CUMBERLAND CITY COUNCIL

24 September 2020

Council ref. PP2020/0006
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Sydney Central City Planning Panel
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ATTN: Chair, Sydney Central City Planning Panel

CUMBERLAND CITY COUNCIL SUBMISSION
PLANNING PROPOSAL AT 1 CRESCENT STREET, HOLROYD (2017SWC141)

As you are aware, Cumberland City Council and the previous Holroyd Council have outlined many concerns regarding the planning proposal over a number of years. Council is disappointed that many of these concerns are yet to be addressed in the current version of the proposal. Significantly, while the majority of traffic from the proposal is forecast to travel west towards Merrylands, the traffic reports prepared as part of the planning proposal have not considered the impacts in the Merrylands area nor the future development permitted through current planning controls in the town centre.

In accordance with Council's resolution, attached is Cumberland City Council's submission for the post-Gateway exhibition of the planning proposal at 1 Crescent Street, Holroyd.

Please do not hesitate to contact Daniel Cavallo, Director, Environment & Planning, on 8757 9850 or daniel.cavallo@cumberland.nsw.gov.au should you have further queries or require additional information.

Yours faithfully,

Hamish McNulty
GENERAL MANAGER

CUMBERLAND CITY COUNCIL SUBMISSION
PLANNING PROPOSAL FOR 1 CRESCENT STREET, HOLROYD (2017SWC141)

Council reaffirms its position that the proposal should not proceed as it lacks both strategic and site specific merit. Council has identified the following key issues that the Panel should consider in the assessment of the planning proposal at 1 Crescent Street, Holroyd.

Key Issues

1. Lack of Strategic Alignment

The proposal is not aligned with relevant strategic plans for the area. This includes:

- Parramatta Road Corridor Urban Transformation Strategy, which identifies the existing planning controls as the desired land use outcome for the site. This Strategy was endorsed by the NSW Government

- Cumberland 2030: Our Local Strategic Planning Statement, which does not identify the proposal as part of strategic planning for the area. This Statement was endorsed by Council and received a letter of support from the Greater Sydney Commission

2. Local Traffic Impacts

Council officers have reviewed existing traffic analysis for the proposal, and also commissioned a technical review through an independent consultant (Attachment 1). Significantly, while the majority of traffic from the proposal is forecast to travel west towards Merrylands, the traffic reports prepared as part of the planning proposal have not considered the impacts in the Merrylands area nor the future development permitted through current planning controls in the town centre.

In response to this, a traffic analysis and modelling exercise was undertaken by the independent consultant to understand these impacts of the development in greater detail. The modelling covered both intersections already modelled as part of the planning proposal, and intersections which were not assessed as part of the planning proposal, and are graphically shown in Figure 1.

Figure 1: Intersections assessed for the traffic modelling exercise

Four scenarios were modelled as part of the traffic analysis. These scenarios are:

1. Base year (2019)
2. Future year (2030) with background traffic growth only
3. Future year (2030) with background traffic growth and 1 Crescent Street development traffic
4. Future year (2030) with background traffic growth, 1 Crescent Street development traffic and mitigation measures.

The results of the modelling indicate that the Pitt Street /Neil Street intersection at Merrylands will suffer the greatest impact from traffic generated by the proposed development, as shown in Figure 2 and 3 below.

Scenario 2: Future year (2030) with background traffic growth only

Intersection	AM peak				PM peak			
	Volume	Delay (s)	LoS	DoS	Volume	Delay (s)	LoS	DoS
Woodville Road / Parramatta Road*	6,208	37.5	C	0.77	6,239	34.3	C	0.79
Woodville Road / Crescent Street*	3,814	14.0	A	0.64	4,186	17.2	B	0.56
Walpole Street / Brickworks Drive	900	6.1	A	0.37	806	5.9	A	0.38
Pitt Street / Walpole Street	2,557	25.2	B	0.97	2,503	15.9	B	0.65
Pitt Street / Neil Street	3,299	60.6	E	0.90	3,912	70.6	F	0.97
Merrylands Road / Woodville Road	3,837	26.0	B	0.82	4,254	25.1	B	0.88

Note: volumes are totals of all arms of the intersection (including peak flow factor).
Delay is average of all arms of the intersection.
LoS = Level of Service (average of all arms of the intersection).
DoS = Degree of Saturation (volume / capacity), where 1.0 means the intersection is at capacity (worst performing arm).

*Includes committed TfNSW intersection upgrade scheme.

Figure 2: Traffic modelling results, future year with background traffic growth only

Scenario 3: Future year (2030) with background traffic growth and 1 Crescent St development traffic

Intersection	AM peak				PM peak			
	Volume	Delay (s)	LoS	DoS	Volume	Delay (s)	LoS	DoS
Woodville Road / Parramatta Road*	6,535	40.6	C	0.80	6,716	37.1	C	0.84
Woodville Road / Crescent Street*	4,196	31.7	C	0.89	4,769	24.2	B	0.77
Walpole Street / Brickworks Drive	1,012	6.1	A	0.46	1,227	5.8	A	0.54
Pitt Street / Walpole Street	2,862	22.7	B	0.81	2,923	22.1	B	0.96
Pitt Street / Neil Street	3,485	76.1	F	1.02	4,168	99.7	F	1.06
Merrylands Road / Woodville Road	3,931	30.3	C	0.86	4,399	31.1	C	0.88

Note: volumes are totals of all arms of the intersection (including peak flow factor).
Delay is average of all arms of the intersection.
LoS = Level of Service (average of all arms of the intersection).
DoS = Degree of Saturation (volume / capacity), where 1.0 means the intersection is at capacity (worst performing arm).

*Includes committed TfNSW intersection upgrade scheme.

Figure 3: Traffic modelling results, future year with background traffic growth and 1 Crescent Street development traffic

The analysis also identifies the need for traffic mitigation works to address the impacts of the planning proposal in the Merrylands area, including improvements to the Pitt Street / Neil Street intersection and the potential for a Merrylands traffic bypass scheme. These improvements include road widening and the provision of additional turning lanes to offset additional traffic flows generated by the proposed development.

3. Poor Public Transport and Active Transport Access

The location of the proposed development is isolated from all modes of public transport. Acess to the nearest bus and train networks are considered beyond industry standards (maximum walking distance of 400m to a bus stop, and 800m to a train station). The closet railway station (Harris Park) is 900m away, whilst the closet bus stop is 450m away (Woodville Road, 907 bus route).

Pedestrian priority and amenity is poor surrounding the development, most of the footpaths are narrow, are directly next to high volume traffic with no protection and lack pedestrian priority at crossings. Currently, there are no pedestrian crossings across Woodville Road near the site, a pedestrian bridge over Woodville Road was previously considered, this concept has not been supported by Transport for NSW. There is no evidence currently available that indicates the proponent is planning to address these issues.

4. Arrangements for Affordable Housing Provision

It is noted that the proponent was unsuccessful in their request to amend Condition 1(C) of the Gateway Determination and are still required to deliver 7% affordable housing in perpetuity (the proponent sought to reduce the term to 12 years but this was not supported by the Regional Panel). As part of its consideration of the matter, the Regional Panel acknolwedged Council's position for a higher proportion of affordable housing in perpetuity, and that affordable housing outcomes have been achieved for planning proposals in the area. However, no changes were made to the condition.

In this regard, the proponent seeks to retain the affordable housing units in private ownership, to be managed by a registered housing provider. The proponent also seeks an offest against

development contributions which is assessed at $3.115 million. Notwithstanding the work undertaken to date as part of the planning proposal, there continues to be an inconsistency of the proposed affordable housing offering when assessed against Council Interim Affordable Housing Policy.

Therefore, Council maintains its position for at least 10% affordable housing contribution dedicated to Council in perpetuity.

5. Built Form and Design Considerations

It is noted that a requirement of the Gateway Determination (as amended) is that a site specific Development Control Plan must be finalised before any development application is determined over the site. Council has concerns regarding the overall built form proposed development that include the following key issues:

- A number of buildings are proposed to have a street wall heights of eight storeys, which is considered excessive and should not exceed three storeys
- Inconsistency with setbacks and building separation when assessed with current planning controls
- Insufficient information on access for residents to the adjoining Holroyd Sportsground, with improve access over A'Becketts Creek required to between integrate the site
- Interface with adjoining industrial development in the area

Council recommends that the site specific Development Control Plan be endorsed by Council prior to lodgement of the first development application for the site.

Community Survey

In addition to the public exhibition process undertaken by the NSW Government, Council undertook a community survey to gauge the perceptions of the local community regarding this proposal. The results of the survey are provided in this submission as Attachment 2.

Proposed Requirements should the Proposal Proceed

Whilst Council still maintains that the planning proposal should not proceed at this time, the final decision is with the Sydney Central City Planning Panel as the planning authority on the proposal. Should the NSW Government decide to proceed with the proposal, Council has identified a number of requirements to mitigate impacts and derive public benefit from the proposal. These include:

- Improvements to transport infrastructure completed prior to the first occupation certificate:
    - Completion of road upgrade to Woodville Road and Parramatta Road by the NSW and Commonwealth Governments
    - Completion of road upgrades at Crescent Street as proposed by the developer

- Completion of road upgrades in the Merrylands area by the developer to mitigate impacts identified by Council
- Direct and safe active transport access to Parramatta and Granville, including linkages across Woodville Road and Parramatta Road
- Shuttle bus by the developer to link the site with Merrylands and Parramatta

- Commitment to an improved affordable housing provision, with clarity on the role of Council and mechanisms to achieve better alignment with Council's policy.
- Open space to be provided as outlined by the developer, integrated with the sportsground and to meet Council's requirements.
- Council to endorse the Development Control Plan prior to the lodgement of the first development application for the site.

Attachments

Attachment 1: Traffic and Transport Technical Review on Planning Proposal for 1 Crescent Street, Holroyd

Attachment 2: Results of community survey on 1 Crescent Street, Holroyd

SCT Consulting

Traffic and Transport Technical Review on Planning Proposal for 1 Crescent Street, Holroyd

Final Report

Prepared by: Florian Langstraat

Reviewed by: Andy Yung

4 September 2020 | Revision 2.0

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SCT Consulting

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Executive Summary

Background and purpose

- Cumberland City Council is reviewing a planning proposal at 1 Crescent Street, Holroyd. The re-zoning would deliver up to 1,250 apartments with additional retail and commercial space.
- The planning proposal is being assessed by the Sydney Central City Planning Panel and is currently on exhibition. Council will submit its views into the public exhibition.
- Council has a number of concerns regarding the traffic impacts of the proposal.
  - For example, the applicant's Traffic Impact Assessment (TIA) notes that more than half of all traffic generated by the development will go west, but there is no assessment of any intersections to the west.
- Council has commissioned SCT Consulting to:
  1. **Review the applicant's TIA;**
  2. **Undertake traffic modelling to understand the traffic impacts of the development in detail – covering both intersections already modelled by the applicant, and intersections which the applicant hasn't modelled; and**
  3. **Provide recommendations to Council to support its response to the public exhibition.**

Review of applicant's TIA: key issues identified

- **Public transport services are quite far away and not easily accessible from the site.**
  - However, access is hindered by long walking distances, poor pedestrian priority and amenity on paths to stations, and limited crossing opportunities of the M4 and Woodville Road. Proposed mitigation measures do not address this issue.
- **Cycling infrastructure is lacking and pedestrian amenity is poor.**
  - The pedestrian environment in the surrounding area is poor and there is a lack of cycling infrastructure to connect nearby centres. Although the lack of surrounding infrastructure is not within the direct control of the applicant, this should be considered if walking and cycling is to be encouraged.
- **Some assumptions behind trip generation are unclear.**
  - The assumptions behind background growth have not been detailed and there are some discrepancies in the calculation of office generated trips.
- **There is no assessment of intersections to the west, even though the TIA suggests that a lot of traffic from the development will go west.**
  - The TIA's trip distribution is appropriate, but suggests that about half of all development traffic will use Walpole Street. An updated analysis of traffic impact including intersections to the west is therefore needed.
- **The TIA's intersection modelling shows that both of the two analysed intersections to the east will have very high degree of saturation (DoS).**
  - DoS above 1.0 occurs for future case post-development (with intersection upgrades) scenarios, suggesting that these intersections have exceeded capacity.

Traffic modelling results

Very large delays (Level of Service F) are forecast at the Pitt Street / Neil Street intersection with background traffic growth and the development traffic.

This intersection has not been considered by the applicant, but it will be used by a lot of the development traffic – particularly as right turns from Crescent Street into Woodville Road are banned, so it is the only option for outbound traffic heading south.

Scenario 3: Future year (2030) with background traffic growth and 1 Crescent St development traffic

Intersection	AM peak				PM peak			
	Volume	Delay (s)	LoS	DoS	Volume	Delay (s)	LoS	DoS
Woodville Road / Parramatta Road*	6,535	40.6	C	0.80	6,716	37.1	C	0.84
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Note: volumes are totals of all arms of the intersection (including peak flow factor).
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*Includes committed TfNSW intersection upgrade scheme.

Key findings for Council's consideration

1. **The TIA presents public transport services as being "close" to the development when they are not.**
   - The applicant's TIA presents a range of train stations and bus stops as being "close" to the development.
   - However, the walking distances noted mean that most of them are not "close", based on typical industry definitions (i.e. a maximum walking distance of 400m to a bus stop, and 800m to a station).
     - See for example guidelines in *Walking, Riding and Access to Public Transport* (Australian Federal Department of Infrastructure and Transport, 2013)
   - In addition, the TIA under-estimates walking distances. For example, the TIA does not consider the lack of Woodville Road crossings to get to bus stops east of Woodville Road. The walking distance to bus stops increases significantly if Woodville Road needs to be crossed.
2. **Pedestrian amenity around the site is poor, and the applicant seems to propose little to improve this.**
   - For example, there are no pedestrian crossings of Woodville Road near the site. We understand that a pedestrian bridge over Woodville Road was previously considered, but there are currently no plans by TfNSW to deliver such a bridge.
   - The TIA proposes no alternative measures to improve pedestrian access across Woodville Road and towards Granville.

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Key findings for Council's consideration

3. **The TIA does not assess traffic impacts on any intersections to the west, even though the TIA itself suggests that around half of the traffic from the development will go west. This is a major omission.**
   - The applicant should assess all intersections on which its development will have a major impact, in addition to the two it has already modelled. As a minimum, this should include this intersections of:
     - Walpole Street / Brickworks Drive;
     - Pitt Street / Walpole Street;
     - Pitt Street / Neil Street; and
     - Merrylands Road / Woodville Road.

     Assessing these intersections is particularly important since right turns from Crescent Street into Woodville Road southbound are banned. This means that all traffic from the development heading south will pass through all these intersections before it can re-connect with Woodville Road.

4. **Intersection modelling undertaken on behalf of Council suggests that of these intersections, Pitt Street / Neil Street is most likely to become a major bottleneck (Level of Service F) with background traffic growth and traffic from the development.**
   - At this intersection, significant road widening and land acquisition would be required to achieve acceptable Levels of Service. This would require further discussions with Council and landowners to confirm the abilities for improvements to be delivered.

02

Review of 1 Crescent Street Traffic Impact Assessment (TIA)

Development specification

- Total Units:
  - Minimum – 1,109
  - Maximum – 1,255

- Unit Type:
  - 1 Bedroom – 50%
  - 2 Bedroom – 45%
  - 3 Bedroom – 5%

- Zoning for Residential
  - B4 Mixed Use – 60%
  - R4 High Density Residential – 40%

- Commercial space:
  - Retail – 7,750 m^2
  - Office – 7,750 m^2

TIA documentation and review

- The applicant's Traffic Impact Assessment (TIA) assesses the potential impacts of the mixed-use planning proposal, and the mitigation required if the proposal is to proceed.
- SCT Consulting has reviewed the assumptions made in the TIA regarding background traffic growth, trip generation and distribution, parking provision and public transport accessibility.
- Studies reviewed include:
  - **Planning Proposal – 1 Crescent Street, Holroyd (Mod Urban, 2019)**
  - **Planning Proposal – 1 Crescent Street, Holroyd, Appendix 7 – Traffic Impact Assessment (ttpp, October 2019)** *(provided by the applicant)*
  - **Crescent Parklands 1 Crescent Street, Holroyd AIMSUN Microsimulation Modelling (ttpp, April 2020)** *(provided by the applicant – assumed to complement the TIA above)*
  - **Planning Proposal – 1 Crescent Street, Holroyd, Appendix 7 – Traffic Impact Assessment (ttpp, May 2019)** *(publicly available – assumed to be superseded by the October 2019 TIA above)*
  - **Planning Proposal – 1 Crescent Street, Holroyd – Traffic Impact Assessment (GTA Consultants, 2015)** *(provided by the applicant – this document is superseded by the 2019 report and has been reviewed for background information only)*

Public transport access - trains

Planning Proposal

- Presents three train stations as close-by and illustrates walking distances to:
  - Harris Park (750m).
  - Granville (1,100m).
  - and Merrylands (1,600m).

Review

- Only Harris Park could realistically be identified as a "close" station.
  - Walking distance to Harris Park appears to be closer to 900m, slightly longer than the usual classification of "close-by".
  - 800m (approximately 10 minutes of walking) is recommended as the maximum walking distance to a high-frequency, direct public transport service. This is outlined in *Walking, Riding and Access to Public Transport* (Australian Federal Department of Infrastructure and Transport, 2013)
- Harris Park has a lower train service frequency than the other two stations.
  - Granville and Merrylands has a city-bound service approximately every 5-10 minutes in the AM Peak, while Harris Park only has one every 15 minutes. The planning proposal appears to have incorrect frequencies for Granville Station.

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Public transport access - trains

Review Continued…

- Poor pedestrian environment on paths to train stations further deter walking trips.
  - Pedestrian priority and amenity are poor, particularly for links to Harris Park and Granville Station. Most of the footpaths are narrow, are directly next to high volume traffic with no protection and lack pedestrian priority at crossings.
  - Poor pedestrian environment discourages walking, especially to the stations that are further away.
  - The publicly exhibited TIA (May 2019) includes a proposal for a pedestrian overbridge crossing Woodville Road. This was not supported by TfNSW and the updated TIA (October 2019, shared privately by the applicant) no longer mentions any pedestrian improvements across Woodville Road. The updated TIA does not include any alternative solutions instead of the pedestrian overbridge.
- Proposed links to Holroyd Sportsground and the shared path to the north will be beneficial.
  - The proposal suggests establishing links over A'becketts Creek which will improve connectivity to Harris Park, connecting pedestrians to the shared pedestrian/cycling path around Holroyd Sportsground. This would allow users to bypass the Woodville Road / Parramatta Road crossings though it does not change the total walking distance to Harris Park.

Public transport access - buses

Planning Proposal

- States that bus stops are in close walking distance to the site, listing bus routes at:
  - Woodville Road – 907(450m).
  - Halsall Street – M91(350m).
  - Pitt Street 802, 804, 806(1,000m).

Review

- The TIA does not consider the lack of Woodville Road crossings for stops on the other side of the corridor. TfNSW currently has no plans to include any new crossings near the site.
  - Walking distance to bus stops increases significantly if Woodville Road needs to be crossed. For example, walking to Halsall Street increases to 600m unless pedestrians make an informal crossing of 6 traffic lanes on Woodville Road.
  - Return stops are also likely on the other side of Woodville Road. While the route 907 is 450m away for the northbound stop, the southbound stop is 600m away due to limited Woodville Road crossings.

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Public transport access - buses

Review Continued…

- Bus stops should not be considered to be within acceptable walking distance.
  - 400m (approximately a 5 minute walk) is recommended as the maximum walking distance to local bus services. This is outlined in *Walking, Riding and Access to Public Transport* (Australian Federal Department of Infrastructure and Transport, 2013).
  - Coupled with the limited crossing opportunities on Woodville Road, it is not recommended that the walking distances to nearby bus stops be identified as acceptable.
- Bus routes in the vicinity terminate at Parramatta CBD.
  - Parramatta CBD is approximately 1,200m to the north by walking. This means walking to the Pitt Street stop is a similar distance to walking to the bus route's destination.
  - Bus stops that are closer will require walking approximately half the distance.

Active transport - pedestrian and cycling

Planning Proposal

- *"Excellent pedestrian connections and permeability and cycle accessibility, including provision of new links and improvements to existing networks".*

Review

- Links crossing A'becketts Creek will be beneficial, particularly for cyclists.
  - The proposed links to the north will link the site with the pedestrian/cyclist shared path that runs east-west under the M4.
- The cycling network is not well connected throughout the LGA.
  - While there is an east-west route adjacent to the site, the larger cycle network is poor throughout the LGA, and most cycle routes are on road, shared with vehicles and lacks clear markings or signage. For example, there is no cycling infrastructure to reach Parramatta.
  - The lack of surrounding infrastructure is of course not within the direct control of the applicant. However, this should be considered if walking and cycling is to be promoted as desirable modes by residents of the development.

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Active transport - pedestrian and cycling

Review Continued…

- Pedestrian amenity is poor, particularly to the north and east.
  - There are limited opportunities to cross Woodville Road or the M4, and footpaths are often narrow, and immediately next to high volume traffic.
  - Walking distances to nearby centres are significant, between 1-2 kilometres. Pedestrian amenity is important if walking is to be encouraged.
  - The TIA does not present any alternative solution to improve pedestrian connectivity apart from the pedestrian overbridge which has now been rescinded in the October update.

Parking requirements

Planning Proposal

- The planning proposal assumes rates according to the Holroyd 2013 DCP parking space requirements, calculating a range of parking requirements according to the minimum and maximum proposed dwellings. Rates used are for:
  - Residential, Multi Dwelling housing for residential in R4 High Density Residential zoning.
  - Residential, Mixed Use zone for residential in B4 Mixed Use zoning.
  - Commercial, B4 zone, for all commercial space (retail and office).

Review

- The proposal accurately presents the required parking for the development.
- The Cumberland DCP (currently in draft) makes changes to parking requirements, increasing the minimum parking spaces.
  - The draft DCP does not have maximums and only establishes minimums. The draft requirements will require approximately 150 more spaces minimum for the site.
- Given the lack of access to public transport, it would not be appropriate for this development to have a restrained parking provision.

Trip generation

Planning Proposal

- Calculates trip generation according to Section 3 of the *Guide to Traffic Generating Developments (RMS 2002)* & its supplementary technical direction *(TDT 2013/04a)*.
- Assumes 20% of commercial (office and retail) trips are internal and an additional 28% of retail trips as linked trips.
- Assumes that AM Peak trip generation for retail and office are 50% of PM Peak trip generation.

Review

- Residential trip generation calculated by the TIA (0.29 trips per unit in the AM and PM peaks) is as recommended by RMS in 2002.
    - These rates tend slightly towards the conservative side (higher trip generation) when compared to the 2013 updated survey rates produced by RMS. However, most of the 2013 surveys were in locations with better public transport access. The trip generation rate of 0.29 is considered a reasonable estimate.
- Trip generation for a shopping centre has been adopted as the retail trip generation rate.
    - The rate in the RMS guide follows Gross Leasable Floor Area (GLFA) instead of Gross Floor Area (GFA). The TIA has applied the rate to GFA instead, producing a slightly conservative estimate of trip generation (more trips).

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Trip generation

Review continued…

- Office trip generation rate is a summary rate, and could be a little on the low side for this site.
  - The rate used (1.6 per 100m^2) is an average rate of all sites in the AM Peak surveyed by RMS in 2013. Some over these have better public transport access than 1 Crescent Street. However, amending this rate is not likely to lead to any significant impact to final trip generation numbers given the small scale of the office component. The rate used in the TIA is considered reasonable.
- There is no support for the assumption that office trips in the AM peak are 50% lower than the PM peak, which is contrary to RMS technical direction.
  - RMS trip generation guides all suggest a sharper peak in the AM period than in the PM peak period. For example, the 2013 TDT found the average rates in Sydney to be 1.6 trips per 100m^2 in the AM as opposed to 1.2 trips per 100m^2 in the PM.
  - There also appears to be a minor calculation error in the PM peak, where the 28% linked-trips assumption (for retail trips) was applied to the calculation of office trips. This appears to be incorrect, but it is relatively insignificant (under-counting of ~20 trips).
- Background growth assumptions are unclear.
  - The TIA presents the future traffic volume at the two analysed intersections, but does not present detail on how the background growth numbers were calculated. This would be helpful information to have to validate the assumptions.

Trip distribution

Planning Proposal:

- Residential:
  - AM peak trips are 20% inbound, 80% outbound.
  - PM peak is the reverse of the AM peak.
- Commercial:
  - AM peak trips are 80% inbound, 20% outbound.
  - PM peak trips are 50% inbound, 50% outbound.
- The distribution onto the local road network is based on 2011 Journey To Work data of the Holroyd Area. This is represented by Travel Zones 1223 and 1274. This leads to a distribution of:
  - Residential: 53% west, 47% east.
  - Other: 34% west, 66% east for traffic along Crescent Street.
- Assumes that background growth along Parramatta Road and Woodville Road is limited.

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Trip distribution

Review

- The inbound / outbound ratio is reasonable and similar to other studies.
  - For example, the Merrylands Town Centre Traffic Management Plan (2020) uses similar inbound/outbound ratios.
- A high level check shows that the assumed distribution of traffic is in line with Journey To Work (2011) data.
  - Note that 2016 Census Journey to Work data is not available by Travel Zone, because of stricter measures introduced by ABS in 2016 to prevent individuals from identification at small geographies. The applicant has used the best available data.
- A significant portion of traffic heads west on Crescent Street / Walpole Street.
  - Factoring the different trip generation numbers, the total distribution of traffic onto Crescent Street is approximately 60% east and 40% west.
- The lack of analysis of intersections to the west therefore seems a major omission, and is not justified in the TIA.
  - Modelling of the signalised intersection of Pitt St/Walpole St, Brickworks Dr/Walpole St roundabout, and the capacity along Walpole and Crescent Street is recommended as a minimum.
- The assumption of limited growth on Parramatta Road and Woodville Road is considered appropriate.
  - These roads are near capacity during peak hours and the surrounding area is well developed.

Intersection modelling

Planning Proposal

- Intersection modelling has been undertaken in SIDRA Intersection, for the Parramatta Road / Woodville Road intersection, and Crescent Street / Woodville Road intersection:
  - Existing (2015) performance at level of service (LoS) F, either during AM Peak or PM Peak.
  - Future year with development (2025) performance at LoS D for Parramatta Road / Woodville Road, and LoS C for Crescent Street / Woodville Road. This performance includes upgrades proposed by the applicant.
- AIMSUN micro-simulation modelling was subsequently completed as per request by TfNSW:
  - Shows acceptable LoS (at or above LoS D) for all intersections except Parramatta Road / Church Street (Woodville Road) which is LoS E for the AM Peak.

Review

- It appears that the upgrade designed for Woodville Road / Parramatta Road / M4 differs from the plans published by TfNSW. Further analysis may be required if TfNSW does not accept the upgrade put forward by 1 Crescent Street, and it is understood that the developer is already aware of this.

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Intersection modelling

Review continued…

- Degree of Saturation (DoS) of future year flows is close to or above 1.0 for both intersections in the SIDRA analysis, even with the proposed upgrades by the applicant. An intersection should not exceed 1.0 in SIDRA analysis and suggests that these intersections are very near or have exceeded capacity.
  - AM Parramatta Road / Woodville Road: 1.13 DoS
  - PM Parramatta Road / Woodville Road: 1.05 DoS
  - AM Woodville Road / Crescent Street: 1.04 DoS
  - PM Woodville Road / Crescent Street: 0.96 DoS
- Intersection flows labelled as "Existing Post Development" in the 2019 report are identical to "Existing Base" in the 2015 Traffic Impact Assessment by GTA.
  - This may be a mislabelling and clarification should be made on what scenario the flows in Appendix A refer to in the 2019 Impact Assessment report.
- While the initial analysis was made in 2015, the "Future Year" of 2025 is now only 5 years away.
  - It may be desirable to do a future year analysis with a larger buffer, for example of 2030.

SCT Consulting

03

Traffic Modelling Methodology

Intersections assessed

Modelling scenarios

1. **Base year (2019)**
2. **Future year (2030) with background traffic growth only**
3. **Future year (2030) with background traffic growth and 1 Crescent St development traffic**
4. **Future year (2030) with background traffic growth, 1 Crescent St development traffic and mitigation measures**

All intersections have been modelled using SIDRA Intersection software.

All models have been developed by SCT Consulting, using the data and assumptions discussed in this section, so the results may vary from the applicant's TIA. SCT Consulting has not had access to the applicant's models.

SCT Consulting's modelling can be considered as an independent review of the likely impacts of the proposed development, with consideration of relevant background traffic growth.

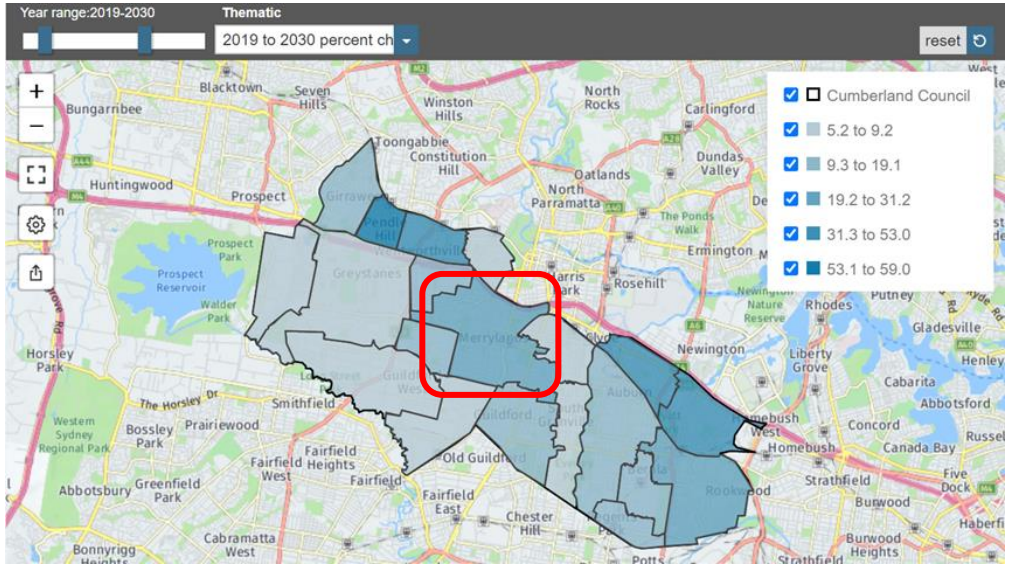
Base year inputs: inputs, assumptions and limitations

- Since current traffic conditions during the COVID-19 pandemic are unrepresentative of normal traffic conditions, all traffic volumes in SCT's models are based on **October 2019 SCATS data** obtained from TfNSW.
- Traffic signal timings are also taken from October 2019 SCATS data.
- Using SCATS data rather than manual count data does have some limitations. The following assumptions have been made:
  - **Mixed turning lanes:** in these lanes (e.g. left and through, or through and right), SCATS cannot detect which direction a vehicle is travelling in. Turning proportions were therefore taken from previous base models and applied to the October 2019 SCATS volumes:
    - Woodville Road / Parramatta Road, Woodville Road / Crescent Street and Pitt Street / Walpole Street intersections: *1 Crescent Street Holroyd Transport Impact Assessment for Planning Proposal* (GTA Consultants, June 2015).
    - Pitt Street / Neil Street intersection: *Merrylands Town Centre Paramics Modelling Report* (Cardno, July 2011).
  - **Heavy vehicle volumes:** SCATS detectors cannot distinguish between light and heavy vehicles. Heavy vehicle proportions were therefore assumed to be as follows:
    - Woodville Road / Parramatta Road, Woodville Road / Crescent Street and Pitt Street / Walpole Street intersections: taken from *1 Crescent Street Holroyd Transport Impact Assessment for Planning Proposal* (GTA Consultants, June 2015).
    - Pitt Street / Neil Street intersection: heavy vehicles assumed to make up 4% of traffic on all intersection approaches.

Base year inputs: inputs, assumptions and limitations

- For the **Walpole Street / Brickworks Drive** roundabout, no direct base-year data was available.
  - No historic SCATS data is available since it is not a signalised intersection, and a manual count during COVID-19 would not be representative of normal traffic conditions.
- Instead, a high-level estimate of traffic volumes at the roundabout was made based on known volumes at the Pitt Street / Walpole Street and Woodville Road / Crescent Street intersections, as well as the number of dwellings in the Brickworks Drive cul-de-sac neighbourhood.

Background traffic growth: inputs and assumptions



- Background traffic growth has been determined based on the **expected dwelling growth in the Merrylands-Holroyd area**, provided by .ID.
- .ID is also used as the source of dwelling growth in the new *Cumberland Local Infrastructure Contributions Plan* (January 2020).
- The dwelling growth between 2019 (base year) and 2030 has been used. This time window is similar to the applicant's (2025 forecast from 2015 base year).
- The 1 Crescent Street development is included in this forecast growth area, so the development was subtracted from the total forecast dwelling growth to prevent double counting.
- This leaves a forecast dwelling growth of **2,430** dwellings.
- Using a peak-hour vehicle trip generation rate of 0.29 per dwelling (same as the rate used by the applicant in its TIA for 1 Crescent Street), the total expected peak-hour vehicle trip generation is **705 vehicle trips**.
- Since it is not known where exactly within the area the growth will occur, it was assumed that the origins of the growth would be roughly equally split between the Pitt Street area (west) and the Woodville Road area (east).
- Finally, trips were distributed based on Journey to Work origin-destination data from the 2016 Census and assigned to specific arms of the modelled intersections.

Background traffic growth: caveats and limitations

- Our methodology for deriving background traffic growth is based on a **general, area-wide, top-down population and dwelling forecast**. Although valid, it is a far less strong basis for background traffic growth than specific planning proposals or development applications.
- Because the data source is a top-down, area-wide forecast, **the exact location of the growth within the broad Merrylands-Holroyd area is unknown**. Our calculations are therefore reliant on a series of simple assumptions. Different assumptions (for example: will the growth occur mainly east or west of the rail line?) will lead to very different results at different intersections.
- **Council can reasonably use this forecast for its own purposes. However, this does not mean that Council can argue that the applicant should use this forecast in its TIA.** We believe the above methodology for deriving background growth is reasonable, given the limited data that is available – but there are other approaches which are equally valid.
  - For example, the applicant could quite reasonably prefer to use a flat annual % traffic growth at some intersections, rather than use .ID dwelling forecasts.
  - Ultimately, it will be up to DPIE as the assessor of the planning proposal to determine the validity of the applicant's traffic modelling assumptions.

1 Crescent Street development traffic: inputs

Trip generation and distribution has been taken directly from the applicant's TIA.

Table 7.1 Resultant Traffic Generation by the Proposal

Development Generated Traffic	Peak Hour Traffic (vehicles per hour)	
	AM Peak Hour	PM Peak Hour
Residential	363	363
Retail	275	549
Office	50	74
Total	+ 688	+ 986
Current Industrial Site Traffic	**- 35**	**- 34**
Resultant Increase	**+ 653**	**+ 952**

Table 7.2 Development Traffic Distribution Percentages

To/From Directions	Residential	Other Uses
Church St-North	5%	8%
M4-West	10%	25%
Parramatta Rd/M4-East	32%	15%
Walpole St-North	20%	14%
Walpole St-South	33%	20%
Woodville Rd-South	-	18%
Total	100%	100%

Source: TTPP (2019), 1 Crescent Street, Holroyd Mixed Use Transport Impact Assessment for Planning Proposal (October 2019)

SCT Consulting

04

Traffic Modelling Results

Scenario 1: Base year (2019)

Scenario 1: Base year (2019)

Intersection	AM peak				PM peak			
	Volume	Delay (s)	LoS	DoS	Volume	Delay (s)	LoS	DoS
Woodville Road / Parramatta Road	5,923	57.7	**E**	1.00	5,954	39.3	**C**	0.89
Woodville Road / Crescent Street	3,528	25.0	**B**	0.88	3,901	14.6	**B**	0.55
Walpole Street / Brickworks Drive	847	6.1	**A**	0.33	680	5.8	**A**	0.28
Pitt Street / Walpole Street	2,260	17.9	**B**	0.89	2,142	15.1	**B**	0.65
Pitt Street / Neil Street	2,885	45.0	**D**	0.95	3,421	45.7	**D**	0.92
Merrylands Road / Woodville Road	3,708	23.5	**B**	0.82	4,062	24.0	**B**	0.84

Note: volumes are totals of all arms of the intersection (including peak flow factor).
Delay is average of all arms of the intersection.
LoS = Level of Service (average of all arms of the intersection).
DoS = Degree of Saturation (volume / capacity), where 1.0 means the intersection is at capacity (worst performing arm).

Scenario 2: Future year (2030) with background traffic growth only

Scenario 2: Future year (2030) with background traffic growth only

Intersection	AM peak				PM peak			
	Volume	Delay (s)	LoS	DoS	Volume	Delay (s)	LoS	DoS
Woodville Road / Parramatta Road*	6,208	37.5	C	0.77	6,239	34.3	C	0.79
Woodville Road / Crescent Street*	3,814	14.0	A	0.64	4,186	17.2	B	0.56
Walpole Street / Brickworks Drive	900	6.1	A	0.37	806	5.9	A	0.38
Pitt Street / Walpole Street	2,557	25.2	B	0.97	2,503	15.9	B	0.65
Pitt Street / Neil Street	3,299	60.6	E	0.90	3,912	70.6	F	0.97
Merrylands Road / Woodville Road	3,837	26.0	B	0.82	4,254	25.1	B	0.88

Note: volumes are totals of all arms of the intersection (including peak flow factor).
Delay is average of all arms of the intersection.
LoS = Level of Service (average of all arms of the intersection).
DoS = Degree of Saturation (volume / capacity), where 1.0 means the intersection is at capacity (worst performing arm).

*Includes committed TfNSW intersection upgrade scheme.

Scenario 3: Future year (2030) with background traffic growth and 1 Crescent St development traffic

Scenario 3: Future year (2030) with background traffic growth and 1 Crescent St development traffic

Intersection	AM peak				PM peak			
	Volume	Delay (s)	LoS	DoS	Volume	Delay (s)	LoS	DoS
Woodville Road / Parramatta Road*	6,535	40.6	C	0.80	6,716	37.1	C	0.84
Woodville Road / Crescent Street*	4,196	31.7	C	0.89	4,769	24.2	B	0.77
Walpole Street / Brickworks Drive	1,012	6.1	A	0.46	1,227	5.8	A	0.54
Pitt Street / Walpole Street	2,862	22.7	B	0.81	2,923	22.1	B	0.96
Pitt Street / Neil Street	3,485	76.1	F	1.02	4,168	99.7	F	1.06
Merrylands Road / Woodville Road	3,931	30.3	C	0.86	4,399	31.1	C	0.88

Note: volumes are totals of all arms of the intersection (including peak flow factor).
Delay is average of all arms of the intersection.
LoS = Level of Service (average of all arms of the intersection).
DoS = Degree of Saturation (volume / capacity), where 1.0 means the intersection is at capacity (worst performing arm).

*Includes committed TfNSW intersection upgrade scheme.

Scenario 4: Future year (2030) with background traffic growth, 1 Crescent St development traffic and mitigation measures

Scenario 4: Future year (2030) with background traffic growth, 1 Crescent St development traffic and mitigation measures

Intersection	AM peak				PM peak			
	Volume	Delay (s)	LoS	DoS	Volume	Delay (s)	LoS	DoS
Woodville Road / Parramatta Road*	N/A – no further mitigation required so same as Scenario 3							
Woodville Road / Crescent Street*	N/A – no further mitigation required so same as Scenario 3							
Walpole Street / Brickworks Drive	N/A – no mitigation required so same as Scenario 3							
Pitt Street / Walpole Street	N/A – no mitigation required so same as Scenario 3							
Pitt Street / Neil Street	3,485	53.0	**D**	0.88	4,168	54.6	**D**	0.97
Merrylands Road / Woodville Road	N/A – no mitigation required so same as Scenario 3							

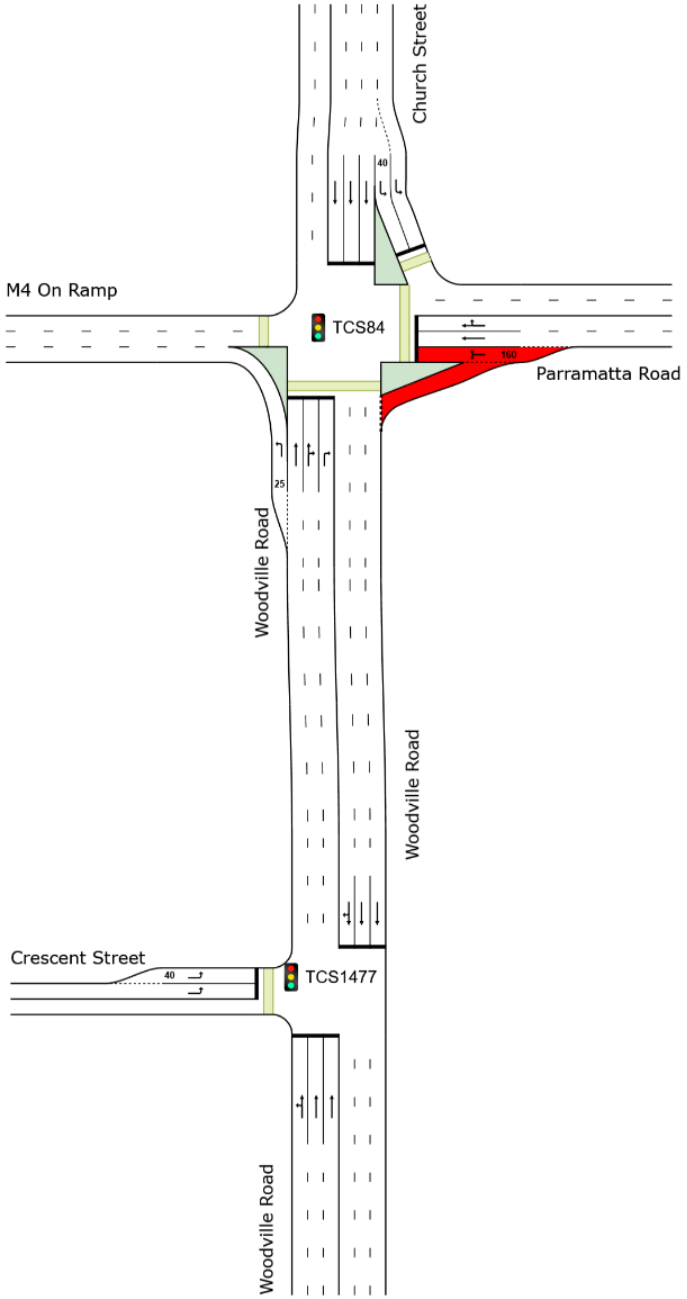
Note: volumes are totals of all arms of the intersection (including peak flow factor).
Delay is average of all arms of the intersection.
LoS = Level of Service (average of all arms of the intersection).
DoS = Degree of Saturation (volume / capacity), where 1.0 means the intersection is at capacity (worst performing arm).

*Includes committed TfNSW intersection upgrade scheme.

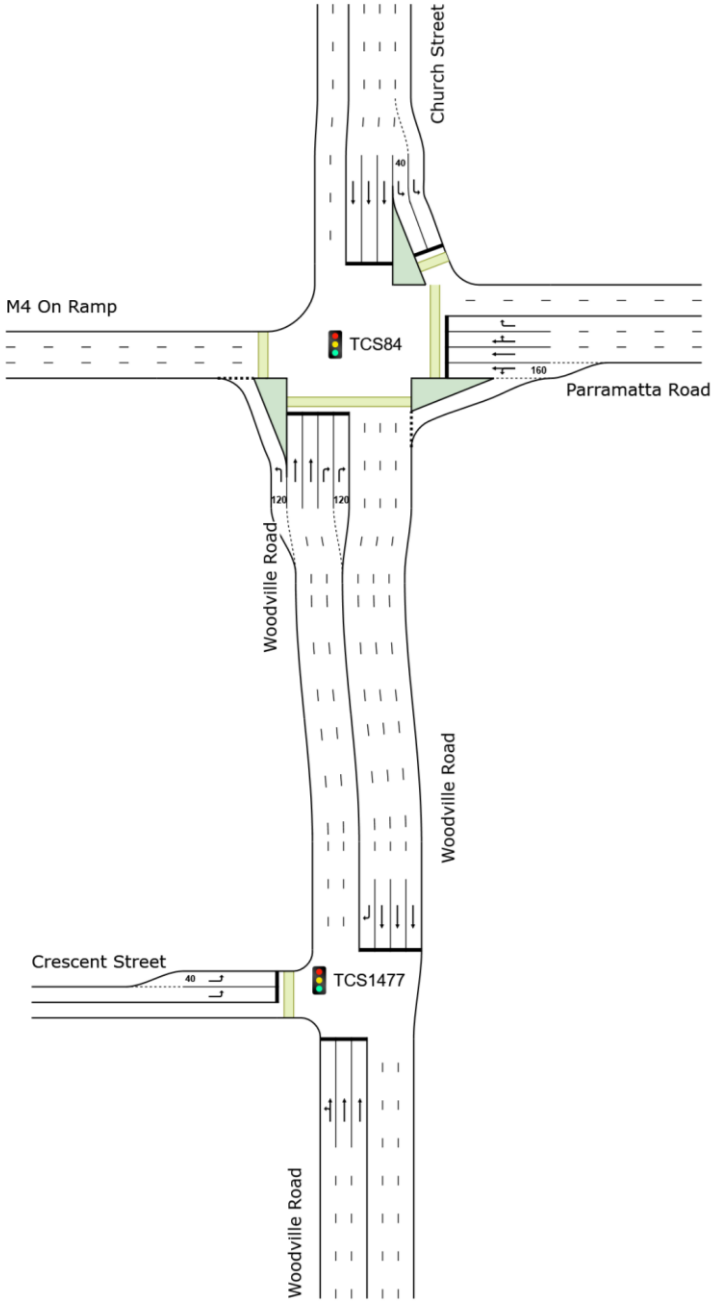
Future year scenarios: Woodville Road / Parramatta Road and Woodville Road / Crescent Street intersections

- These intersections are the subject of a committed TfNSW scheme.
- As the scheme is committed, the new intersection lay-out has been used for Scenarios 2, 3 and 4.
- The intersection lay-out is based on the latest TfNSW design which has been shared by Council.

Woodville Road / Parramatta Road / Crescent Street – before



Woodville Road / Parramatta Road / Crescent Street – after (Scenarios 2, 3 and 4)



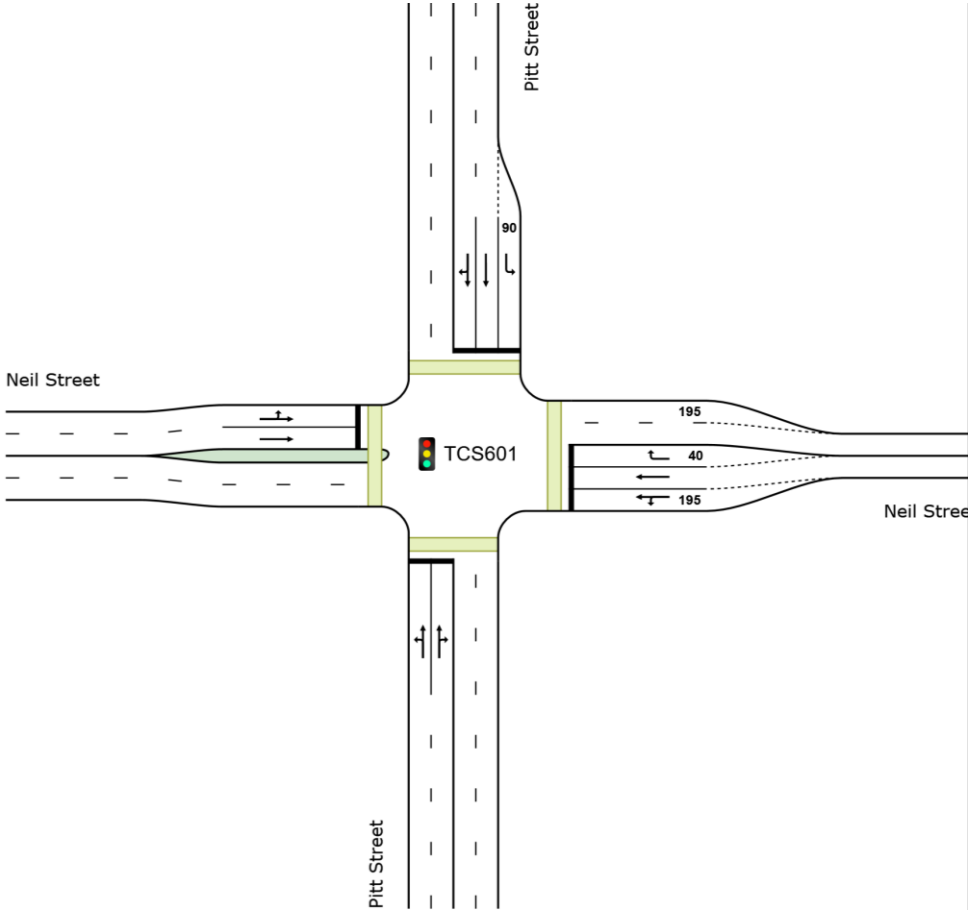
Future year scenarios: Pitt Street / Neil Street intersection

- The existing intersection has poor Levels of Service in Scenarios 2 and 3, when considered with any future traffic growth (regardless of whether this is background traffic or development traffic).
- In Scenario 4, we have therefore tested a **hypothetical intersection lay-out** which would be required to achieve a Level of Service D with the Scenario 3 traffic volumes.
- This lay-out is hypothetical for modelling purposes only, and does not reflect any real-world design. Delivering this lay-out would require significant road widening and land acquisition.

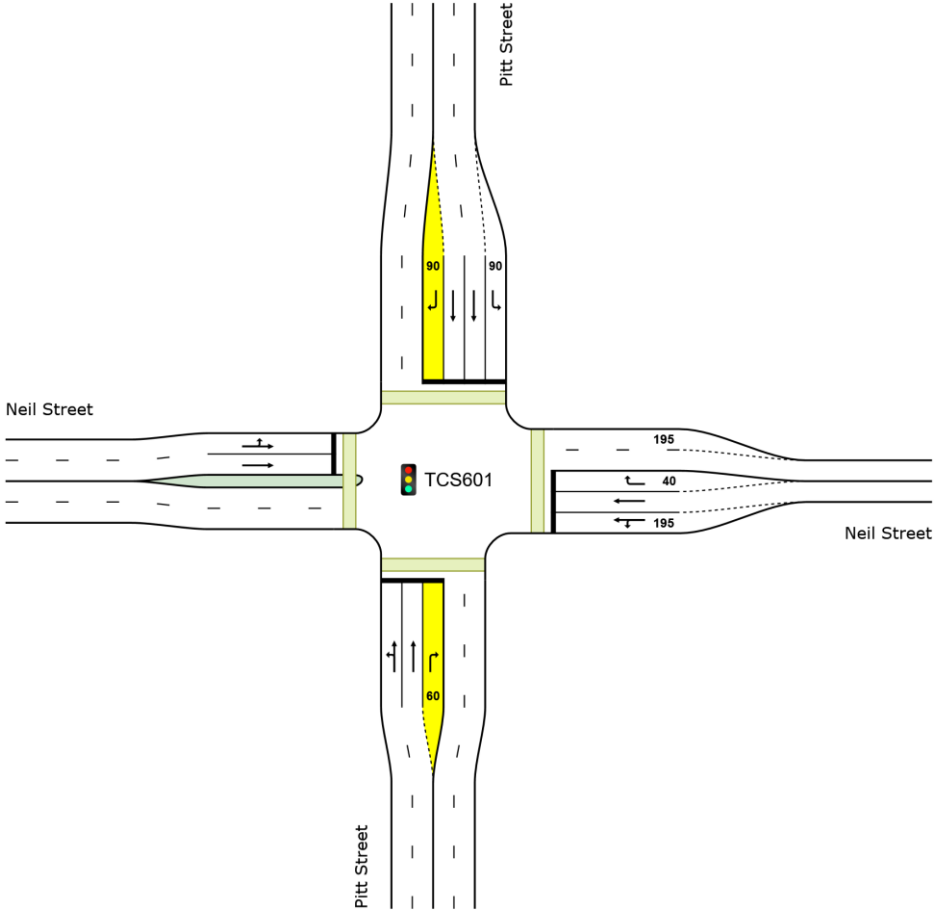
The lay-out of the **Walpole Street / Brickworks Drive**, **Pitt Street / Walpole Street** and **Woodville Road / Merrylands Road** intersections is the same in all scenarios, as these intersections do not require any upgrades.

Future year scenarios: Pitt Street / Neil Street intersection

Pitt Street / Neil Street – before



Pitt Street / Neil Street – after (Scenario 4 only)



05

Conclusions and Recommendations to Council

Conclusions from the traffic modelling

- The **Woodville Road / Parramatta Road** intersection currently sees significant delays. With TfNSW's committed upgrade, Levels of Service are forecast to improve, and remain acceptable (**LoS C**) even with the development traffic added.
- There are already significant delays at the **Pitt Street / Neil Street** intersection (LoS), and delays are forecast to increase with the additional background traffic and traffic from the development (**LoS F**).
  - This intersection has not been considered by the applicant. However, it is on a major route for traffic to and form the development. Since right turns from Crescent Street into Woodville Road are banned, it is the only route for traffic from the development heading south.
  - At this intersection, significant road widening and land acquisition would be required to achieve acceptable Levels of Service (**LoS D**). This is unlikely to be feasible given the land uses surrounding the intersection.
  - Alternatively, the Pitt Street / Neil Street intersection could be relieved with a *Merrylands town centre bypass*. The idea of a bypass has been noted in previous studies (e.g. 2013 Holroyd Town Centres Transport Study), but it has never been modelled or designed in any detail to date. Further discussions with Council will need to be undertaken to investigate this.
- There are no significant issues at the **Woodville Road / Crescent Street**, **Woodville Road / Merrylands Road** and **Pitt Street / Walpole Street** intersections (**LoS B - LoS C**).

Key findings for Council's consideration

1. **The TIA presents public transport services as being "close" to the development when they are not.**
   - The applicant's TIA presents a range of train stations and bus stops as being "close" to the development.
   - However, the walking distances noted mean that most of them are not "close", based on typical industry definitions (i.e. a maximum walking distance of 400m to a bus stop, and 800m to a station).
     - See for example guidelines in *Walking, Riding and Access to Public Transport* (Australian Federal Department of Infrastructure and Transport, 2013)
   - In addition, the TIA under-estimates walking distances. For example, the TIA does not consider the lack of Woodville Road crossings to get to bus stops east of Woodville Road. The walking distance to bus stops increases significantly if Woodville Road needs to be crossed.
2. **Pedestrian amenity around the site is poor, and the applicant seems to propose little to improve this.**
   - For example, there are no pedestrian crossings of Woodville Road near the site. We understand that a pedestrian bridge over Woodville Road was previously considered, but there are currently no plans by TfNSW to deliver such a bridge.
   - The TIA proposes no alternative measures to improve pedestrian access across Woodville Road and towards Granville.

Section continues on next slide

Key findings for Council's consideration

3. **The TIA does not assess traffic impacts on any intersections to the west, even though the TIA itself suggests that around half of the traffic from the development will go west. This is a major omission.**
   - The applicant should assess all intersections on which its development will have a major impact, in addition to the two it has already modelled. As a minimum, this should include this intersections of:
     - Walpole Street / Brickworks Drive;
     - Pitt Street / Walpole Street;
     - Pitt Street / Neil Street; and
     - Merrylands Road / Woodville Road.

     Assessing these intersections is particularly important since right turns from Crescent Street into Woodville Road southbound are banned. This means that all traffic from the development heading south will pass through all these intersections before it can re-connect with Woodville Road.
4. **Intersection modelling undertaken on behalf of Council suggests that of these intersections, Pitt Street / Neil Street is most likely to become a major bottleneck (Level of Service F) with background traffic growth and traffic from the development.**
   - At this intersection, significant road widening and land acquisition would be required to achieve acceptable Levels of Service. This is unlikely to be feasible given the land uses surrounding the intersection.

Thank you

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Principal Consultant

Andy Yung
Director

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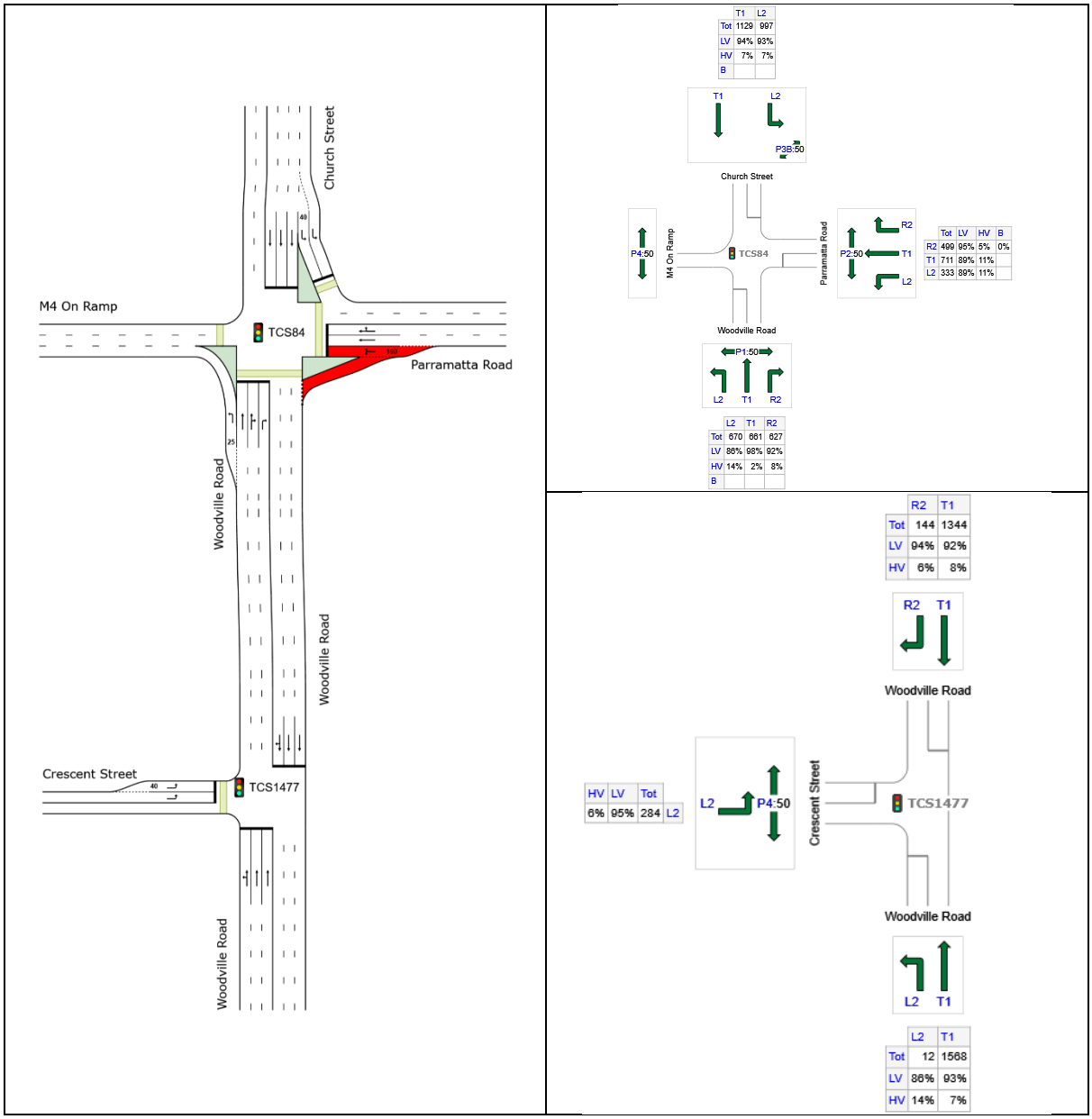
Appendix

Detailed SIDRA Intersection Results

1.0 2019 AM Peak Intersection Performance Summary

1.1 Parramatta Road / Church Street / Woodville Road + Woodville Road / Crescent Street – 2019 AM Peak



1.1.1 Parramatta Road / Church Street / Woodville Road 7.30-8.30 Intersection Performance Summary

MOVEMENT SUMMARY

Site: TCS84 [1.1 Woodville_Parramatta - 7.30-8.30 (Site Folder: General)]

Network: N101 [1.AM Woodville (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	705	14.0	705	14.0	0.418	5.8	LOS A	0.0	0.0	0.00	0.52	0.00	51.6
2	T1	696	2.4	696	2.4	* 0.993	83.1	LOS F	28.6	204.0	0.78	1.01	1.25	18.9
3	R2	660	8.4	660	8.4	0.993	101.1	LOS F	27.9	204.0	1.00	1.08	1.38	16.6
Approach		2061	8.3	2061	8.3	0.993	62.4	LOS E	28.6	204.0	0.58	0.86	0.86	22.9
East: Parramatta Road														
4	L2	351	11.1	351	11.1	0.277	11.0	LOS A	6.8	51.8	0.33	0.66	0.33	44.6
5	T1	748	11.1	748	11.1	0.996	93.0	LOS F	59.4	436.5	1.00	1.26	1.48	23.8
6	R2	525	4.6	525	4.6	* 0.996	98.9	LOS F	59.4	436.5	1.00	1.15	1.47	23.0
Approach		1624	9.0	1624	9.0	0.996	77.2	LOS F	59.4	436.5	0.86	1.10	1.23	24.9
North: Church Street														
7	L2	1049	7.0	1049	7.0	0.576	16.8	LOS B	15.7	116.4	0.52	0.73	0.52	46.4
8	T1	1188	6.5	1188	6.5	0.860	58.8	LOS E	26.7	197.1	1.00	0.99	1.16	20.8
Approach		2238	6.7	2238	6.7	0.860	39.1	LOS C	26.7	197.1	0.77	0.87	0.86	32.0
All Vehicles		5923	7.9	5923	7.9	0.996	57.7	LOS E	59.4	436.5	0.73	0.93	0.96	26.4

1.1.2 Woodville Road / Crescent Street 7.30-8.30 Intersection Performance Summary

MOVEMENT SUMMARY

Site: TCS1477 [1.2 Woodville_Crescent - 7.30-8.30 (Site Folder: General)]

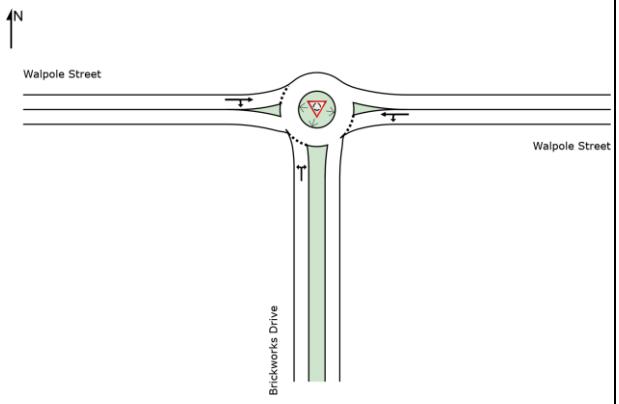
Network: N101 [1.AM Woodville (Network Folder: General)]

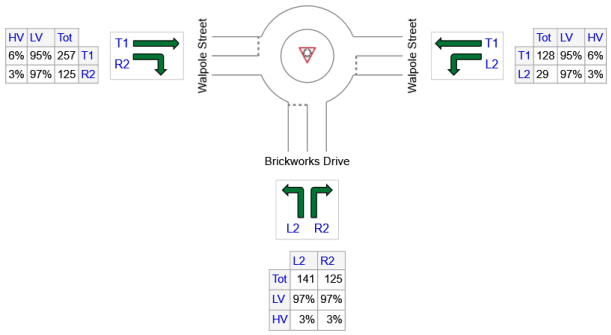
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	13	14.3	13	14.3	* 0.877	41.3	LOS C	35.8	266.6	0.86	0.93	1.02	35.2
2	T1	1651	7.3	1651	7.3	0.877	35.8	LOS C	35.8	266.6	0.86	0.93	1.02	27.7
Approach		1663	7.4	1663	7.4	0.877	35.8	LOS C	35.8	266.6	0.86	0.93	1.02	27.8
North: Woodville Road														
8	T1	1415	8.2	1415	8.2	* 0.415	1.0	LOS A	10.7	78.5	0.07	0.05	0.07	58.2
9	R2	152	5.9	152	5.9	0.415	61.8	LOS E	10.7	78.5	1.00	0.83	1.00	21.8
Approach		1566	8.0	1566	8.0	0.415	6.9	LOS A	10.7	78.5	0.16	0.13	0.16	50.1
West: Crescent Street														
10	L2	299	5.5	299	5.5	0.725	59.8	LOS E	9.6	70.0	0.98	0.89	1.09	19.2
Approach		299	5.5	299	5.5	0.725	59.8	LOS E	9.6	70.0	0.98	0.89	1.09	19.2
All Vehicles		3528	7.5	3528	7.5	0.877	25.0	LOS B	35.8	266.6	0.56	0.57	0.65	34.2

1.2 Walpole Street / Brickworks Drive 2019 AM Peak





1.2.1 Walpole Street / Brickworks Drive AM Peak Intersection Performance Summary

MOVEMENT SUMMARY

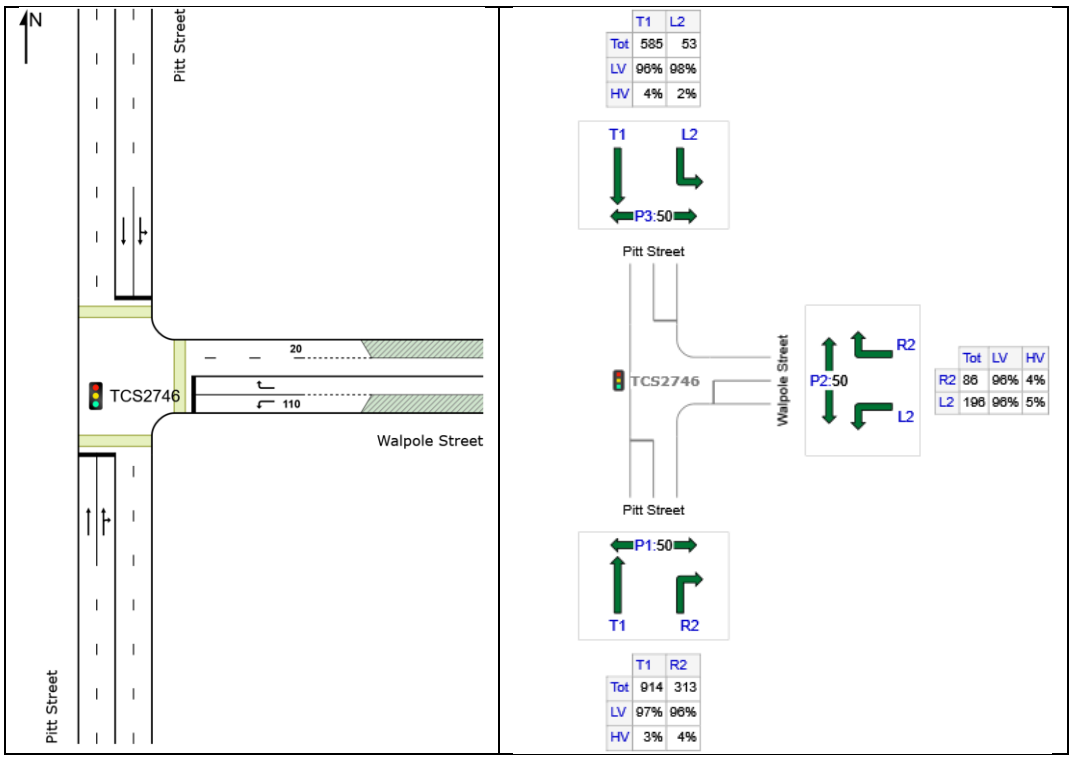
Site: [1.11 Walpole_Brickworks AM Peak (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Brickworks Drive														
1	L2	141	3.0	148	3.0	0.225	4.6	LOS A	1.2	8.8	0.32	0.58	0.32	48.4
3	R2	125	3.0	132	3.0	0.225	7.4	LOS A	1.2	8.8	0.32	0.58	0.32	48.7
Approach		266	3.0	280	3.0	0.225	5.9	LOS A	1.2	8.8	0.32	0.58	0.32	48.5
East: Walpole Street														
4	L2	29	3.0	31	3.0	0.134	5.4	LOS A	0.7	5.0	0.30	0.52	0.30	49.3
5	T1	128	5.5	135	5.5	0.134	5.3	LOS A	0.7	5.0	0.30	0.52	0.30	53.6
Approach		157	5.0	165	5.0	0.134	5.4	LOS A	0.7	5.0	0.30	0.52	0.30	52.7
West: Walpole Street														
11	T1	257	5.5	271	5.5	0.325	5.5	LOS A	2.0	14.4	0.35	0.58	0.35	52.8
12	R2	125	3.0	132	3.0	0.325	8.5	LOS A	2.0	14.4	0.35	0.58	0.35	49.1
Approach		382	4.7	402	4.7	0.325	6.5	LOS A	2.0	14.4	0.35	0.58	0.35	51.5
All Vehicles		805	4.2	847	4.2	0.325	6.1	LOS A	2.0	14.4	0.33	0.56	0.33	50.7

1.3 Pitt Street / Walpole Street 2019 AM Peak



1.3.1 Pitt Street / Walpole Street 8.00-9.00 Intersection Performance Summary

MOVEMENT SUMMARY

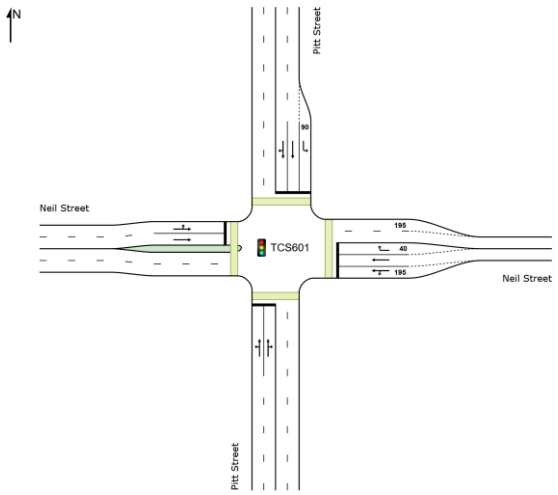
Site: TCS2746 [1.3 Pitt_Walpole - 8.00-9.00 (Site Folder: General)]

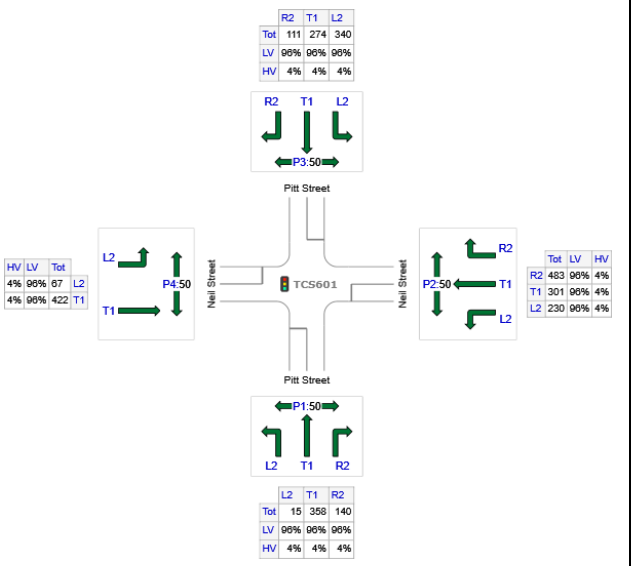
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 68 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pitt Street														
2	T1	914	3.1	962	3.1	* 0.744	7.7	LOS A	20.8	149.3	0.71	0.65	0.71	53.3
3	R2	313	4.1	329	4.1	0.887	44.2	LOS D	13.3	96.5	1.00	1.06	1.46	32.3
Approach		1227	3.4	1292	3.4	0.887	17.0	LOS B	20.8	149.3	0.78	0.75	0.90	45.7
East: Walpole Street														
4	L2	196	4.5	206	4.5	0.252	16.9	LOS B	4.2	30.7	0.65	0.73	0.65	42.5
6	R2	86	4.1	91	4.1	* 0.341	34.1	LOS C	2.8	20.6	0.94	0.76	0.94	35.5
Approach		282	4.4	297	4.4	0.341	22.1	LOS B	4.2	30.7	0.74	0.74	0.74	40.1
North: Pitt Street														
7	L2	53	2.0	56	2.0	0.466	22.4	LOS B	8.4	60.7	0.80	0.70	0.80	44.7
8	T1	585	3.9	616	3.9	0.466	17.2	LOS B	8.6	62.0	0.80	0.69	0.80	46.3
Approach		638	3.7	672	3.7	0.466	17.7	LOS B	8.6	62.0	0.80	0.69	0.80	46.2
All Vehicles		2147	3.6	2260	3.6	0.887	17.9	LOS B	20.8	149.3	0.78	0.73	0.85	45.0

1.4 Pitt Street / Neil Street 2019 AM Peak





1.4.1 Pitt Street / Neil Street 8.00-9.00 Intersection Performance Summary

MOVEMENT SUMMARY

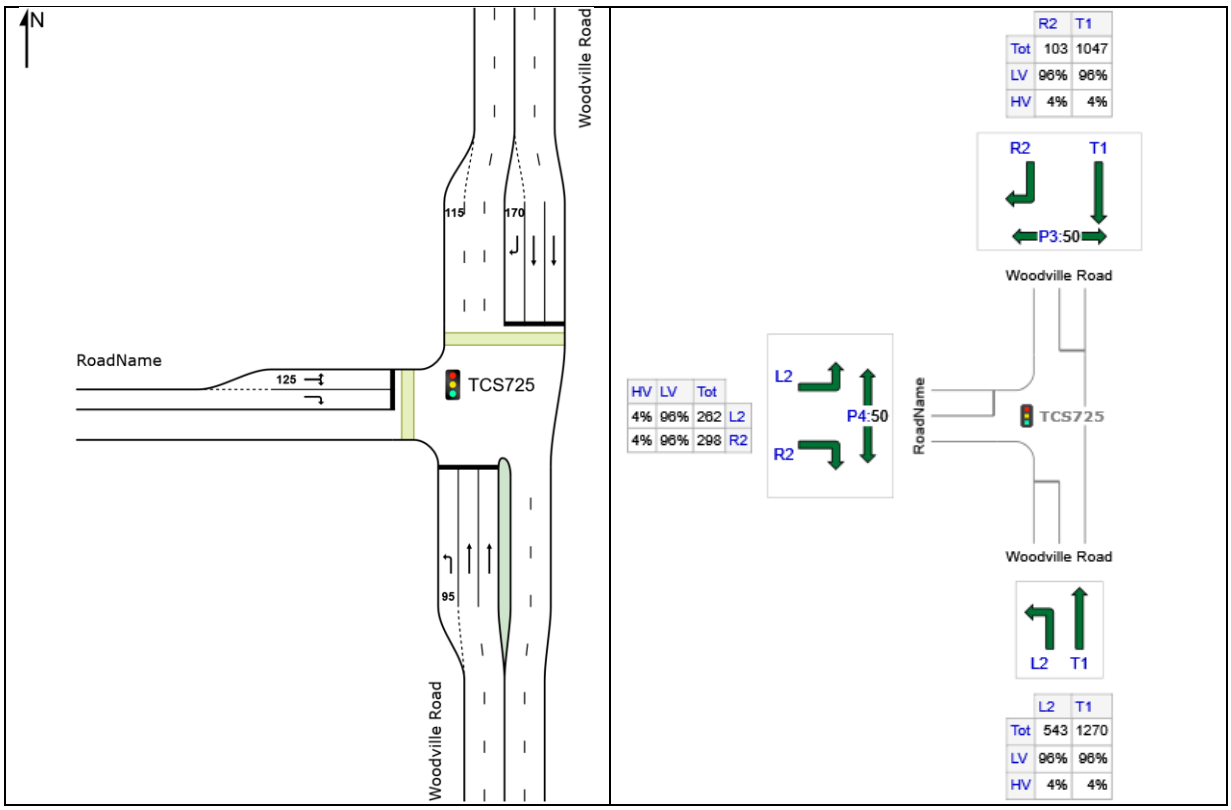
Site: TCS601 [1.4 Pitt_Neil - 8.00-9.00 (Site Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 111 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pitt Street														
1	L2	15	4.0	16	4.0	* 0.805	57.8	LOS E	15.4	111.1	1.00	0.94	1.16	26.6
2	T1	358	4.0	377	4.0	0.805	52.2	LOS D	15.4	111.1	1.00	0.94	1.16	32.0
3	R2	140	4.0	147	4.0	0.805	57.9	LOS E	15.1	109.7	1.00	0.94	1.16	31.1
Approach		513	4.0	540	4.0	0.805	53.9	LOS D	15.4	111.1	1.00	0.94	1.16	31.6
East: Neil Street														
4	L2	230	4.0	242	4.0	0.292	19.3	LOS B	8.1	58.9	0.56	0.70	0.56	45.0
5	T1	301	4.0	317	4.0	0.292	17.4	LOS B	8.6	62.4	0.63	0.57	0.63	42.3
6	R2	483	4.0	508	4.0	* 0.948	75.6	LOS F	30.8	223.0	1.00	1.23	1.40	26.5
Approach		1014	4.0	1067	4.0	0.948	45.6	LOS D	30.8	223.0	0.79	0.91	0.98	32.7
North: Pitt Street														
7	L2	340	4.0	358	4.0	0.512	20.0	LOS B	7.9	57.4	0.81	0.80	0.81	44.2
8	T1	274	4.0	288	4.0	* 0.632	47.1	LOS D	10.6	76.7	0.98	0.81	0.98	33.6
9	R2	111	4.0	117	4.0	0.632	52.7	LOS D	10.3	74.5	0.98	0.82	0.98	27.1
Approach		725	4.0	763	4.0	0.632	35.2	LOS C	10.6	76.7	0.90	0.81	0.90	36.9
West: Neil Street														
10	L2	67	4.0	71	4.0	0.721	52.9	LOS D	13.4	97.3	0.99	0.87	1.05	27.7
11	T1	422	4.0	444	4.0	* 0.721	48.4	LOS D	13.7	99.4	0.99	0.87	1.05	28.5
Approach		489	4.0	515	4.0	0.721	49.0	LOS D	13.7	99.4	0.99	0.87	1.05	28.4
All Vehicles		2741	4.0	2885	4.0	0.948	45.0	LOS D	30.8	223.0	0.90	0.88	1.01	32.8

1.5 Merrylands Road / Woodville Road 2019 AM Peak



1.5.1 Merrylands Road / Woodville Road 8.00-9.00 Intersection Performance Summary

MOVEMENT SUMMARY

Site: TCS725 [1.5 Merrylands_Woodville - 8.00-9.00 (Site Folder: General)]

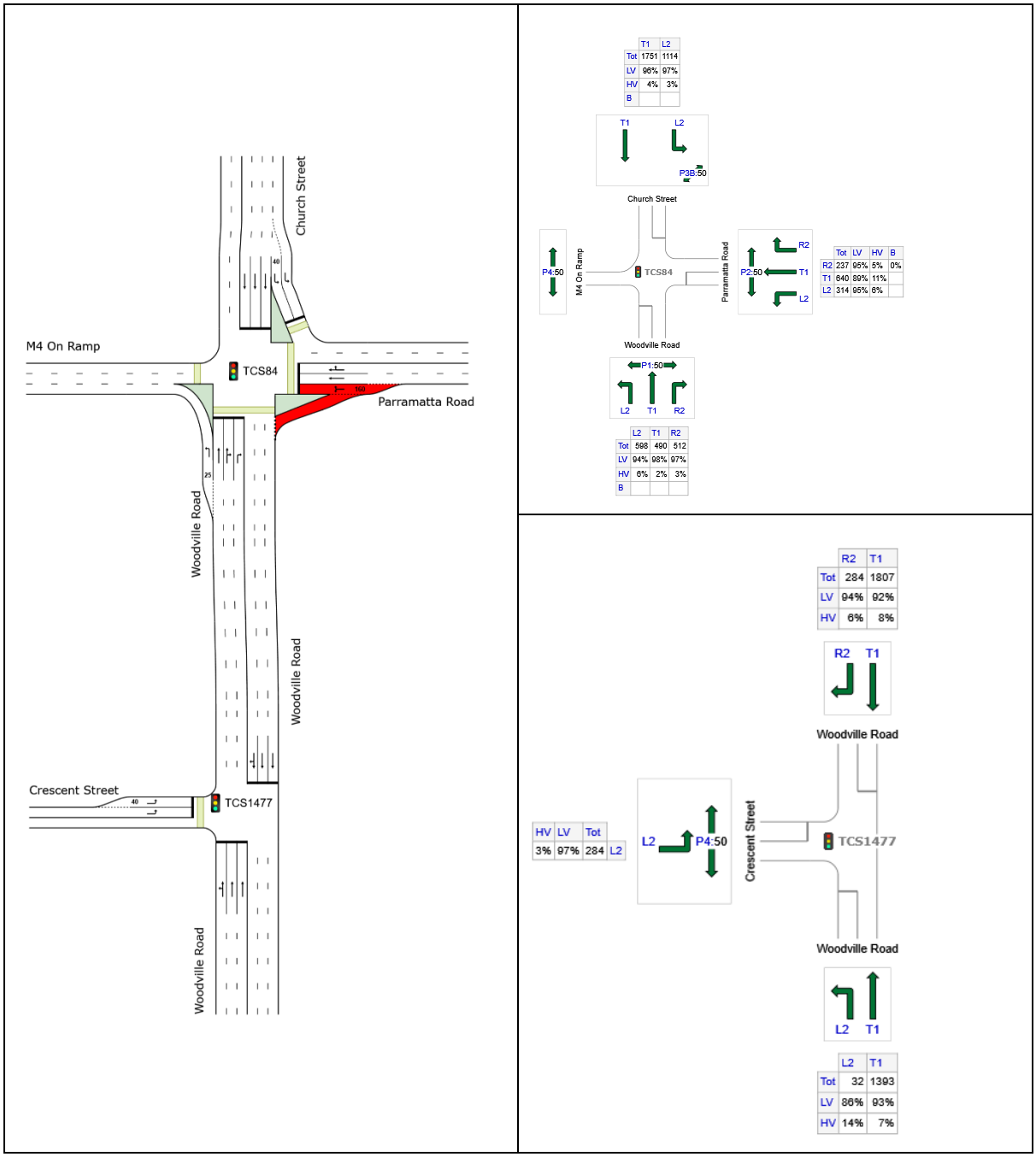
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 114 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	543	4.0	572	4.0	0.392	9.7	LOS A	8.8	63.6	0.31	0.70	0.31	53.7
2	T1	1270	4.0	1337	4.0	* 0.824	26.2	LOS B	39.2	283.4	0.83	0.76	0.84	48.6
Approach		1813	4.0	1908	4.0	0.824	21.2	LOS B	39.2	283.4	0.67	0.74	0.68	50.0
North: Woodville Road														
8	T1	1047	4.0	1102	4.0	0.435	9.4	LOS A	14.1	102.2	0.51	0.46	0.51	59.3
9	R2	103	4.0	108	4.0	* 0.685	64.9	LOS E	6.3	45.4	1.00	0.83	1.11	29.8
Approach		1150	4.0	1211	4.0	0.685	14.4	LOS A	14.1	102.2	0.55	0.49	0.56	54.5
West: RoadName														
10	L2	262	4.0	276	4.0	0.625	51.3	LOS D	16.0	116.0	0.92	0.84	0.92	35.4
12	R2	298	4.0	314	4.0	* 0.625	47.8	LOS D	16.0	116.0	0.95	0.83	0.95	33.9
Approach		560	4.0	589	4.0	0.625	49.4	LOS D	16.0	116.0	0.94	0.83	0.94	34.6
All Vehicles		3523	4.0	3708	4.0	0.824	23.5	LOS B	39.2	283.4	0.67	0.67	0.68	47.9

2.0 2019 PM Peak Intersection Performance Summary

2.1 Parramatta Road / Church Street / Woodville Road + Woodville Road / Crescent Street – 2019 PM Peak



2.1.2 Parramatta Road / Church Street / Woodville Road 17.00-18.00 Intersection Performance Summary

MOVEMENT SUMMARY

Site: TCS84 [1.6 Woodville_Parramatta - 17.00-18.00 (Site Folder: General)]

Network: N102 [1.PM Woodville (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	629	5.7	629	5.7	0.353	5.7	LOS A	0.0	0.0	0.00	0.52	0.00	52.0
2	T1	516	2.1	516	2.1	0.865	29.7	LOS C	19.3	137.2	0.49	0.55	0.64	33.9
3	R2	539	2.9	539	2.9	* 0.865	77.9	LOS F	19.1	136.8	1.00	0.90	1.12	19.7
Approach		1684	3.7	1684	3.7	0.865	36.1	LOS C	19.3	137.2	0.47	0.65	0.56	30.9
East: Parramatta Road														
4	L2	331	5.5	331	5.5	0.334	22.3	LOS B	10.6	78.1	0.58	0.81	0.58	35.1
5	T1	674	11.1	674	11.1	* 0.894	61.1	LOS E	32.7	250.9	1.00	1.03	1.21	29.9
6	R2	249	4.6	249	4.6	0.894	66.8	LOS E	32.6	242.7	1.00	1.01	1.21	29.1
Approach		1254	8.3	1254	8.3	0.894	52.0	LOS D	32.7	250.9	0.89	0.97	1.04	30.4
North: Church Street														
7	L2	1173	3.3	1173	3.3	0.514	13.0	LOS A	14.5	104.0	0.43	0.70	0.43	48.9
8	T1	1843	3.7	1843	3.7	* 0.889	50.4	LOS D	45.2	326.2	1.00	1.02	1.15	22.9
Approach		3016	3.5	3016	3.5	0.889	35.8	LOS C	45.2	326.2	0.78	0.90	0.87	32.5
All Vehicles		5954	4.6	5954	4.6	0.894	39.3	LOS C	45.2	326.2	0.71	0.84	0.82	31.6

2.1.3 Woodville Road / Crescent Street 17.00-18.00 Intersection Performance

MOVEMENT SUMMARY

Site: TCS1477 [1.7 Woodville_Crescent - 17.00-18.00 (Site Folder: General)]

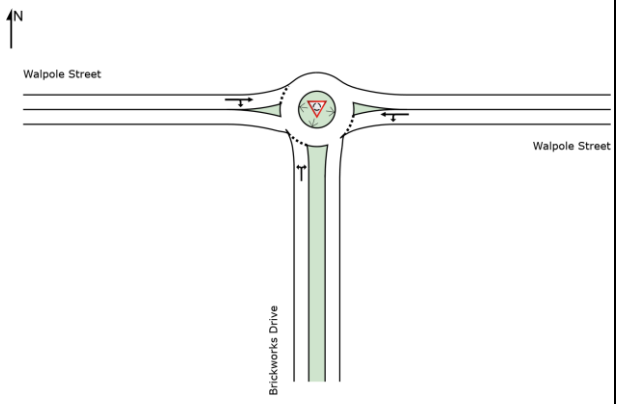
Network: N102 [1.PM Woodville (Network Folder: General)]

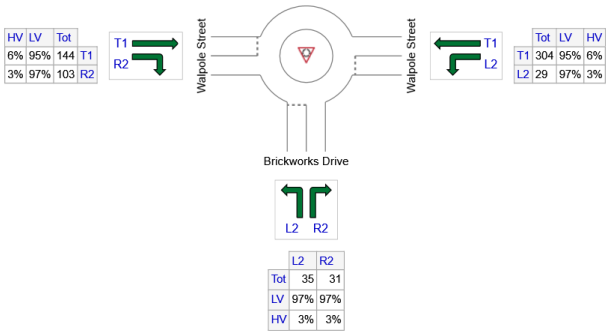
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	34	5.6	34	5.6	* 0.550	24.8	LOS B	19.5	141.5	0.68	0.63	0.68	41.8
2	T1	1466	3.9	1466	3.9	0.550	19.2	LOS B	20.1	145.6	0.68	0.62	0.68	36.9
Approach		1500	3.9	1500	3.9	0.550	19.3	LOS B	20.1	145.6	0.68	0.62	0.68	37.1
North: Woodville Road														
8	T1	1902	4.6	1902	4.6	* 0.540	1.6	LOS A	21.4	152.6	0.09	0.07	0.09	57.3
9	R2	299	1.7	299	1.7	0.540	59.4	LOS E	21.4	152.6	1.00	0.87	1.00	22.3
Approach		2201	4.2	2201	4.2	0.540	9.4	LOS A	21.4	152.6	0.22	0.18	0.22	47.2
West: Crescent Street														
10	L2	200	3.3	200	3.3	0.189	36.4	LOS C	4.5	32.1	0.74	0.74	0.74	25.3
Approach		200	3.3	200	3.3	0.189	36.4	LOS C	4.5	32.1	0.74	0.74	0.74	25.3
All Vehicles		3901	4.1	3901	4.1	0.550	14.6	LOS B	21.4	152.6	0.42	0.38	0.42	41.7

2.2 Walpole Street / Brickworks Drive 2019 PM Peak





2.2.1 Walpole Street / Brickworks Drive PM Peak Intersection Performance Summary

MOVEMENT SUMMARY

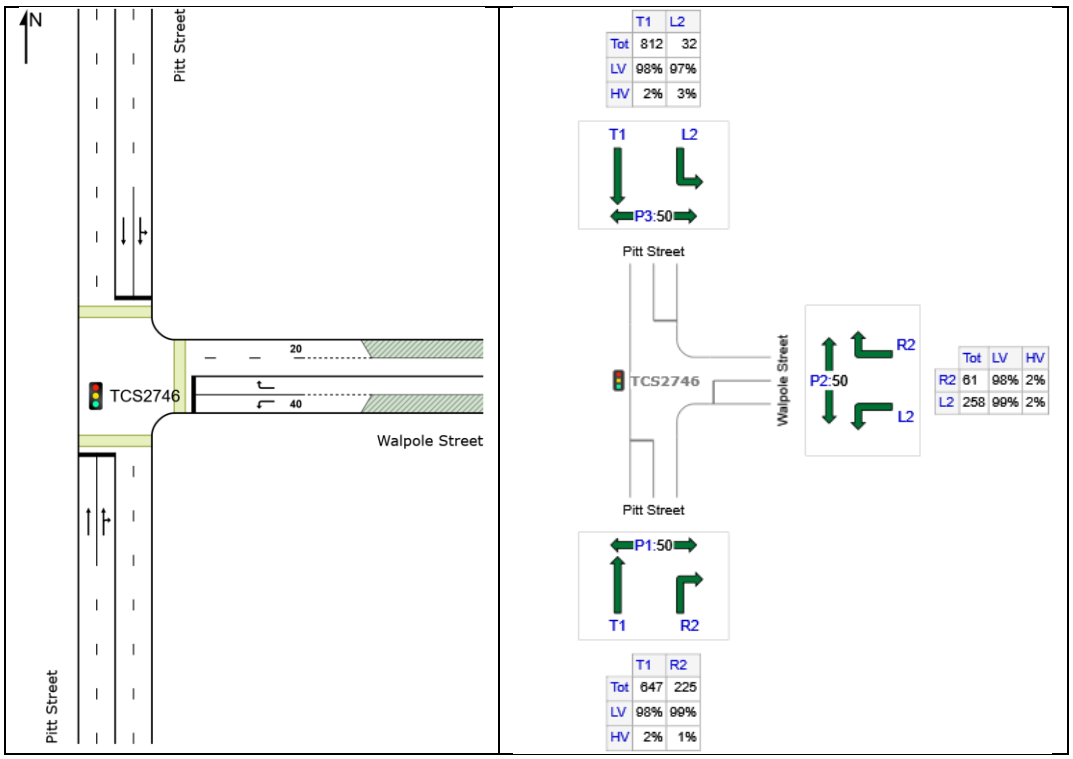
Site: [1.12 Walpole_Brickworks PM Peak (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Brickworks Drive														
1	L2	35	3.0	37	3.0	0.068	5.4	LOS A	0.3	2.4	0.46	0.62	0.46	48.1
3	R2	31	3.0	33	3.0	0.068	8.2	LOS A	0.3	2.4	0.46	0.62	0.46	48.4
Approach		66	3.0	69	3.0	0.068	6.8	LOS A	0.3	2.4	0.46	0.62	0.46	48.2
East: Walpole Street														
4	L2	29	3.0	31	3.0	0.278	5.4	LOS A	1.5	11.2	0.29	0.51	0.29	49.3
5	T1	304	5.5	320	5.5	0.278	5.3	LOS A	1.5	11.2	0.29	0.51	0.29	53.6
Approach		333	5.3	351	5.3	0.278	5.3	LOS A	1.5	11.2	0.29	0.51	0.29	53.2
West: Walpole Street														
11	T1	144	5.5	152	5.5	0.191	4.9	LOS A	1.1	7.7	0.15	0.56	0.15	53.2
12	R2	103	3.0	108	3.0	0.191	7.9	LOS A	1.1	7.7	0.15	0.56	0.15	49.5
Approach		247	4.5	260	4.5	0.191	6.2	LOS A	1.1	7.7	0.15	0.56	0.15	51.6
All Vehicles		646	4.7	680	4.7	0.278	5.8	LOS A	1.5	11.2	0.25	0.54	0.25	52.0

2.3 Pitt Street / Walpole Street PM Peak- 2019



2.3.1 Pitt Street / Walpole Street 17.00-18.00 Intersection Performance Summary

MOVEMENT SUMMARY

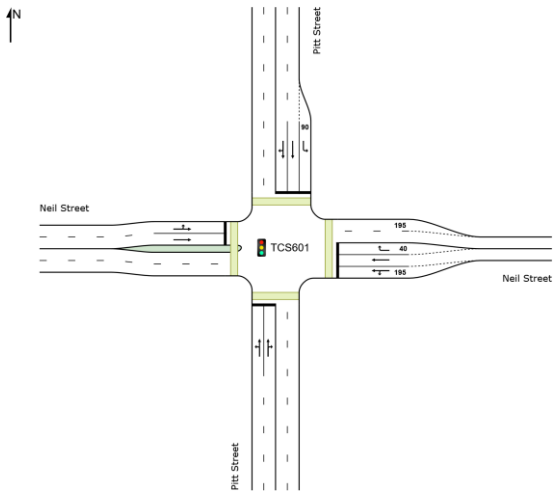
Site: TCS2746 [1.8 Pitt_Walpole - 17.00-18.00 (Site Folder: General)]

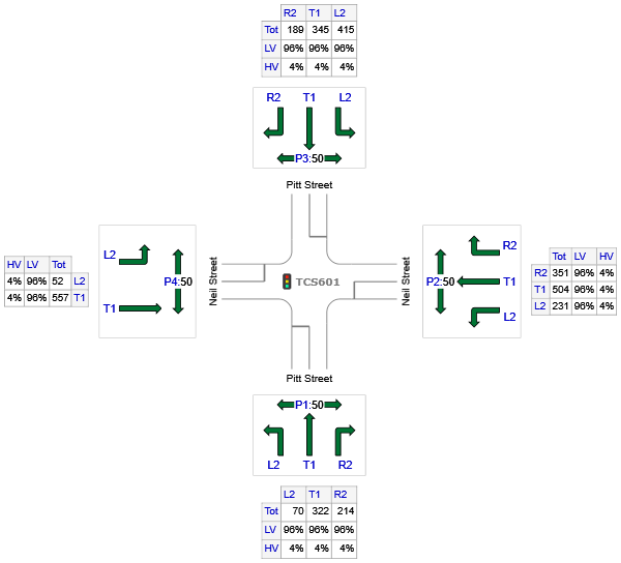
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 66 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pitt Street														
2	T1	647	1.9	681	1.9	0.497	4.5	LOS A	9.7	69.2	0.48	0.43	0.48	55.8
3	R2	225	0.9	237	0.9	* 0.652	33.6	LOS C	7.5	52.7	0.97	0.84	1.03	36.1
Approach		872	1.6	918	1.6	0.652	12.0	LOS A	9.7	69.2	0.61	0.54	0.62	48.9
East: Walpole Street														
4	L2	258	1.5	272	1.5	0.348	18.5	LOS B	6.0	42.3	0.72	0.76	0.72	41.8
6	R2	61	2.0	64	2.0	* 0.289	34.7	LOS C	2.0	14.2	0.95	0.75	0.95	35.3
Approach		319	1.6	336	1.6	0.348	21.6	LOS B	6.0	42.3	0.76	0.75	0.76	40.4
North: Pitt Street														
7	L2	32	3.3	34	3.3	* 0.547	21.5	LOS B	10.8	77.1	0.80	0.71	0.80	43.7
8	T1	812	2.1	855	2.1	0.547	15.5	LOS B	10.9	77.7	0.80	0.70	0.80	47.7
Approach		844	2.1	888	2.1	0.547	15.7	LOS B	10.9	77.7	0.80	0.70	0.80	47.5
All Vehicles		2035	1.8	2142	1.8	0.652	15.1	LOS B	10.9	77.7	0.71	0.64	0.72	46.8

2.4 Pitt Street / Neil Street PM Peak





2.4.1 Pitt Street / Neil Street 16.00-17.00 Intersection Performance Summary

MOVEMENT SUMMARY

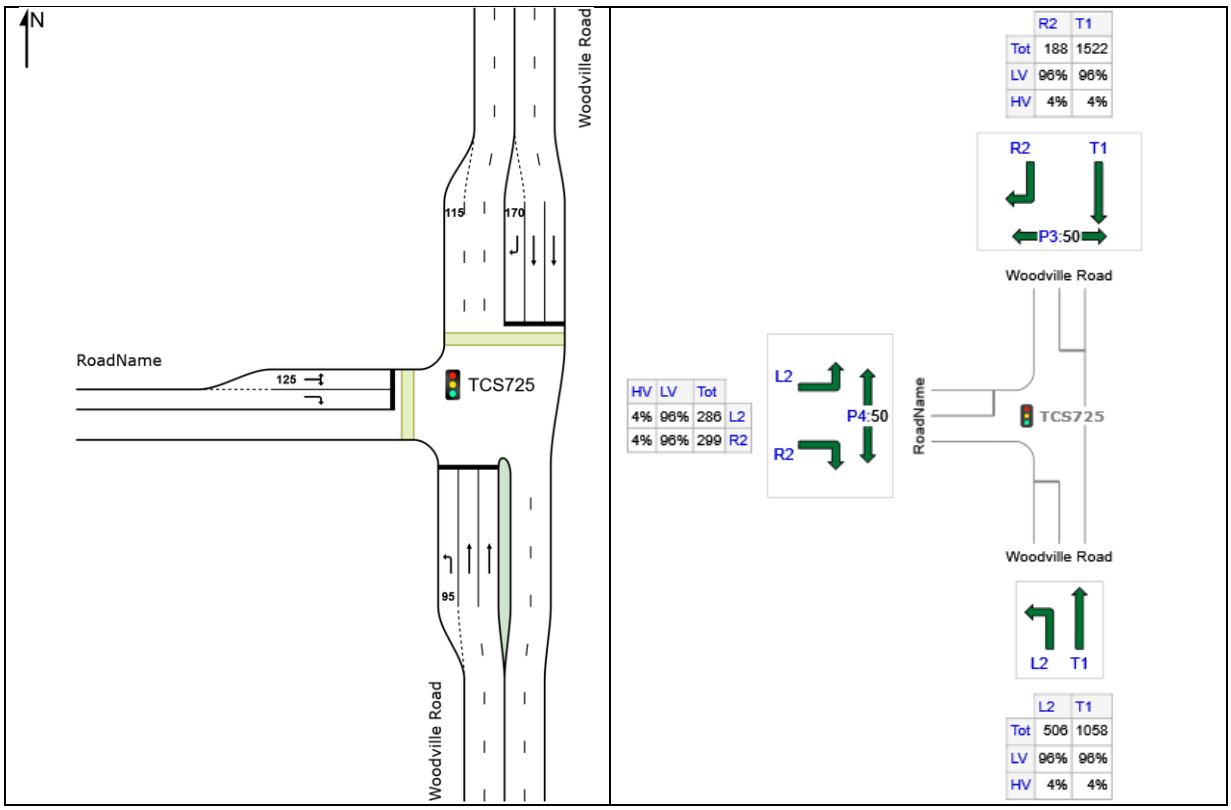
Site: TCS601 [1.9 Pitt_Neil - 16.00-17.00 (Site Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 115 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pitt Street														
1	L2	70	4.0	74	4.0	* 0.804	56.4	LOS D	18.2	132.1	1.00	0.94	1.13	26.7
2	T1	322	4.0	339	4.0	0.804	50.8	LOS D	18.4	133.2	1.00	0.93	1.13	32.2
3	R2	214	4.0	225	4.0	0.804	56.4	LOS D	18.4	133.2	1.00	0.92	1.13	31.2
Approach		606	4.0	638	4.0	0.804	53.4	LOS D	18.4	133.2	1.00	0.93	1.13	31.3
East: Neil Street														
4	L2	231	4.0	243	4.0	0.563	29.7	LOS C	18.8	136.4	0.78	0.76	0.78	40.7
5	T1	504	4.0	531	4.0	0.563	23.2	LOS B	18.8	136.4	0.74	0.67	0.74	38.4
6	R2	351	4.0	369	4.0	* 0.916	72.9	LOS F	22.3	161.8	1.00	1.19	1.35	27.0
Approach		1086	4.0	1143	4.0	0.916	40.7	LOS C	22.3	161.8	0.83	0.86	0.95	33.6
North: Pitt Street														
7	L2	415	4.0	437	4.0	0.732	24.8	LOS B	11.8	85.3	0.94	0.85	0.95	41.7
8	T1	345	4.0	363	4.0	* 0.825	54.9	LOS D	16.9	122.6	1.00	0.95	1.18	31.4
9	R2	189	4.0	199	4.0	0.825	60.7	LOS E	16.4	118.5	1.00	0.94	1.18	24.8
Approach		949	4.0	999	4.0	0.825	42.9	LOS D	16.9	122.6	0.97	0.90	1.08	33.9
West: Neil Street														
10	L2	52	4.0	55	4.0	0.779	54.3	LOS D	17.7	128.4	0.99	0.91	1.09	27.4
11	T1	557	4.0	586	4.0	* 0.779	50.8	LOS D	18.0	130.5	1.00	0.91	1.09	28.1
Approach		609	4.0	641	4.0	0.779	51.1	LOS D	18.0	130.5	1.00	0.91	1.09	28.0
All Vehicles		3250	4.0	3421	4.0	0.916	45.7	LOS D	22.3	161.8	0.94	0.90	1.04	32.2

2.5 Merrylands Road / Woodville Road PM Peak



2.5.1 Merrylands Road / Woodville Road 16.00-17.00 Intersection Performance Summary

MOVEMENT SUMMARY

Site: TCS725 [1.10 Merrylands_Woodville - 16.00-17.00 (Site Folder: General)]

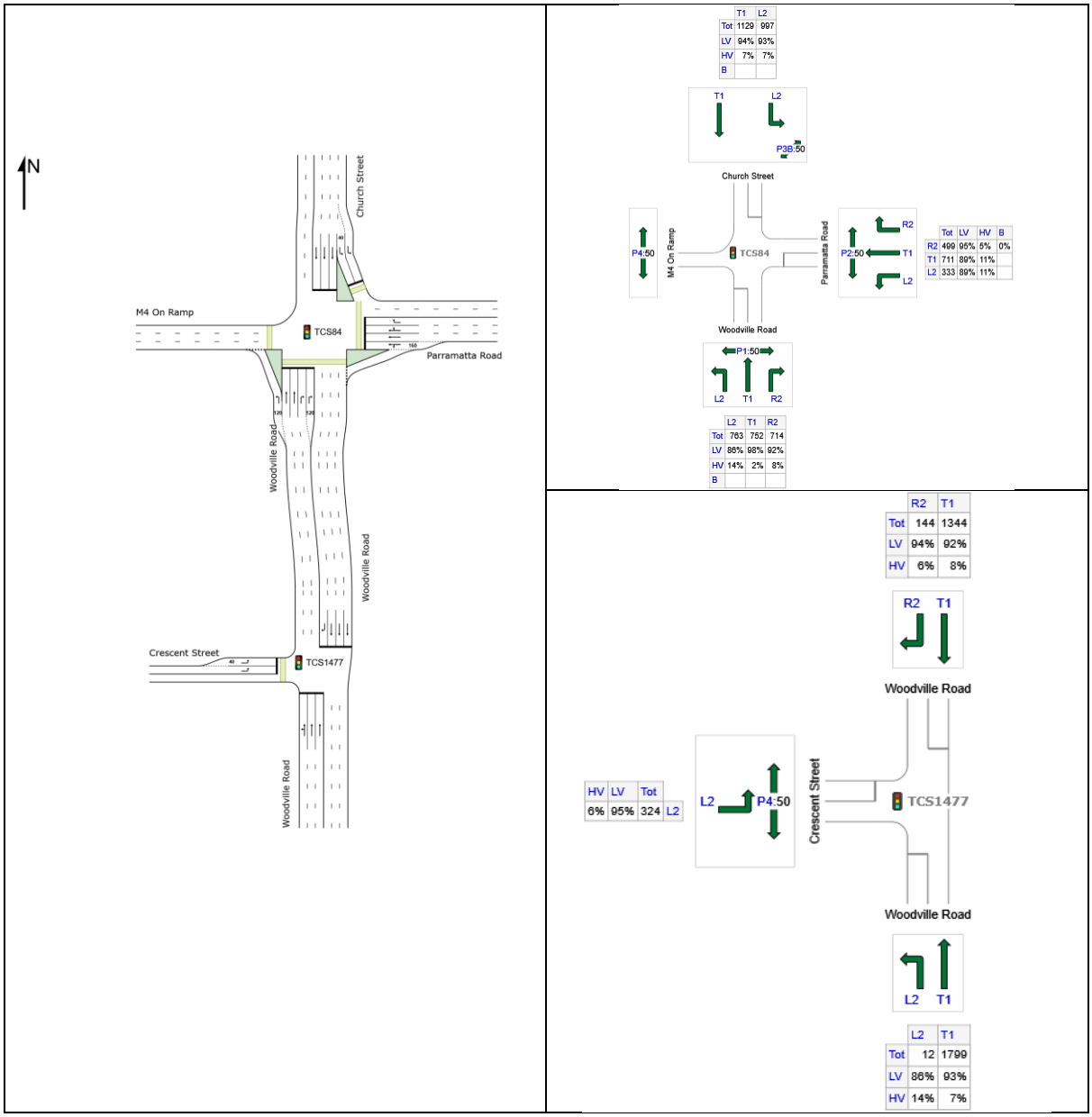
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 122 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	506	4.0	533	4.0	0.383	11.2	LOS A	10.1	73.0	0.35	0.71	0.35	52.5
2	T1	1058	4.0	1114	4.0	* 0.722	25.3	LOS B	31.6	228.8	0.79	0.71	0.79	48.2
Approach		1564	4.0	1646	4.0	0.722	20.7	LOS B	31.6	228.8	0.65	0.71	0.65	49.5
North: Woodville Road														
8	T1	1522	4.0	1602	4.0	0.620	11.4	LOS A	25.8	187.1	0.60	0.55	0.60	57.5
9	R2	188	4.0	198	4.0	* 0.836	70.0	LOS E	12.7	92.2	1.00	0.91	1.24	28.6
Approach		1710	4.0	1800	4.0	0.836	17.8	LOS B	25.8	187.1	0.64	0.59	0.67	51.7
West: RoadName														
10	L2	286	4.0	301	4.0	0.656	49.7	LOS D	18.4	133.0	0.93	0.84	0.93	34.5
12	R2	299	4.0	315	4.0	* 0.656	51.5	LOS D	18.4	133.0	0.96	0.84	0.96	32.8
Approach		585	4.0	616	4.0	0.656	50.7	LOS D	18.4	133.0	0.94	0.84	0.94	33.6
All Vehicles		3859	4.0	4062	4.0	0.836	24.0	LOS B	31.6	228.8	0.69	0.68	0.70	47.0

3.0 2030 AM Peak Background Growth Only Intersection Performance Summary

3.1 Parramatta Road / Church Street / Woodville Road + Woodville Road / Crescent Street – 2030 Background Growth AM Peak



3.1.1 Parramatta Road / Church Street / Woodville Road 7.30-8.30 Intersection Performance Summary

MOVEMENT SUMMARY

Site: TCS84 [2.1.1 Woodville_Parramatta - 7.30-8.30 (Transport Upgrade) (Site Folder: General)]

Network: N101 [2.AM Woodville (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	803	14.0	803	14.0	0.696	18.7	LOS B	21.9	171.6	0.58	0.85	0.58	39.6
2	T1	792	2.4	792	2.4	0.336	13.0	LOS A	10.9	78.0	0.44	0.39	0.44	45.0
3	R2	752	8.4	752	8.4	* 0.751	65.0	LOS E	24.8	186.3	1.00	0.88	1.01	22.3
Approach		2346	8.3	2346	8.3	0.751	31.6	LOS C	24.8	186.3	0.67	0.70	0.67	32.8
East: Parramatta Road														
4	L2	351	11.1	351	11.1	0.713	48.5	LOS D	23.5	180.5	0.91	0.99	0.91	24.1
5	T1	748	11.1	748	11.1	0.713	46.2	LOS D	23.6	180.9	0.95	0.86	0.95	33.9
6	R2	525	4.6	525	4.6	0.713	52.5	LOS D	23.5	176.9	0.95	0.85	0.95	32.4
Approach		1624	9.0	1624	9.0	0.713	48.8	LOS D	23.6	180.9	0.94	0.88	0.94	31.8
North: Church Street														
7	L2	1049	7.0	1049	7.0	* 0.771	20.2	LOS B	18.6	137.7	0.57	0.74	0.57	44.5
8	T1	1188	6.5	1188	6.5	0.741	48.9	LOS D	24.6	181.6	0.97	0.85	0.97	23.4
Approach		2238	6.7	2238	6.7	0.771	35.5	LOS C	24.6	181.6	0.78	0.80	0.78	33.5
All Vehicles		6208	7.9	6208	7.9	0.771	37.5	LOS C	24.8	186.3	0.78	0.79	0.78	32.7

3.1.2 Woodville Road / Crescent Street 7.30-8.30 Intersection Performance Summary

MOVEMENT SUMMARY

Site: TCS1477 [2.2 Woodville_Crescent - 7.30-8.30 (Site Folder: General)]

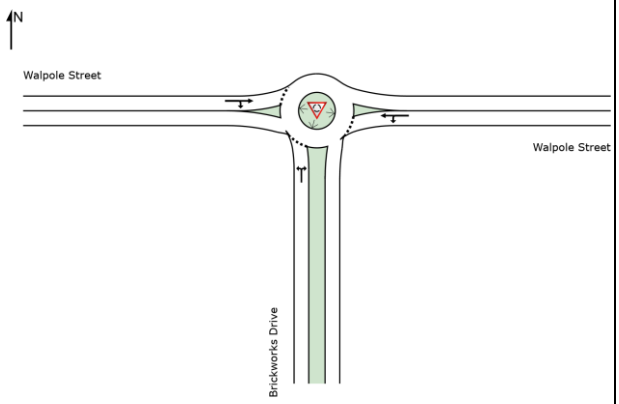
Network: N101 [2.AM Woodville (Network Folder: General)]

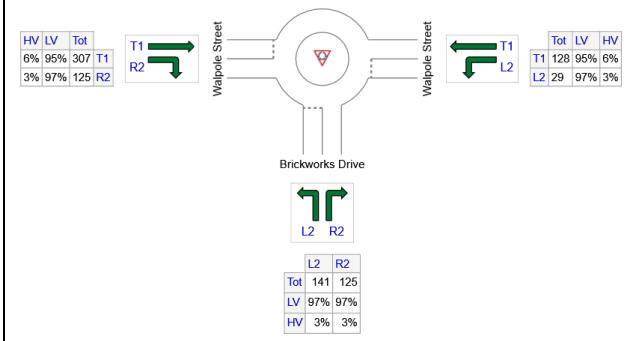
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	13	14.3	13	14.3	* 0.644	17.4	LOS B	20.4	152.1	0.58	0.54	0.58	45.8
2	T1	1894	7.3	1894	7.3	0.644	11.7	LOS A	30.4	226.3	0.58	0.54	0.58	43.5
Approach		1906	7.3	1906	7.3	0.644	11.7	LOS A	30.4	226.3	0.58	0.54	0.58	43.5
North: Woodville Road														
8	T1	1415	8.2	1415	8.2	0.279	0.1	LOS A	0.5	3.5	0.03	0.02	0.03	59.8
9	R2	152	5.9	152	5.9	0.411	70.0	LOS E	10.3	75.7	1.00	0.82	1.00	20.1
Approach		1566	8.0	1566	8.0	0.411	6.9	LOS A	10.3	75.7	0.12	0.10	0.12	50.2
West: Crescent Street														
10	L2	341	5.5	341	5.5	* 0.623	59.1	LOS E	11.5	84.3	0.95	0.81	0.95	19.3
Approach		341	5.5	341	5.5	0.623	59.1	LOS E	11.5	84.3	0.95	0.81	0.95	19.3
All Vehicles		3814	7.4	3814	7.4	0.644	14.0	LOS A	30.4	226.3	0.43	0.38	0.43	41.8

3.2 Walpole Street / Brickworks Drive 2030 Background Growth Only AM Peak





3.2.1 Walpole Street / Brickworks Drive AM Peak Intersection Performance Summary

MOVEMENT SUMMARY

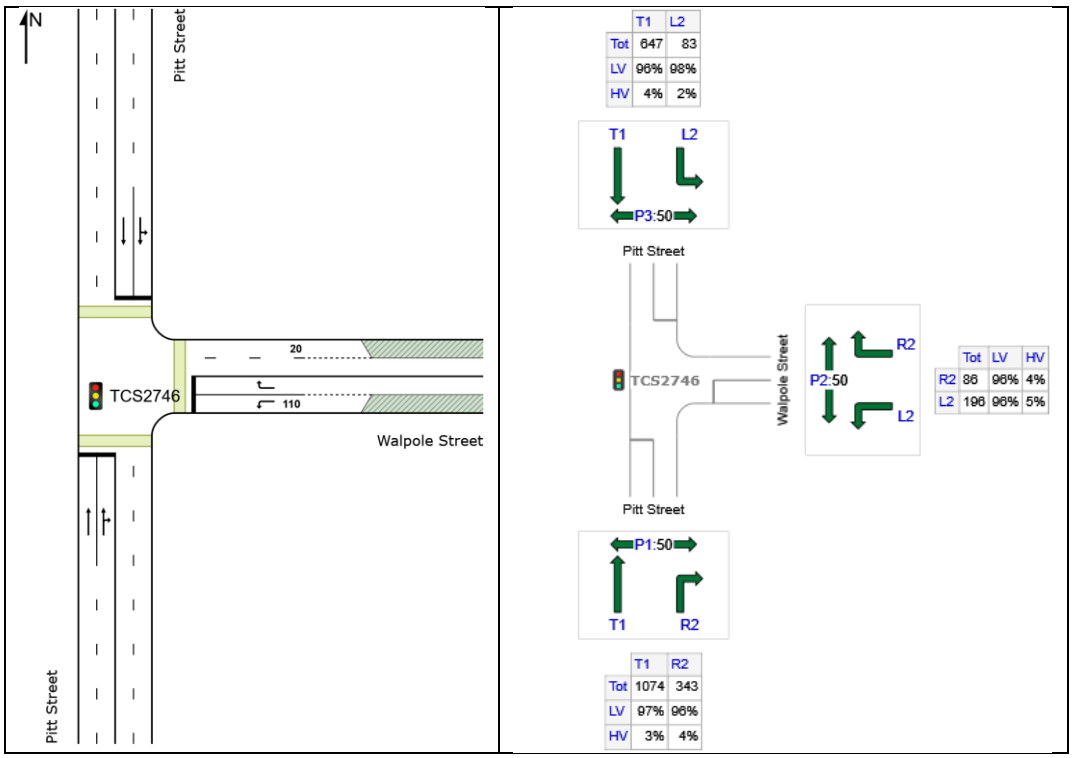
Site: [2.11 Walpole_Brickworks AM Peak (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Brickworks Drive														
1	L2	141	3.0	148	3.0	0.225	4.6	LOS A	1.2	8.8	0.32	0.58	0.32	48.4
3	R2	125	3.0	132	3.0	0.225	7.4	LOS A	1.2	8.8	0.32	0.58	0.32	48.7
Approach		266	3.0	280	3.0	0.225	5.9	LOS A	1.2	8.8	0.32	0.58	0.32	48.5
East: Walpole Street														
4	L2	29	3.0	31	3.0	0.134	5.4	LOS A	0.7	5.0	0.30	0.52	0.30	49.3
5	T1	128	5.5	135	5.5	0.134	5.3	LOS A	0.7	5.0	0.30	0.52	0.30	53.6
Approach		157	5.0	165	5.0	0.134	5.4	LOS A	0.7	5.0	0.30	0.52	0.30	52.7
West: Walpole Street														
11	T1	307	5.5	323	5.5	0.368	5.6	LOS A	2.3	17.1	0.37	0.57	0.37	52.8
12	R2	125	3.0	132	3.0	0.368	8.6	LOS A	2.3	17.1	0.37	0.57	0.37	49.1
Approach		432	4.8	455	4.8	0.368	6.4	LOS A	2.3	17.1	0.37	0.57	0.37	51.7
All Vehicles		855	4.3	900	4.3	0.368	6.1	LOS A	2.3	17.1	0.34	0.56	0.34	50.8

3.3 Pitt Street / Walpole Street 2030 Background Growth AM Peak



3.3.1 Pitt Street / Walpole Street 8.00-9.00 Intersection Performance Summary

MOVEMENT SUMMARY

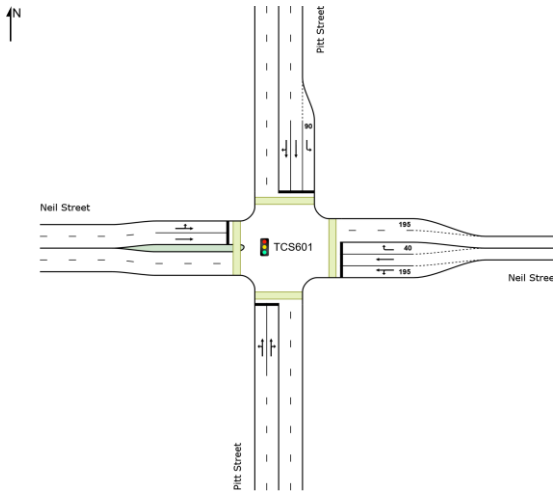
Site: TCS2746 [2.3 Pitt_Walpole - 8.00-9.00 (Site Folder: General)]

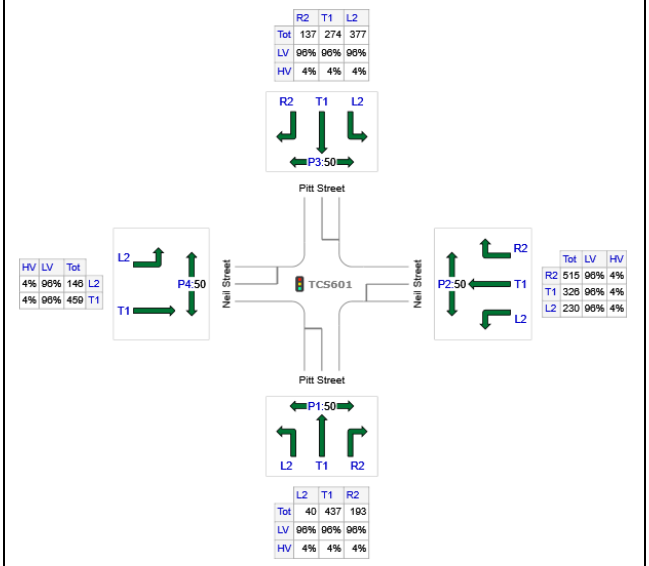
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 68 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pitt Street														
2	T1	1074	3.1	1131	3.1	* 0.874	17.9	LOS B	37.5	269.6	0.86	0.92	1.01	46.4
3	R2	343	4.1	361	4.1	0.972	64.9	LOS E	18.4	133.1	1.00	1.20	1.86	27.6
Approach		1417	3.3	1492	3.3	0.972	29.3	LOS C	37.5	269.6	0.89	0.99	1.21	39.8
East: Walpole Street														
4	L2	196	4.5	206	4.5	0.252	16.9	LOS B	4.2	30.7	0.65	0.73	0.65	42.5
6	R2	86	4.1	91	4.1	* 0.341	34.1	LOS C	2.8	20.6	0.94	0.76	0.94	35.5
Approach		282	4.4	297	4.4	0.341	22.1	LOS B	4.2	30.7	0.74	0.74	0.74	40.1
North: Pitt Street														
7	L2	83	2.0	87	2.0	0.535	24.1	LOS B	9.9	71.5	0.83	0.74	0.83	42.1
8	T1	647	3.9	681	3.9	0.535	17.8	LOS B	10.2	73.6	0.83	0.72	0.83	46.1
Approach		730	3.7	768	3.7	0.535	18.5	LOS B	10.2	73.6	0.83	0.73	0.83	45.6
All Vehicles		2429	3.6	2557	3.6	0.972	25.2	LOS B	37.5	269.6	0.86	0.88	1.04	41.4

3.4 Pitt Street / Neil Street 2030 Background Growth AM Peak





3.4.1 Pitt Street / Neil Street 8.00-9.00 Intersection Performance Summary

MOVEMENT SUMMARY

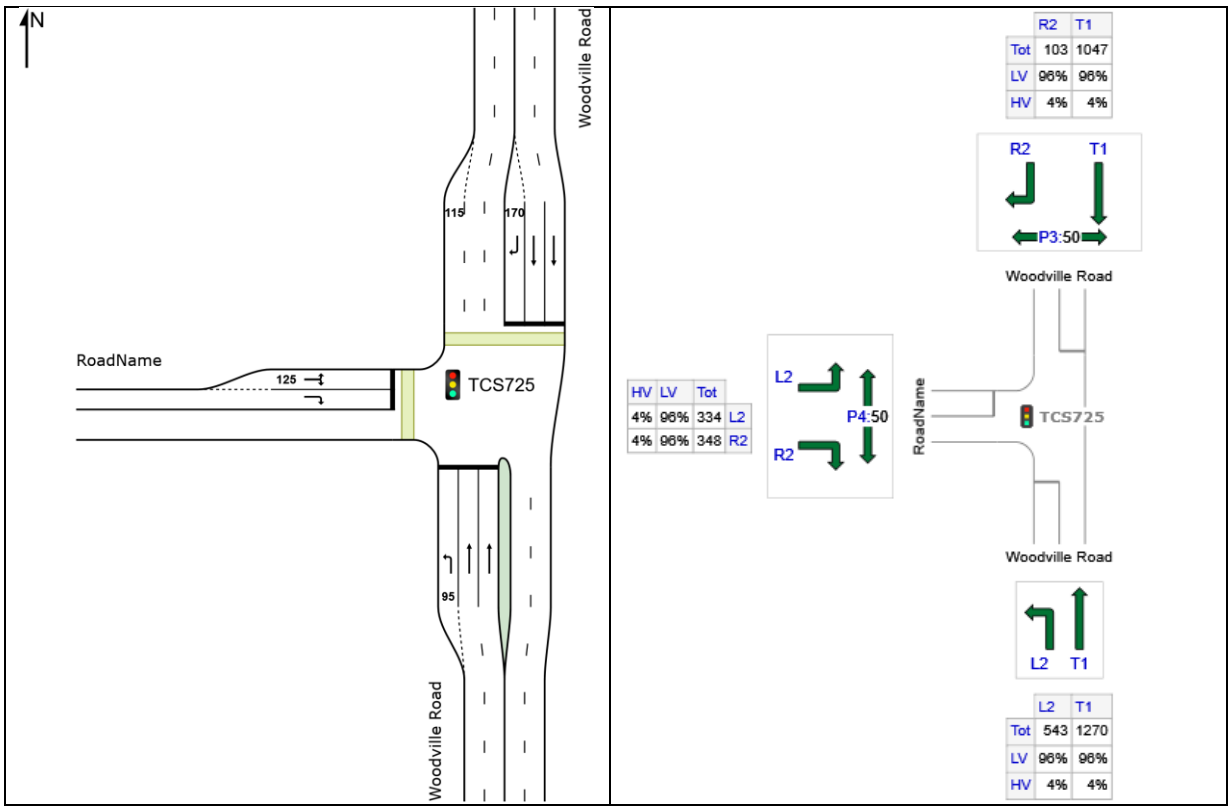
Site: TCS601 [2.4 Pitt_Neil - 8.00-9.00 (Do Nothing) (Site Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pitt Street														
1	L2	40	4.0	42	4.0	* 0.892	79.8	LOS F	28.5	206.6	1.00	1.02	1.21	21.6
2	T1	437	4.0	460	4.0	0.892	74.3	LOS F	28.5	206.6	1.00	1.01	1.21	26.8
3	R2	193	4.0	203	4.0	0.892	80.0	LOS F	28.3	204.8	1.00	0.99	1.22	26.1
Approach		670	4.0	705	4.0	0.892	76.3	LOS F	28.5	206.6	1.00	1.01	1.21	26.3
East: Neil Street														
4	L2	230	4.0	242	4.0	0.321	24.2	LOS B	12.5	90.4	0.58	0.69	0.58	42.7
5	T1	326	4.0	343	4.0	0.321	19.6	LOS B	12.5	90.4	0.58	0.54	0.58	40.7
6	R2	515	4.0	542	4.0	* 0.904	75.6	LOS F	39.4	285.6	1.00	1.15	1.17	26.5
Approach		1071	4.0	1127	4.0	0.904	47.5	LOS D	39.4	285.6	0.78	0.86	0.86	32.0
North: Pitt Street														
7	L2	377	4.0	397	4.0	* 0.532	23.8	LOS B	12.1	87.7	0.80	0.81	0.80	42.2
8	T1	274	4.0	288	4.0	0.869	78.7	LOS F	17.5	126.6	1.00	0.98	1.24	26.1
9	R2	137	4.0	144	4.0	0.869	84.5	LOS F	16.9	122.7	1.00	0.96	1.25	20.3
Approach		788	4.0	829	4.0	0.869	53.5	LOS D	17.5	126.6	0.91	0.89	1.03	30.9
West: Neil Street														
10	L2	146	4.0	154	4.0	0.878	78.8	LOS F	24.7	178.6	1.00	0.98	1.20	21.5
11	T1	459	4.0	483	4.0	* 0.878	74.6	LOS F	25.5	184.8	1.00	0.99	1.20	22.1
Approach		605	4.0	637	4.0	0.878	75.6	LOS F	25.5	184.8	1.00	0.99	1.20	21.9
All Vehicles		3134	4.0	3299	4.0	0.904	60.6	LOS E	39.4	285.6	0.90	0.93	1.05	28.3

3.5 Merrylands Road / Woodville Road 2030 Background Growth AM Peak



3.5.1 Merrylands Road / Woodville Road 8.00-9.00 Intersection Performance Summary

MOVEMENT SUMMARY

Site: TCS725 [2.5 Merrylands_Woodville - 8.00-9.00 (Site Folder: General)]

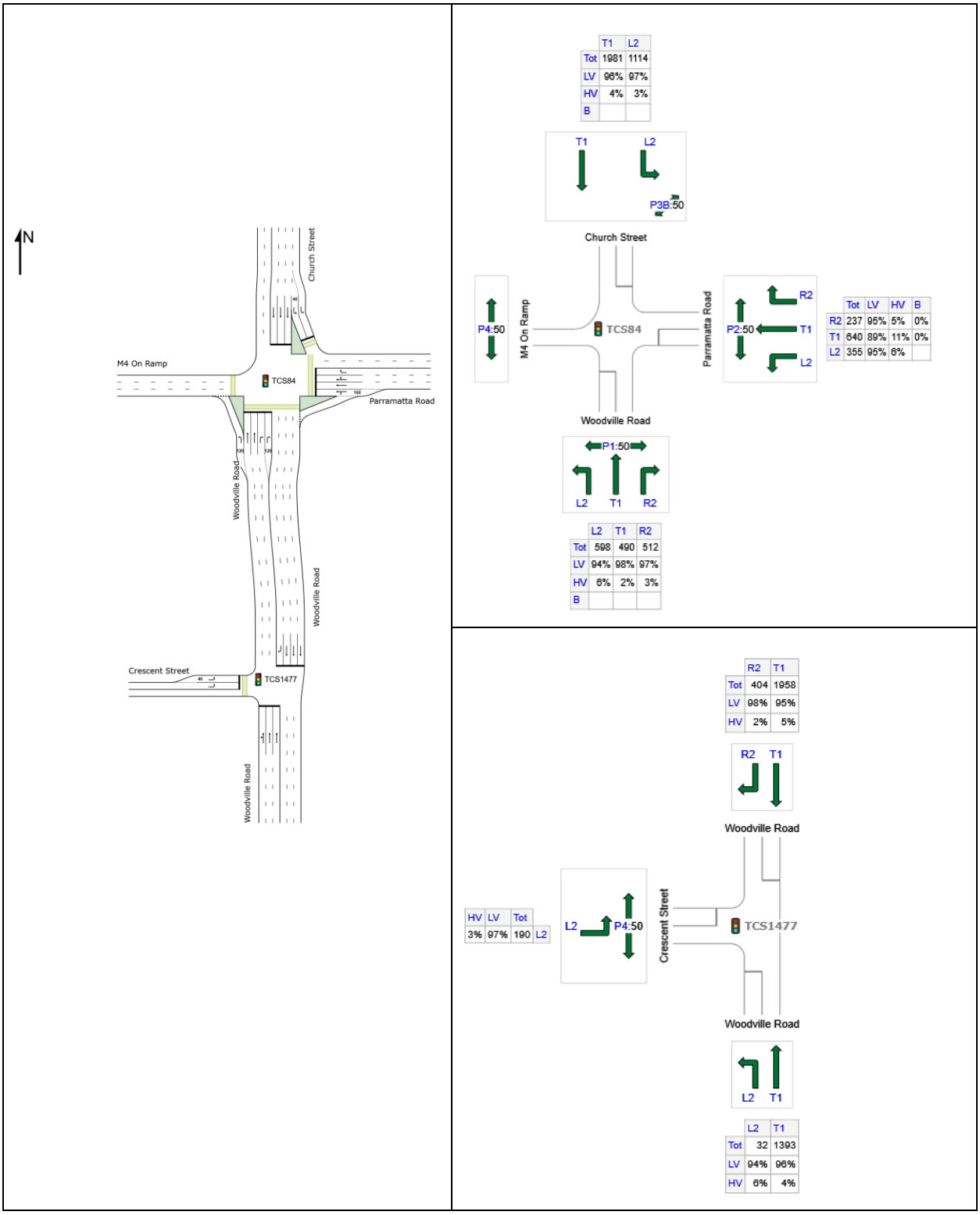
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 114 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	543	4.0	572	4.0	0.392	9.7	LOS A	8.8	63.6	0.31	0.70	0.31	53.7
2	T1	1270	4.0	1337	4.0	* 0.824	28.1	LOS B	39.2	283.4	0.83	0.76	0.84	48.6
Approach		1813	4.0	1908	4.0	0.824	22.6	LOS B	39.2	283.4	0.67	0.74	0.68	50.0
North: Woodville Road														
8	T1	1047	4.0	1102	4.0	0.435	9.4	LOS A	14.1	102.2	0.51	0.46	0.51	59.3
9	R2	103	4.0	108	4.0	* 0.685	64.9	LOS E	6.3	45.4	1.00	0.83	1.11	29.8
Approach		1150	4.0	1211	4.0	0.685	14.4	LOS A	14.1	102.2	0.55	0.49	0.56	54.5
West: RoadName														
10	L2	334	4.0	352	4.0	0.749	58.7	LOS E	21.1	152.5	0.96	0.87	0.99	34.6
12	R2	348	4.0	366	4.0	* 0.749	51.1	LOS D	21.1	152.5	0.99	0.88	1.04	32.9
Approach		682	4.0	718	4.0	0.749	54.8	LOS D	21.1	152.5	0.97	0.87	1.02	33.7
All Vehicles		3645	4.0	3837	4.0	0.824	26.0	LOS B	39.2	283.4	0.69	0.69	0.71	47.0

4.0 2030 PM Peak Background Growth Only Intersection Performance Summary

4.1 Parramatta Road / Church Street / Woodville Road + Woodville Road / Crescent Street – 2030 Background Growth PM Peak



4.1.2 Parramatta Road / Church Street / Woodville Road 17.00-18.00 Intersection Performance Summary

MOVEMENT SUMMARY

Site: TCS84 [2.6.1 Woodville_Parramatta - 17.00-18.00 (Transport Upgrade) (Site Folder: General)]

Network: N101 [2.PM Woodville (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	629	5.7	629	5.7	0.470	12.0	LOS A	10.6	77.8	0.36	0.72	0.36	44.9
2	T1	516	2.1	516	2.1	0.192	6.0	LOS A	4.2	30.1	0.26	0.23	0.26	51.9
3	R2	539	2.9	539	2.9	* 0.768	77.6	LOS F	18.8	135.0	1.00	0.86	1.04	20.0
Approach		1684	3.7	1684	3.7	0.768	31.2	LOS C	18.8	135.0	0.53	0.61	0.55	33.0
East: Parramatta Road														
4	L2	374	5.5	374	5.5	0.776	56.2	LOS D	24.2	178.9	0.97	1.05	0.99	21.8
5	T1	674	11.1	674	11.1	* 0.776	57.9	LOS E	24.2	178.9	1.00	0.92	1.06	30.9
6	R2	249	4.6	249	4.6	0.776	60.1	LOS E	20.3	155.5	0.97	0.83	0.97	30.1
Approach		1297	8.2	1297	8.2	0.776	57.8	LOS E	24.2	178.9	0.98	0.94	1.02	28.7
North: Church Street														
7	L2	1173	3.3	1173	3.3	0.703	14.1	LOS A	16.1	115.8	0.45	0.71	0.45	48.2
8	T1	2085	3.7	2085	3.7	* 0.786	33.6	LOS C	39.5	285.4	0.91	0.83	0.91	29.0
Approach		3258	3.6	3258	3.6	0.786	26.6	LOS B	39.5	285.4	0.74	0.79	0.74	36.6
All Vehicles		6239	4.6	6239	4.6	0.786	34.3	LOS C	39.5	285.4	0.74	0.77	0.75	33.4

4.1.3 Woodville Road / Crescent Street 17.00-18.00 Intersection Performance

MOVEMENT SUMMARY

Site: TCS1477 [2.7 Woodville_Crescent - 17.00-18.00 (Site Folder: General)]

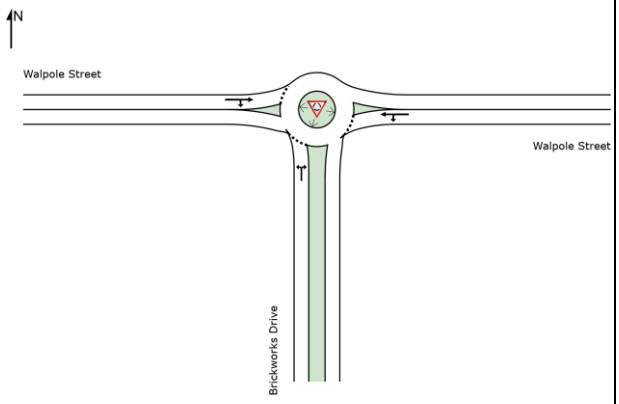
Network: N101 [2.PM Woodville (Network Folder: General)]

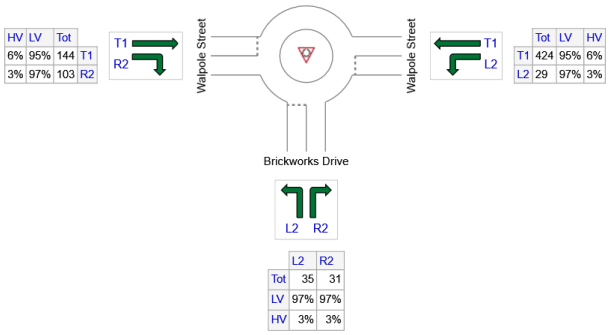
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	34	5.6	34	5.6	* 0.557	31.9	LOS C	24.3	176.2	0.75	0.68	0.75	38.7
2	T1	1466	3.9	1466	3.9	0.557	26.3	LOS B	24.5	177.4	0.75	0.68	0.75	32.3
Approach		1500	3.9	1500	3.9	0.557	26.4	LOS B	24.5	177.4	0.75	0.68	0.75	32.5
North: Woodville Road														
8	T1	2061	4.6	2061	4.6	0.397	0.2	LOS A	1.6	11.8	0.07	0.05	0.07	59.5
9	R2	425	1.7	425	1.7	* 0.550	60.5	LOS E	28.4	201.9	1.00	0.88	1.00	21.9
Approach		2486	4.1	2486	4.1	0.550	10.5	LOS A	28.4	201.9	0.23	0.19	0.23	46.0
West: Crescent Street														
10	L2	200	3.3	200	3.3	0.131	30.8	LOS C	4.1	29.5	0.65	0.71	0.65	27.4
Approach		200	3.3	200	3.3	0.131	30.8	LOS C	4.1	29.5	0.65	0.71	0.65	27.4
All Vehicles		4186	4.0	4186	4.0	0.557	17.2	LOS B	28.4	201.9	0.44	0.39	0.44	39.6

4.2 Walpole Street / Brickworks Drive 2030 Background Growth Only PM Peak





4.2.1 Walpole Street / Brickworks Drive PM Peak Intersection Performance Summary

MOVEMENT SUMMARY

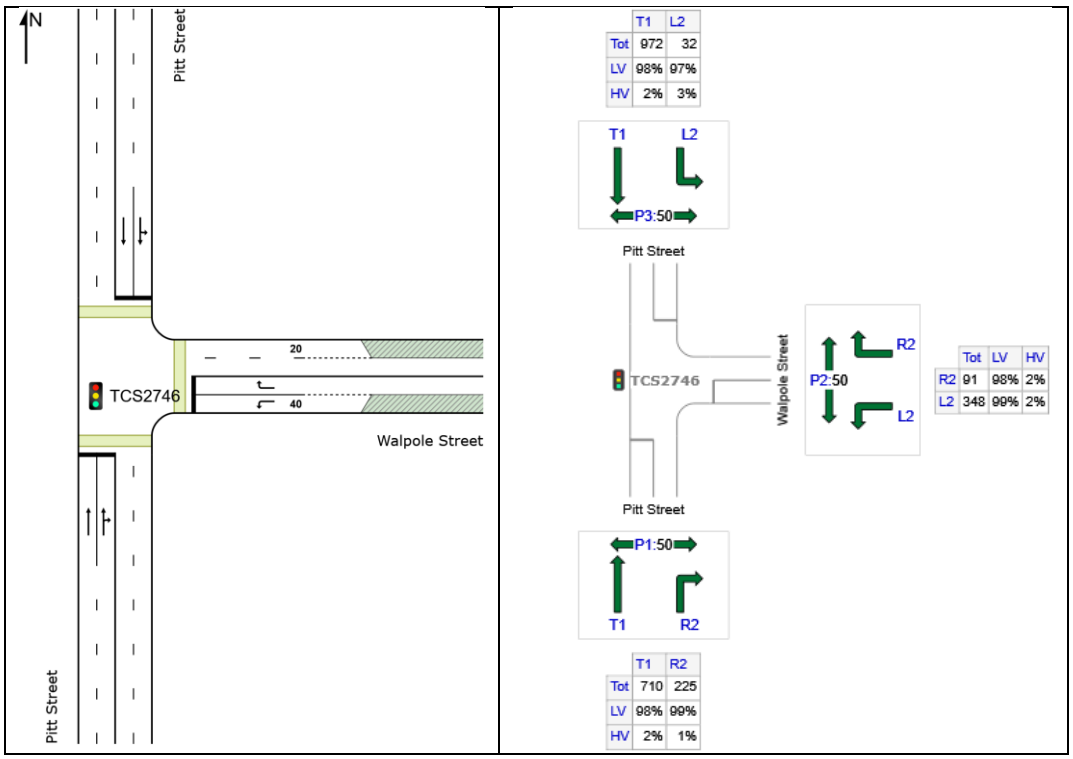
Site: [2.12 Walpole_Brickworks PM Peak (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Brickworks Drive														
1	L2	35	3.0	37	3.0	0.078	6.3	LOS A	0.4	3.0	0.56	0.67	0.56	47.6
3	R2	31	3.0	33	3.0	0.078	9.1	LOS A	0.4	3.0	0.56	0.67	0.56	47.9
Approach		66	3.0	69	3.0	0.078	7.6	LOS A	0.4	3.0	0.56	0.67	0.56	47.7
East: Walpole Street														
4	L2	29	3.0	31	3.0	0.378	5.5	LOS A	2.3	17.1	0.33	0.52	0.33	49.2
5	T1	424	5.5	446	5.5	0.378	5.4	LOS A	2.3	17.1	0.33	0.52	0.33	53.5
Approach		453	5.3	477	5.3	0.378	5.4	LOS A	2.3	17.1	0.33	0.52	0.33	53.2
West: Walpole Street														
11	T1	144	5.5	152	5.5	0.191	4.9	LOS A	1.1	7.9	0.15	0.56	0.15	53.2
12	R2	103	3.0	108	3.0	0.191	7.9	LOS A	1.1	7.9	0.15	0.56	0.15	49.5
Approach		247	4.5	260	4.5	0.191	6.2	LOS A	1.1	7.9	0.15	0.56	0.15	51.6
All Vehicles		766	4.9	806	4.9	0.378	5.9	LOS A	2.3	17.1	0.29	0.54	0.29	52.1

4.3 Pitt Street / Walpole Street 2030 Background Growth PM Peak



4.3.1 Pitt Street / Walpole Street 17.00-18.00 Intersection Performance Summary

MOVEMENT SUMMARY

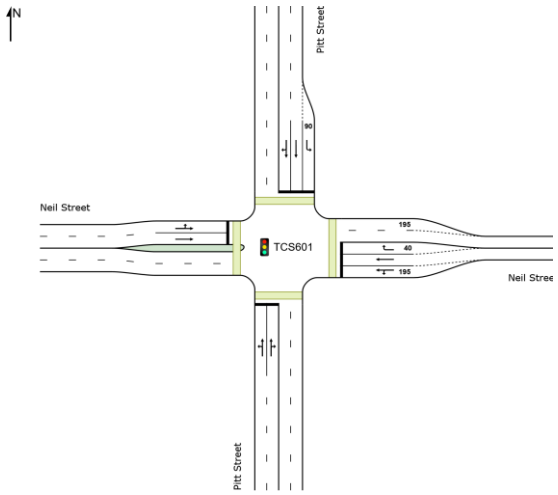
Site: TCS2746 [2.8 Pitt_Walpole - 17.00-18.00 (Site Folder: General)]

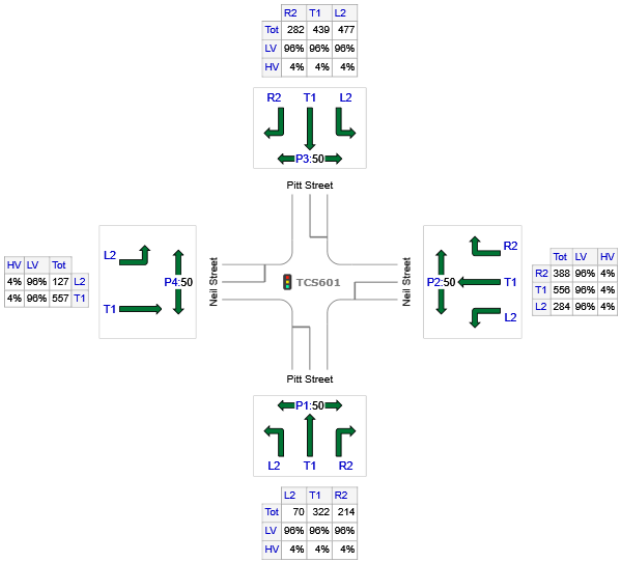
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 66 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pitt Street														
2	T1	710	1.9	747	1.9	0.545	4.8	LOS A	11.3	80.3	0.51	0.46	0.51	55.6
3	R2	225	0.9	237	0.9	* 0.652	33.6	LOS C	7.5	52.7	0.97	0.84	1.03	36.1
Approach		935	1.7	984	1.7	0.652	11.7	LOS A	11.3	80.3	0.62	0.55	0.63	49.2
East: Walpole Street														
4	L2	348	1.5	366	1.5	0.470	19.5	LOS B	8.6	60.9	0.77	0.78	0.77	41.4
6	R2	91	2.0	96	2.0	* 0.432	35.4	LOS C	3.0	21.7	0.97	0.77	0.97	35.0
Approach		439	1.6	462	1.6	0.470	22.8	LOS B	8.6	60.9	0.81	0.78	0.81	39.9
North: Pitt Street														
7	L2	32	3.3	34	3.3	* 0.650	22.5	LOS B	13.7	97.4	0.85	0.75	0.85	43.2
8	T1	972	2.1	1023	2.1	0.650	16.5	LOS B	13.8	98.1	0.85	0.75	0.85	47.1
Approach		1004	2.1	1057	2.1	0.650	16.7	LOS B	13.8	98.1	0.85	0.75	0.85	47.0
All Vehicles		2378	1.9	2503	1.9	0.652	15.9	LOS B	13.8	98.1	0.75	0.68	0.76	46.3

4.4 Pitt Street / Neil Street 2030 Background Growth PM Peak





4.4.1 Pitt Street / Neil Street 16.00-17.00 Intersection Performance Summary

MOVEMENT SUMMARY

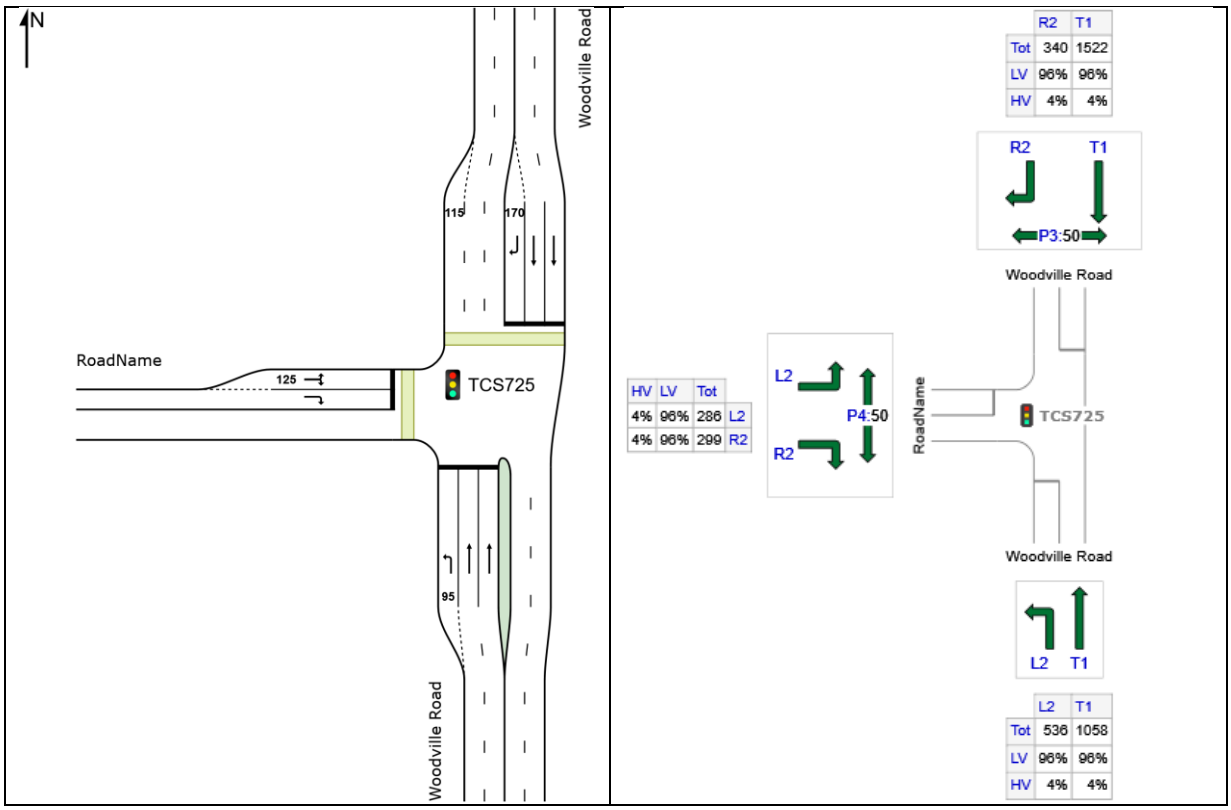
Site: TCS601 [2.9.0 Pitt_Neil - 16.00-17.00 (Do Nothing) (Site Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pitt Street														
1	L2	70	4.0	74	4.0	0.970	105.5	LOS F	29.7	215.3	1.00	1.17	1.45	17.8
2	T1	322	4.0	339	4.0	* 0.970	99.8	LOS F	29.9	216.7	1.00	1.15	1.44	22.5
3	R2	214	4.0	225	4.0	0.970	105.4	LOS F	29.9	216.7	1.00	1.10	1.44	22.0
Approach		606	4.0	638	4.0	0.970	102.4	LOS F	29.9	216.7	1.00	1.13	1.44	21.8
East: Neil Street														
4	L2	284	4.0	299	4.0	0.605	35.8	LOS C	27.7	200.9	0.79	0.78	0.79	38.0
5	T1	556	4.0	585	4.0	0.605	28.7	LOS C	27.7	200.9	0.74	0.68	0.74	35.5
6	R2	388	4.0	408	4.0	* 0.896	82.3	LOS F	29.5	213.5	1.00	1.14	1.20	25.3
Approach		1228	4.0	1293	4.0	0.896	47.3	LOS D	29.5	213.5	0.83	0.85	0.90	31.4
North: Pitt Street														
7	L2	477	4.0	502	4.0	0.632	23.3	LOS B	14.4	104.3	0.83	0.83	0.83	42.5
8	T1	439	4.0	462	4.0	0.956	89.9	LOS F	37.2	269.2	1.00	1.12	1.38	24.1
9	R2	282	4.0	297	4.0	0.956	95.9	LOS F	37.2	269.2	1.00	1.06	1.36	18.6
Approach		1198	4.0	1261	4.0	0.956	64.8	LOS E	37.2	269.2	0.93	0.99	1.16	27.8
West: Neil Street														
10	L2	127	4.0	134	4.0	* 0.956	97.3	LOS F	32.0	231.7	1.00	1.11	1.38	18.7
11	T1	557	4.0	586	4.0	0.956	94.0	LOS F	32.9	238.2	1.00	1.13	1.38	19.1
Approach		684	4.0	720	4.0	0.956	94.6	LOS F	32.9	238.2	1.00	1.13	1.38	19.1
All Vehicles		3716	4.0	3912	4.0	0.970	70.6	LOS F	37.2	269.2	0.92	0.99	1.16	25.7

4.5 Merrylands Road / Woodville Road 2030 Background Growth PM Peak



4.5.1 Merrylands Road / Woodville Road 16.00-17.00 Intersection Performance Summary

MOVEMENT SUMMARY

Site: TCS725 [2.10.0 Merrylands_Woodville - 16.00-17.00 (Site Folder: General)]

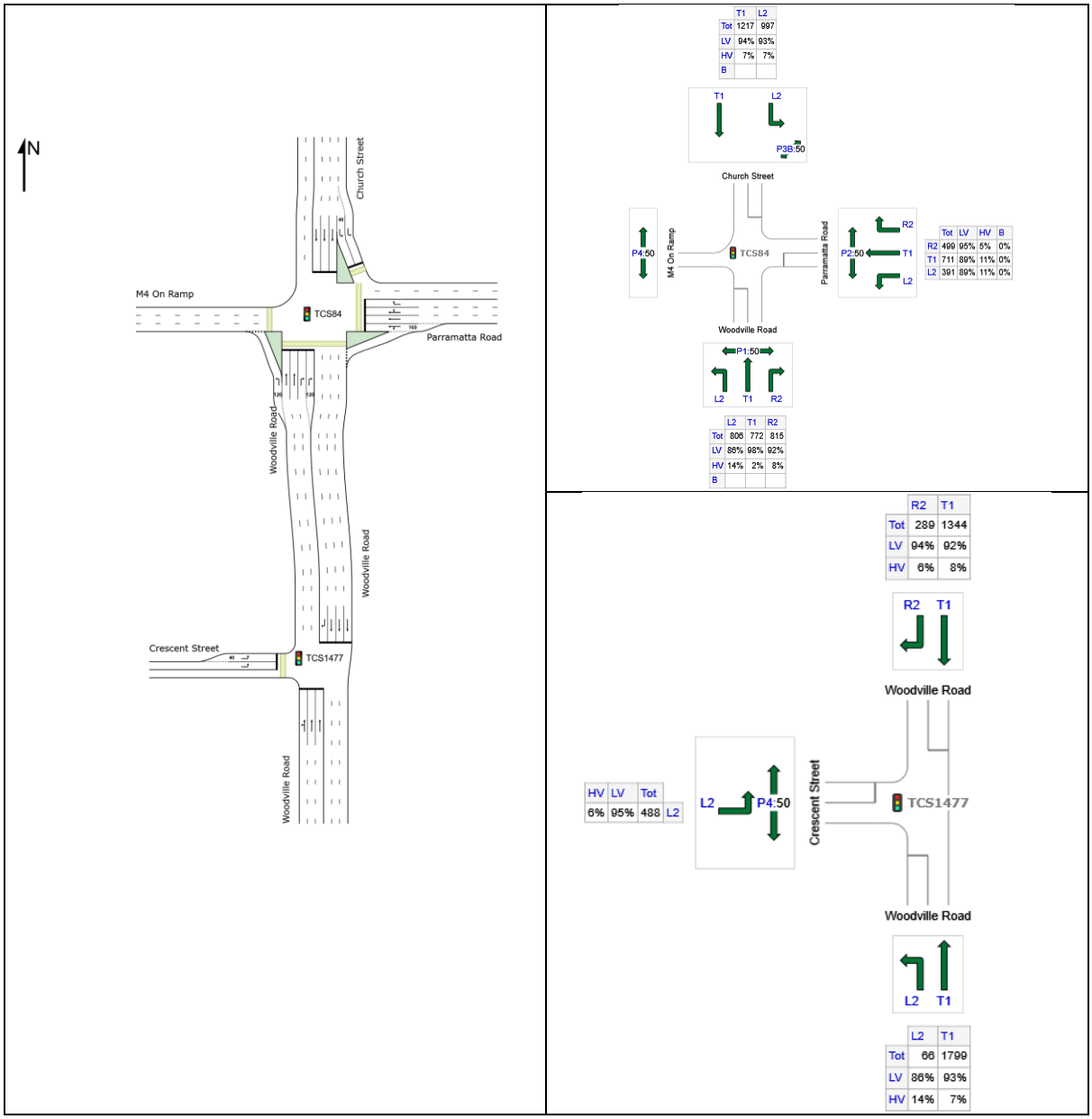
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	536	4.0	564	4.0	0.493	15.8	LOS B	13.1	94.8	0.57	0.77	0.57	49.3
2	T1	1058	4.0	1114	4.0	* 0.878	32.3	LOS C	33.2	240.0	0.92	0.91	1.04	44.1
Approach		1594	4.0	1678	4.0	0.878	26.8	LOS B	33.2	240.0	0.81	0.86	0.88	45.7
North: Woodville Road														
8	T1	1522	4.0	1602	4.0	0.593	6.9	LOS A	17.4	125.6	0.54	0.50	0.54	61.8
9	R2	340	4.0	358	4.0	* 0.849	50.2	LOS D	17.3	125.5	1.00	0.95	1.24	33.9
Approach		1862	4.0	1960	4.0	0.849	14.8	LOS B	17.4	125.6	0.62	0.58	0.67	53.7
West: RoadName														
10	L2	286	4.0	301	4.0	0.858	53.8	LOS D	18.4	133.0	1.00	0.97	1.26	33.2
12	R2	299	4.0	315	4.0	* 0.858	53.3	LOS D	18.4	133.0	1.00	0.97	1.32	32.2
Approach		585	4.0	616	4.0	0.858	53.6	LOS D	18.4	133.0	1.00	0.97	1.29	32.7
All Vehicles		4041	4.0	4254	4.0	0.878	25.1	LOS B	33.2	240.0	0.75	0.75	0.84	46.2

5.0 2030 AM Peak Background Growth With Development Intersection Performance Summary

5.1 Parramatta Road / Church Street / Woodville Road + Woodville Road / Crescent Street – 2030 With Development AM Peak



5.1.1 Parramatta Road / Church Street / Woodville Road 7.30-8.30 Intersection Performance Summary

MOVEMENT SUMMARY

Site: TCS84 [3.1.1 Woodville_Parramatta - 7.30-8.30 (Transport Upgrade) (Site Folder: General)]

Network: N101 [3.AM Woodville (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	848	14.0	848	14.0	0.718	20.9	LOS B	26.0	204.0	0.73	0.91	0.73	38.1
2	T1	813	2.4	813	2.4	0.329	12.6	LOS A	14.0	100.1	0.54	0.48	0.54	45.3
3	R2	858	8.4	858	8.4	* 0.793	68.1	LOS E	27.2	204.0	1.00	0.89	1.02	21.7
Approach		2519	8.4	2519	8.4	0.793	34.3	LOS C	27.2	204.0	0.76	0.76	0.77	31.6
East: Parramatta Road														
4	L2	412	11.1	412	11.1	0.777	47.4	LOS D	26.9	206.1	0.94	1.04	0.94	24.4
5	T1	748	11.1	748	11.1	* 0.777	50.7	LOS D	26.9	206.1	0.98	0.92	1.01	32.5
6	R2	525	4.6	525	4.6	0.777	58.3	LOS E	24.8	186.1	0.99	0.89	1.03	30.8
Approach		1685	9.1	1685	9.1	0.777	52.3	LOS D	26.9	206.1	0.97	0.94	1.00	30.5
North: Church Street														
7	L2	1049	7.0	1049	7.0	0.739	22.5	LOS B	20.0	148.3	0.61	0.76	0.61	43.3
8	T1	1281	6.5	1281	6.5	* 0.799	52.4	LOS D	28.0	206.7	0.99	0.91	1.04	22.5
Approach		2331	6.7	2331	6.7	0.799	38.9	LOS C	28.0	206.7	0.82	0.84	0.85	31.9
All Vehicles		6535	8.0	6535	8.0	0.799	40.6	LOS C	28.0	206.7	0.84	0.84	0.86	31.4

5.1.2 Woodville Road / Crescent Street 7.30-8.30 Intersection Performance Summary

MOVEMENT SUMMARY

Site: TCS1477 [3.2.0 Woodville_Crescent - 7.30-8.30 (Site Folder: General)]

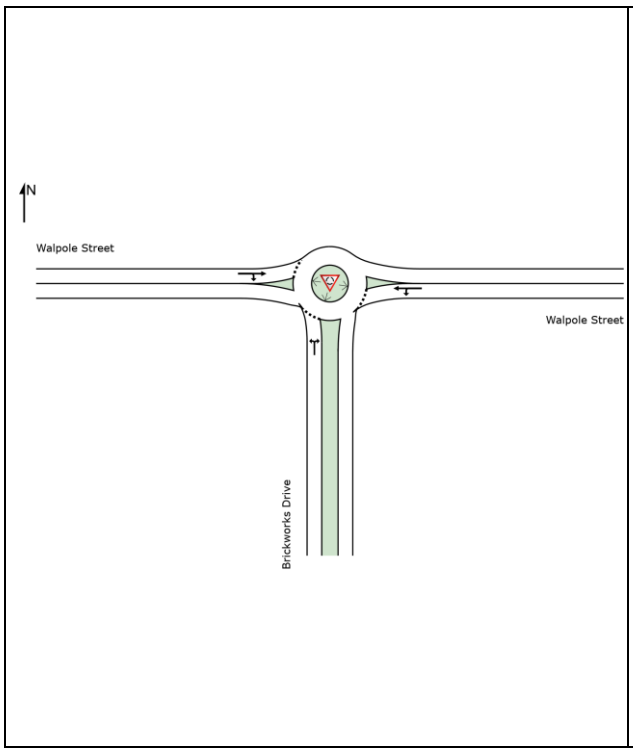
Network: N101 [3.AM Woodville (Network Folder: General)]

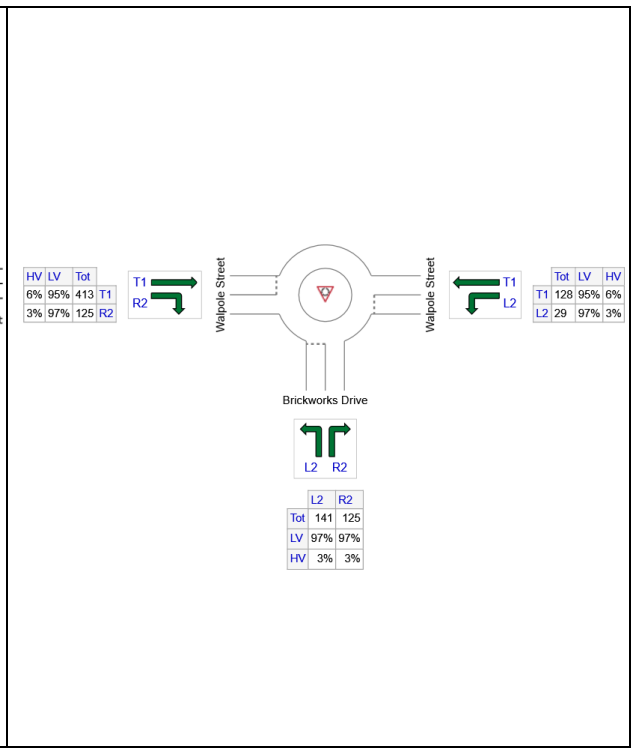
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	69	14.3	69	14.3	* 0.889	52.7	LOS D	37.8	283.5	0.94	1.00	1.12	31.6
2	T1	1894	7.3	1894	7.3	0.889	39.7	LOS C	60.9	453.1	0.94	0.96	1.05	26.2
Approach		1963	7.5	1963	7.5	0.889	40.2	LOS C	60.9	453.1	0.94	0.96	1.06	26.5
North: Woodville Road														
8	T1	1415	8.2	1415	8.2	0.279	0.2	LOS A	1.3	10.0	0.06	0.04	0.06	59.5
9	R2	304	5.9	304	5.9	0.520	65.1	LOS E	20.5	150.5	1.00	0.86	1.00	21.0
Approach		1719	7.8	1719	7.8	0.520	11.7	LOS A	20.5	150.5	0.23	0.19	0.23	44.9
West: Crescent Street														
10	L2	514	5.5	514	5.5	* 0.879	66.6	LOS E	20.3	148.4	0.89	0.96	1.18	17.9
Approach		514	5.5	514	5.5	0.879	66.6	LOS E	20.3	148.4	0.89	0.96	1.18	17.9
All Vehicles		4196	7.4	4196	7.4	0.889	31.7	LOS C	60.9	453.1	0.64	0.64	0.73	30.6

5.2 Walpole Street / Brickworks Drive 2030 With Development AM Peak





5.2.1 Walpole Street / Brickworks Drive AM Peak Intersection Performance Summary

MOVEMENT SUMMARY

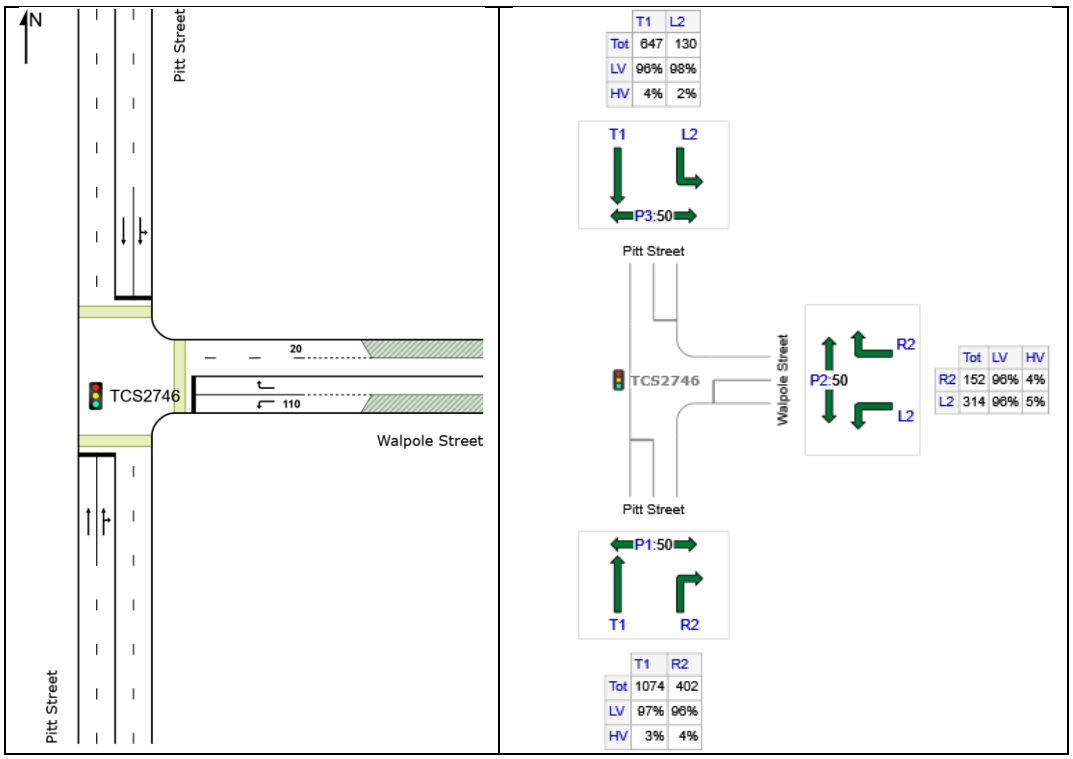
Site: [3.11 Walpole_Brickworks AM Peak (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Brickworks Drive														
1	L2	141	3.0	148	3.0	0.225	4.6	LOS A	1.2	8.8	0.32	0.58	0.32	48.4
3	R2	125	3.0	132	3.0	0.225	7.4	LOS A	1.2	8.8	0.32	0.58	0.32	48.7
Approach		266	3.0	280	3.0	0.225	5.9	LOS A	1.2	8.8	0.32	0.58	0.32	48.5
East: Walpole Street														
4	L2	29	3.0	31	3.0	0.134	5.4	LOS A	0.7	5.1	0.30	0.52	0.30	49.3
5	T1	128	5.5	135	5.5	0.134	5.3	LOS A	0.7	5.1	0.30	0.52	0.30	53.6
Approach		157	5.0	165	5.0	0.134	5.4	LOS A	0.7	5.1	0.30	0.52	0.30	52.7
West: Walpole Street														
11	T1	413	5.5	435	5.5	0.458	5.7	LOS A	3.3	23.8	0.41	0.57	0.41	52.8
12	R2	125	3.0	132	3.0	0.458	8.7	LOS A	3.3	23.8	0.41	0.57	0.41	49.1
Approach		538	4.9	566	4.9	0.458	6.4	LOS A	3.3	23.8	0.41	0.57	0.41	51.9
All Vehicles		961	4.4	1012	4.4	0.458	6.1	LOS A	3.3	23.8	0.37	0.56	0.37	51.0

5.3 Pitt Street / Walpole Street 2030 With Development AM Peak



5.3.1 Pitt Street / Walpole Street 8.00-9.00 Intersection Performance Summary

MOVEMENT SUMMARY

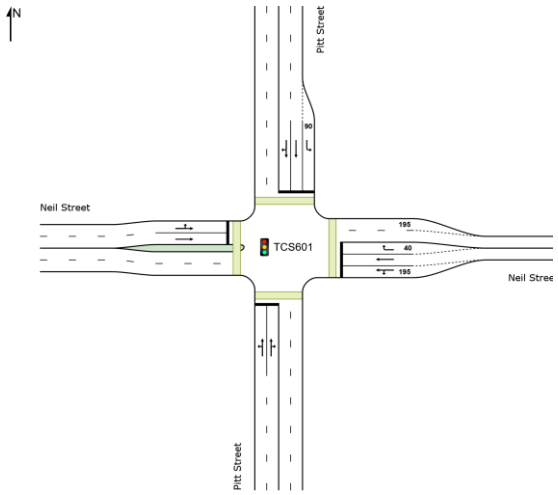
Site: TCS2746 [3.3.0 Pitt_Walpole - 8.00-9.00 (Site Folder: General)]

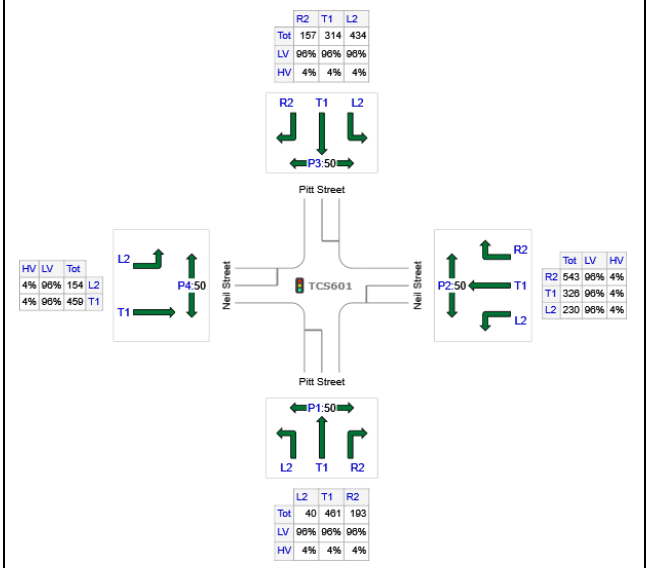
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pitt Street														
2	T1	1074	3.1	1131	3.1	0.811	11.7	LOS A	27.8	200.1	0.78	0.76	0.83	50.2
3	R2	402	4.1	423	4.1	* 0.811	33.3	LOS C	17.5	126.3	0.97	0.94	1.14	36.5
Approach		1476	3.4	1554	3.4	0.811	17.6	LOS B	27.8	200.1	0.83	0.81	0.92	45.5
East: Walpole Street														
4	L2	314	4.5	331	4.5	0.330	13.7	LOS A	6.1	44.5	0.58	0.72	0.58	41.8
6	R2	152	4.1	160	4.1	* 0.776	43.1	LOS D	6.0	43.6	1.00	0.91	1.28	34.5
Approach		466	4.4	491	4.4	0.776	23.3	LOS B	6.1	44.5	0.72	0.78	0.81	39.1
North: Pitt Street														
7	L2	130	2.0	137	2.0	* 0.812	37.5	LOS C	14.6	104.8	1.00	0.98	1.20	36.3
8	T1	647	3.9	681	3.9	0.812	30.9	LOS C	15.2	110.1	1.00	0.98	1.19	39.5
Approach		777	3.6	818	3.6	0.812	32.0	LOS C	15.2	110.1	1.00	0.98	1.19	38.9
All Vehicles		2719	3.6	2862	3.6	0.812	22.7	LOS B	27.8	200.1	0.86	0.85	0.98	42.3

5.4 Pitt Street / Neil Street 2030 With Development AM Peak





5.4.1 Pitt Street / Neil Street 8.00-9.00 Intersection Performance Summary

MOVEMENT SUMMARY

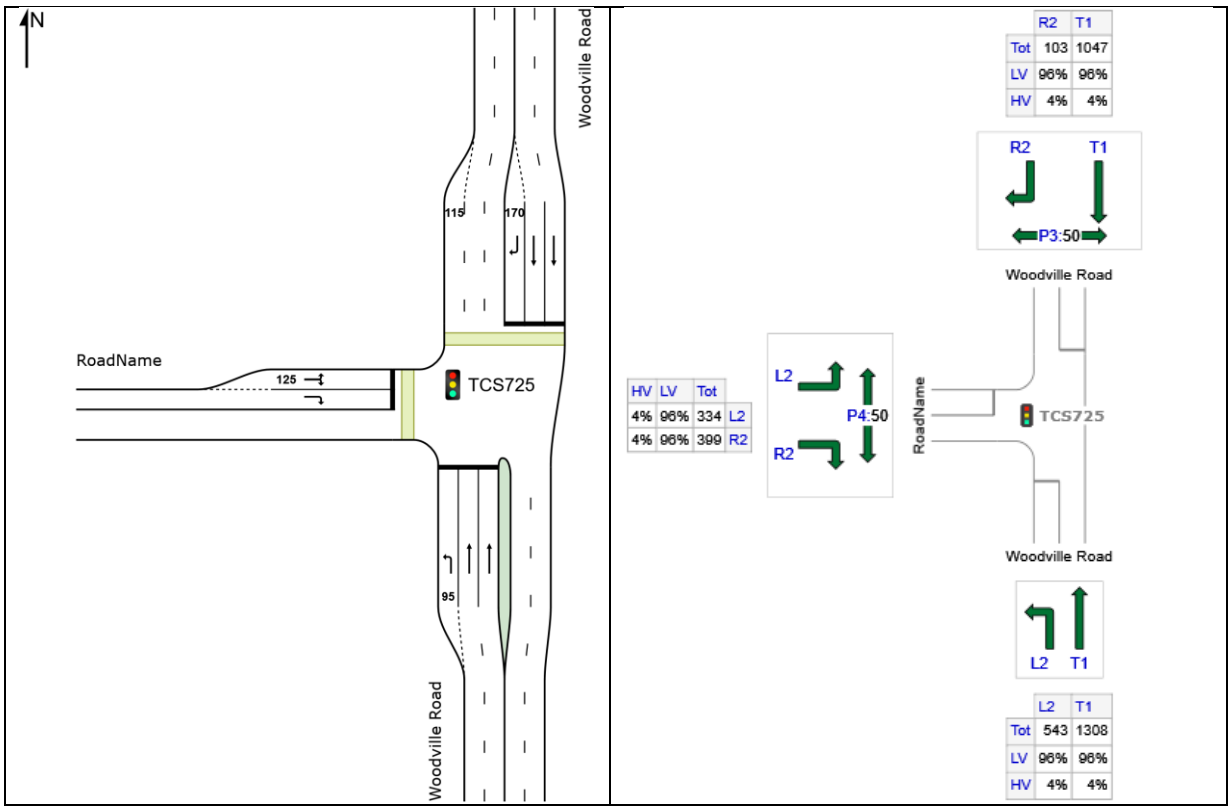
Site: TCS601 [3.4.0 Pitt_Neil - 8.00-9.00 (Do Nothing) (Site Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pitt Street														
1	L2	40	4.0	42	4.0	1.019	129.1	LOS F	38.5	279.0	1.00	1.29	1.59	15.2
2	T1	461	4.0	485	4.0	* 1.019	123.5	LOS F	38.5	279.0	1.00	1.27	1.59	19.6
3	R2	193	4.0	203	4.0	1.019	129.3	LOS F	38.3	276.9	1.00	1.21	1.59	19.2
Approach		694	4.0	731	4.0	1.019	125.4	LOS F	38.5	279.0	1.00	1.25	1.59	19.3
East: Neil Street														
4	L2	230	4.0	242	4.0	0.327	24.8	LOS B	12.8	92.6	0.58	0.69	0.58	42.4
5	T1	326	4.0	343	4.0	0.327	20.1	LOS B	12.8	92.6	0.58	0.55	0.58	40.4
6	R2	543	4.0	572	4.0	* 0.954	91.5	LOS F	48.2	349.2	1.00	1.18	1.29	23.8
Approach		1099	4.0	1157	4.0	0.954	56.4	LOS D	48.2	349.2	0.79	0.89	0.93	29.5
North: Pitt Street														
7	L2	434	4.0	457	4.0	0.566	22.4	LOS B	13.5	97.8	0.79	0.81	0.79	42.9
8	T1	314	4.0	331	4.0	0.829	72.1	LOS F	19.2	139.1	1.00	0.94	1.15	27.3
9	R2	157	4.0	165	4.0	0.829	77.9	LOS F	18.6	134.7	1.00	0.92	1.16	21.4
Approach		905	4.0	953	4.0	0.829	49.3	LOS D	19.2	139.1	0.90	0.87	0.98	32.0
West: Neil Street														
10	L2	154	4.0	162	4.0	* 0.956	98.5	LOS F	28.5	206.4	1.00	1.09	1.40	18.5
11	T1	459	4.0	483	4.0	0.956	94.3	LOS F	29.5	213.5	1.00	1.12	1.39	19.0
Approach		613	4.0	645	4.0	0.956	95.3	LOS F	29.5	213.5	1.00	1.11	1.40	18.8
All Vehicles		3311	4.0	3485	4.0	1.019	76.1	LOS F	48.2	349.2	0.90	1.00	1.17	25.0

5.5 Merrylands Road / Woodville Road 2030 With Development AM Peak



5.5.1 Merrylands Road / Woodville Road 8.00-9.00 Intersection Performance Summary

MOVEMENT SUMMARY

Site: TCS725 [3.5 Merrylands_Woodville - 8.00-9.00 (Site Folder: General)]

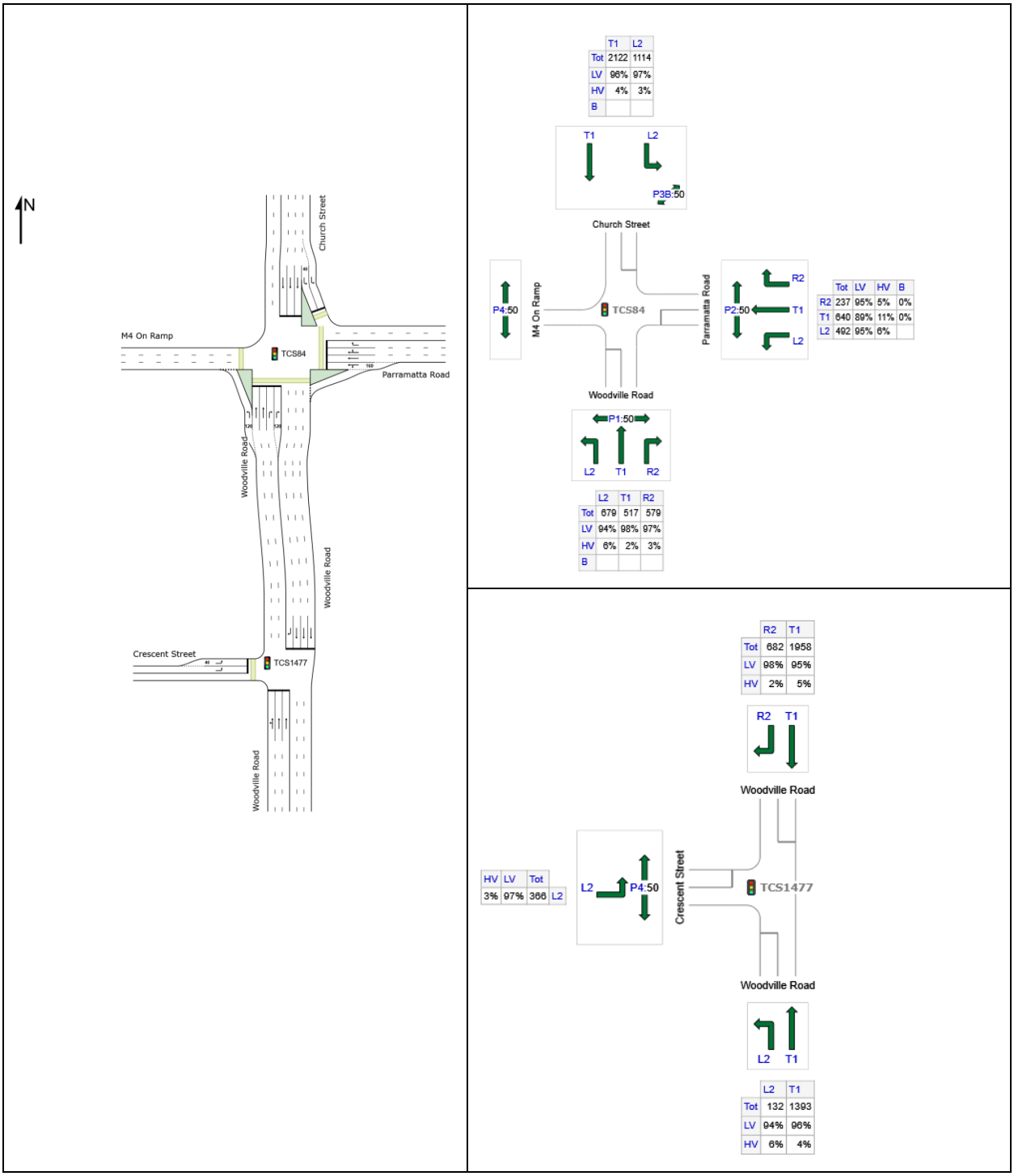
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 115 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	543	4.0	572	4.0	0.391	9.7	LOS A	8.8	63.5	0.30	0.70	0.30	53.7
2	T1	1308	4.0	1377	4.0	* 0.856	34.5	LOS C	44.1	319.2	0.85	0.80	0.89	46.8
Approach		1851	4.0	1948	4.0	0.856	27.2	LOS B	44.1	319.2	0.69	0.77	0.71	48.7
North: Woodville Road														
8	T1	1047	4.0	1102	4.0	0.439	9.8	LOS A	14.5	104.9	0.52	0.46	0.52	58.9
9	R2	103	4.0	108	4.0	0.691	65.5	LOS E	6.3	45.8	1.00	0.83	1.11	29.7
Approach		1150	4.0	1211	4.0	0.691	14.8	LOS B	14.5	104.9	0.56	0.50	0.57	54.1
West: RoadName														
10	L2	334	4.0	352	4.0	* 0.804	71.9	LOS F	23.8	172.2	0.99	0.91	1.07	33.3
12	R2	399	4.0	420	4.0	0.804	53.9	LOS D	23.8	172.2	1.00	0.91	1.11	32.1
Approach		733	4.0	772	4.0	0.804	62.1	LOS E	23.8	172.2	0.99	0.91	1.09	32.6
All Vehicles		3734	4.0	3931	4.0	0.856	30.3	LOS C	44.1	319.2	0.71	0.71	0.74	45.7

6.0 2030 PM Peak Background Growth With Development Intersection Performance Summary

6.1 Parramatta Road / Church Street / Woodville Road + Woodville Road / Crescent Street – 2030 With Development PM Peak



6.1.1 Parramatta Road / Church Street / Woodville Road 17.00-18.00 Intersection Performance Summary

MOVEMENT SUMMARY

Site: TCS84 [3.6.1 Woodville_Parramatta - 17.00-18.00 (Transport Upgrade) (Site Folder: General)]

Network: N101 [3.PM Woodville (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	715	5.7	715	5.7	0.534	12.7	LOS A	12.4	91.1	0.38	0.74	0.38	44.3
2	T1	544	2.1	544	2.1	0.200	5.7	LOS A	4.6	32.9	0.25	0.22	0.25	52.3
3	R2	609	2.9	609	2.9	* 0.837	80.6	LOS F	21.8	156.1	1.00	0.89	1.08	19.5
Approach		1868	3.7	1868	3.7	0.837	32.8	LOS C	21.8	156.1	0.55	0.64	0.57	32.3
East: Parramatta Road														
4	L2	518	5.5	518	5.5	0.838	56.6	LOS E	33.1	243.1	0.98	1.09	1.05	21.6
5	T1	674	11.1	674	11.1	* 0.838	63.3	LOS E	33.1	243.1	1.00	0.97	1.14	29.6
6	R2	249	4.6	249	4.6	0.670	61.2	LOS E	15.8	115.2	0.98	0.84	0.98	29.9
Approach		1441	8.0	1441	8.0	0.838	60.5	LOS E	33.1	243.1	0.99	0.99	1.08	27.4
North: Church Street														
7	L2	1173	3.3	1173	3.3	0.603	14.5	LOS B	16.5	118.7	0.46	0.71	0.46	47.9
8	T1	2234	3.7	2234	3.7	* 0.842	37.4	LOS C	45.7	330.4	0.95	0.89	0.98	27.4
Approach		3406	3.6	3406	3.6	0.842	29.5	LOS C	45.7	330.4	0.78	0.83	0.80	35.0
All Vehicles		6716	4.6	6716	4.6	0.842	37.1	LOS C	45.7	330.4	0.76	0.81	0.80	32.0

6.1.2 2030 With Development Woodville Road / Crescent Street 17.00-18.00 Intersection Performance

MOVEMENT SUMMARY

Site: TCS1477 [3.7.0 Woodville_Crescent - 17.00-18.00 (Site Folder: General)]

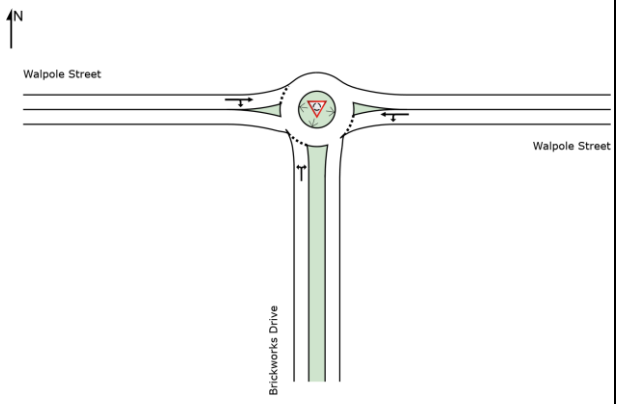
Network: N101 [3.PM Woodville (Network Folder: General)]

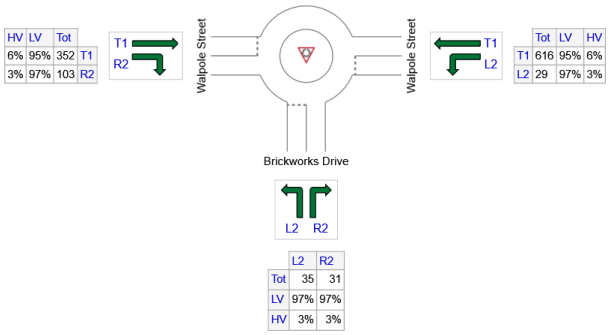
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	139	5.6	139	5.6	* 0.763	43.6	LOS D	33.3	241.8	0.93	0.84	0.93	34.1
2	T1	1466	3.9	1466	3.9	0.763	38.4	LOS C	34.3	248.3	0.93	0.84	0.93	26.6
Approach		1605	4.0	1605	4.0	0.763	38.8	LOS C	34.3	248.3	0.93	0.84	0.93	27.5
North: Woodville Road														
8	T1	2061	4.6	2061	4.6	0.397	0.4	LOS A	3.1	22.7	0.13	0.08	0.13	59.0
9	R2	718	1.7	718	1.7	* 0.771	59.6	LOS E	28.7	204.0	1.00	0.91	1.00	22.1
Approach		2779	3.9	2779	3.9	0.771	15.7	LOS B	28.7	204.0	0.36	0.30	0.36	41.2
West: Crescent Street														
10	L2	385	3.3	385	3.3	0.209	24.6	LOS B	7.1	51.1	0.59	0.71	0.59	30.1
Approach		385	3.3	385	3.3	0.209	24.6	LOS B	7.1	51.1	0.59	0.71	0.59	30.1
All Vehicles		4769	3.9	4769	3.9	0.771	24.2	LOS B	34.3	248.3	0.57	0.51	0.57	34.9

6.2 Walpole Street / Brickworks Drive 2030 With Development PM Peak





6.2.1 Walpole Street / Brickworks Drive PM Peak Intersection Performance Summary

MOVEMENT SUMMARY

Site: [3.12 Walpole_Brickworks PM Peak (Site Folder: General)]

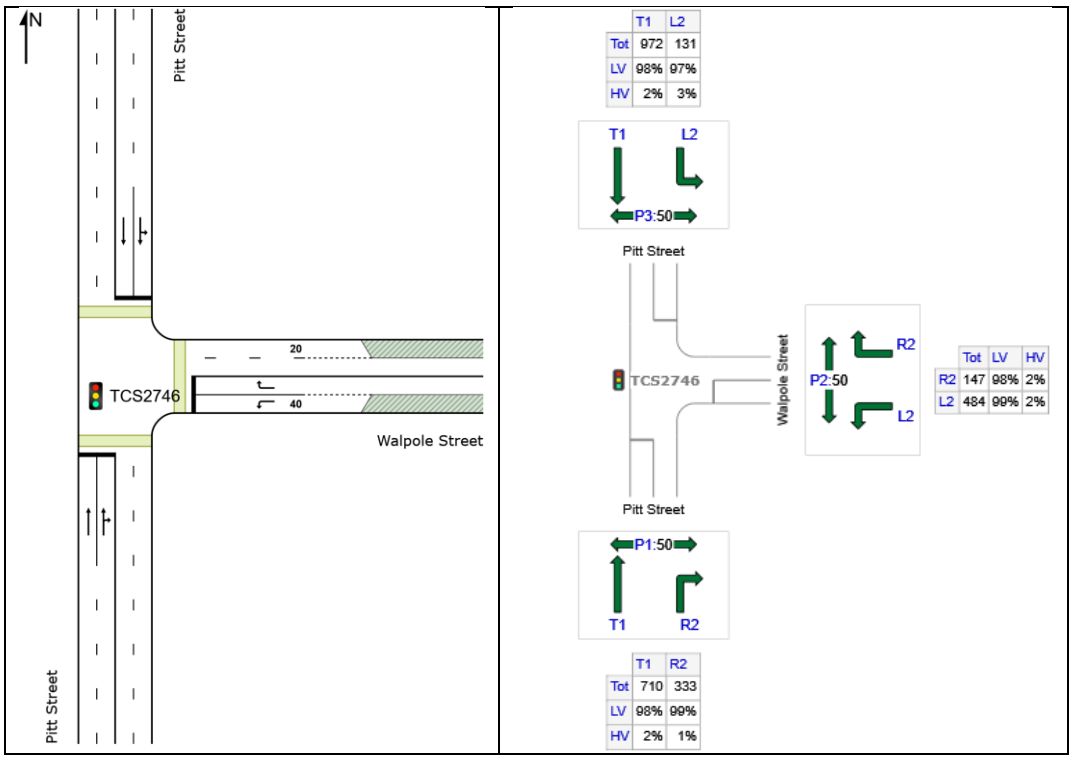
New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Brickworks Drive														
1	L2	35	3.0	37	3.0	0.101	8.3	LOS A	0.6	4.2	0.70	0.75	0.70	46.4
3	R2	31	3.0	33	3.0	0.101	11.1	LOS A	0.6	4.2	0.70	0.75	0.70	46.7
Approach		66	3.0	69	3.0	0.101	9.6	LOS A	0.6	4.2	0.70	0.75	0.70	46.5
East: Walpole Street														
4	L2	29	3.0	31	3.0	0.539	5.7	LOS A	4.2	30.7	0.41	0.53	0.41	49.0
5	T1	616	5.5	648	5.5	0.539	5.6	LOS A	4.2	30.7	0.41	0.53	0.41	53.2
Approach		645	5.4	679	5.4	0.539	5.6	LOS A	4.2	30.7	0.41	0.53	0.41	53.0
West: Walpole Street														
11	T1	352	5.5	371	5.5	0.354	4.9	LOS A	2.5	18.6	0.19	0.52	0.19	53.5
12	R2	103	3.0	108	3.0	0.354	8.0	LOS A	2.5	18.6	0.19	0.52	0.19	49.7
Approach		455	4.9	479	4.9	0.354	5.6	LOS A	2.5	18.6	0.19	0.52	0.19	52.6
All Vehicles		1166	5.1	1227	5.1	0.539	5.8	LOS A	4.2	30.7	0.34	0.53	0.34	52.4

6.3

6.4 Pitt Street / Walpole Street 2030 With Development PM Peak



6.4.1 Pitt Street / Walpole Street 17.00-18.00 Intersection Performance Summary

MOVEMENT SUMMARY

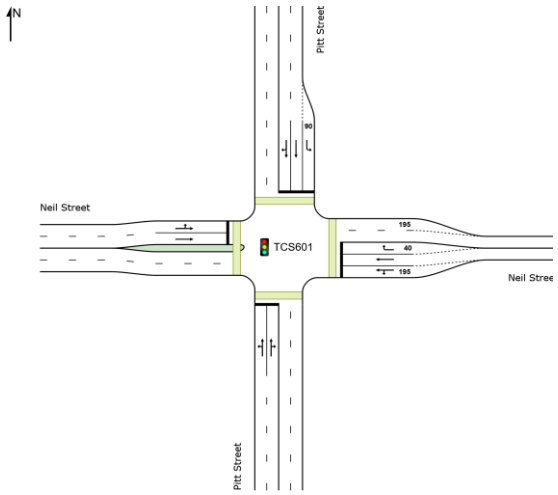
Site: TCS2746 [3.8.0 Pitt_Walpole - 17.00-18.00 (Site Folder: General)]

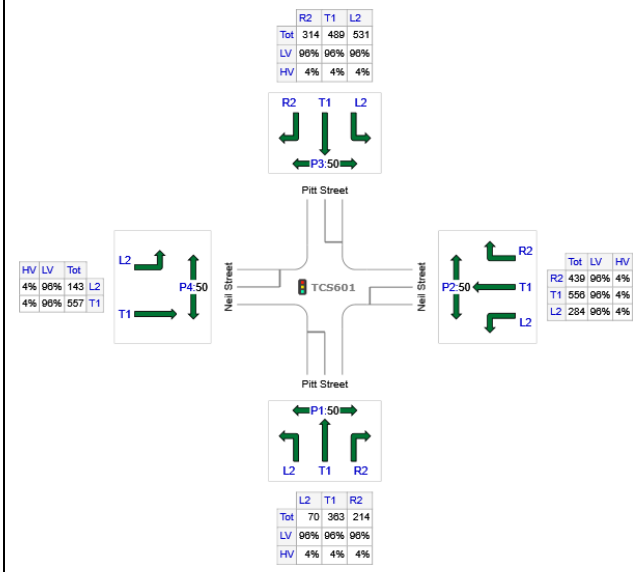
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 66 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pitt Street														
2	T1	710	1.9	747	1.9	0.545	4.8	LOS A	11.3	80.3	0.51	0.46	0.51	55.6
3	R2	333	0.9	351	0.9	* 0.964	60.8	LOS E	16.9	118.9	1.00	1.19	1.84	28.5
Approach		1043	1.6	1098	1.6	0.964	22.7	LOS B	16.9	118.9	0.67	0.69	0.93	42.6
East: Walpole Street														
4	L2	484	1.5	509	1.5	0.761	23.7	LOS B	14.4	102.2	0.85	0.87	0.95	39.5
6	R2	147	2.0	155	2.0	* 0.697	37.9	LOS C	5.3	37.6	1.00	0.87	1.16	34.2
Approach		631	1.6	664	1.6	0.761	27.0	LOS B	14.4	102.2	0.89	0.87	1.00	38.1
North: Pitt Street														
7	L2	131	3.3	138	3.3	* 0.723	24.3	LOS B	16.0	114.0	0.89	0.83	0.92	42.0
8	T1	972	2.1	1023	2.1	0.723	18.0	LOS B	16.4	116.8	0.89	0.82	0.92	46.0
Approach		1103	2.2	1161	2.2	0.723	18.7	LOS B	16.4	116.8	0.89	0.82	0.92	45.5
All Vehicles		2777	1.9	2923	1.9	0.964	22.1	LOS B	16.9	118.9	0.81	0.78	0.94	42.5

6.5 Pitt Street / Neil Street 2030 With Development AM Peak





6.5.1 Pitt Street / Neil Street 8.00-9.00 Intersection Performance Summary

MOVEMENT SUMMARY

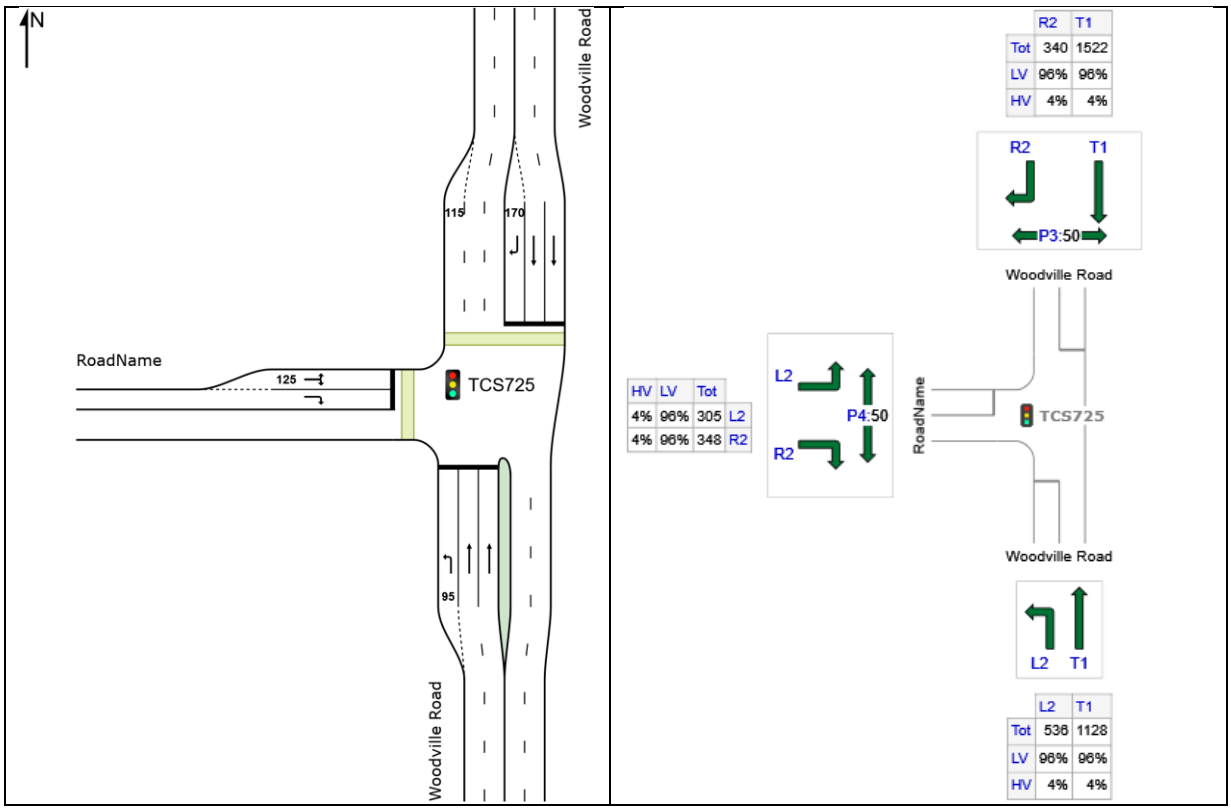
Site: TCS601 [3.9.0 Pitt_Neil - 16.00-17.00 (Do Nothing) (Site Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pitt Street														
1	L2	70	4.0	74	4.0	1.033	138.4	LOS F	36.9	266.9	1.00	1.32	1.66	14.3
2	T1	363	4.0	382	4.0	* 1.033	132.8	LOS F	37.1	268.5	1.00	1.29	1.66	18.5
3	R2	214	4.0	225	4.0	1.033	138.3	LOS F	37.1	268.5	1.00	1.22	1.65	18.2
Approach		647	4.0	681	4.0	1.033	135.2	LOS F	37.1	268.5	1.00	1.27	1.65	18.0
East: Neil Street														
4	L2	284	4.0	299	4.0	0.654	37.5	LOS C	30.8	222.7	0.82	0.80	0.82	37.4
5	T1	556	4.0	585	4.0	0.654	29.7	LOS C	30.8	222.7	0.75	0.69	0.75	35.0
6	R2	439	4.0	462	4.0	* 0.976	107.3	LOS F	40.4	292.1	1.00	1.24	1.40	21.6
Approach		1279	4.0	1346	4.0	0.976	58.1	LOS E	40.4	292.1	0.85	0.90	0.99	28.5
North: Pitt Street														
7	L2	531	4.0	559	4.0	0.683	23.2	LOS B	16.8	121.4	0.85	0.84	0.85	42.5
8	T1	489	4.0	515	4.0	1.056	147.2	LOS F	53.9	390.0	1.00	1.36	1.72	17.3
9	R2	314	4.0	331	4.0	1.056	150.4	LOS F	53.9	390.0	1.00	1.24	1.70	13.2
Approach		1334	4.0	1404	4.0	1.056	98.6	LOS F	53.9	390.0	0.94	1.13	1.37	21.5
West: Neil Street														
10	L2	143	4.0	151	4.0	* 1.050	147.9	LOS F	41.1	297.6	1.00	1.31	1.71	13.5
11	T1	557	4.0	586	4.0	1.050	144.3	LOS F	42.0	303.9	1.00	1.35	1.70	13.7
Approach		700	4.0	737	4.0	1.050	145.0	LOS F	42.0	303.9	1.00	1.34	1.70	13.7
All Vehicles		3960	4.0	4168	4.0	1.056	99.7	LOS F	53.9	390.0	0.93	1.11	1.35	20.7

6.6 Merrylands Road / Woodville Road 2030 With Development PM Peak



6.6.1 Merrylands Road / Woodville Road 16.00-17.00 Intersection Performance Summary

MOVEMENT SUMMARY

Site: TCS725 [3.10 Merrylands_Woodville - 16.00-17.00 (Site Folder: General)]

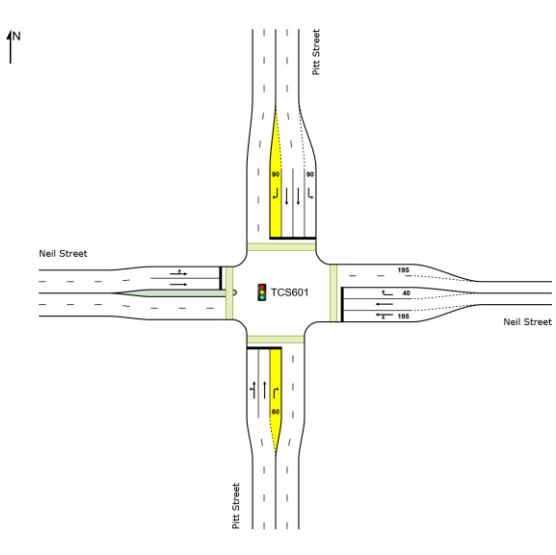
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

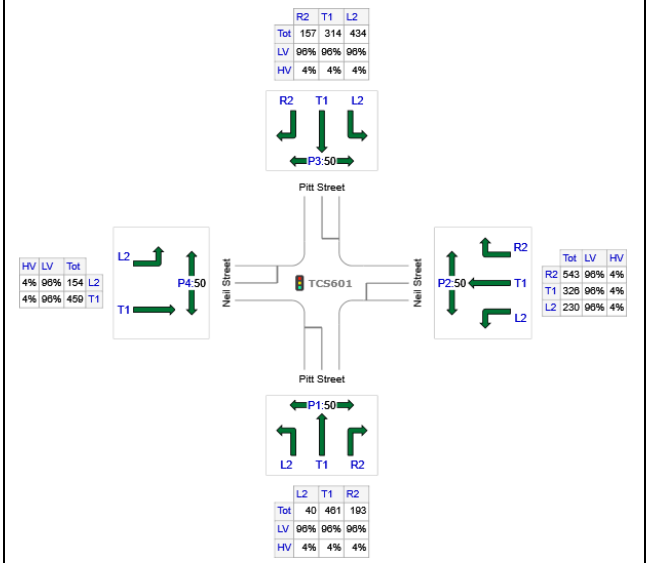
Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	536	4.0	564	4.0	0.463	16.1	LOS B	15.3	110.9	0.51	0.76	0.51	49.1
2	T1	1128	4.0	1187	4.0	* 0.872	36.8	LOS C	43.2	312.5	0.91	0.87	0.97	42.0
Approach		1664	4.0	1752	4.0	0.872	30.2	LOS C	43.2	312.5	0.78	0.83	0.82	44.1
North: Woodville Road														
8	T1	1522	4.0	1602	4.0	0.588	8.8	LOS A	22.5	162.9	0.53	0.49	0.53	59.9
9	R2	340	4.0	358	4.0	* 0.881	66.4	LOS E	23.4	169.3	1.00	0.95	1.24	29.5
Approach		1862	4.0	1960	4.0	0.881	19.3	LOS B	23.4	169.3	0.62	0.58	0.66	50.4
West: RoadName														
10	L2	305	4.0	321	4.0	0.876	67.9	LOS E	25.7	185.8	1.00	0.96	1.21	29.8
12	R2	348	4.0	366	4.0	* 0.876	66.8	LOS E	25.7	185.8	1.00	0.96	1.26	28.8
Approach		653	4.0	687	4.0	0.876	67.3	LOS E	25.7	185.8	1.00	0.96	1.24	29.3
All Vehicles		4179	4.0	4399	4.0	0.881	31.1	LOS C	43.2	312.5	0.74	0.74	0.82	43.1

7.0 2030 AM Peak Background Growth With Development And Mitigation Intersection Performance Summary

7.1 Pitt Street / Neil Street 2030 With Development AM Peak (With Mitigation Measures)





7.1.1 Pitt Street / Neil Street 8.00-9.00 Intersection Performance Summary (With Mitigation Measures)

MOVEMENT SUMMARY

Site: TCS601 [3.4.1 Pitt_Neil - 8.00-9.00 (Upgrade) (Site Folder: General)]

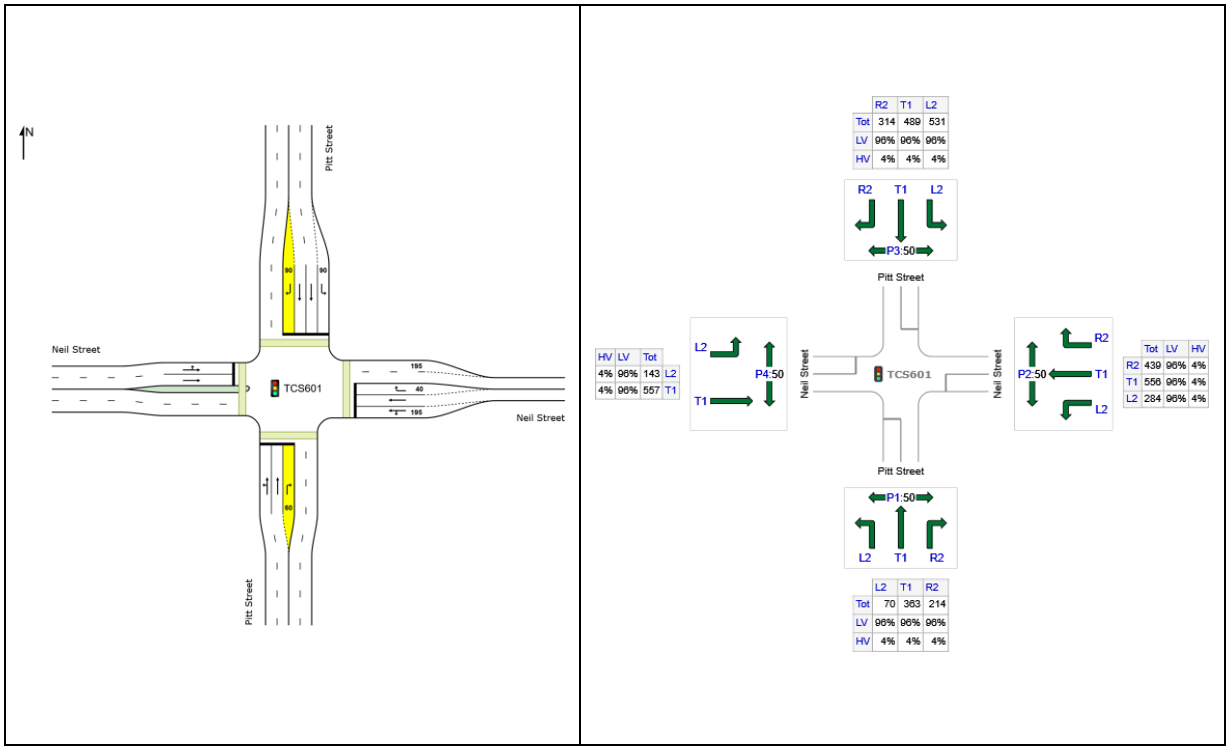
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pitt Street														
1	L2	40	4.0	42	4.0	* 0.877	81.6	LOS F	22.4	161.9	1.00	1.00	1.22	21.3
2	T1	461	4.0	485	4.0	0.877	75.6	LOS F	22.4	161.9	1.00	1.00	1.23	26.8
3	R2	193	4.0	203	4.0	0.844	82.2	LOS F	15.9	114.9	1.00	0.92	1.21	25.3
Approach		694	4.0	731	4.0	0.877	77.8	LOS F	22.4	161.9	1.00	0.98	1.22	26.1
East: Neil Street														
4	L2	230	4.0	242	4.0	0.281	19.8	LOS B	10.2	74.2	0.50	0.67	0.50	44.9
5	T1	326	4.0	343	4.0	0.281	16.3	LOS B	10.2	74.2	0.53	0.50	0.53	43.1
6	R2	543	4.0	572	4.0	* 0.853	61.2	LOS E	36.1	261.6	0.99	1.10	1.06	29.7
Approach		1099	4.0	1157	4.0	0.853	39.2	LOS C	36.1	261.6	0.75	0.83	0.78	34.9
North: Pitt Street														
7	L2	434	4.0	457	4.0	0.520	20.0	LOS B	12.5	90.2	0.74	0.80	0.74	44.1
8	T1	314	4.0	331	4.0	0.502	60.9	LOS E	11.0	79.9	0.96	0.78	0.96	30.1
9	R2	157	4.0	165	4.0	0.686	74.5	LOS F	11.9	86.1	1.00	0.83	1.04	21.6
Approach		905	4.0	953	4.0	0.686	43.6	LOS D	12.5	90.2	0.86	0.80	0.86	33.8
West: Neil Street														
10	L2	154	4.0	162	4.0	* 0.816	61.3	LOS E	20.3	147.1	1.00	1.00	1.09	25.1
11	T1	459	4.0	483	4.0	* 0.816	63.9	LOS E	23.0	166.2	1.00	0.96	1.10	24.4
Approach		613	4.0	645	4.0	0.816	63.3	LOS E	23.0	166.2	1.00	0.97	1.10	24.6
All Vehicles		3311	4.0	3485	4.0	0.877	53.0	LOS D	36.1	261.6	0.88	0.88	0.96	30.4

8.0 2030 PM Peak Background Growth With Development And Mitigation Intersection Performance Summary

8.1 Pitt Street / Neil Street 2030 With Development PM Peak (With Mitigation Measures)



8.1.1 Pitt Street / Neil Street 16.00-17.00 Intersection Performance Summary (With Mitigation Measures)

MOVEMENT SUMMARY

Site: TCS601 [3.9.1 Pitt_Neil - 16.00-17.00 (Upgrade) (Site Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Pitt Street														
1	L2	70	4.0	74	4.0	0.834	66.9	LOS E	13.7	99.4	1.00	0.96	1.22	23.9
2	T1	363	4.0	382	4.0	0.834	60.7	LOS E	14.9	107.8	1.00	0.96	1.22	29.9
3	R2	214	4.0	225	4.0	0.624	53.6	LOS D	12.2	88.7	0.97	0.83	0.97	31.5
Approach		647	4.0	681	4.0	0.834	59.0	LOS E	14.9	107.8	0.99	0.91	1.13	29.9
East: Neil Street														
4	L2	284	4.0	299	4.0	0.587	27.0	LOS B	21.9	158.9	0.75	0.75	0.75	41.9
5	T1	556	4.0	585	4.0	0.587	20.2	LOS B	21.9	158.9	0.69	0.64	0.69	40.2
6	R2	439	4.0	462	4.0	* 0.966	89.3	LOS F	32.2	233.3	1.00	1.26	1.46	24.2
Approach		1279	4.0	1346	4.0	0.966	45.4	LOS D	32.2	233.3	0.81	0.88	0.97	32.2
North: Pitt Street														
7	L2	531	4.0	559	4.0	* 0.884	40.0	LOS C	22.7	164.4	1.00	0.97	1.17	35.6
8	T1	489	4.0	515	4.0	0.903	68.1	LOS E	17.4	126.1	1.00	1.05	1.36	28.4
9	R2	314	4.0	331	4.0	0.915	73.4	LOS F	22.9	166.1	1.00	1.00	1.35	21.8
Approach		1334	4.0	1404	4.0	0.915	58.1	LOS E	22.9	166.1	1.00	1.00	1.28	29.3
West: Neil Street														
10	L2	143	4.0	151	4.0	* 0.872	63.0	LOS E	22.3	161.1	1.00	1.05	1.22	24.8
11	T1	557	4.0	586	4.0	* 0.872	60.1	LOS E	23.9	173.0	1.00	1.03	1.22	25.6
Approach		700	4.0	737	4.0	0.872	60.7	LOS E	23.9	173.0	1.00	1.03	1.22	25.4
All Vehicles		3960	4.0	4168	4.0	0.966	54.6	LOS D	32.2	233.3	0.94	0.95	1.14	29.6

1 Crescent Street, Holroyd - Planning Proposal Community Survey

Thursday, September 10, 2020

272

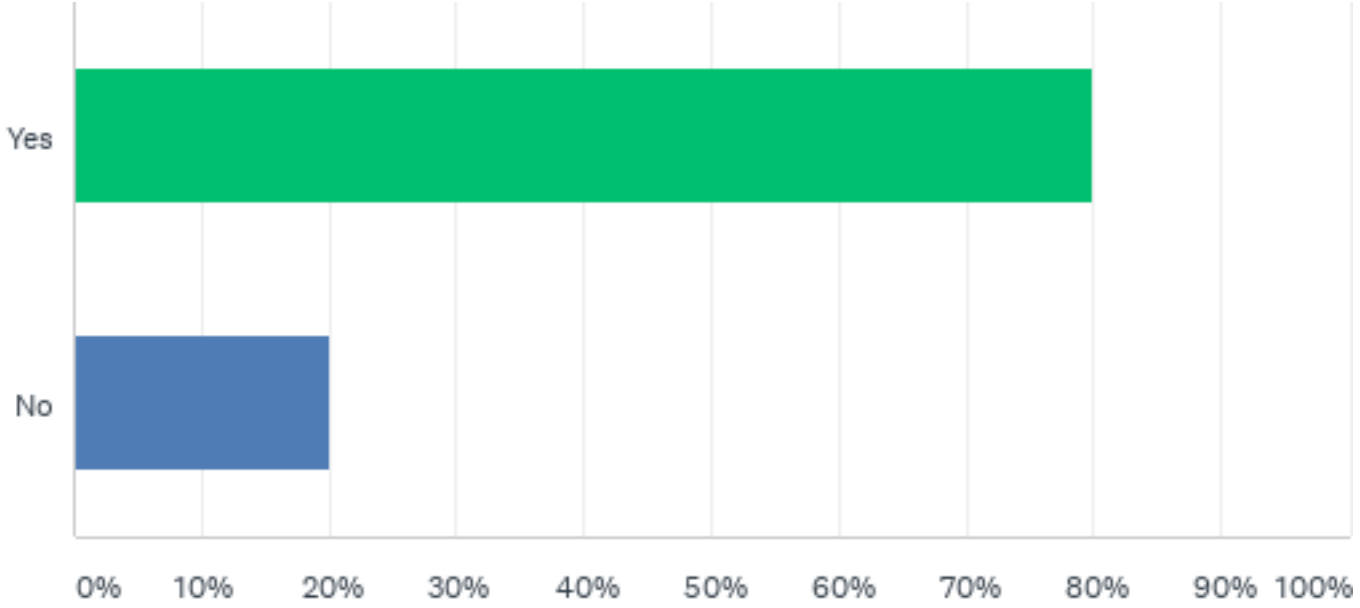
Total Responses

Date Created: Thursday, August 27, 2020

Complete Responses: 272

Q1: Are you aware of the Planning Proposal at 1 Crescent Street Holroyd?

Answered: 270 Skipped: 2



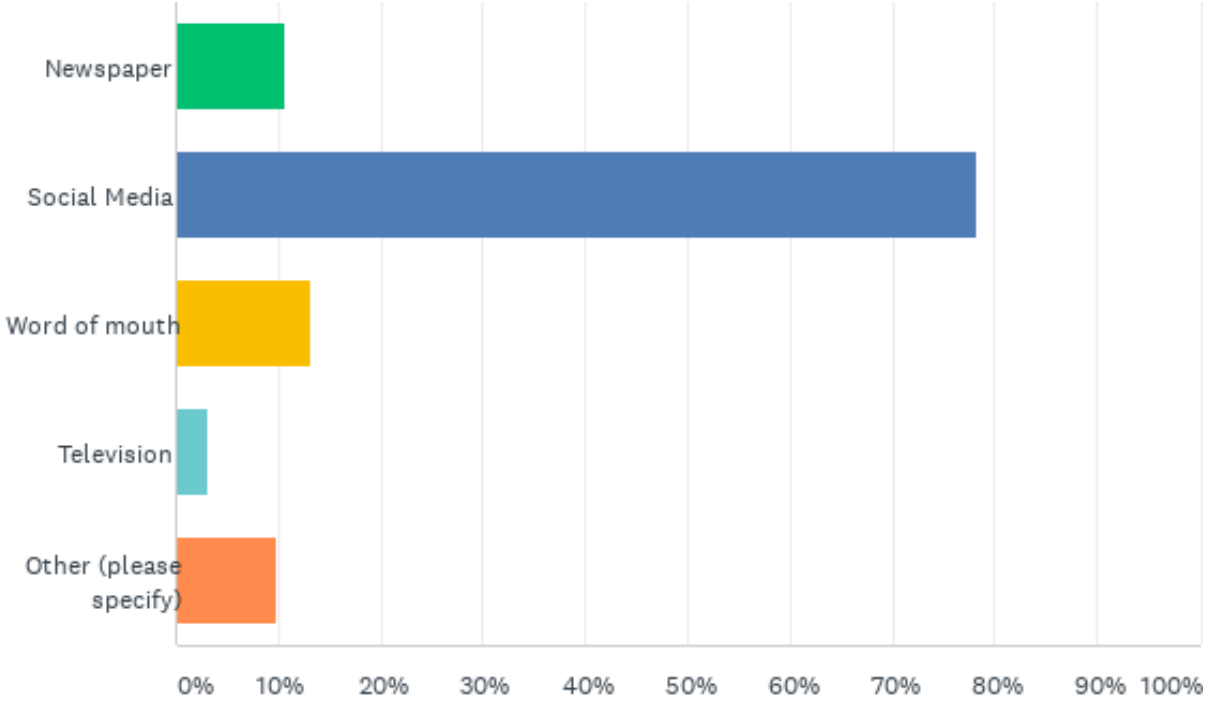
Q1: Are you aware of the Planning Proposal at 1 Crescent Street Holroyd?

Answered: 270 Skipped: 2

ANSWER CHOICES	RESPONSES	
Yes	80.00%	216
No	20.00%	54
TOTAL		270

Q2: If yes, how did you hear about it?

Answered: 252 Skipped: 20



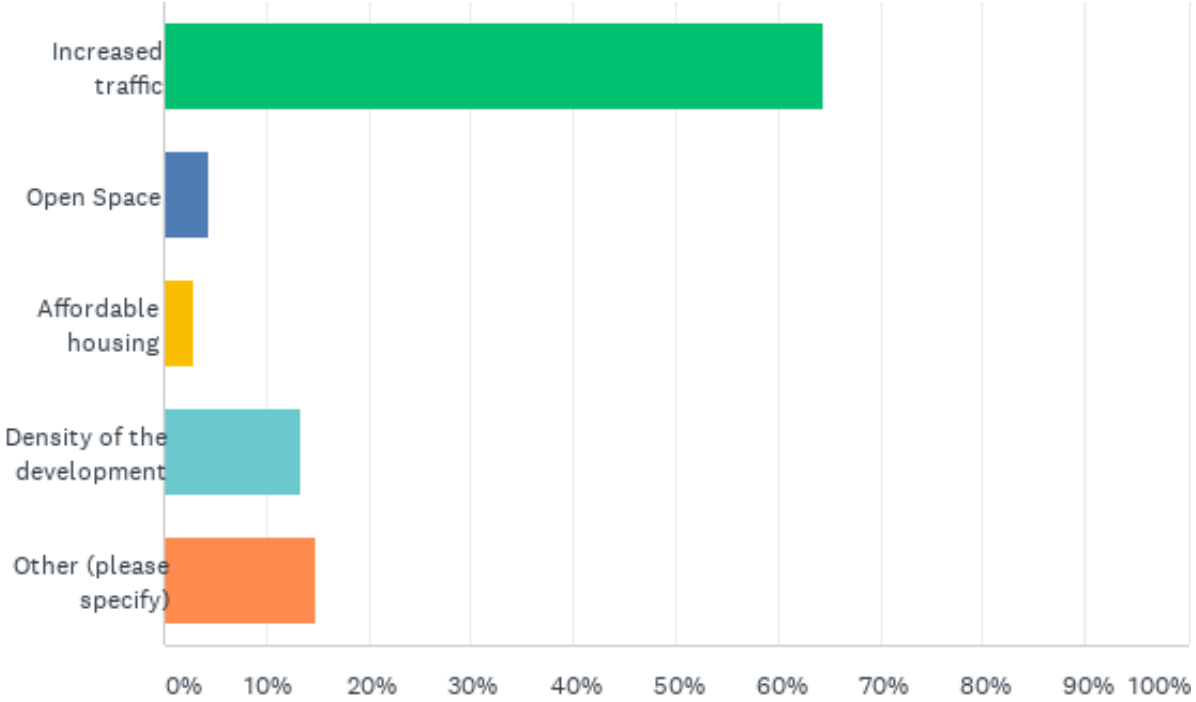
Q2: If yes, how did you hear about it?

Answered: 252 Skipped: 20

ANSWER CHOICES	RESPONSES	
Newspaper	10.71%	27
Social Media	78.17%	197
Word of mouth	13.10%	33
Television	3.17%	8
Other (please specify)	9.92%	25
Total Respondents: 252		

Q3: What do you believe will be the main impacts on the community from this development going ahead?

Answered: 270 Skipped: 2



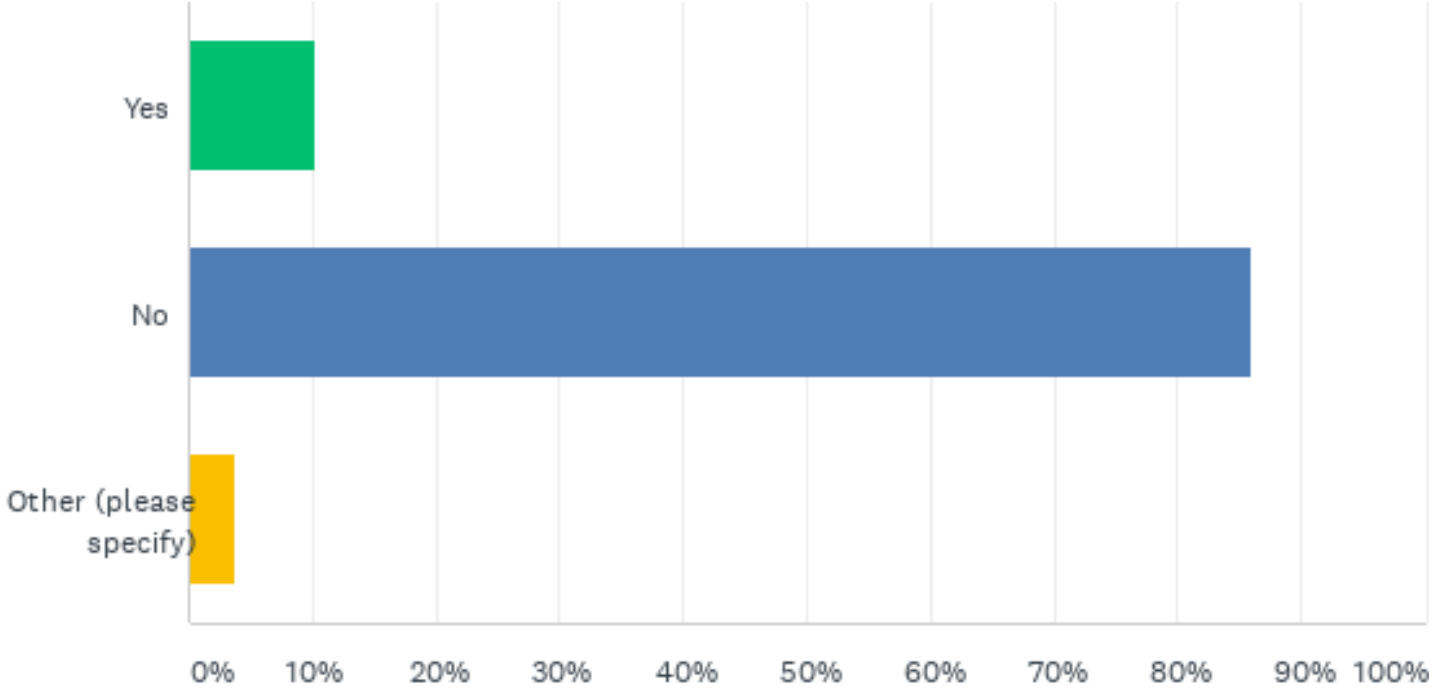
Q3: What do you believe will be the main impacts on the community from this development going ahead?

Answered: 270 Skipped: 2

ANSWER CHOICES	RESPONSES	
Increased traffic	64.44%	174
Open Space	4.44%	12
Affordable housing	2.96%	8
Density of the development	13.33%	36
Other (please specify)	14.81%	40
TOTAL		270

Q4: Should Council or the State Government support this proposal?

Answered: 272 Skipped: 0



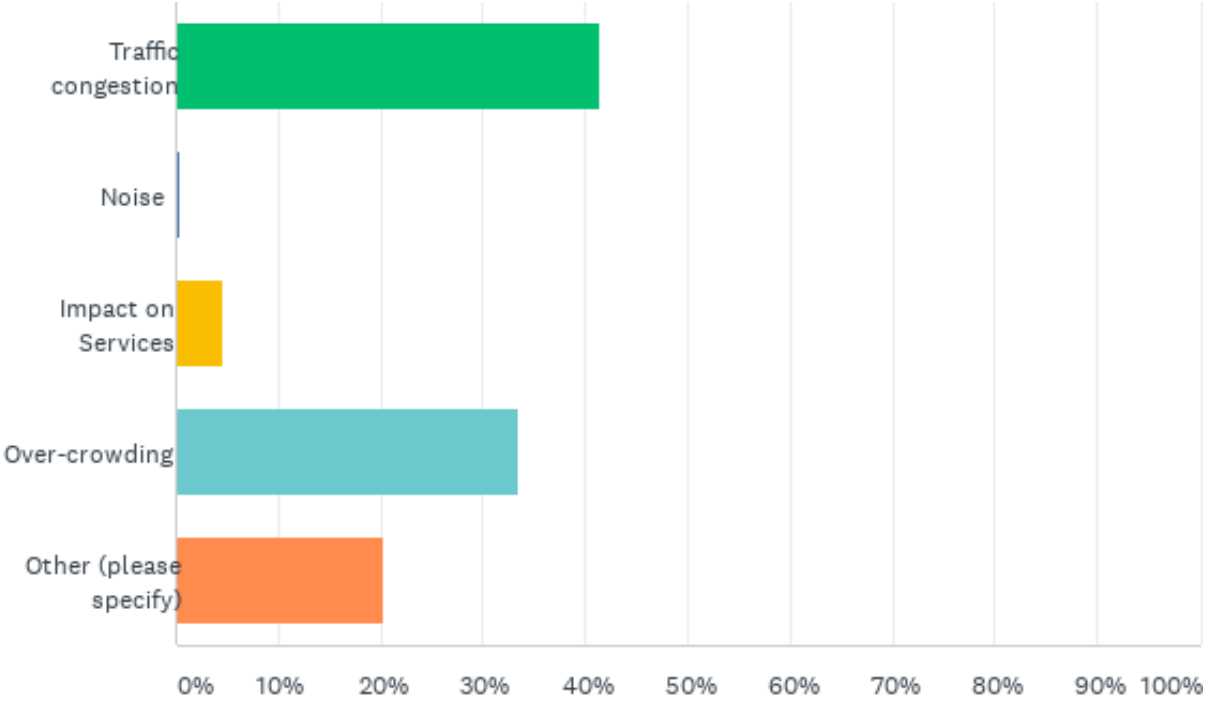
Q4: Should Council or the State Government support this proposal?

Answered: 272 Skipped: 0

ANSWER CHOICES	RESPONSES	
Yes	10.29%	28
No	86.03%	234
Other (please specify)	3.68%	10
TOTAL		272

Q5: What are your major concerns with new developments such as this in the area?

Answered: 266 Skipped: 6



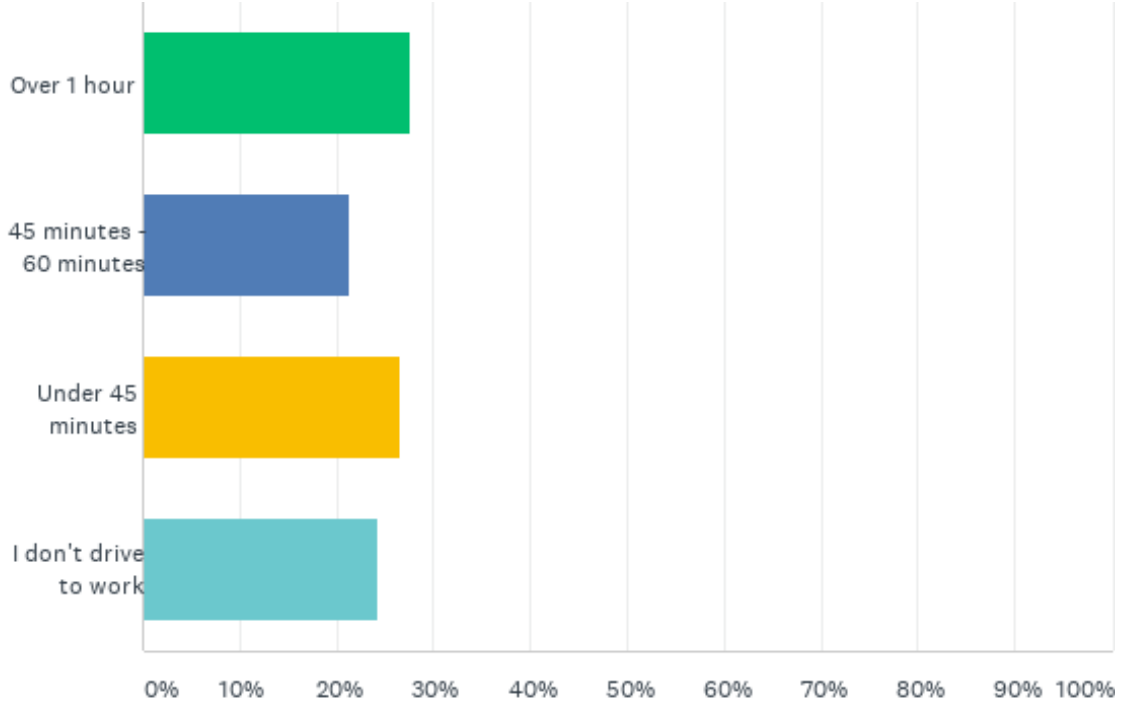
Q5: What are your major concerns with new developments such as this in the area?

Answered: 266 Skipped: 6

ANSWER CHOICES	RESPONSES	
Traffic congestion	41.35%	110
Noise	0.38%	1
Impact on Services	4.51%	12
Over-crowding	33.46%	89
Other (please specify)	20.30%	54
TOTAL		266

Q6: How long do you spend in your car travelling to work?

Answered: 271 Skipped: 1



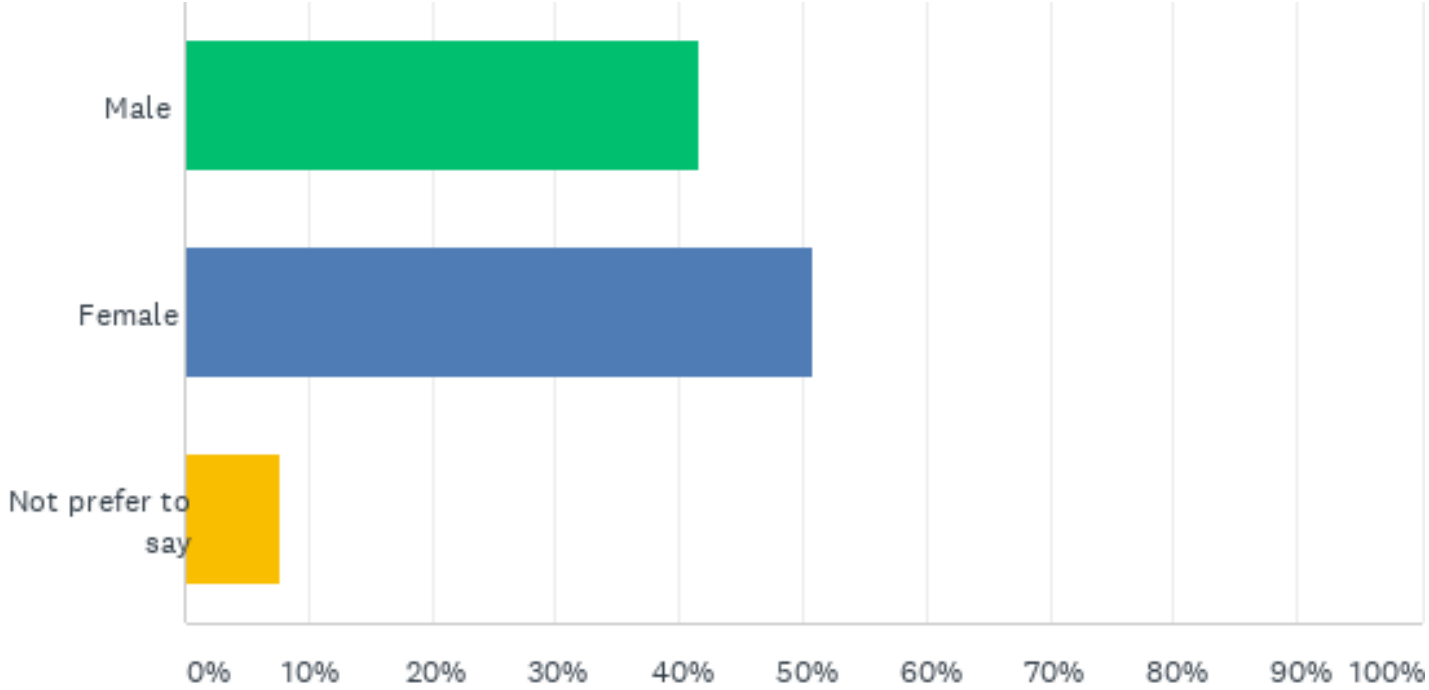
Q6: How long do you spend in your car travelling to work?

Answered: 271 Skipped: 1

ANSWER CHOICES	RESPONSES	
Over 1 hour	27.68%	75
45 minutes - 60 minutes	21.40%	58
Under 45 minutes	26.57%	72
I don't drive to work	24.35%	66
TOTAL		271

Q8: What is your gender?

Answered: 272 Skipped: 0



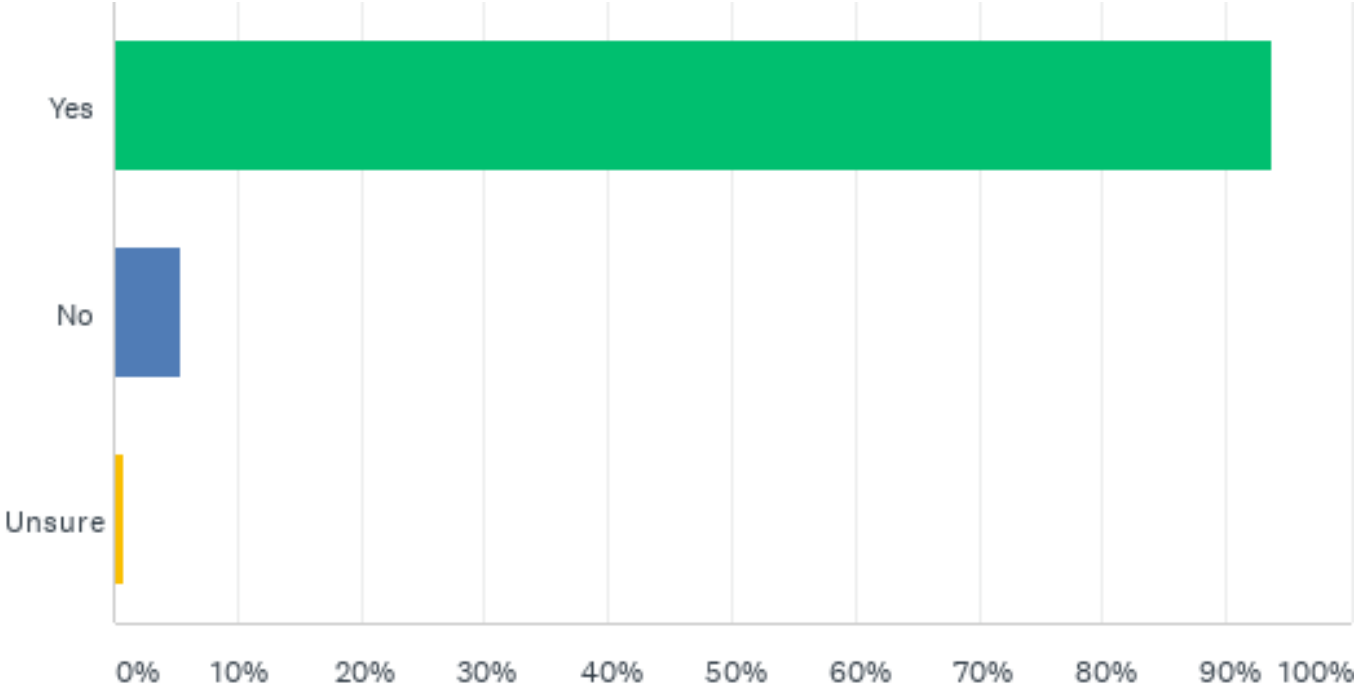
Q8: What is your gender?

Answered: 272 Skipped: 0

ANSWER CHOICES	RESPONSES	
Male	41.54%	113
Female	50.74%	138
Not prefer to say	7.72%	21
TOTAL		272

Q9: Do you live in the Cumberland City Council area?

Answered: 272 Skipped: 0



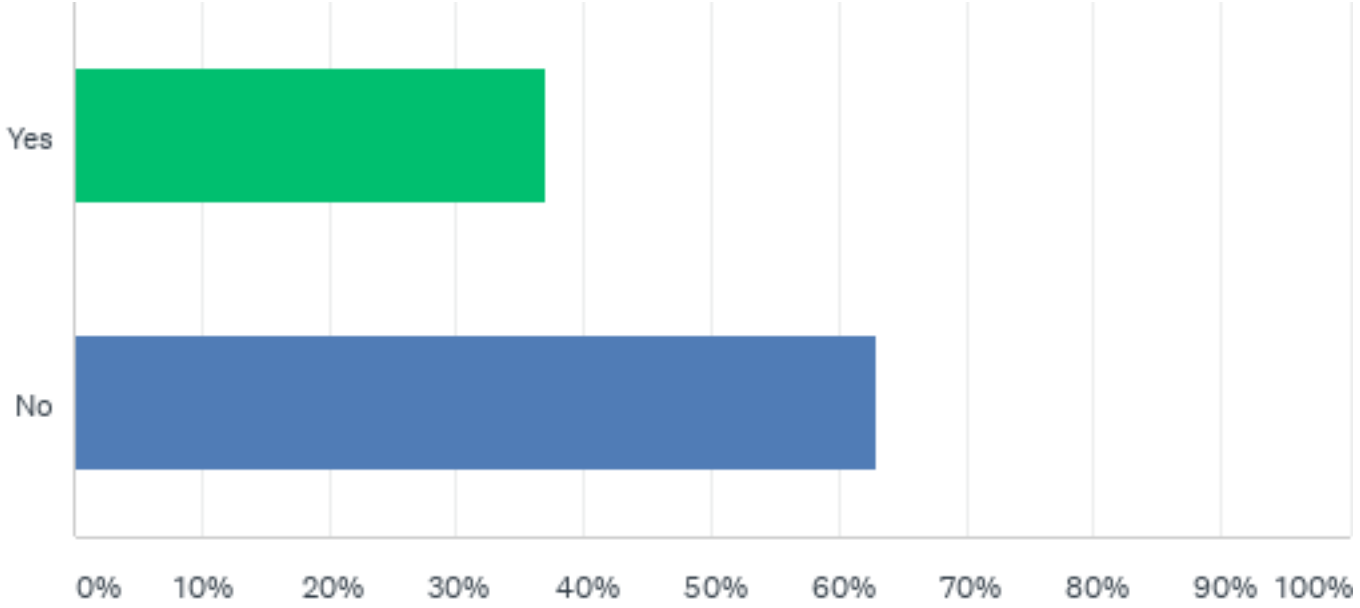
Q9: Do you live in the Cumberland City Council area?

Answered: 272 Skipped: 0

ANSWER CHOICES	RESPONSES	
Yes	93.75%	255
No	5.51%	15
Unsure	0.74%	2
TOTAL		272

Q10: Do you want to find out more information?

Answered: 268 Skipped: 4



Q10: Do you want to find out more information?

Answered: 268 Skipped: 4

ANSWER CHOICES	RESPONSES	
Yes	36.94%	99
No	63.06%	169
TOTAL		268

CITY OF PARRAMATTA

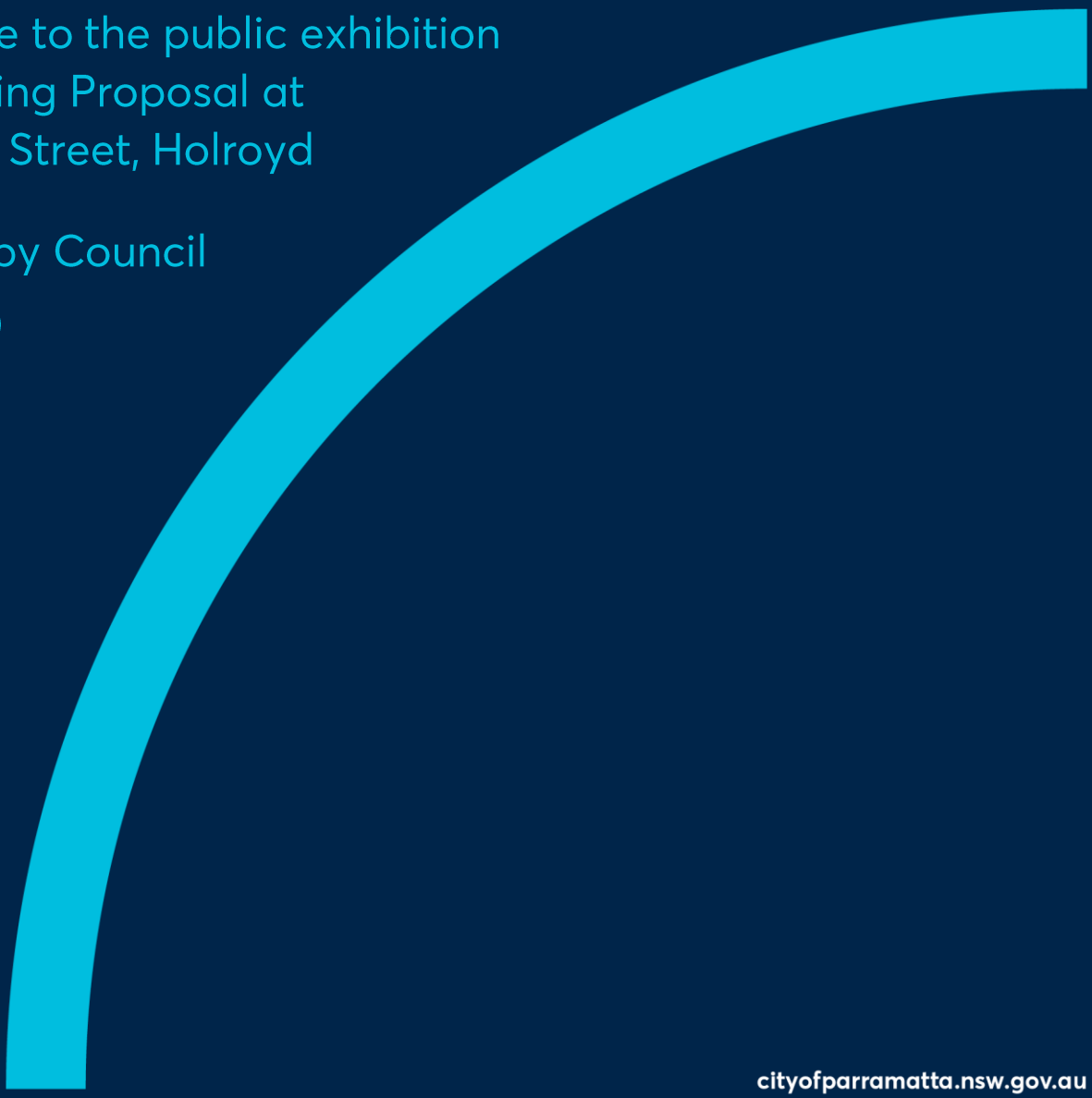
Submission

To the Sydney Central City Planning Panel

In response to the public exhibition
of a Planning Proposal at
1 Crescent Street, Holroyd

Endorsed by Council

14.09.2020



CONTENTS

1. INTRODUCTION

The City of Parramatta Council (Council) welcomes the opportunity to provide a submission to the recently exhibited planning proposal at 1 Crescent Street, Holroyd. The planning proposal was placed on public exhibition between 3 August till 30 August 2020.

Council was granted an extension by the Sydney Central City Planning Panel (SCCPP), the planning proposal authority, to allow this submission to be considered by Council at its meeting on 14 September 2020.

Council has reviewed the planning proposal and its associated documents to prepare this submission. A number of issues and concerns relating to the planning proposal have been raised, particularly in relation to the planning proposal's consistency with the Parramatta Road Corridor Urban Transformation Strategy and traffic assumptions amongst other issues. These issues are summarised below and will be further discussed in Part 2 of this submission:

- Inconsistent with the recommended controls under the Parramatta Road Corridor Urban Transformation Strategy
- Excessive density in a constrained location
- Lack of logical distribution or rationalisation of building heights and density resulting in no clear typology
- Concerns relating to the traffic assumptions adopted prior to the completion of the precinct-wide traffic study
- Proposed infrastructure improvements without a clear funding and delivery mechanism
- Lack of full consideration of impacts on the Parramatta LGA

Accordingly, Council **objects** to the planning proposal.

This submission was endorsed at the meeting 14 September 2020. Subsequently, it has since been forwarded to the SCCPP.

2. COMMENTARY ON THE PLANNING PROPOSAL

This section provides an overview of the planning proposal and commentary on certain issues that have arisen as part of Council's assessment.

The site and proposed amendments

The subject site is at 1 Crescent Street, Holroyd (Lot 10 DP 808585) with a site area of 37,904m^2. It is currently occupied by a vacant industrial warehouse and office facility.

The site is located in the Cumberland Council local government area (LGA), however, it borders on the City of Parramatta Council's LGA. It is also directly adjacent to the major intersection at Parramatta Road, Woodville Road, Church Street and the M4 (**Figure 1**).

Figure 1 – Subject site and surrounding context

The planning proposal is seeking to amend the Holroyd Local Environmental Plan 2013 (HLEP 2013) by:

- Rezoning the site from B5 Business Development to part R4 High Density Residential, part B6 Enterprise Corridor (with 'commercial premises' as an additional permitted use), part RE1 Public Recreation and part SP2 Infrastructure.

- Increasing the maximum Height of Building control from 15m across the site to between 32m and 96m.
- Increasing the maximum Floor Space Ratio (FSR) control from 1:1 across the site to part 3.4:1 and part 4.2:1.

Whilst the site is not within the Parramatta LGA boundary, there are concerns that should the planning proposal proceed, there may be negative impacts on the residents and businesses within the Parramatta LGA as well as having negative implications on the broader strategic planning framework that has been set for this area by the State Government.

A. Land use and strategic planning

The Parramatta Road Corridor Urban Transformation Strategy

In November 2016, the State Government released the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS). The PRCUTS is a statutory document that was developed by the State Government with the aim of providing the long-term vision and framework to support employment and housing growth along the Parramatta Road Corridor extending from Camperdown in the east to Granville in the west. It is made up eight major precincts along the corridor with some precincts having frame areas.

The PRCUTS is supported by an existing Section 9.1 Ministerial Direction which requires all planning proposals in the Parramatta Road Corridor area to be consistent with the PRCUTS and the PRCUTS Implementation Tool Kit. The Implementation Tool Kit comprises four key documents, including:

- Planning and Design Guidelines
- Implementation Plan 2016-2023
- Infrastructure Schedule
- Urban Amenity Improvement Plan

The subject site is located within he PRCUTS Granville Precinct western frame area (**Figure 2**). The frame areas are intended to form connections between the major precincts along the corridor and to also shape the transformation of the corridor itself. Under the PRCUTS, the future vision of the precincts and frame areas along the corridor are identified by recommended planning and design guidelines.

Figure 2 – PRCUTS Granville Precinct and frame areas

PRCUTS Planning and Design Guidelines

The PRCUTS *Planning and Design Guidelines* provides the recommended planning and urban design controls along the length of the corridor to inform its future vision. These recommended controls are applicable to both the major precincts as well as the frame areas.

Under the PRCUTS *Planning and Design Guidelines*, the following controls are recommended for the site:

- Rezone from B5 Business Development across the site to part B5 Business Development and part B6 Enterprise Corridor.
- Increase the maximum Height of Building control from 15m across the site to part 30m and part 42m.
- Increase the maximum FSR control from 1:1 across the site to part 1.8:1 and part 2:1.

The proposed amendments to the HLEP 2013 under the planning proposal are significantly different from the recommended controls under the PRCUTS, as seen in **Figures 3, 4 and 5** below:

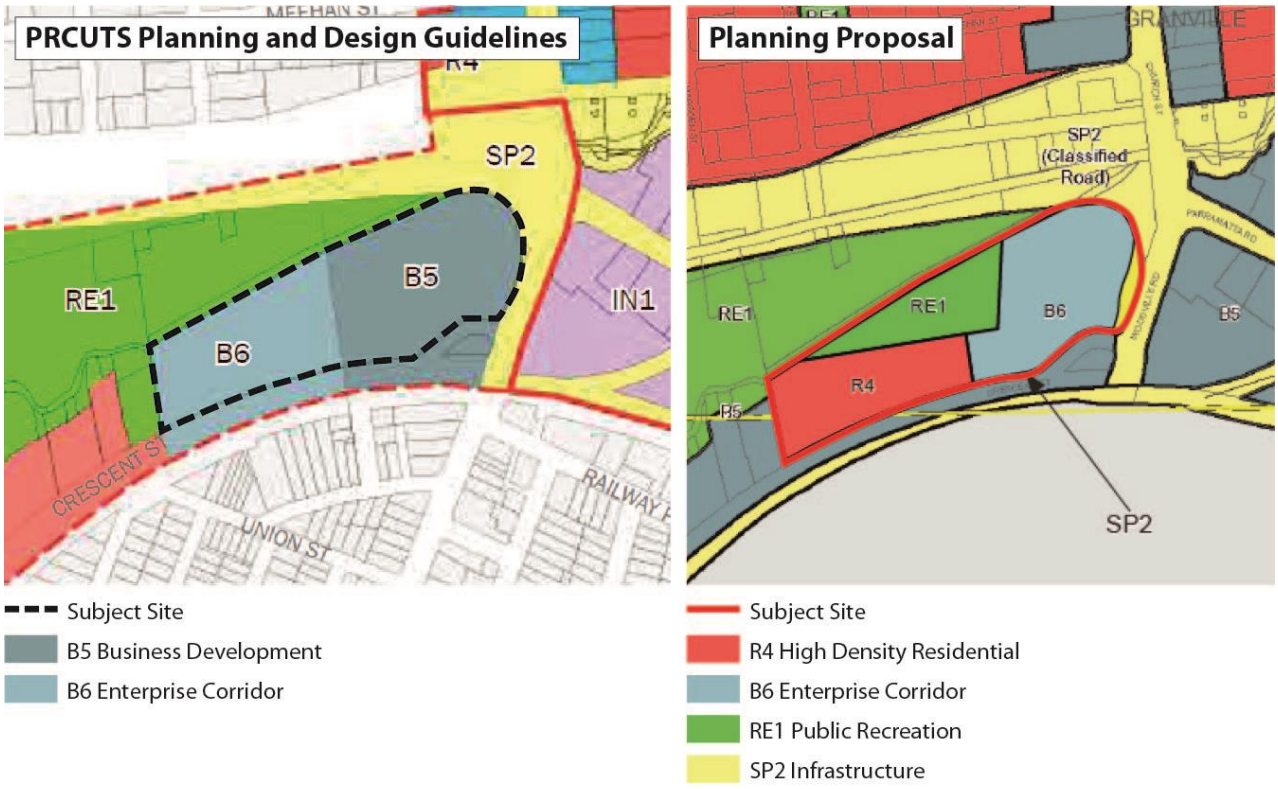


Figure 3 – Comparison between recommended and proposed zoning controls

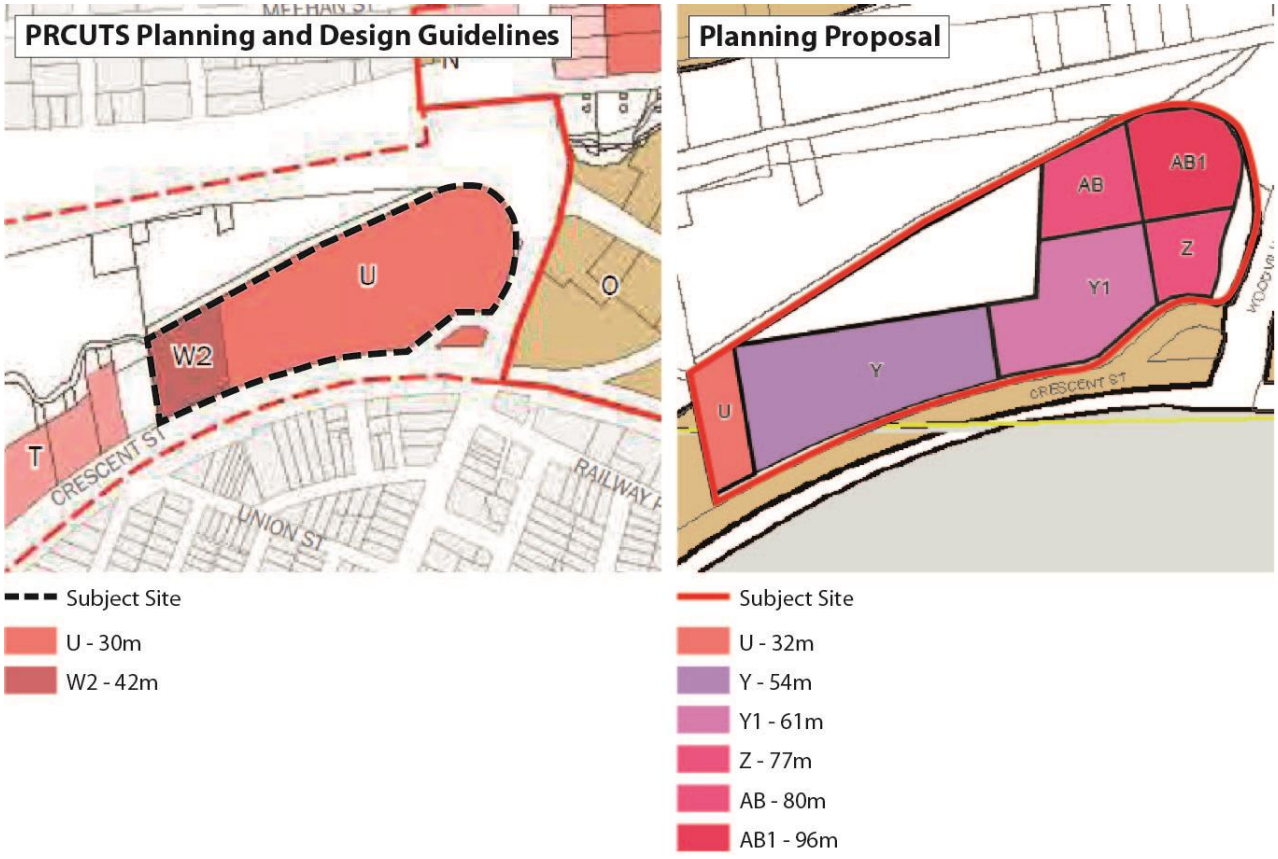


Figure 4 – Comparison between recommended and proposed Height of Building controls

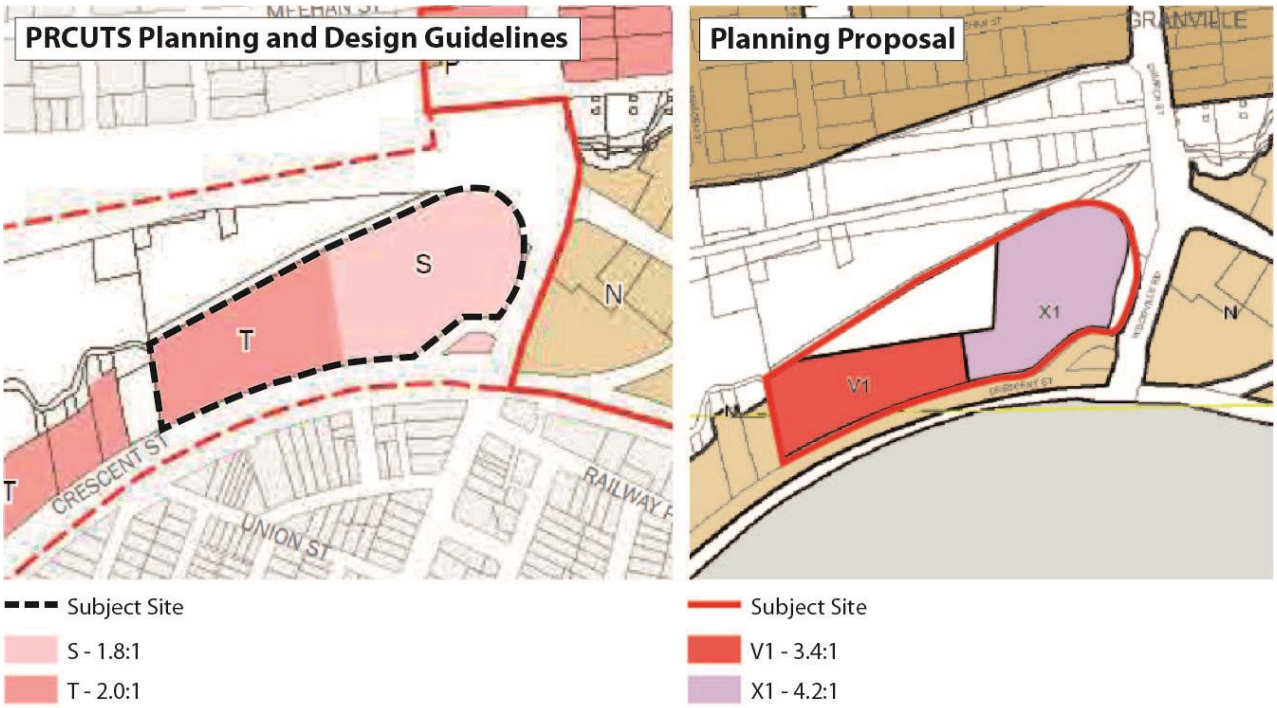


Figure 5 – Comparison between recommended and proposed FSR controls

The recommended zoning under the PRCUTS for the subject site is to be rezoned from B5 Business Development across the site to part B5 Business Development at the eastern portion of the site and part B6 Enterprise Corridor at the western portion of the site. As these are the recommended zoning controls under the PRCUTS, it is envisaged that this site be retained mainly for employment purposes with some provision for residential uses under the B6 Enterprise Corridor zone.

The objectives of the B5 Business Development zone are to enable a mix of business and warehouse uses, and specialised retail uses that require a large floor area. This zoning is recommended for the eastern portion of the site which is directly affected by amenity impacts from the M4, Woodville Road, Parramatta Road and the rail line. Council considers this portion of the site as unsuitable for residential uses due to these negative amenity impacts. Notwithstanding, Council supports the recommended PRCUTS zoning to allow for the retention of employment generating uses to complement the nearby recommended IN1 General Industrial and B3 Commercial Core zones.

Similarly, under the PRCUTS, the western portion of the site is intended for a B6 Enterprise Corridor zoning. The objectives of the B6 Enterprise Corridor are to promote businesses along main roads, to provide a range of employment uses, to maintain the strength of centres and to provide for residential uses, but only as part of a mixed use development. Whilst there is provision to allow residential uses in this zone, based on the recommended controls under the PRCUTS, the new residential dwellings proposed under the planning proposal far exceeds the expected dwellings envisioned under the PRCUTS for this portion of the site. This will be discussed further in part 2B.

The proposed zoning amendments reduces both the existing and recommended employment generating zones with an excessive increase in residential uses for a site in this location. Furthermore, the proposed heights and densities (FSRs) under the planning proposal go above and beyond the PRCUTS' recommended controls. The proposed controls are largely inconsistent with what is envisioned for the site under the PRCUTS.

Consistency with the Section 9.1 Ministerial Direction – *7.3 Parramatta Road Corridor Urban Transformation Strategy*

The proposed controls being inconsistent with the PRCUTS raises a significant issue as there is an existing Section 9.1 Ministerial Direction which requires all planning proposals in the Parramatta Road Corridor area to be consistent with the PRCUTS and the PRCUTS Implementation Tool Kit.

Under Clause 4 of the Ministerial Direction *7.3 Parramatta Road Corridor Urban Transformation Strategy*, there are a number of requirements that need to be met:

> From the Section 9.1 Ministerial Direction – *7.3 Parramatta Road Corridor Urban Transformation Strategy*
>
> **What a relevant planning authority must do if this Direction applies**
>
> (4) A planning proposal that applies to land within the Parramatta Road Corridor must:
>
> (a) Give effect to the objectives of this Direction,
>
> (b) Be consistent with the Strategic Actions within the *Parramatta Road Corridor Urban Transformation Strategy (November, 2016)*,
>
> (c) Be consistent with the *Parramatta Road Corridor Planning and Design Guidelines (November, 2016)* and particularly the requirements set out in Section 3 Corridor-wide Guidelines and the relevant Precinct Guidelines,
>
> (d) Be consistent with the staging and other identified thresholds for land use change identified in the *Parramatta Road Corridor Implementation Plan 2016-2023 (November, 2016)*,
>
> (e) Contain a requirement that development is not permitted until land is adequately serviced (or arrangements satisfactory to the relevant planning authority, or other appropriate authority, have been made to service it) consistent with the *Parramatta Road Corridor Implementation Plan 2016-2023 (November, 2016)*,
>
> (f) Be consistent with the relevant District Plan.

The planning proposal is not compliant with at least two of the above requirements of the Ministerial Direction:

(4)(c) – as indicated above (refer to **Figures 3, 4 and 5**), the proposed controls under the planning proposal are significantly inconsistent with the recommended controls under the PRCUTS *Planning and Design Guidelines*.

(4)(d) – the planning proposal is seeking a rezoning outside of the PRCUTS *Implementation Plan 2016-2023* action plan. According to the *Implementation Plan 2016-2023*, the subject site is outside of the release area for 2016-2023. The release area is only applicable to the core of the Granville Precinct which is bounded by Granville station to the south, the rail line to the west, Parramatta Road to the north and Duck Creek to the east (**Figure 6**). Accordingly, the planning proposal is inconsistent with the staging for land use change identified in the *Implementation Plan 2016-2023*.

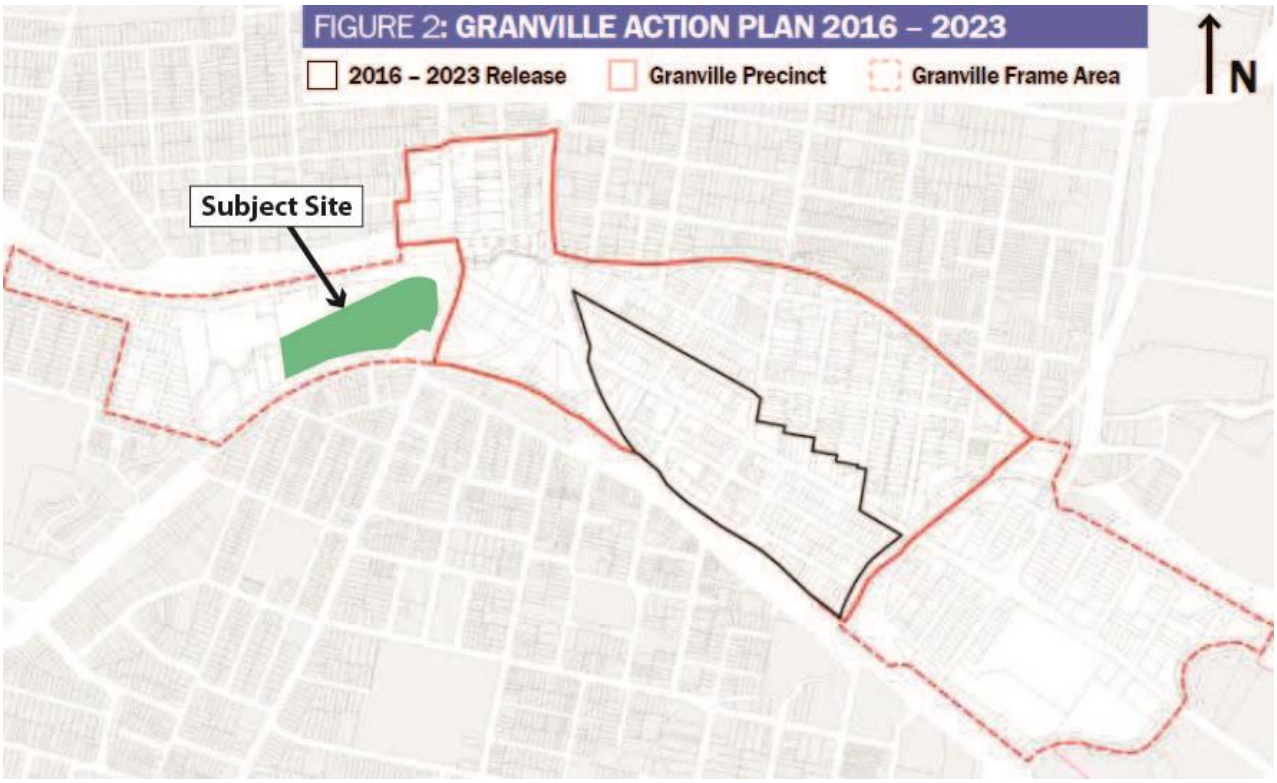


Figure 6 – Granville Action Plan 2016-2023 from the PRCUTS *Implementation Plan 2016-2023*

Under the Ministerial Direction, there is scope for a planning proposal to be inconsistent with the Direction, and subsequently the PRCUTS, under Clause 5. The planning proposal needs to demonstrate one of the following criteria in order to allow its inconsistency with the Direction:

(a) Consistent with the *Out of Sequence Checklist in the Parramatta Road Corridor Implementation Plan 2016-2023 (November, 2016)*, or
(b) Justified by a study (prepared in support of the planning proposal) that clearly demonstrates better outcomes are delivered than identified in the *Parramatta Road Corridor Urban Transformation Strategy (November, 2016)* and *Parramatta Road Corridor Implementation Plan 2016-2023 (November, 2016)* having regard to the vision and objectives, or
(c) Of minor significance.

Council has reviewed the planning proposal against the PRCUTS *Out of Sequence Checklist* and consider it to not meet the out of sequence criteria to qualify its implementation and inconsistency with the Ministerial Direction. In order for a planning proposal to justify its inconsistency with the Ministerial Direction, and subsequently the PRCUTS, it needs to address ***each*** criteria in the *Out of Sequence Checklist* and provide appropriate supporting documentation. It should also be noted that the PRCUTS *Implementation Plan 2016-2023* states that **"the Out of Sequence Checklist is <u>not</u> a mechanism to proceed with development in the Corridor that is inconsistent with the Strategy."** Notwithstanding, one particular criteria in the *Out of Sequence Checklist* is the requirement for a planning proposal to be consistent with the "recommended land uses, heights, densities, open space, active transport and built form plans for the relevant Precinct or Frame Area." As discussed above, the proposed controls being sought under the planning proposal are largely inconsistent with what is recommended under the PRCUTS. Accordingly, the planning proposal is considered as not having met ***each*** of the criteria under the *Out of Sequence Checklist* and is therefore not supported as having met the requirements under Clause 5(a) of the Ministerial Direction to justify its inconsistency with it.

Council considers that despite the extensive technical studies undertaken, there remains gaps in the technical analysis. Two technical studies which have raised issues include the urban design study and

flooding study, which will be discussed in further detail in Part 2B and Part 2E, respectively. Council does not consider the planning proposal to deliver better outcomes than what is identified under the PRCUTS and therefore does not support the planning proposal as meeting this criteria to qualify its inconsistency with the Ministerial Direction.

Furthermore, Council does not consider the Planning Proposal to be of minor significance as it is seeking a significant uplift from the current controls.

PRCUTS Implementation Plan 2016-2023 and the required precinct-wide traffic study

Under the PRCUTS *Implementation Plan 2016-2023*, it is stated that **"proposals that are inconsistent with these documents are unlikely to be supported."** The documents being referred to are those in the PRCUTS Implementation Tool Kit, as discussed above.

Subsequently, Council raises the issue that under the PRCUTS *Implementation Plan 2016-2023* for the Granville Precinct, **"prior to any rezoning commencing, a Precinct-wide traffic study and supporting modelling is required to be completed which considers the recommended land uses and densities, as well as future Westconnex conditions, and identifies the necessary road improvements and upgrades required to be delivered as part of any proposed renewal in the Precinct."**

This precinct-wide traffic study is currently being undertaken by Council, in collaboration with Cumberland Council and the DPIE, however this is currently on hold as it is awaiting finalisation of the strategic transport model by Transport for NSW (TfNSW) for the Parramatta Road Corridor. The purpose of the precinct-wide traffic and transport study in the Granville/Auburn area is to determine whether the recommended controls identified in the PRCUTS can be accommodated considering current and future traffic volumes. This study will ultimately inform the appropriate future controls for the Precinct and is an integral part to the broader implementation of the Strategy. Therefore, there are concerns regarding the assumptions used to justify increased densities that were not envisaged in the PRCUTS and how they would impact on existing and future cumulative traffic impacts at both the site and along the broader Corridor. This matter will be further discussed further in Part 2C of this submission.

The planning proposal is significantly inconsistent with the PRCUTS and its supporting documents in relation to zoning, building height and floor space ratio. It is also inconsistent with the above requirements within the PRCUTS *Implementation Plan 2016-2023* requiring the precinct-wide traffic study and supporting modelling to be completed prior to any rezoning. Should the planning proposal be approved for finalisation by the SCCPP, there is a high risk of setting an unjustified precedent for sites not only in the Granville Precinct, but along the Parramatta Road Corridor and beyond, to seek planning controls that are inconsistent with State endorsed strategies.

Considering the points raised above, the planning proposal is not supported from land use and strategic planning grounds.

B. Urban design and proposed density

As discussed in Part 2A, the proposed FSR controls are above and beyond the recommended controls under the PRCUTS. The planning proposal indicates that under these proposed controls, an estimated 1,255 new dwellings will be delivered with approximately 12,755m^2 of non-residential floor space. Employing an estimated occupancy rate of 2.3 people per dwelling, this could potentially equate to a new residential population of 2,887 people.

Under the PRCUTS, the recommended zoning controls for the site is part B5 Business Development and part B6 Enterprise Corridor. The portion of the site recommended under the PRCUTS to be zoned as B6 Enterprise Corridor is approximately 17,000m^2 with a recommended FSR control of 2.0:1. Council considers that this could potentially allow up to 34,000m^2 of gross floor area (GFA) within this portion of the site. Under the HLEP 2013, the B6 Enterprise Corridor zone allows provision for residential uses as part of a mixed-use development, therefore (assuming 10% of the GFA to be used for non-residential purposes), this could potentially equate to 360 new dwellings when factoring in an average of 85m^2 per dwelling. The planning proposal is seeking to develop well over three times as many residential dwellings than what is envisioned under the PRCUTS for this site.

This raises significant concerns as the subject site is considered to be a highly constrained site with poor amenity. It is isolated by major infrastructure barriers, including Woodville Road to the east, the rail line to the south and the A'Becketts Creek channel and M4 to the north. Council considers the proposed density to be excessive for a site within such a constrained location as it provides a hostile environment in terms of poor amenity caused by noise, air quality and lack of pedestrian connectivity and accessibility. The proposal is not considered to reflect best practice principles of high density living and Council has concerns that it is an overdevelopment of the site and its use should be fundamentally be non-residential, consistent with the PRCUTS.

Having reviewed the urban design studies, Council raises the following urban design issues as not having been addressed by the proposal:

- Higher density development should have small street blocks and maximum connectivity. There is no connectivity externally or internally within the site. It is a gated estate.
- All buildings should have a street address. Buildings F and E2 do not have a street address, Buildings B, C and D have a confused street address with streets on either side of the buildings.
- Building heights should be related to street hierarchy. There is no logical distribution or rationalisation of heights. There are seven different tower heights with only eight towers. Minimal differences in the number of storeys of the buildings such as 1 and 2 storeys in the podium and similarly in the towers (12 ;14 and 17) and (22; 23 and 28) do not assist variety but rather they increase the perceived density of the precinct.
- The built form should be organised to deliver a street wall that relates to the human experience of the place. The lower levels of the buildings require a defined 'street wall height' that relates one building to another as a collective. There is no clear street wall and a mixture of 2, 8, 12, 14, 17 and 23 storey buildings that face the public domain.
- Buildings should represent a clear typology. There are towers grafted on 8 storey buildings in three locations. These are A, B and between E1and E2. There is no clear distinction between podium and tower at E1, E2, G and F.
- There is no communal open space on the ground.
- Developments should optimise amenity. By grouping the four tallest towers and highest density at the north eastern end of the site the majority of residents are exposed to the most hostile conditions.

- The proposal compounds many features that are undesirable in dense apartment living. These are exposed on a site that is highly visible.

Accordingly, Council raises concerns in relation to the planning proposal's urban design and does not support it in this regard.

C. Traffic and transport

Strategic traffic and transport context

As discussed above in Part 2A, Council is currently undertaking a precinct-wide traffic and transport study in the Granville/Auburn area, as required under the PRCUTS *Implementation Plan 2016-2023*. This work is being undertaken in collaboration with Cumberland Council and the DPIE.

The purpose of the precinct-wide traffic and transport study in the Granville/Auburn area is to determine whether the recommended controls identified in the PRCUTS can be accommodated considering current and future traffic volumes. This study will ultimately inform the appropriate future controls for the Precinct and is an integral part to the broader implementation of the Strategy.

As discussed, this study is currently on hold as it is awaiting finalisation of the strategic transport model by TfNSW for the Parramatta Road Corridor before any precinct modelling can be carried out. Until TfNSW completes this work, the precinct-wide traffic and transport studies for the precincts along the entire length of the Parramatta Road Corridor, including the Granville/Auburn area, is unable to progress. Subsequently, all planning proposals seeking controls that are inconsistent with the recommended controls under the PRCUTS should not progress until the work is complete. This is in accordance with the PRCUTS *Implementation Plan 2016-2023* which states, **"prior to any rezoning commencing, a Precinct-wide traffic study and supporting modelling is required to be completed which considers the recommended land uses and densities, as well as future Westconnex conditions, and identifies the necessary road improvements and upgrades required to be delivered as part of any proposed renewal in the Precinct."**

At this stage, the cumulative traffic impacts arising from the implementation of the PRCUTS are still yet to be fully understood. Enabling the subject Planning Proposal to proceed ahead of this critical work, factoring in the proposed densities being sought are above and beyond the recommended PRCUTS controls, is considered to be premature.

Site specific vehicular traffic volumes and implications

The applicant has prepared a traffic impact assessment report which assessed the performance of key intersections for the future scenario of the planning proposal. The applicant has also undertaken additional traffic modelling at the request of TfNSW which was based on the mesoscopic base model for the PRCUTS. The results of the applicant's modelling indicates that the road network can accommodate the estimated traffic generation resulting from the planning proposal.

Council raises significant concerns regarding the assumptions used to inform the applicant's transport modelling given that the precinct-wide traffic study that will model the cumulative impacts arising from the PRCUTS are still yet to be completed. Despite the applicant undertaking traffic modelling employing the mesoscopic base model for the PRCUTS, Council questions whether this has taken into consideration the traffic impacts along the length of the corridor and not just in proximity to the site. The reason why the Granville/Auburn precinct-wide traffic and transport study is on hold, including other precinct traffic studies along the PRCUTS for that matter, is because all councils along the Parramatta Road Corridor are awaiting the TfNSW strategic transport model to be completed in order to determine the traffic impacts along the *whole* length of the Parramatta Road Corridor.

Furthermore, there is a risk that should the planning proposal progress prior to the completion of the Granville/Auburn precinct-wide traffic study, discussed above, this could set an undesirable precedent for other sites along the PRCUTS area to proceed prior to the completion of appropriate traffic

modelling at densities exceeding the PRCUTS' recommendations. Progressing the planning proposal ahead of this work will have implications on the future traffic and transport network and could compromise the vision, objectives and proposed planning controls identified in the PRCUTS.

D. Pedestrian/cycle amenity and proposed infrastructure

The subject site is heavily constrained and considered to be isolated. As such, a number of infrastructure improvements have been identified as part of the delivery of the planning proposal by the applicant. Since the site directly borders City of Parramatta's LGA, some of the proposed improvements are located within the Parramatta LGA boundary (see **Figure 7**).

Figure 7 – Proposed infrastructure improvements under the Planning Proposal

There are six infrastructure improvements proposed by the applicant that permeate into the Parramatta LGA boundary:

- A – Improvements to underpass connection towards Parramatta/Harris Park
- B – Potential for direct connection to Church Street west from underpass
- C – Funding for Church Street pedestrian/cycleway improvements
- E – At-grade connection across Woodville Road
- F1 – Bridged connection across Woodville Road
- F2 – Bridged connection across Woodville Road

Should the planning proposal progress, the proposed connections to the Parramatta CBD and Granville should be delivered via planning agreement or alternative delivery mechanism to ensure greater connectivity and accessibility to these key sites. That said, the proposed mechanism for ensuring funding and delivery of connections across council boundaries needs to be identified in the scope, funding and delivery responsibilities of the proposed upgrades identified in the planning proposal by the applicant. Any infrastructure improvement arising as part of the planning proposal should be fully funded by the applicant at no cost to Council.

Furthermore, should the proposed infrastructure improvements be delivered as part of any progression of the planning proposal, Council needs to be included in the planning and delivery stages. This will ensure that the infrastructure is in accordance with Council's standards and expected quality.

E. Flooding

Council has reviewed the applicant's flooding report (conducted in 2015) and raise concerns that since the subject site is immediately upstream of the Parramatta LGA, flooding at this location will affect areas immediately downstream, including areas inside the Parramatta LGA.

The applicant's flooding report states that there are no flooding implications of the rezoning in floods of the 1 in 100 year size, since the flood waters would be contained within the A'Becketts Creek channel. However, should there be a flood of a size greater than the 1 in 100 year flood event, any filling of the site could cause flooding around the site (including the Parramatta LGA) to be much worse.

Therefore, Council recommends re-running a TUFLOW 2D model for the site for the following reasons:

- Check the results of the 2015 study, including if there have been any substantial changes in the catchment in the 5 years since the report was written.
- Extend the results to consider the effects of floods larger than the 1 in 100 year flood.
- Extend the results to consider the effects on overland flow flooding of the proposed development.
- Investigate if flooding downstream could be reduced through additional flood storage on the site.

Until further technical studies are completed which consider the broader flooding implications which may arise as part of the planning proposal, Council does not support it nor does it agree that this study clearly demonstrates a better outcome other than the PRCUTS, in reference to clause 5(b) of the relevant the Section 9.1 Ministerial Direction.

3. CONCLUSION

Council raises significant concerns relating to the Planning Proposal at 1 Crescent Street, Holroyd. The planning proposal is seeking amendments to the HLEP 2013 which are significantly inconsistent with the recommended controls under the PRCUTS. The proposed controls go above and beyond what is recommended under the PRCUTS and is therefore considered to be unsuitable and inappropriate for a site as constrained as this. The planning proposal is regarded as being inconsistent with the relevant Section 9.1 Ministerial Direction and subsequently the PRCUTS and PRCUTS Implementation Tool Kit, particularly the *Planning and Design Guidelines* and the *Implementation Plan 2016-2023*.

As discussed in Part 2A and 2C, Council raises concerns in relation to the planning proposal and the traffic assumptions used to justify the sought-after densities *prior* to the completion of the Granville/Auburn precinct-wide traffic study. Since this work is yet to be completed, Council strongly highlights the risk that should this planning proposal progress prior to the completion of the appropriate technical traffic and transport analysis, it places a risk of setting an unjustified precedent for sites along the length of the Parramatta Road Corridor as well as potentially compromising the vision, objectives and proposed planning controls under the PRCUTS.

Furthermore, the planning proposal is considered to not demonstrate best urban design practice principles for high density living, especially for a site as constrained as this with poor amenity issues. Council reiterates its concern that it is an overdevelopment of the site and its use should be fundamentally be non-residential, consistent with the PRCUTS.

For these reasons and those raised above in Part 2 of this submission, Council **objects** to the planning proposal.

Notwithstanding, should the planning proposal be supported by the SCCPP and progress further, Council requests that it be included in any discussions relating to the planning and delivery of any proposed infrastructure improvements which are located within Council's boundary.