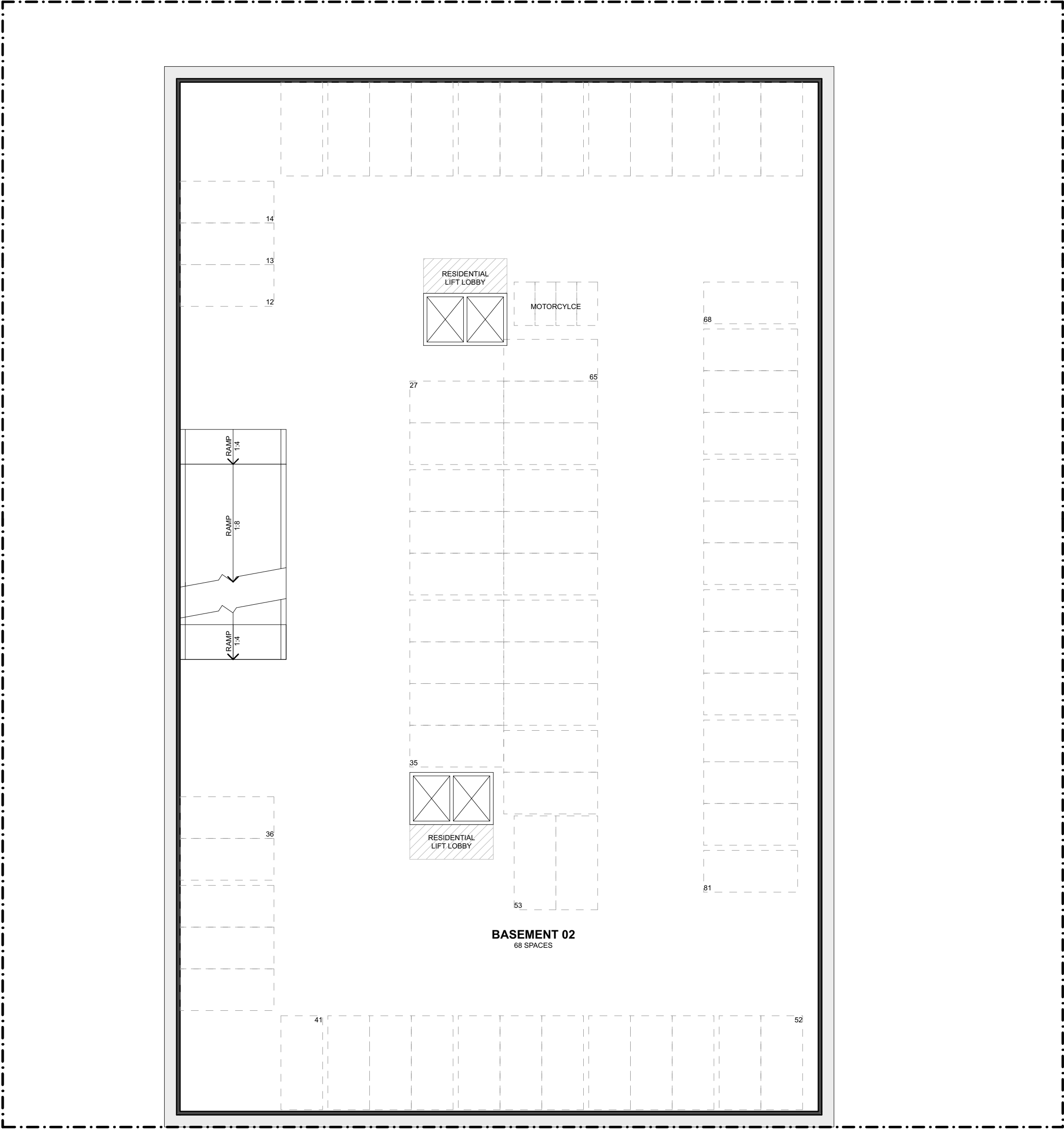


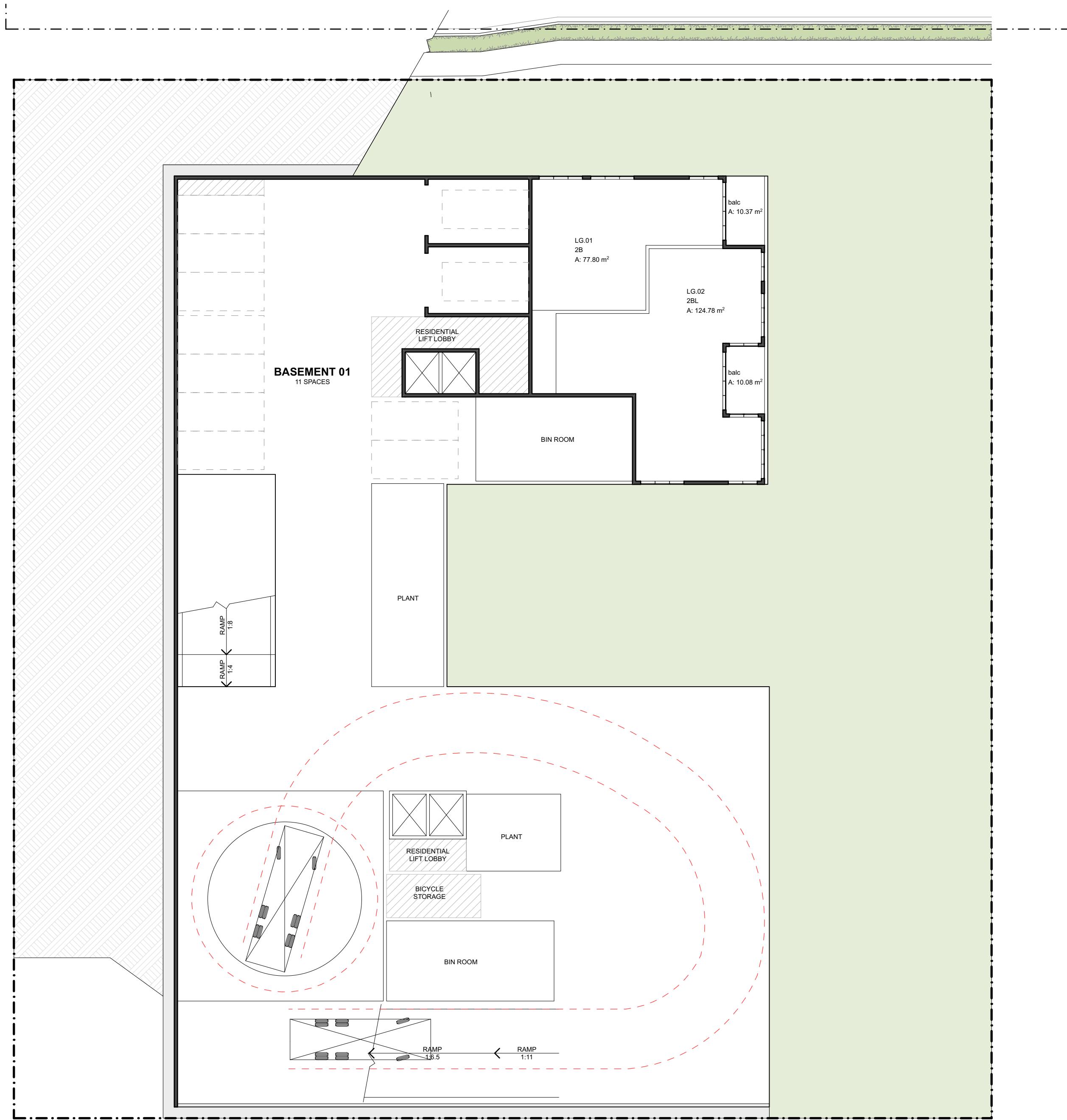
2019-2022 Adjustment Factor										
Factors to be applied to account for the Covid-19 traffic reduction for Windsor Rd, Seven Hills Rd, Old Northern Rd Intersection (TCS 322)										
Year	Peak	Det 4,5	Det 9,10	Det 18	Det 1,2,3	Det 17	Det 11,12	Det 6,7,8	Det 14,15	Det 16
		Windsor WB THRU	Windsor WB RT	Windsor WB LT	Windsor EB THRU	Windsor EB LT	ONR SB THRU	ONR SB LT	SHR NB LT/THRU	SHR NB RT
2019	AM	1335	382	272	1044	12	559	912	497	109
	PM	1541	547	483	1239	43	632	631	627	99
2022	AM	1308	397	363	1248	18	552	665	681	176
	PM	1456	481	462	1166	38	631	625	692	137
Difference	AM	-27	15	91	204	6	-7	-247	184	67
	PM	-85	-66	-21	-73	-5	-1	-6	65	38
Adjustment Factor	AM	1.02	1.00	1.00	1.00	1.00	1.01	1.37	1.00	1.00
	PM	1.06	1.14	1.05	1.06	1.13	1.00	1.01	1.00	1.00
Factors to be applied to account for the Covid-19 traffic reduction for Seven Hills Rd and Arthur St Intersection (TCS 4634)										
	Peak	SHR EB THRU	SHR EB RT	SHR WB THRU	SHR WB LT	Arthur LT	Arthur RT			
Adjustment Factor	AM	1.00	1.00	1.01	1.01	1.01	1.00			
	PM	1.00	1.00	1.05	1.05	1.05	1.00			
(if the factor is lower than 1.00, no change to traffic survey data)										

Appendix B

Design Plans







Appendix C

SIDRA Output

Site: TCS 0322 [Windsor Rd-Seven Hills Rd Ex.AM (Site Folder: Existing)] Network: N101 [AM Peak (Network Folder: Existing)]

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 132 seconds (Site User-Given Phase Times)

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

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Windsor Road (S)											
P1	Full	47	60.3	LOS F	0.2	0.2	0.96	0.96	248.1	225.4	0.91
East: Old Northern Road											
P2	Full	24	60.2	LOS F	0.1	0.1	0.96	0.96	239.9	215.6	0.90
P2B	Slip/ Bypass	24	60.2	LOS F	0.1	0.1	0.96	0.96	235.6	210.5	0.89
North: Windsor Road (N)											
P3	Full	38	60.2	LOS F	0.1	0.1	0.96	0.96	246.1	223.1	0.91
West: Seven Hills Road											

P4 Full	26	60.2	LOS F	0.1	0.1	0.96	0.96	242.7	219.0	0.90
All Pedestrians	160	60.2	LOS F	0.2	0.2	0.96	0.96	243.6	220.1	0.90

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TTPP - THE TRANSPORT PLANNING PARTNERSHIP | Licence: NETWORK / 1PC | Processed: Monday, 29 January 2024 12:28:38 PM

Project: C:\Users\clint\OneDrive - TTPP\21118 10-12 Seven Hills Rd, Baulkham Hills\07 Modelling Files\Model\21118-Seven Hills Road sid9.0 - 240123.sip9

MOVEMENT SUMMARY

Site: TCS 4634 [Seven Hills Rd-Arthur St EX.AM (Site Folder: Existing)]

Network: N101 [AM Peak (Network Folder: Existing)]

Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Phase Times)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Arthur St														
1	L2	120	0.9	120	0.9	0.131	17.8	LOS B	3.0	21.0	0.54	0.69	0.54	43.4
3	R2	285	0.7	285	0.7	* 0.645	41.3	LOS C	12.7	89.2	0.95	0.83	0.95	9.7
Approach		405	0.8	405	0.8	0.645	34.3	LOS C	12.7	89.2	0.83	0.79	0.83	22.6
East: Seven Hills Rd (E)														
4	L2	419	0.5	419	0.5	0.710	34.8	LOS C	19.4	136.3	0.91	0.85	0.91	18.8
5	T1	581	2.9	581	2.9	* 0.785	32.8	LOS C	24.3	174.7	0.95	0.89	1.00	39.1
Approach		1000	1.9	1000	1.9	0.785	33.6	LOS C	24.3	174.7	0.93	0.87	0.96	33.5
West: Seven Hills Rd (W)														
11	T1	663	3.3	663	3.3	0.503	17.6	LOS B	14.7	105.9	0.70	0.63	0.70	43.3
12	R2	99	0.0	99	0.0	* 0.503	35.2	LOS C	10.6	75.4	0.88	0.78	0.88	35.8
Approach		762	2.9	762	2.9	0.503	19.9	LOS B	14.7	105.9	0.73	0.65	0.73	42.2
All Vehicles		2167	2.0	2167	2.0	0.785	28.9	LOS C	24.3	174.7	0.84	0.78	0.86	34.8

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Arthur St											
P1	Full	13	44.2	LOS E	0.0	0.0	0.94	0.94	220.6	211.7	0.96
East: Seven Hills Rd (E)											
P2	Full	20	44.2	LOS E	0.1	0.1	0.94	0.94	223.5	215.1	0.96
West: Seven Hills Rd (W)											
P4	Full	11	44.2	LOS E	0.0	0.0	0.94	0.94	223.8	215.5	0.96
All Pedestrians		43	44.2	LOS E	0.1	0.1	0.94	0.94	222.7	214.2	0.96

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 [Arthur St-Yattenden Cres EX.AM (Site Folder: Existing)]**

 **Network: N101 [AM Peak (Network Folder: Existing)]**

Site Category: Existing Design
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Arthur St (S)														
2	T1	351	0.9	351	0.9	0.257	4.0	LOS A	1.8	12.4	0.17	0.44	0.17	30.5
3	R2	4	0.0	4	0.0	0.257	6.7	LOS A	1.8	12.4	0.17	0.44	0.17	41.0
3u	U	4	0.0	4	0.0	0.257	8.0	LOS A	1.8	12.4	0.17	0.44	0.17	33.0
Approach		359	0.9	359	0.9	0.257	4.1	LOS A	1.8	12.4	0.17	0.44	0.17	30.9
East: Yattenden Cres														
4	L2	20	0.0	20	0.0	0.043	8.1	LOS A	0.3	2.4	0.61	0.57	0.61	35.2
6	R2	18	0.0	18	0.0	0.043	10.2	LOS A	0.3	2.4	0.61	0.57	0.61	33.7
Approach		38	0.0	38	0.0	0.043	9.1	LOS A	0.3	2.4	0.61	0.57	0.61	34.6
North: Arthur St (N)														
7	L2	21	0.0	21	0.0	0.326	4.4	LOS A	1.9	13.1	0.05	0.46	0.05	41.7
8	T1	480	0.4	480	0.4	0.326	3.8	LOS A	1.9	13.1	0.05	0.46	0.05	39.0
9u	U	16	0.0	16	0.0	0.326	7.8	LOS A	1.9	13.1	0.05	0.46	0.05	35.4
Approach		517	0.4	517	0.4	0.326	4.0	LOS A	1.9	13.1	0.05	0.46	0.05	39.1
All Vehicles		914	0.6	914	0.6	0.326	4.2	LOS A	1.9	13.1	0.12	0.46	0.12	36.6

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

Site: TCS 0322 [Windsor Rd-Seven Hills Rd Ex.PM (Site Folder: Existing)] Network: N101 [PM Peak (Network Folder: Existing)]

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Site User-Given Phase Times)

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

- * Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Windsor Road (S)											
P1	Full	26	64.2	LOS F	0.1	0.1	0.96	0.96	252.0	225.4	0.89
East: Old Northern Road											
P2	Full	13	64.2	LOS F	0.0	0.0	0.96	0.96	243.8	215.6	0.88
P2B	Slip/ Bypass	13	64.2	LOS F	0.0	0.0	0.96	0.96	239.6	210.5	0.88
North: Windsor Road (N)											
P3	Full	29	64.2	LOS F	0.1	0.1	0.96	0.96	250.1	223.1	0.89
West: Seven Hills Road											

P4 Full	20	64.2	LOS F	0.1	0.1	0.96	0.96	246.7	219.0	0.89
All Pedestrians	101	64.2	LOS F	0.1	0.1	0.96	0.96	247.8	220.4	0.89

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: TCS 4634 [Seven Hills Rd-Arthur St EX.PM (Site Folder: Existing)]

Network: N101 [PM Peak (Network Folder: Existing)]

Site Category: Existing Design

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Phase Times)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Arthur St														
1	L2	76	0.0	76	0.0	0.103	20.2	LOS B	1.8	12.6	0.64	0.70	0.64	42.1
3	R2	275	0.4	274	0.4	* 0.953	64.3	LOS E	14.7	103.3	1.00	1.15	1.71	6.7
Approach		351	0.3	350 ^{N1}	0.3	0.953	54.8	LOS D	14.7	103.3	0.92	1.05	1.48	14.7
East: Seven Hills Rd (E)														
4	L2	384	0.8	371	0.8	0.680	24.7	LOS B	17.0	119.7	0.85	0.81	0.85	24.3
5	T1	832	1.3	804	1.3	* 0.752	21.0	LOS B	21.2	149.8	0.89	0.82	0.91	44.4
Approach		1216	1.1	1175 ^{N1}	1.1	0.752	22.2	LOS B	21.2	149.8	0.87	0.82	0.89	40.9
West: Seven Hills Rd (W)														
11	T1	593	1.1	593	1.1	0.581	14.7	LOS B	10.8	76.3	0.74	0.65	0.74	45.3
12	R2	88	0.0	88	0.0	* 0.581	26.4	LOS B	10.8	76.3	0.88	0.76	0.88	40.7
Approach		681	0.9	681	0.9	0.581	16.2	LOS B	10.8	76.3	0.76	0.67	0.76	44.6
All Vehicles		2247	0.9	2206 ^{N1}	1.0	0.953	25.5	LOS B	21.2	149.8	0.85	0.81	0.94	37.4

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

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

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

* Critical Movement (Signal Timing)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Arthur St											
P1	Full	2	34.2	LOS D	0.0	0.0	0.93	0.93	210.6	211.7	1.01
East: Seven Hills Rd (E)											
P2	Full	9	34.2	LOS D	0.0	0.0	0.93	0.93	213.5	215.1	1.01
West: Seven Hills Rd (W)											
P4	Full	4	34.2	LOS D	0.0	0.0	0.93	0.93	213.8	215.5	1.01
All Pedestrians		16	34.2	LOS D	0.0	0.0	0.93	0.93	213.2	214.8	1.01

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 [Arthur St-Yattenden Cres EX.PM (Site Folder: Existing)]**

 **Network: N101 [PM Peak (Network Folder: Existing)]**

Site Category: Existing Design
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Arthur St (S)														
2	T1	302	0.3	302	0.3	0.223	4.0	LOS A	1.4	10.1	0.15	0.45	0.15	30.7
3	R2	7	0.0	7	0.0	0.223	6.7	LOS A	1.4	10.1	0.15	0.45	0.15	41.1
3u	U	1	0.0	1	0.0	0.223	8.0	LOS A	1.4	10.1	0.15	0.45	0.15	33.1
Approach		311	0.3	311	0.3	0.223	4.0	LOS A	1.4	10.1	0.15	0.45	0.15	31.3
East: Yattenden Cres														
4	L2	5	0.0	5	0.0	0.024	6.9	LOS A	0.2	1.1	0.52	0.58	0.52	35.9
6	R2	17	0.0	17	0.0	0.024	9.0	LOS A	0.2	1.1	0.52	0.58	0.52	34.5
Approach		22	0.0	22	0.0	0.024	8.5	LOS A	0.2	1.1	0.52	0.58	0.52	34.9
North: Arthur St (N)														
7	L2	39	0.0	38	0.0	0.280	4.4	LOS A	1.5	10.5	0.05	0.47	0.05	41.7
8	T1	398	0.8	387	0.8	0.280	3.8	LOS A	1.5	10.5	0.05	0.47	0.05	38.9
9u	U	16	0.0	15	0.0	0.280	7.8	LOS A	1.5	10.5	0.05	0.47	0.05	35.3
Approach		453	0.7	440 ^{N1}	0.7	0.280	4.0	LOS A	1.5	10.5	0.05	0.47	0.05	39.2
All Vehicles		785	0.5	773 ^{N1}	0.5	0.280	4.2	LOS A	1.5	10.5	0.10	0.46	0.10	36.8

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.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

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

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

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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 Site: TCS 0322 [Windsor Rd-Seven Hills Rd FU.AM (Site Folder: 2032 Future)]
 Network: N101 [AM Peak (Network Folder: 2032 Future)]

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 132 seconds (Site Practical Cycle Time)

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

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Windsor Road (S)											
P1	Full	47	60.3	LOS F	0.2	0.2	0.96	0.96	248.1	225.4	0.91
East: Old Northern Road											
P2	Full	24	60.2	LOS F	0.1	0.1	0.96	0.96	239.9	215.6	0.90
P2B	Slip/ Bypass	24	60.2	LOS F	0.1	0.1	0.96	0.96	235.6	210.5	0.89
North: Windsor Road (N)											
P3	Full	38	60.2	LOS F	0.1	0.1	0.96	0.96	246.1	223.1	0.91
West: Seven Hills Road											

P4 Full	26	60.2	LOS F	0.1	0.1	0.96	0.96	242.7	219.0	0.90
All Pedestrians	160	60.2	LOS F	0.2	0.2	0.96	0.96	243.6	220.1	0.90

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: TCS 4634 [Seven Hills Rd-Arthur St FU.AM (Site Folder: 2032 Future)]

Network: N101 [AM Peak (Network Folder: 2032 Future)]

Site Category: Future Base
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Practical Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Arthur St														
1	L2	121	0.9	121	0.9	0.134	15.6	LOS B	2.5	17.3	0.55	0.69	0.55	44.6
3	R2	425	0.7	425	0.7	* 0.837	40.4	LOS C	18.0	127.0	1.00	0.96	1.21	9.9
Approach		546	0.8	546	0.8	0.837	34.9	LOS C	18.0	127.0	0.90	0.90	1.07	20.1
East: Seven Hills Rd (E)														
4	L2	421	0.5	421	0.5	0.785	34.2	LOS C	18.2	128.6	0.95	0.90	1.05	19.1
5	T1	615	2.9	615	2.9	* 0.867	35.2	LOS C	24.1	173.0	0.99	1.03	1.21	38.1
Approach		1036	1.9	1036	1.9	0.867	34.8	LOS C	24.1	173.0	0.98	0.98	1.15	33.2
West: Seven Hills Rd (W)														
11	T1	667	3.3	667	3.3	0.690	19.6	LOS B	17.3	124.6	0.85	0.77	0.87	42.1
12	R2	118	0.0	118	0.0	* 0.690	39.4	LOS C	8.1	57.5	0.99	0.92	1.07	33.7
Approach		785	2.8	785	2.8	0.690	22.6	LOS B	17.3	124.6	0.87	0.79	0.90	40.6
All Vehicles		2367	2.0	2367	2.0	0.867	30.8	LOS C	24.1	173.0	0.92	0.90	1.05	33.3

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Arthur St											
P1	Full	13	34.2	LOS D	0.0	0.0	0.93	0.93	210.7	211.7	1.00
East: Seven Hills Rd (E)											
P2	Full	20	34.3	LOS D	0.0	0.0	0.93	0.93	213.5	215.1	1.01
West: Seven Hills Rd (W)											
P4	Full	11	34.2	LOS D	0.0	0.0	0.93	0.93	213.8	215.5	1.01
All Pedestrians		43	34.2	LOS D	0.0	0.0	0.93	0.93	212.7	214.2	1.01

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 [Arthur St-Yattenden Cres FU.AM (Site Folder: 2032 Future)]

Network: N101 [AM Peak (Network Folder: 2032 Future)]

Site Category: Future Base Roundabout

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Arthur St (S)														
2	T1	354	0.9	354	0.9	0.359	5.0	LOS A	2.3	16.4	0.47	0.55	0.47	27.5
3	R2	4	0.0	4	0.0	0.359	7.7	LOS A	2.3	16.4	0.47	0.55	0.47	39.3
3u	U	4	0.0	4	0.0	0.359	9.0	LOS A	2.3	16.4	0.47	0.55	0.47	31.0
Approach		362	0.9	362	0.9	0.359	5.1	LOS A	2.3	16.4	0.47	0.55	0.47	27.9
East: Yattenden Cres														
4	L2	20	0.0	20	0.0	0.210	8.9	LOS A	1.8	12.8	0.69	0.64	0.69	33.7
6	R2	156	0.0	156	0.0	0.210	11.1	LOS A	1.8	12.8	0.69	0.64	0.69	31.8
Approach		176	0.0	176	0.0	0.210	10.9	LOS A	1.8	12.8	0.69	0.64	0.69	32.1
North: Arthur St (N)														
7	L2	39	0.0	39	0.0	0.341	4.4	LOS A	2.2	15.6	0.05	0.46	0.05	41.7
8	T1	485	0.4	485	0.4	0.341	3.8	LOS A	2.2	15.6	0.05	0.46	0.05	38.9
9u	U	16	0.0	16	0.0	0.341	7.8	LOS A	2.2	15.6	0.05	0.46	0.05	35.3
Approach		540	0.4	540	0.4	0.341	4.0	LOS A	2.2	15.6	0.05	0.46	0.05	39.1
All Vehicles		1078	0.5	1078	0.5	0.359	5.5	LOS A	2.3	16.4	0.30	0.52	0.30	34.9

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

MOVEMENT SUMMARY

Site: TCS 0322 [Windsor Rd-Seven Hills Rd FU.PM (Site Folder: 2032 Future)]

Network: N101 [PM Peak (Network Folder: 2032 Future)]

Site Category: Future Base

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Site Practical Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Windsor Road (S)														
1	L2	516	1.2	516	1.2	1.077	114.7	LOS F	100.1	709.4	1.00	1.31	1.67	12.1
2	T1	1658	1.8	1658	1.8	* 1.077	114.4	LOS F	134.1	953.1	1.00	1.41	1.65	16.1
3	R2	597	6.4	597	6.4	0.985	109.0	LOS F	27.6	203.6	1.00	1.11	1.54	14.5
Approach		2771	2.7	2771	2.7	1.077	113.3	LOS F	134.1	953.1	1.00	1.33	1.63	15.0
East: Old Northern Road														
4	L2	657	3.9	657	3.9	0.438	37.9	LOS C	15.6	110.4	0.77	0.79	0.77	28.6
5	T1	759	1.5	759	1.5	* 1.118	187.1	LOS F	47.9	339.6	1.00	1.56	2.03	2.1
Approach		1416	2.6	1416	2.6	1.118	117.9	LOS F	47.9	339.6	0.89	1.21	1.44	8.5
North: Windsor Road (N)														
7	L2	51	0.0	51	0.0	0.118	23.3	LOS B	2.9	23.1	0.63	0.62	0.63	16.6
8	T1	1353	2.1	1353	2.1	0.974	82.0	LOS F	59.3	419.2	0.99	1.17	1.33	20.9
Approach		1403	2.1	1403	2.1	0.974	79.8	LOS F	59.3	419.2	0.98	1.15	1.31	20.6
West: Seven Hills Road														
10	L2	175	0.9	175	0.9	1.058	143.0	LOS F	56.7	399.8	1.00	1.38	1.70	10.2
11	T1	452	0.7	451	0.7	1.058	137.5	LOS F	56.7	399.8	1.00	1.38	1.70	7.9
12	R2	414	1.4	413	1.4	* 1.068	157.9	LOS F	22.9	161.9	1.00	1.23	1.91	12.8
Approach		1040	1.0	1039 ^N ₁	1.0	1.068	146.5	LOS F	56.7	399.8	1.00	1.32	1.78	10.5
All Vehicles		6629	2.3	6629	2.3	1.118	112.4	LOS F	134.1	953.1	0.97	1.26	1.55	13.8

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

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

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

* Critical Movement (Signal Timing)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Windsor Road (S)											
P1	Full	26	64.2	LOS F	0.1	0.1	0.96	0.96	252.0	225.4	0.89
East: Old Northern Road											
P2	Full	13	64.2	LOS F	0.0	0.0	0.96	0.96	243.8	215.6	0.88
P2B	Slip/Bypass	13	64.2	LOS F	0.0	0.0	0.96	0.96	239.6	210.5	0.88
North: Windsor Road (N)											
P3	Full	29	64.2	LOS F	0.1	0.1	0.96	0.96	250.1	223.1	0.89

West: Seven Hills Road											
P4	Full	20	64.2	LOS F	0.1	0.1	0.96	0.96	246.7	219.0	0.89
All Pedestrians		101	64.2	LOS F	0.1	0.1	0.96	0.96	247.8	220.4	0.89

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: TCS 4634 [Seven Hills Rd-Arthur St FU.PM (Site Folder: 2032 Future)]

Network: N101 [PM Peak (Network Folder: 2032 Future)]

Site Category: Future Base

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Practical Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total HV veh/h	%				[Veh. veh	Dist] m				
South: Arthur St														
1	L2	76	0.0	76	0.0	0.087	16.4	LOS B	1.6	11.0	0.56	0.68	0.56	44.2
3	R2	428	0.4	427	0.4	* 0.919	53.0	LOS D	21.4	150.2	1.00	1.07	1.46	7.9
Approach		504	0.3	503 ^{N1}	0.3	0.919	47.5	LOS D	21.4	150.2	0.93	1.01	1.32	14.2
East: Seven Hills Rd (E)														
4	L2	386	0.8	350	0.8	0.805	34.1	LOS C	20.7	145.8	0.95	0.92	1.07	19.6
5	T1	885	1.3	803	1.3	* 0.890	35.7	LOS C	28.1	199.0	0.99	1.05	1.22	37.8
Approach		1272	1.1	1154 ^{N1}	1.1	0.890	35.2	LOS C	28.1	199.0	0.98	1.01	1.18	34.6
West: Seven Hills Rd (W)														
11	T1	596	1.1	596	1.1	0.826	31.6	LOS C	17.0	120.3	0.94	0.99	1.17	35.7
12	R2	114	0.0	114	0.0	* 0.826	44.4	LOS D	12.2	85.9	1.00	1.06	1.25	32.1
Approach		709	0.9	709	0.9	0.826	33.6	LOS C	17.0	120.3	0.95	1.00	1.18	35.1
All Vehicles		2485	0.9	2366 ^{N1}	0.9	0.919	37.4	LOS C	28.1	199.0	0.96	1.01	1.21	31.2

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.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

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

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

* Critical Movement (Signal Timing)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Arthur St											
P1	Full	2	34.2	LOS D	0.0	0.0	0.93	0.93	210.6	211.7	1.01
East: Seven Hills Rd (E)											
P2	Full	9	34.2	LOS D	0.0	0.0	0.93	0.93	213.5	215.1	1.01
West: Seven Hills Rd (W)											
P4	Full	4	34.2	LOS D	0.0	0.0	0.93	0.93	213.8	215.5	1.01
All Pedestrians		16	34.2	LOS D	0.0	0.0	0.93	0.93	213.2	214.8	1.01

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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240123.sip9

MOVEMENT SUMMARY

Site: 101 [Arthur St-Yattenden Cres FU.PM (Site Folder: 2032 Future)]

Network: N101 [PM Peak (Network Folder: 2032 Future)]

Site Category: Future Base Roundabout

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist m				
South: Arthur St (S)														
2	T1	303	0.3	303	0.3	0.376	5.1	LOS A	1.9	13.5	0.46	0.56	0.46	27.6
3	R2	7	0.0	7	0.0	0.376	7.8	LOS A	1.9	13.5	0.46	0.56	0.46	39.4
3u	U	1	0.0	1	0.0	0.376	9.1	LOS A	1.9	13.5	0.46	0.56	0.46	31.1
Approach		312	0.3	312	0.3	0.376	5.1	LOS A	1.9	13.5	0.46	0.56	0.46	28.2
East: Yattenden Cres														
4	L2	5	0.0	5	0.0	0.234	7.4	LOS A	1.5	10.4	0.58	0.64	0.58	34.9
6	R2	169	0.0	169	0.0	0.234	9.6	LOS A	1.5	10.4	0.58	0.64	0.58	33.3
Approach		175	0.0	175	0.0	0.234	9.6	LOS A	1.5	10.4	0.58	0.64	0.58	33.4
North: Arthur St (N)														
7	L2	65	0.0	61	0.0	0.292	4.4	LOS A	1.8	12.3	0.05	0.47	0.05	41.6
8	T1	411	0.8	381	0.8	0.292	3.8	LOS A	1.8	12.3	0.05	0.47	0.05	38.8
9u	U	16	0.0	15	0.0	0.292	7.8	LOS A	1.8	12.3	0.05	0.47	0.05	35.3
Approach		492	0.7	456 ^{N1}	0.7	0.292	4.0	LOS A	1.8	12.3	0.05	0.47	0.05	39.3
All Vehicles		978	0.4	943 ^{N1}	0.5	0.376	5.4	LOS A	1.9	13.5	0.29	0.53	0.29	35.4

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

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

 Site: TCS 0322 [Windsor Rd-Seven Hills Rd FUD.AM (Site Folder: 2032 Future with Development)]

 Network: N101 [AM Peak (Network Folder: 2032 Future with Development)]

Site Category: Future + Dev

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 132 seconds (Site Practical Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Windsor Road (S)														
1	L2	377	1.1	377	1.1	0.955	65.9	LOS E	63.9	454.9	1.00	1.17	1.27	19.4
2	T1	1388	2.7	1388	2.7	* 0.955	58.9	LOS E	74.6	534.2	1.00	1.13	1.24	25.2
3	R2	423	9.1	423	9.1	0.986	107.5	LOS F	18.5	139.4	1.00	1.13	1.64	14.6
Approach		2188	3.7	2188	3.7	0.986	69.5	LOS E	74.6	534.2	1.00	1.14	1.32	21.6
East: Old Northern Road														
4	L2	698	5.3	698	5.3	0.532	42.1	LOS C	17.1	122.0	0.85	0.81	0.85	27.1
5	T1	657	2.4	657	2.4	* 0.997	103.9	LOS F	29.5	210.9	1.00	1.24	1.59	3.8
Approach		1355	3.9	1355	3.9	0.997	72.1	LOS F	29.5	210.9	0.92	1.02	1.21	13.8
North: Windsor Road (N)														
7	L2	25	0.0	25	0.0	0.099	21.4	LOS B	1.8	15.6	0.65	0.58	0.65	17.3
8	T1	1340	3.5	1340	3.5	0.973	79.1	LOS F	56.1	400.5	0.99	1.18	1.35	21.4
Approach		1365	3.4	1365	3.4	0.973	78.1	LOS F	56.1	400.5	0.98	1.17	1.34	21.1
West: Seven Hills Road														
10	L2	137	1.9	137	1.9	0.864	55.3	LOS D	37.9	272.0	1.00	0.97	1.11	21.4
11	T1	441	3.1	441	3.1	0.864	49.7	LOS D	37.9	272.0	1.00	0.97	1.11	17.8
12	R2	535	2.0	535	2.0	* 0.981	103.2	LOS F	23.0	164.0	1.00	1.10	1.57	17.9
Approach		1113	2.4	1113	2.4	0.981	76.1	LOS F	37.9	272.0	1.00	1.03	1.33	18.2
All Vehicles		6021	3.4	6021	3.4	0.997	73.2	LOS F	74.6	534.2	0.98	1.10	1.30	19.3

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

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

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Windsor Road (S)											
P1	Full	47	60.3	LOS F	0.2	0.2	0.96	0.96	248.1	225.4	0.91
East: Old Northern Road											
P2	Full	24	60.2	LOS F	0.1	0.1	0.96	0.96	239.9	215.6	0.90
P2B	Slip/Bypass	24	60.2	LOS F	0.1	0.1	0.96	0.96	235.6	210.5	0.89
North: Windsor Road (N)											
P3	Full	38	60.2	LOS F	0.1	0.1	0.96	0.96	246.1	223.1	0.91

West: Seven Hills Road											
P4	Full	26	60.2	LOS F	0.1	0.1	0.96	0.96	242.7	219.0	0.90
All Pedestrians		160	60.2	LOS F	0.2	0.2	0.96	0.96	243.6	220.1	0.90

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: TCS 4634 [Seven Hills Rd-Arthur St FUD.AM (Site Folder: 2032 Future with Development)]

Network: N101 [AM Peak (Network Folder: 2032 Future with Development)]

Site Category: Future + Dev

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Practical Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Arthur St														
1	L2	121	0.9	121	0.9	0.134	17.0	LOS B	2.8	19.5	0.55	0.69	0.55	43.8
3	R2	447	0.7	447	0.7	* 0.813	40.5	LOS C	20.1	141.7	0.99	0.93	1.12	9.8
Approach		568	0.8	568	0.8	0.813	35.5	LOS C	20.1	141.7	0.89	0.88	1.00	19.6
East: Seven Hills Rd (E)														
4	L2	443	0.5	443	0.5	0.761	34.6	LOS C	19.8	139.3	0.93	0.88	0.98	18.9
5	T1	615	2.9	615	2.9	* 0.841	34.6	LOS C	25.7	184.5	0.98	0.98	1.12	38.4
Approach		1058	1.9	1058	1.9	0.841	34.6	LOS C	25.7	184.5	0.96	0.93	1.06	33.1
West: Seven Hills Rd (W)														
11	T1	667	3.3	667	3.3	0.723	22.4	LOS B	20.1	144.4	0.87	0.79	0.89	40.5
12	R2	118	0.0	118	0.0	* 0.723	45.0	LOS D	9.1	64.5	1.00	0.95	1.11	31.6
Approach		785	2.8	785	2.8	0.723	25.8	LOS B	20.1	144.4	0.89	0.81	0.92	38.8
All Vehicles		2412	1.9	2412	1.9	0.841	31.9	LOS C	25.7	184.5	0.92	0.88	1.00	32.5

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Arthur St											
P1	Full	13	39.2	LOS D	0.0	0.0	0.93	0.93	215.6	211.7	0.98
East: Seven Hills Rd (E)											
P2	Full	20	39.2	LOS D	0.0	0.0	0.93	0.93	218.5	215.1	0.98
West: Seven Hills Rd (W)											
P4	Full	11	39.2	LOS D	0.0	0.0	0.93	0.93	218.8	215.5	0.98
All Pedestrians		43	39.2	LOS D	0.0	0.0	0.93	0.93	217.7	214.2	0.98

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 [Arthur St-Yattenden Cres FUD.AM (Site Folder: 2032 Future with Development)]**

 **Network: N101 [AM Peak (Network Folder: 2032 Future with Development)]**

Site Category: Future + Dev
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Arthur St (S)														
2	T1	354	0.9	354	0.9	0.411	5.2	LOS A	2.4	17.1	0.49	0.57	0.49	27.2
3	R2	4	0.0	4	0.0	0.411	7.9	LOS A	2.4	17.1	0.49	0.57	0.49	39.2
3u	U	4	0.0	4	0.0	0.411	9.2	LOS A	2.4	17.1	0.49	0.57	0.49	30.9
Approach		362	0.9	362	0.9	0.411	5.3	LOS A	2.4	17.1	0.49	0.57	0.49	27.6
East: Yattenden Cres														
4	L2	20	0.0	20	0.0	0.236	9.3	LOS A	1.9	13.2	0.71	0.65	0.71	33.4
6	R2	156	0.0	156	0.0	0.236	11.4	LOS A	1.9	13.2	0.71	0.65	0.71	31.5
Approach		176	0.0	176	0.0	0.236	11.2	LOS A	1.9	13.2	0.71	0.65	0.71	31.8
North: Arthur St (N)														
7	L2	39	0.0	39	0.0	0.358	4.4	LOS A	2.4	16.7	0.06	0.47	0.06	41.5
8	T1	485	0.4	485	0.4	0.358	3.8	LOS A	2.4	16.7	0.06	0.47	0.06	38.6
9u	U	38	0.0	38	0.0	0.358	7.8	LOS A	2.4	16.7	0.06	0.47	0.06	35.0
Approach		562	0.4	562	0.4	0.358	4.1	LOS A	2.4	16.7	0.06	0.47	0.06	38.8
All Vehicles		1100	0.5	1100	0.5	0.411	5.6	LOS A	2.4	17.1	0.30	0.53	0.30	34.6

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

■ ■ Network: N101 [PM Peak
(Network Folder: 2032 Future
with Development)]

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Site Practical Cycle Time)

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Windsor Road (S)											
P1	Full	26	64.2	LOS F	0.1	0.1	0.96	0.96	252.0	225.4	0.89
East: Old Northern Road											
P2	Full	13	64.2	LOS F	0.0	0.0	0.96	0.96	243.8	215.6	0.88
P2B	Slip/ Bypass	13	64.2	LOS F	0.0	0.0	0.96	0.96	239.6	210.5	0.88
North: Windsor Road (N)											

P3	Full	29	64.2	LOS F	0.1	0.1	0.96	0.96	250.1	223.1	0.89
West: Seven Hills Road											
P4	Full	20	64.2	LOS F	0.1	0.1	0.96	0.96	246.7	219.0	0.89
All Pedestrians		101	64.2	LOS F	0.1	0.1	0.96	0.96	247.8	220.4	0.89

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: TCS 4634 [Seven Hills Rd-Arthur St FUD.PM (Site Folder: 2032 Future with Development)]

 Network: N101 [PM Peak (Network Folder: 2032 Future with Development)]

Site Category: Future + Dev

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Practical Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Arthur St														
1	L2	76	0.0	76	0.0	0.087	16.4	LOS B	1.6	11.0	0.56	0.68	0.56	44.2
3	R2	434	0.4	433	0.4	* 0.930	55.5	LOS D	22.3	156.4	1.00	1.09	1.50	7.6
Approach		509	0.3	508 ^{N1}	0.3	0.930	49.7	LOS D	22.3	156.4	0.93	1.02	1.36	13.7
East: Seven Hills Rd (E)														
4	L2	392	0.8	359	0.8	0.818	35.0	LOS C	21.4	150.8	0.96	0.93	1.09	19.2
5	T1	885	1.3	812	1.3	* 0.903	37.8	LOS C	29.6	209.1	0.99	1.07	1.26	37.0
Approach		1277	1.1	1171 ^{N1}	1.1	0.903	36.9	LOS C	29.6	209.1	0.98	1.03	1.21	33.9
West: Seven Hills Rd (W)														
11	T1	596	1.1	596	1.1	0.828	31.8	LOS C	17.2	121.3	0.94	0.99	1.17	35.6
12	R2	114	0.0	114	0.0	* 0.828	44.7	LOS D	12.2	85.9	1.00	1.06	1.26	32.1
Approach		709	0.9	709	0.9	0.828	33.9	LOS C	17.2	121.3	0.95	1.00	1.19	35.0
All Vehicles		2496	0.9	2388 ^{N1}	0.9	0.930	38.8	LOS C	29.6	209.1	0.96	1.02	1.23	30.6

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

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

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

* Critical Movement (Signal Timing)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Arthur St											
P1	Full	2	34.2	LOS D	0.0	0.0	0.93	0.93	210.6	211.7	1.01
East: Seven Hills Rd (E)											
P2	Full	9	34.2	LOS D	0.0	0.0	0.93	0.93	213.5	215.1	1.01
West: Seven Hills Rd (W)											
P4	Full	4	34.2	LOS D	0.0	0.0	0.93	0.93	213.8	215.5	1.01
All Pedestrians		16	34.2	LOS D	0.0	0.0	0.93	0.93	213.2	214.8	1.01

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 [Arthur St-Yattenden Cres FUD.PM (Site Folder: 2032 Future with Development)]**

 **Network: N101 [PM Peak (Network Folder: 2032 Future with Development)]**

Site Category: Future + Dev
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Arthur St (S)														
2	T1	303	0.3	303	0.3	0.396	5.1	LOS A	1.9	13.6	0.47	0.56	0.47	27.5
3	R2	7	0.0	7	0.0	0.396	7.8	LOS A	1.9	13.6	0.47	0.56	0.47	39.3
3u	U	1	0.0	1	0.0	0.396	9.1	LOS A	1.9	13.6	0.47	0.56	0.47	31.0
Approach		312	0.3	312	0.3	0.396	5.2	LOS A	1.9	13.6	0.47	0.56	0.47	28.2
East: Yattenden Cres														
4	L2	5	0.0	5	0.0	0.247	7.5	LOS A	1.5	10.6	0.59	0.65	0.59	34.8
6	R2	169	0.0	169	0.0	0.247	9.7	LOS A	1.5	10.6	0.59	0.65	0.59	33.2
Approach		175	0.0	175	0.0	0.247	9.7	LOS A	1.5	10.6	0.59	0.65	0.59	33.3
North: Arthur St (N)														
7	L2	65	0.0	61	0.0	0.299	4.4	LOS A	1.8	12.7	0.05	0.47	0.05	41.6
8	T1	411	0.8	384	0.8	0.299	3.8	LOS A	1.8	12.7	0.05	0.47	0.05	38.8
9u	U	21	0.0	20	0.0	0.299	7.8	LOS A	1.8	12.7	0.05	0.47	0.05	35.2
Approach		497	0.7	465 ^{N1}	0.6	0.299	4.1	LOS A	1.8	12.7	0.05	0.47	0.05	39.2
All Vehicles		983	0.4	951 ^{N1}	0.5	0.396	5.5	LOS A	1.9	13.6	0.29	0.53	0.29	35.3

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.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

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

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

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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