Technical Memorandum

Quality Information	
Project:	Tallawong Station SSDA – Post Exhibition Responses to Traffic and Parking Comments
Project Number:	SCT_00049
Document Name:	Post Exhibition Responses to Traffic and Parking Comments
Prepared:	Daniel Lee, Principal Consultant
Reviewed:	Andy Yung, Associate Director
Authorised:	Andy Yung, Associate Director

Background

The Cudgegong Road (Area 20) Precinct was rezoned by the Department of Planning and Environment (DPE). The Cudgegong town centre will become a local village centre with a range of housing typologies and provide convenient and lifestyle destinations for residents, workers and visitors, all within walking distance. The SSDA is seeking approval for the development of a mixed-use town centre (within the Developable Government Land) with approximately 1,100 dwellings and supporting retail, office and community uses.

SCT Consulting prepared a Traffic Impact Assessment in May 2018 to support the exhibition of the State Significant Development Application. Comments were received from agencies and the public, with traffic and transport comments focussed on:

– Parking rates;

– Cumulative impact assessment of broader developments in the area;

– Need for clarity on adequacy of pedestrian and cycling linkages;

This memo provides responses to all the comments received during public exhibition under the category of Car Parking and Cumulative Traffic Impacts as well as a number of other traffic related miscellaneous comments.

Two other technical notes were included as **Appendix A: Parking rates review** and **Appendix B: Cumulative Traffic Impacts**, which documented the details of the additional work undertaken to support the responses provided in this technical note.

Car Parking

Post-exhibition comments	Responses
Provide additional analysis of non-residential car parking rates, considering site's developing context and evidence of car parking demand at comparable centres. DPE has advised that it considers comparable centres should be similar greenfield sites, possibly Rouse Hill or Edmondson Park. A similar comparable analysis should be considered for residential car parking rates.	TSPS is an exemplar transit-oriented development with direct access to the metro network and proposed mix of land uses that serve local residents predominantly within a walking catchment. The precinct will support future residents / employees who choose to live and work in a transit-oriented centre with low parking provision. Hence the need to predict and provide parking provision does not align with the principle of TSPS. The best approach to facilitate / influence reduced car use is to restrain parking provision at its destination for non-residential uses (while offering attractive public transport alternative in this case Sydney Metro and its connecting bus network). This is evident in parking provision, mode share targets as well as DCP parking rates of key centres with good public transport access such as Parramatta, Chatswood, Liverpool, North Sydney, Macquarie Park in an attempt to successfully reduce the amount of vehicular access to these centres. The centres suggested by DP&E are not comparable in the following way: • Rouse Hill Regional Centre was designed and established without mass transit. It has very high car use and hence car parking demand given it does not currently have good and direct access to a train station. The regional scale and catchment of Rouse Hill Regional Centre is significantly larger than Tallawong Station Precinct South, hence was built with high parking provision. • Edmondson Park Town Centre has very high parking provision despite its proximity to the station. Hence this does not achieve the principle of a TOD exemplar. Unlike TSPS, the heavy rail services to the town centre is less frequent, there are no other good and direct connections to the employment and retail centres.

Post-exhibition comments	Responses
Provide additional justification for residential car parking rates addressing the following comments: • Use of RMS and Parramatta car parking rates is not supported. RMS Subregional Centre parking rates should be used. • While SEPP 65 applies to development, the site is not classified as a Regional CBD Centre and thus parking rates for this category of centre cannot be used to determine parking numbers. Sub-regional CBD Centre parking rates should be applied which would mean 1,627 parking spaces, not 1,100, are required.	All relevant DCP parking rates have all been considered as documented in **Appendix A**. TSPS is an exemplar transit-oriented development with direct access to the metro network and proposed mix of land uses that serve local residents predominantly within a walking catchment. The precinct will support future residents who choose to live in a transit-oriented centre with low parking provision. Hence the need to predict and provide parking provision does not align with the principle of TSPS. There are over 4,000 approved dwellings / apartments in the surrounding area within the Tallawong Station Precinct with higher parking provision if people / households want to own more cars. After consideration of all the feedback received on the SSDA TIA and the review of the additional DCP rates, we propose to increase the residential car parking rates to those prescribed for the Macquarie Park corridor and Ryde Station Precinct, which are similar to / align with the RMS Metro Subregional Centre rates proposed for residential, but with reduction in visitor parking space allocation. This will yield the requirement of 1,144 spaces which equates to 1.04 spaces per unit. On average, excluding the visitor parking spaces, 95% of the 1,100 units will have their one allocated parking space. The proposed parking rates for visitors are different to those proposed by RMS Subregional Centre rates as the proposed development has excellent access to public transport in a CBD / town centre and also the reduction in visitor parking spaces are offset by the creation of new on-street short-term parking spaces in the new streets.
Inadequate car parking being provided. Not reasonable to assume that future residents would be working along Metro corridor. Very few places in Sydney which are easily accessible by public transport for residents of Sydney's North West.	TSPS is an exemplar transit-oriented development with direct access to the metro network and proposed mix of land uses that serve local residents predominantly within a walking catchment. The precinct will support future residents who choose to live in a transit-oriented centre with low parking provision. Hence the need to predict and provide parking provision does not align with the principle of TSPS. There are over 4,000 approved dwellings / apartments in the surrounding area within the Tallawong Station Precinct with higher parking provision if people / households want to own more cars. Future residents of the proposed development will be located within a 300m walking distance to the new Metro Station of the future SMNW project, which will provide direct access to Chatswood, Macquarie Park and other centres along the Sydney Metro corridor as well as the train network, with fifteen services in an hour during the peak. After consideration of all the feedback received on the SSDA TIA and the review of the additional DCP rates, we propose to increase the residential car parking rates to those prescribed for the Macquarie Park corridor and Ryde Station Precinct, which are similar to / align with the RMS Metro Subregional Centre rates proposed for residential, but with reduction in visitor parking space allocation. This will yield the requirement of 1,144 spaces which equates to 1.04 spaces per unit. On average, excluding the visitor parking spaces, 95% of the 1,100 units will have their one allocated parking space.
Lack of car parking will not make people use bikes.	Noted.

Post-exhibition comments	Responses
Car parking required because of inadequate public transport system.	TfNSW and Landcom are proposing reduced car parking provision for Tallawong Station Precinct South (TSPS) to facilitate: • An exemplar transit-oriented development (maximising the benefits of fast frequent metro connections with services every 4 minutes in the peak and 10 minutes in off-peak); • A town centre not dominated by cars; • Activation and life on the street; and • A reduction in the congestion of precinct roads. Future residents of the proposed development will be located within a 300m walking distance to the new Metro Station of the future SMNW project, which will provide direct access to Chatswood, Macquarie Park and other centres along the Sydney Metro corridor as well as the train network. Public transport will have significant improvements with Sydney Metro services operating every 4 minutes from Tallawong Station and additional bus services and routes re-directed via Tallawong Station interchange when the station is opened.
Car parking needs to be provided for each unit.	TSPS is an exemplar transit-oriented development with direct access to the metro network and proposed mix of land uses that serve local residents predominantly within a walking catchment. The precinct will support future residents who choose to live in a transit-oriented centre with low parking provision. Hence the need to predict and provide parking provision does not align with the principle of TSPS. There are over 4,000 approved dwellings / apartments in the surrounding area within the Tallawong Station Precinct with higher parking provision if people / households want to own more cars. After consideration of all the feedback received on the SSDA TIA and the review of the additional DCP rates, we propose to increase the residential car parking rates to those prescribed for the Macquarie Park corridor and Ryde Station Precinct, which are similar to / align with the RMS Metro Subregional Centre rates proposed for residential, but with reduction in visitor parking space allocation. This will yield the requirement of 1,144 spaces which equates to 1.04 spaces per unit. On average, excluding the visitor parking spaces, 95% of the 1,100 units will have their one allocated parking space. The proposed parking rates for visitors are different to those proposed by RMS Subregional Centre rates as the proposed development has excellent access to public transport in a CBD / town centre and also the reduction in visitor parking spaces are offset by the creation of new on-street short-term parking spaces in the new streets.

Post-exhibition comments	Responses
If adequate car parking is not provided, the precinct will become dangerously overcrowded potentially leading to social problems. Concerned that there is insufficient car parking.	TSPS is an exemplar transit-oriented development with direct access to the metro network and proposed mix of land uses that serve local residents predominantly within a walking catchment. The precinct will support future residents / employees who choose to live and work in a transit-oriented centre with low parking provision. Hence the need to predict and provide parking provision does not align with the principle of TSPS. There are over 4,000 approved dwellings / apartments in the surrounding area within the Tallawong Station Precinct with higher parking provision if people / households want to own more cars. Rouse Hill Regional Centre will continue to support the 'drive and shop' and the broader North West Growth Area. The best approach to facilitate / influence reduced car use is to restrain parking provision at its destination for non-residential uses (while offering attractive public transport alternative in this case Sydney Metro and its connecting bus network). This is evident in parking provision, mode share targets as well as DCP parking rates of key centres with good public transport access such as Parramatta, Chatswood, Liverpool, North Sydney, Macquarie Park in an attempt to successfully reduce the amount of vehicular access to these centres. Future residents of the proposed development will be located within a 300m walking distance to the new Metro Station of the future SMNW project, which will provide direct access to Chatswood, Macquarie Park and other centres along the Sydney Metro corridor as well as the train network, with fifteen services in an hour during the peak.
Final designs need to provide for ample car parking. Need to provide for a minimum of 1 car space per dwelling and 3 bedroom dwellings should have 2 car spaces.	TfNSW and Landcom are proposing reduced car parking provision for Tallawong Station Precinct South (TSPS) to facilitate: • An exemplar transit-oriented development (maximising the benefits of fast frequent metro connections with services every 4 minutes in the peak and 10 minutes in off-peak); • A town centre not dominated by cars; • Activation and life on the street; and • A reduction in the congestion of precinct roads. After consideration of all the feedback received on the SSDA TIA and the review of the additional DCP rates, we propose to increase the residential car parking rates to those prescribed for the Macquarie Park corridor and Ryde Station Precinct, which are similar to / align with the RMS Metro Subregional Centre rates proposed for residential, but with reduction in visitor parking space allocation. This will yield the requirement of 1,144 spaces which equates to 1.04 spaces per unit. On average, excluding the visitor parking spaces, 95% of the 1,100 units will have their one allocated parking space. The proposed car parking rates for residential are 0.6 space per 1-bedroom unit, 0.9 space per 2-bedroom unit, 1.4 spaces per 3-bedroom unit and 0.1 space per unit for visitors.

Post-exhibition comments	Responses
Insufficient car parking is provided, people will park in commuter car park and this will cause significant problems for people catching trains.	Strategies have also been considered to minimise the potential impacts of reduced off-street parking provision as follows: • Timed / Restricted on-street parking in areas surrounding the station and the development. • Commuter car park use only if it is linked to public transport trips via Opal Card.
Unrealistic to assume that people living close to public transport will not own a car unless legislative and physical restrictions are put in place.	One of the benefits of living near rail stations, especially those that also have mixed use town centres, is that residents are not as reliant on cars to get to work, do the shopping, drop children at child care, visit a park, or go out for coffer or dinner. It also makes not owning a car a viable and attractive option. Owning fewer cars per household, or even foregoing a car altogether can save households many thousands of dollars per year. Evidence from other transit-oriented centres around rail stations such as St Leonards shows that car ownership falls as owning a car, or more than one car is not necessary or desirable. TfNSW and Landcom are proposing reduced car parking provision for Tallawong Station Precinct South (TSPS) to facilitate: • An exemplar transit-oriented development (maximising the benefits of fast frequent metro connections with services every 4 minutes in the peak and 10 minutes in off-peak); • A town centre not dominated by cars; • Activation and life on the street; and • A reduction in the congestion of precinct roads. After consideration of all the feedback received on the SSDA TIA and the review of the additional DCP rates, we propose to increase the residential car parking rates to those prescribed for the Macquarie Park corridor and Ryde Station Precinct, which are similar to / align with the RMS Metro Subregional Centre rates proposed for residential, but with reduction in visitor parking space allocation. This will yield the requirement of 1,144 spaces which equates to 1.04 spaces per unit. On average, excluding the visitor parking spaces, 95% of the 1,100 units will have their one allocated parking space. There are over 4,000 approved dwellings / apartments in the surrounding area within the Tallawong Station Precinct with higher parking provision if people / households want to own more cars.
High rise development will bring too many people to the area, most of who will have cars.	Noted. The proposed development is designed to allow future residents / employees to own a car while enjoying the good accessibility to good public transport and active transport network.
Reality is people will still drive cars.	Noted. The proposed development is designed to allow future residents / employees to own a car while enjoying the good accessibility to good public transport and active transport network.

Post-exhibition comments	Responses
Best way to encourage public transport use for commuting is to limit parking at commuters' destination. Should be greater focus on zoning land for office accommodation within walking distance of the stations.	Noted.
Initially the site was earmarked for commuter car parking. Requests NSW Government to reserve the site for parking to meet needs of future residents of Box Hill, Riverstone, Schofields and Marsden Park.	It is understood the current commuter car park at Tallawong Station could be converted to multi-storey car park to provide more commuter car parking spaces, if additional demands are warranted.

Cumulative Traffic Impacts

Post-exhibition comments	Responses
Evaluate cumulative traffic impact from additional dwellings in wider Area 20 Precinct and proposed dwellings above baseline scenario for Station Precinct and identify mitigation works if required.	Additional traffic modelling was undertaken for the cumulative impact assessment of broader developments in Area 20 as well as the proposed development within the Developable Government Land at Tallawong Station. Refer to **Appendix B** for detailed analysis. The traffic modelling confirmed that the performance of the surrounding major intersections would operate at a marginally lower level of service or performance as a result of the additional approved 533 lots in the wider Area 20 Precinct as well as the additional 1,100 units proposed by Landcom: • Windsor Road / Commercial Road; • Schofields Road / Cudgegong Road; and • Schofields Road / Tallawong Road. The exception to this is the Terry Road / Schofields Road intersection which is estimated to perform at Level of Service E during the 2036 AM peak as a result of the additional approved 533 lots (excluding the 1,100 units in the Concept Proposal). To accommodate the additional vehicle movements arising from the extra 533 lots, the right turn bay of the northern approach at this intersection would need to be extended from 40m to 120m. The SIDRA modelling with the extended right turn bay confirmed that the intersection would be expected to operate with Level of Service D or better under all modelling scenarios. However, the modelling confirms that the extension to the right turn bay is not needed as a result of the subject development and would therefore need to be provided by others. It should be noted that this northern approach at the Terry Road / Schofields Road intersection has been constructed as a stub with a right turn lane. The full extent of the right turn bay has not been fully constructed yet. Hence the proposed extension of the right turn bay, if required, can be considered prior to the construction of this northern approach.

Post-exhibition comments	Responses
Clarify calculation of increase of peak hour trips at Schofields Rd/Cudgegong Rd and Schofields Rd/Tallawong Rd intersections.	In the original SSDA Traffic Impact Assessment, SCT Consulting determined a baseline dwelling yield (i.e. a certain number of apartments) based on the 2015 Cudgegong Road Station (Area 20 Precinct) Finalisation Report and the associated Arup traffic report. SCT Consulting considered the proportion of the subject site's zonings compared to the area of B2/B4 apartments and R3 zonings. Using this approach it was estimated that 650 apartments were within the site. With an estimated yield of 1,100 apartments the Concept Proposal is approximately 450 apartments more than the baseline dwelling yield. Applying residential trip rates of 1.19 and 0.15 per dwelling in the AM and PM peak hours consistent with the Arup traffic report, the net increase in trip generation was distributed onto the adjacent network based on the Journey-to-Work data to the wider road network. The majority of the car park accesses are connected to the wider network via Conferta Avenue which forms left-in left-out intersections with both Tallawong Road and Cudgegong Road. Hence, the majority of traffic will be entering Tallawong Station Precinct South via Cudgegong Road and the majority of traffic leaving Tallawong Station Precinct South will be via Tallawong Road.
Will increase traffic on Ridgeline Drive and The Ponds Boulevarde beyond their capacity and increasing risk of accident.	According to the SSDA Traffic Impact Assessment and the additional traffic modelling undertaken, the proposed development at Tallawong Station Precinct South is not expected to generate significant traffic volumes along Ridgeline Drive and The Ponds Boulevarde, especially during the peak hours.
Current infrastructure and roads insufficient to accommodate new proposal.	The SSDA Traffic Impact Assessment and the additional traffic modelling undertaken (refer to **Appendix B**), have confirmed that the current infrastructure and roads are sufficient to accommodate new proposal.
Proposal will place extra vehicular pressure on Old Windsor Rd which is already operating beyond capacity.	Noted. The amount of traffic expected to be generated by the proposed development and using Old Windsor is negligible compared to its existing and forecast traffic volumes. The SSDA Traffic Impact Assessment and the additional traffic modelling undertaken (refer to **Appendix B**), have confirmed that the current infrastructure and roads are sufficient to accommodate new proposal.
Already significant residential and commercial developments underway in the area and these developments will put extra pressure on Old Windsor Rd.	
Old Windsor Rd should be upgraded and all traffic pinch points cleared before any new development is approved.	

Post-exhibition comments	Responses
Scale of development will result in excessive traffic.	TfNSW and Landcom are proposing reduced car parking provision for Tallawong Station Precinct South (TSPS) to facilitate: • An exemplar transit-oriented development; • A town centre not dominated by cars; • Activation and life on the street; and • A reduction in the congestion of precinct roads. The SSDA Traffic Impact Assessment and the additional traffic modelling undertaken (refer to **Appendix B**), have confirmed that the current infrastructure and roads are sufficient to accommodate new proposal.
Already enough development in the pipeline to exceed capacity of the Metro and old line and Windsor Road highly congested.	TfNSW and Landcom are proposing reduced car parking provision for Tallawong Station Precinct South (TSPS) to facilitate: • An exemplar transit-oriented development; • A town centre not dominated by cars; • Activation and life on the street; and • A reduction in the congestion of precinct roads. Future residents of the proposed development will be located within a 300m walking distance to the new Metro Station of the future SMNW project, which will provide direct access to Chatswood, Macquarie Park and other centres along the Sydney Metro corridor as well as the train network, with fifteen services in an hour during the peak. Development of the site with superior accessibility is considered appropriate. The SSDA Traffic Impact Assessment and the additional traffic modelling undertaken (refer to **Appendix B**), have confirmed that the current infrastructure and roads are sufficient to accommodate new proposal.

Post-exhibition comments	Responses
State roads do not have sufficient capacity to accommodate additional population. New train system may help existing problems but increase in population will be greater than system can handle. Most residents prefer their own cars. Planners and developers failing to understand this pressure.	TfNSW and Landcom are proposing reduced car parking provision for Tallawong Station Precinct South (TSPS) to facilitate: • An exemplar transit-oriented development; • A town centre not dominated by cars; • Activation and life on the street; and • A reduction in the congestion of precinct roads. The proposed development is designed to allow future residents / employees to own a car while enjoying the good accessibility to good public transport and active transport network. Future residents of the proposed development will be located within a 300m walking distance to the new Metro Station of the future SMNW project, which will provide direct access to Chatswood, Macquarie Park and other centres along the Sydney Metro corridor as well as the train network, with fifteen services in an hour during the peak.
SSDA has not taken into account a number of significant applications and development consents for nearby parcels (refer submission for details of recent applications/approvals).	Additional traffic modelling was undertaken for the cumulative impact assessment of broader developments in Area 20 as well as the proposed development within the Developable Government Land at Tallawong Station. Refer to **Appendix B** for detailed analysis.

Post-exhibition comments	Responses
Approved residential densities/yields and expected timing of delivery need to be taken into account.	The traffic modelling confirmed that the performance of the surrounding major intersections would operate at a marginally lower level of service or performance as a result of the additional approved 533 lots in the wider Area 20 Precinct as well as the additional 1,100 units proposed by Landcom: • Windsor Road / Commercial Road; • Schofields Road / Cudgegong Road; and • Schofields Road / Tallawong Road. The exception to this is the Terry Road / Schofields Road intersection which is estimated to perform at Level of Service E during the 2036 AM peak as a result of the additional approved 533 lots (excluding the 1,100 units in the Concept Proposal). To accommodate the additional vehicle movements arising from the extra 533 lots, the right turn bay of the northern approach at this intersection would need to be extended from 40m to 120m. The SIDRA modelling with the extended right turn bay confirmed that the intersection would be expected to operate with Level of Service D or better under all modelling scenarios. However, the modelling confirms that the extension to the right turn bay is not needed as a result of the subject development and would therefore need to be provided by others. It should be noted that this northern approach at the Terry Road / Schofields Road intersection has been constructed as a stub with a right turn lane. The full extent of the right turn bay has not been fully constructed yet. Hence the proposed extension of the right turn bay, if required, can be considered prior to the construction of this northern approach.

Miscellaneous

Post-exhibition comments	Responses
The report proposed the need for developing a Travel Plan to deliver best practice travel programs and initiatives to manage travel demand for the Cudgegong Road Station Precinct. Clarification is needed as to which party is responsible for preparing the Travel Plan and the subsequent delivery of the Travel Plan measures.	Landcom and Sydney Metro as part of the SSDA set the framework and Travel Demand Management Strategies for future developers to develop and implement a Travel Plan to support the development of Tallawong Station Precinct South as a transit-oriented development. It is recommended this requirement be noted as conditions of consent.
It is noted that some information regarding the current bus routes needs to be updated, in particular, routes 742, 747 and 751 are now operating past the site and will be directed via Tallawong Station interchange when it is opened.	Noted. This will further increase accessibility of the proposed development to the surrounding areas via these additional bus routes that are now operating past the site and will be directed via Tallawong Station interchange when it is opened.

Appendix A – Car Parking Rates Review Summary

Technical Memorandum

Quality Information	
Project:	Tallawong Station SSDA – Post Exhibition Car Parking Provision Review
Project Number:	SCT_00049
Document Name:	Car Parking Provision Review
Prepared:	Sarah Xu, Professional Consultant
Reviewed:	Andy Yung, Associate Director
Authorised:	Andy Yung, Associate Director

Background

The Cudgegong Road (Area 20) Precinct was rezoned by the Department of Planning and Environment (DPE). The Cudgegong town centre will become a local village centre with a range of housing typologies and provide convenient and lifestyle destinations for residents, workers and visitors, all within walking distance. The SSDA is seeking approval for the development of a mixed-use town centre (within the Developable Government Land) with approximately 1,100 dwellings and supporting retail, office and community uses.

SCT Consulting prepared a Traffic Impact Assessment in May 2018 to support the exhibition of the State Significant Development Application. Comments were received from agencies and the public, with traffic and transport comments focussed on:

– Parking rates;

– Cumulative impact assessment of broader developments in the area;

– Need for clarity on adequacy of pedestrian and cycling linkages;

This memo summarises a further review of applicable and relevant car parking guidelines and policies and the preferred parking provision that should be apply to the proposed development.

SSDA parking provision

Transit-oriented developments must aim to adopt car parking rates that provide a balance between meeting car parking demand whilst encouraging sustainable and active transport by residents. New developments are encouraged to minimise car parking provision and demonstrate the inclusion of supportive mix of land uses and transport alternatives or strategies to reduce trip generation and discourage private motor vehicle use.

Based on a review of relevant guidelines such as RMS Guide to Traffic Generating Developments as well as Council DCP rates, the SSDA Traffic Impact Assessment recommended provision of:

– 971 parking spaces for residential component of the development (average of 0.88 space per apartments); and

– 143 parking spaces for the non-residential component of the development.

The SSDA TIA recommended that a total of approximately 1,110 parking space should be provided for the development.

Additional parking rates review

As a result of the feedback / comments received for the proposed parking provision, a further review of relevant parking rates was undertaken for residential and non-residential parking rates that could be relevant for Tallawong Station Precinct South (TSPS). The further review was undertaken to supplement the work completed in the Traffic Impact Assessment, with rates that are more relevant to a transit-oriented development.

As a principle, TfNSW and Landcom are proposing reduced car parking provision for Tallawong Station Precinct South (TSPS) to facilitate:

– An exemplar transit-oriented development (maximising the benefits of fast frequent metro connections with services every 4 minutes in the peak and 10 minutes in off-peak);

– A town centre not dominated by cars;

– Activation and life on the street; and

– A reduction in the congestion of precinct roads.

TSPS is an exemplar transit-oriented development with direct access to the metro network and proposed mix of land uses that serve local residents predominantly within a walking catchment. The precinct will support future residents / employees who choose to live and work in a transit-oriented centre with low parking provision. Hence the need to predict and provide parking provision does not align with the principle of TSPS.

The best approach to facilitate / influence reduced car use is to restrain parking provision at its destination for non-residential uses (while offering attractive public transport alternative in this case Sydney Metro and its connecting bus network). This is evident in parking provision, mode share targets as well as DCP parking rates of key centres with good public transport access such as Parramatta, Chatswood, Liverpool, North Sydney, Macquarie Park in an attempt to successfully reduce the amount of vehicular access to these centres.

The centres suggested by DP&E are not comparable in the following way:

– Rouse Hill Regional Centre was designed and established without mass transit. It has very high car use and hence car parking demand given it does not currently have good and direct access to a train station. The regional scale and catchment of Rouse Hill Regional Centre is significantly larger than Tallawong Station Precinct South, hence was built with high parking provision.

– Edmondson Park Town Centre has very high parking provision despite its proximity to the station. Hence this does not achieve the principle of a TOD exemplar. Unlike TSPS, the heavy rail services to the town centre is less frequent, there are no other good and direct connections to the employment and retail centres.

Non-residential parking provision

Additional technical research

In support of the proposed reduced car parking rates for non-residential development, it is suggested the following features of the proposed non-residential uses in proximity to public transport should reduce parking needs:

– The commercial and retail uses proposed within the TSPS will serve the local community, which is expected to have a limited travel catchment, with reduced parking demand. The retail is not designed to serve a wider car access market, which have access to alternatives at Rouse Hill Regional Centre, The Ponds and other centres.

– The other major customer market for the proposed retail at Tallawong is Metro station users, who have been provided with car parking, kiss-and-ride spaces and bus access, thus obviating the need to off-street parking.

– The tenancies will generally be small, with lower expected traffic generation rates, and parking demand.

– The local nature of the non-residential uses, located at the station, will serve the local population, where the ability to use active transport instead of private cars will be higher.

– Research in Sydney has found that residents in higher density developments close to rail stations with ready access to local supermarkets are highly likely to walk to do their shopping, reducing the demand for parking (Ellis and Parolin 2010).

– While the commuter car parking at Tallawong Station is proposed principally for week-day commuters who will park and ride from there, off peak use by people visiting the non-residential uses at Tallawong is also possible.

Additional DCP review

A number of additional guidelines of parking rate provision were considered in additional to the RMS Guide to Traffic Generating Developments as well as the Blacktown DCP. The additional references provide guidance to parking rates for town centres that are close to existing or future train stations including:

– Draft Bella Vista and Kellyville Precinct DCP;

– City of Ryde DCP – North Ryde Station Precinct;

– City of Ryde DCP – Macquarie Park Corridor;

– Liverpool Council DCP – Liverpool City Centre;

– Parramatta Council – Special Precincts (Westmead);

– Green Square (City of Sydney DCP); and

– North Sydney Council DCP.

Of all the additional guidelines considered, the three that are particularly relevant to Tallawong Station Precinct South (TSPS) are the ones specific for Epping Town Centre, Bella Vista and Kellyville Precinct as well as North Ryde Precinct as these precincts are all located along the Sydney Metro North West corridor and hence the retail and employment uses are servicing the metro users and local residents.

Majority of the retail customers would not be 'drive and shop' at TSPS during the business operating hours, similar to Coles Express / Food offering at St Leonards Station and the growing number of 'express' retail offers located at key public transport interchanges. Therefore, the parking demand for the retail component would be minimal. These precincts including TSPS will support future residents / employees who choose to live and work in a transit-oriented centre with low parking provision. A full summary of the relevant parking rates for non-residential uses (office and retail) are included in **Appendix A**.

A breakdown of the non-residential car parking provision considered in this review is provided in **Table 1**.

Table 1 – Non-residential parking provision

Land uses	Indicative yield	Most relevant parking rates	Parking provision if applied to TSPS
Retail	6,000sqm^	Draft Bella Vista and Kellyville Precinct DCP: 1 space / 50m^2 of retail GFA and 1 space / 30m^2 of supermarket (GFA)	160
		Parramatta DCP – Epping Town Centre (2011): 1 space / 60m^2 of GFA	100
		City of Ryde DCP – North Ryde Station Precinct: 1 space / 100m^2 of retail GFA and 1 space / 60m^2 of supermarket (GFA)	80
		Average (1 space / 70m^2 for retail GFA and 1 space per 60m^2 of supermarket GFA)	**93**
Office / commercial	3,000sqm	Parramatta DCP – Epping Town Centre (2011): 1 space / 70m^2	43
		Draft Bella Vista and Kellyville Precinct DCP: 1 space / 80m^2	38
		City of Ryde DCP – North Ryde Station Precinct: 1 space / 90m^2	34
		Average (~1 space / 80m^2)	**38**
Total			**131**

^ assuming 50% retail / 50% supermarket

Based on an average of the rates proposed under these three precinct-specific DCPs, the non-residential component of the proposed development would provide 131 spaces. Given the provision of 131 spaces for non-residential component as part of this review is very similar to what was original proposed in the SSDA TIA based on the Parramatta DCP – Epping Town Centre (2011), the recommended non-residential parking rates for TSPS will remain the same as the SSDA TIA:

– 1 space per 60m^2 of supermarket GFA;

– 1 space / 60m^2 for retail GFA; and

– 1 space / 70m^2 for commercial / office GFA.

The non-residential component of TSPS would provide 143 car parking spaces.

Residential parking provision

Additional technical research

One of the benefits of living near rail stations, especially those that also have mixed use town centres, is that residents are not as reliant on cars to get to work, do the shopping, drop children at child care, visit a park, or go out for coffer or dinner. It also makes not owning a car a viable and attractive option. Owning fewer cars per household, or even foregoing a car altogether can save households many thousands of dollars per year.

Evidence from other transit-oriented centres around rail stations such as St Leonards shows that car ownership falls as owning a car, or more than one car is not necessary or desirable.

A NSW Audit Office report on Transport in December 2016 reported a 12% increase in all forms of public transport patronage during 2015-16. Subsequent data indicates that public transport patronage has grown by over 20% in the past 2 years. The introduction of Sydney's first turn-up-and-go metro service is expected to be very attractive and continue the increase in public transport patronage, especially for people living in close proximity to stations.

In support of the proposed reduced car parking rates for residential development, additional technical research was undertaken and suggested the following changes in travel behaviour with the influence of proximity to public transport:

– *"the closer a person lives to a train station the more likely they are to use the train for their travel (Cervero, 1994)"*, quoted in Ellis and Parolin 2010.

– *"Residents who prefer to walk and use public transport are more likely to choose to live in a denser neighbourhood where many services, such as retail shops, are within walking distance and public transport is frequent and easily accessible (Krizek, 2003)"*, quoted in Ellis and Parolin 2010.

– Car ownership reduces within higher density accommodation close to stations due to the travel behaviour which favours public transport and active transport (research across Brisbane by Kelly & Pekol, 2013).

– Recent data from Roads and Maritime Services indicates that + 25% of people aged 20-34 do not have a driver's license, also supporting a reduction in parking demand.

– *"… Distance to transit has a significant effect on residential car parking demand. This effect was found to be strongest when residential development was within 1,500 metres of a major public transport node, with the most significant effect evident for developments situated within 400 metres* (research across Brisbane by Kelly & Pekol, 2013).

Further, in light of the cost of underground parking spaces (in the order of $50,000-60,000 per space) the potential benefits to the affordability of the development and the purchase price of apartments will be enhanced significantly with reduced car parking provision.

Additional DCP review

A number of additional guidelines of parking rate provision were considered in additional to the RMS Guide to Traffic Generating Developments as well as the Blacktown DCP. The additional references provide guidance to parking rates for town centres that are close to existing or future train stations including:

– Draft Bella Vista and Kellyville Precinct DCP;

– City of Ryde DCP – North Ryde Station Precinct;

– City of Ryde DCP – Macquarie Park Corridor; and

– Liverpool Council DCP – Liverpool City Centre.

Despite TSPS not being a Metro-Regional CBD (note the naming reference dated back to 1990's in the RMS Guide to Traffic Generating Developments), these parking rates proposed are most relevant to a residential development that has excellent access to public transport in a CBD / town centre and should be applied to Tallawong Station Precinct South, as per original advice in the SSDA Traffic Impact Assessment.

TSPS is an exemplar transit-oriented development with direct access to the metro network and proposed mix of land uses that serve local residents predominantly within a walking catchment. The precinct will support future residents who choose to live in a transit-oriented centre with low parking provision. Hence the need to predict and provide parking provision does not align with the principle of TSPS. There are over 4,000 approved dwellings / apartments in the surrounding area within the Tallawong Station Precinct with higher parking provision if people / households want to own more cars.

The comparison of the recommended rates with the RMS guidelines is summarised in **Table 2**. A full summary of the relevant parking rates for residential uses (office and retail) are included in **Appendix A**.

Table 2 – Residential parking provision

Land uses	Indicative yield	Most relevant parking rates	1 Bed	2 Beds	3 Beds	Visitor	Parking provision if applied to TSPS
Units	1,100	RMS Guidelines for Metro Sub-Regional CBD Centres	0.6	0.9	1.4	0.2	1,254 1.14 spaces / unit
		City of Ryde DCP – Macquarie Park Corridor	**0.6**	**0.9**	**1.4**	**0.1**	**1,144** **1.04 spaces / unit**
		City of Ryde DCP – North Ryde Station Precinct	**0.6**	**0.9**	**1.4**	**0.1**	**1,144** **1.04 spaces / unit**
		RMS Guidelines for Metro Regional CBD Centres	0.4	0.7	1.2	0.14	971 0.88 spaces / unit

After consideration of all the feedback received on the SSDA TIA and the review of the additional DCP rates, we propose to increase the residential car parking rates to those prescribed for the Macquarie Park corridor and Ryde Station Precinct, which are similar to / align with the RMS Metro Subregional Centre rates proposed for residential, but with reduction in visitor parking space allocation. This will yield the requirement of 1,144 spaces which equates to 1.04 spaces per unit. On average, excluding the visitor parking spaces, 95% of the 1,100 units will have their one allocated parking space.

The proposed parking rates for visitors are different to those proposed by RMS Subregional Centre rates as the proposed development has excellent access to public transport in a CBD / town centre and also the reduction in visitor parking spaces are offset by the creation of new on-street short-term parking spaces in the new streets.

Conclusions

TSPS is an exemplar transit-oriented development with direct access to the metro network and proposed mix of land uses that serve local residents predominantly within a walking catchment. The precinct will support future residents / employees who choose to live and work in a transit-oriented centre with low parking provision. Hence the need to predict and provide parking provision does not align with the principle of TSPS.

Based on the parking provision review, the overall development will provide 1,287 car parking spaces, an additional 187 spaces when compared to the original SSDA Traffic Impact Assessment.

References

Alexandra Kelly, Adam Pekol, *Transit Proximity and Car Parking Demand at Medium/High Density Residential Developments*, Australasian Transport Research Forum 2013 Proceedings, 2 - 4 October 2013, Brisbane, Australia

Catherine Ellis, Bruno Parolin, *Does increased residential density around train stations encourage more environmentally sustainable travel behaviour?* Australasian Transport Research Forum 2010 Proceedings 29 September – 1 October 2010, Canberra, Australia

Audit Office of New South Wales, *New South Wales Auditor-General's Report, Financial Audit, Volume Nine 2016, Report on Transport*, December 2016

Appendix A – Car Parking Rates Review Summary

Tallawong Station DGL Site

Parking review (post-exhibition)

Andy Yung

23 October 2018

Purpose of this Report

- SCT Consulting has been engaged by Landcom to undertake a review of all traffic and transport related submissions and to prepare an updated Traffic Impact Assessment report to support a State Significant Development Application (SSDA) for proposed subdivision of the Cudgegong Road Town Centre Precinct, post-exhibition.
- Three key topics to be reviewed include:
  - Parking rates;
  - Cumulative impact assessment of broader developments in the area; and
  - Need for clarity on adequacy of pedestrian and cycling linkages.

- This presentation summarises a review of residential and non-residential parking rates that could be relevant for Tallawong Station Precinct South (TSPS).

- As a principle, TfNSW and Landcom are proposing reduced car parking provision for Tallawong Station Precinct South (TSPS) to facilitate:
  - An exemplar transit oriented development (maximising the benefits of fast frequent metro connections with services every 4 minutes in the peak and 10 minutes in off-peak);
  - A town centre not dominated by cars;
  - Activation and life on the street; and
  - A reduction in the congestion of precinct roads.

Land use and vehicular needs

Land use	Indicative yield	Is a Parking Reduction Appropriate?	Is Pick-up / drop-off Required?	Is Servicing / loading Required?
Retail	6,000m^2 GFA	Yes, given context, retail would serve the walk-up catchment of local residents and passing trade from metro station, hence can be delivered with minimal parking. Should also consider shared parking with office component (E.g. Coles Express / Food offering at St Leonards Station).	Yes, given passing trade. Can be provided on-street / use the station kiss 'n' ride.	Yes, internal to development.
Office / commercial	3,000m^2 GFA	Yes, TSPS is an exemplar transit-oriented development with direct access to the metro network and proposed mix of land uses that serve local residents predominantly within a walking catchment. The precinct will support future employees who choose to work in a centre with low parking provision.	Not typically required. But can use the station kiss 'n' ride.	Yes, internal to development.
Residential	1,100 apartments	Yes, TSPS is an exemplar transit-oriented development with direct access to the metro network and proposed mix of land uses that serve local residents predominantly within a walking catchment. The precinct will support future residents who choose to live in a transit-oriented centre with low parking provision. There are over 4,000 approved dwellings / apartments in the surrounding area within the Tallawong Station Precinct with higher parking provision if people / households want to own more cars.	N/A	Yes, internal to development.

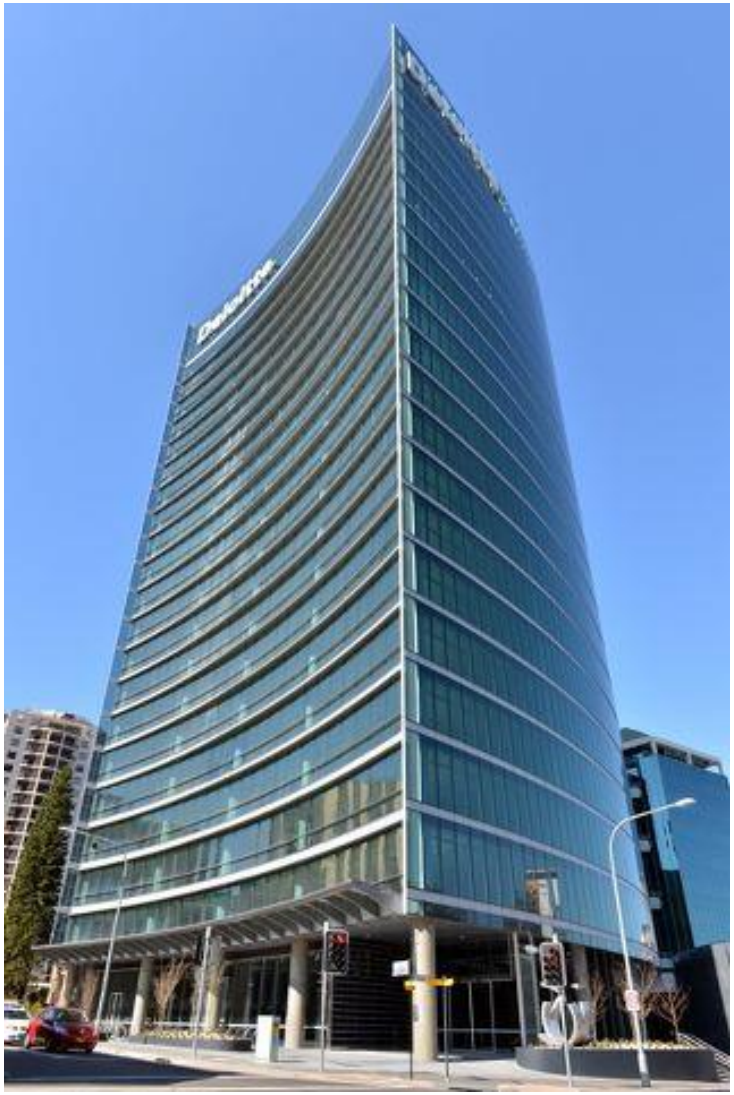
Parking provision - office

Land uses	Indicative yield	Relevant parking rate	Parking provision if applied to TSPS	Proposed Spaces
Office	3,000 sqm	Rouse Hill Regional Centre: 1 space / 25m^2	120	**38***
		RMS Guidelines for Metro Sub-Regional CBD Centres: 1 space / 30m^2	*100*	
		RMS Guidelines for Metro Regional CBD Centres: 1 space / 40m^2	*75*	
		Blacktown City Council Growth Centre Precincts DCP (2016): 1 space / 40m^2	*75*	
		Hill Shire Council DCP: 1 space per 40m^2	75	
		Parramatta DCP – Epping Town Centre (2011): 1 space / 70m^2	***43***	
		Draft Bella Vista and Kellyville Precinct DCP: 1 space / 80m^2	**38**	
		City of Ryde DCP – North Ryde Station Precinct: 1 space / 90m^2	**34**	
		City of Ryde DCP – Macquarie Park Corridor: 1 space / 100m^2	30	
		Liverpool Council DCP - Liverpool City Centre: 1 space / 100m^2	30	
		Parramatta Council – Special Precincts (Westmead): 1 space / 100m^2 (Max)	30	
		Green Square (City of Sydney): 1 space per 125m^2 (Max)	34	
		Occupied building – Eclipse (60 Station St, Parramatta): 1 space / 178m^2	17	
		North Sydney Council DCP: 1 space / 400m^2	8	

Rates in italics were previous considered in the SSDA Traffic Assessment only

Based on an average of the rates proposed under these three precinct-specific DCPs, the office component of TSPS would provide 38 spaces.

Parking provision – examples



ECLIPSE – 60 STATION STREET PARRAMATTA:

Storeys	19 storeys office / ground floor retail
Completed	August 2012
NLA	25,728m^2
Floorplate	1,320m^2
Site Area	3,203m^3
Parking spaces	144 cars and 193 bicycle racks and shower facilities **1 car space / 178m^2 and 1 bike parking space / 133m^2**
Developer	Leighton & Grosvenor Properties
Owner	REST Super
Major tenants	Deloitte, QBE, NSW Government (Landcom)
FSR (as built)	8:1
Features	5 * NABERS; Side core; Floor plate designed for a 1:10m^2 density ratio, with lifting services to PCA 'A-Grade' standards. End-of-trip facilities. Pre-commitments from Deloitte and QBE.

Parking provision - retail

Land use	Indicative yield	Parking rate	Parking provision if applied to TSPS	Proposed Spaces
Retail	6,000 sqm^	*RMS Guide to Trip Generating Developments: 1 space / 16.4m² of GLFA*	*274*	**93**
		Blacktown City Council Growth Centre Precincts DCP (2016): 1 space / 22m² of GFA	*273*	
		Hill Shire Council DCP & Rouse Hill Regional Centre: 1 space / 18.5m² of GLFA	243	
		City of Ryde DCP – Macquarie Park Corridor: 1 space / 25m² of GFA	240	
		Draft Bella Vista and Kellyville Precinct DCP: 1 space / 50m² of retail GFA and 1 space / 30m² of supermarket (GFA)	**160**	
		North Sydney Council DCP: 1 space / 100m² of GFA for neighbourhood centre retail and 1 space per 25m² of GFA for supermarket	150	
		The Parramatta DCP – Epping Town Centre (2011): 1 space / 60m² of GFA	**100**	
		City of Ryde DCP – North Ryde Station Precinct: 1 space / 100m² of retail GFA and 1 space / 60m² of supermarket (GFA)	**80**	
		Liverpool Council DCP - Liverpool City Centre: 1 space / 100m²	60	

^ assuming 50% retail / 50% supermarket
It is also assumed that GLFA is 75% of GFA.
Rates in italics were previous considered in the SSDA Traffic Assessment only

Based on an average of the rates proposed under these three precinct-specific DCPs, the retail component of TSPS would provide 93 spaces.

Parking provision – non residential

Based on an average of the rates proposed under these three precinct-specific DCPs, the non-residential component of the proposed development would provide 131 spaces.

Given the provision of 131 spaces for non-residential component as part of this review is very similar to what was original proposed in the SSDA TIA based on the Parramatta DCP – Epping Town Centre (2011), the recommended non-residential parking rates for TSPS will remain the same as the SSDA TIA:

- 1 space / 60m^2 of supermarket GFA;
- 1 space / 60m^2 for retail GFA; and
- 1 space / 70m^2 for commercial / office GFA.

The non-residential component of TSPS would provide 143 car parking spaces.

Parking provision - residential

Land uses	Indicative yield	Parking rates	1 Bed	2 Beds	3+ Beds	Visitor	Parking provision if applied to TSPS	Proposed Spaces
Units	1,100	Rouse Hill Regional Centre	1	2	2	0.2	2,200 2 spaces / unit	**1,144**
		Blacktown City Council Growth Centre Precincts DCP (2016)	*1*	*1*	*1.5*	*0.2*	*1,430* *1.3 spaces / unit*	
		Draft Bella Vista and Kellyville Precinct DCP	1	1	1	0.25	1,375 1.25 spaces / unit	
		Liverpool Council DCP – Liverpool City Centre	1	1	1.5	0.1	1,320 1.2 spaces / unit	
		The Parramatta DCP – Epping Town Centre (2011)	0.75	1	1.5	0.1	1,265 1.15 spaces / unit	
		RMS Guidelines for Metro Sub-Regional CBD Centres	*0.6*	*0.9*	*1.4*	*0.2*	*1,254* *1.14 spaces / unit*	
		City of Ryde DCP – Macquarie Park Corridor	**0.6**	**0.9**	**1.4**	**0.1**	**1,144** **1.04 spaces / unit**	
		City of Ryde DCP – North Ryde Station Precinct	**0.6**	**0.9**	**1.4**	**0.1**	**1,144** **1.04 spaces / unit**	
		RMS Guidelines for Metro Regional CBD Centres	*0.4*	*0.7*	*1.2*	*0.14*	*971* *0.88 spaces / unit*	

Rates in italics were previous considered in the SSDA Traffic Assessment only

Recommendation: 0.6 space per 1 bed / 0.9 space per 2 bed / 1.4 space per 3+ bed / 0.1 visitor space per dwelling based on other station precincts along the NW Metro line (as highlighted).

Hence, residential parking provision is approximately 1,144 spaces (+173 from the Traffic Assessment)

Overall, provision of 1,287 parking spaces (+187 from the Traffic Assessment)

Parking provision – shared vehicles

Opportunities:

– Consider and investigate further opportunities to support reduced parking provision by introducing shared vehicle parking spaces within the development.

Context:

– There are no requirements for shared vehicles space in Blacktown Council DCP.

– North Sydney Council does not provide a minimum rate of car share parking; however the DCP allows developers to substitute residential or commercial parking spaces with car share spaces at the rate of 3 or 4 to 1.

– City of Parramatta Council DCP prescribes 1 carshare parking space is to be provided for any business development with a floor space of 5,000 square metres or above and is within a 800m radial catchment of a railway station. 1 car share space can be provided in lieu of 3 car parking spaces.

– There are two car share parking spaces currently provided by GoGet within Rouse Hill Regional Centre.

Outcomes:

– Allowance of 5-10 car share parking space which is aimed at offsetting dedicated parking space provision to support the reduced parking provision for TSPS.

Parking provision – shared vehicles

Justification:

– Subject to further discussions with car sharing providers, given the increase in density and quantity of development surrounding the station, it is proposed that 20-30 normal parking spaces be replaced by 5-10 car share parking spaces at this location.

Outcomes:

– Allowance of 5-10 car share parking space and further reduction of 15-20 normal parking spaces for this development.

Appendix B – Cumulative Traffic Impacts Modelling

Technical Memorandum

Quality Information	
Project:	Tallawong Station SSDA – Post Exhibition Traffic Modelling
Project Number:	SCT_00049
Document Name:	Cumulative impact assessment of broader developments in Area 20
Prepared:	Daniel Lee, Principal Consultant
Reviewed:	Andy Yung, Associate Director
Authorised:	Andy Yung, Associate Director

Background

The Cudgegong Road (Area 20) Precinct was rezoned by the Department of Planning and Environment (DPE). The Cudgegong town centre will become a local village centre with a range of housing typologies and provide convenient and lifestyle destinations for residents, workers and visitors, all within walking distance. The SSDA is seeking approval for the development of a mixed-use town centre (within the Developable Government Land) with approximately 1,100 dwellings and supporting retail, office and community uses.

SCT Consulting prepared a Traffic Impact Assessment in May 2018 to support the exhibition of the State Significant Development Application. Comments were received from agencies and the public, with comments focussed on:

– Parking rates;

– Cumulative impact assessment of broader developments in the area;

– Need for clarity on adequacy of pedestrian and cycling linkages;

Specifically, the Department of Planning & Environment has asked Landcom to prepare a cumulative impact assessment for the additional dwellings approved in the wider Area 20 Precinct and dwellings proposed by the proponent additional to the baseline scenario.

This memo summarises the additional traffic modelling undertaken for the cumulative impact assessment of broader developments in Area 20 as well as the proposed development within the Developable Government Land at Tallawong Station.

Modelling scenarios

The *Area 20 Traffic Assessment, Arup 2015* was used as the assessment of the baseline scenario. This report supported the rezoning in the vicinity of Tallawong Station in Area 20, with zoning amendments expected to accommodate up to 4,400 dwellings. The assessment and the traffic modelling completed by Arup, was based on the regional growth forecasts from a Netanal model.

The modelling scenarios analysed will include:

– **2036 AM & PM – Baseline (Area 20 Approved Indicative Layout Plan)**, which was undertaken to demonstrate that the traffic modelling is consistent with previous work by Arup as well as to establish the baseline for this cumulative assessment;

– **2036 AM & PM – Background Growth (Area 20 Indicative Layout Plan + subsequent approvals)**, which will show the impacts of the subsequent approvals on the previously identified infrastructure. This modelling will be used to show whether any upgrades are required to service the background growth (as a result of the additional dwelling approved in the wider Area 20); and

– **2036 AM & PM – Proposal (Area 20 Indicative Layout Plan + subsequent approvals + Cudgegong Road Town Centre Precinct SSDA uplift)**, which considered the incremental impacts of the proponent additional development on the network.

SCT Consulting has prepared traffic models for the following locations, which are the same locations assessed in the original Area 20 Traffic Assessment, to understand the incremental impacts:

– Windsor Road / Commercial Road;
– Schofields Road / Terry Road;
– Schofields Road / Cudgegong Road; and
– Schofields Road / Tallawong Road.

It is expected that the additional dwellings and associated trip generation would have negligible impacts to the operations of Windsor Road / Rouse Road, assuming all trips travelling to and from Windsor Road north would access the network via Commercial Road. Hence, no additional modelling has been undertaken at this location.

Traffic demand analysis

According to the traffic generation assumptions established in the *Area 20 Traffic Assessment, Arup 2015*, the approved 4,400 dwellings would be expected to generate approximately 1,950 trips during the peak hours.

Based on DA information provided by Landcom, a total of 4,933 dwellings have been approved to date within the Area 20 precinct boundary. Of the 4,933 dwellings approved, 3,872 (79%) of them are medium density housing and 1,054 (21%) are medium to high density ones that are located within 800m of Tallawong Station. Adopting the same trip generation rates as per the original assessment completed, the additional 533 dwellings approved (over the approved 4,400 dwellings) is expected to generate an additional 200 peak hour trips. These trips were distributed onto the adjacent network based on the JTW data. The entry into the precinct, from this uplift, were evenly distributed between the Cudgegong Road and Terry Road intersections of Schofields Road. Conversely, exiting trips, were distributed between Tallawong Road and Terry Road.

The proposed 1,100 additional units would result in 209 more trips during the AM peak and 165 trips during the PM peak. These additional trips were distributed in the Tallawong precinct in the same manner as the transport assessment undertaken for *Cudgegong Road Traffic and Transport Impact Assessment, SCT May 2018*.

Intersection performance

The intersection performance based on assessment undertaken in SIDRA 8.0 for the three modelling scenarios (baseline, additional 533 approved dwellings as well as the additional 1,100 units proposed by Landcom) are summarised in the following tables. Details of performance by intersection approaches are included in Appendix A.

As the SIDRA models developed by Arup is not available, the models were replicated using the latest version of SIDRA 8.0 and the geometrical layouts and volumes published in the Area 20 Traffic Assessment.

Table 1 Cudgegong Road / Schofields Road

Scenario	Delays (seconds)	LOS	95th Percentile Queue – Longest approach
AM Peak (4,400 Lots)	16.6	B	121.7m (west approach)
AM Peak (additional 533 lots)	25.3	C	145.3m (west approach)
AM Peak (additional 533 lots + 1,100 units)	20.7	C	187.5m (west approach)
PM Peak (4,400 Lots)	17.3	B	160.0m (west approach)
PM Peak (additional 533 lots)	18.9	B	181.3m (west approach)
PM Peak (additional 533 lots + 1,100 units)	22.1	C	204.9m (west approach)

Source: SCT Consulting, 2018

Table 2 Tallawong Road / Schofields Road

Scenario	Delays (seconds)	LOS	95th Percentile Queue – Longest approach
AM Peak (4,400 Lots)	43.1	D	115.5m (east approach)
AM Peak (additional 533 lots)	43.1	D	118.4m (east approach)
AM Peak (additional 533 lots + 1,100 units)	46.5	D	123.7m (east approach)
PM Peak (4,400 Lots)	48.7	D	200.0m (south approach)
PM Peak (additional 533 lots)	49.5	D	200.0m (south approach)
PM Peak (additional 533 lots + 1,100 units)	50.1	D	210.4m (south approach)

Source: SCT Consulting, 2018

Table 3 Commercial Road / Windsor Road

Scenario	Delays (seconds)	LOS	95th Percentile Queue – Longest approach
AM Peak (4,400 Lots)	13.6	A	156.4m (north approach)
AM Peak (additional 533 lots)	24.5	B	216.5m (north approach)
AM Peak (additional 533 lots + 1,100 units)	24.3	B	216.5m (north approach)
PM Peak (4,400 Lots)	13.9	A	148.5m (south approach)
PM Peak (additional 533 lots)	14.1	A	148.2m (south approach)
PM Peak (additional 533 lots + 1,100 units)	14.2	A	148.2m (south approach)

Source: SCT Consulting, 2018

Table 4 Terry Road / Schofields Road

Scenario	Delays (seconds)	LOS	95th Percentile Queue – Longest approach
AM Peak (4,400 Lots)	52.9	D	235.6m (west approach)
AM Peak (additional 533 lots)	60.5	E	278.1m (west approach)
AM Peak (additional 533 lots + 1,100 units)	70.9	F	347.3m (west approach)
PM Peak (4,400 Lots)	40.1	C	207.3m (south approach)
PM Peak (additional 533 lots)	41.3	C	214.5m (south approach)
PM Peak (additional 533 lots + 1,100 units)	41.6	C	214.5m (south approach)

Source: SCT Consulting, 2018

The traffic modelling confirmed that the performance of the surrounding major intersections would operate at a marginally lower level of service or performance as a result of the additional approved 533 lots in the wider Area 20 Precinct as well as the additional 1,100 units proposed by Landcom:

– Windsor Road / Commercial Road;

– Schofields Road / Cudgegong Road; and

– Schofields Road / Tallawong Road.

The exception to this is the Terry Road / Schofields Road intersection which is estimated to perform at Level of Service E during the 2036 AM peak as a result of the additional approved 533 lots (excluding the 1,100 units in the Concept Proposal).

To accommodate the additional vehicle movements arising from the extra 533 lots, the right turn bay of the northern approach at this intersection would need to be extended from 40m to 120m. The SIDRA modelling with the extended right turn bay confirmed that the intersection would be expected to operate with Level of Service D or better under all modelling scenarios. However, the modelling confirms that the extension to the right turn bay is not needed as a result of the subject development and would therefore need to be provided by others.

It should be noted that this northern approach at the Terry Road / Schofields Road intersection has been constructed as a stub with a right turn lane. The full extent of the right turn bay has not been fully constructed yet. Hence the proposed extension of the right turn bay, if required, can be considered prior to the construction of this northern approach. The 40m right turn bay tested in the base case was based on the assumptions made in the Arup report. At the time of this assessment, no updated information was available to confirm the dimension of this right turn bay in the final design.

Table 5 Terry Road / Schofields Road – Extension of Northern Approach Right Turn Bay to 120m

Scenario	Delays (seconds)	LOS	95th Percentile Queue – Longest approach
AM Peak (4,400 Lots)	45.9	D	210.5m (north approach)
AM Peak (additional 533 lots)	50.2	D	244.4m (west approach)
AM Peak (additional 533 lots + 1,100 units)	55.0	D	298.1m (west approach)
PM Peak (4,400 Lots)	40.1	C	207.3m (south approach)
PM Peak (additional 533 lots)	41.3	C	214.5m (south approach)
PM Peak (additional 533 lots + 1,100 units)	41.6	C	214.5m (south approach)

Source: SCT Consulting, 2018

Conclusions

The traffic modelling confirmed that the performance of the surrounding major intersections would operate at a marginally lower level of service or performance as a result of the additional approved 533 lots in the wider Area 20 Precinct as well as the additional 1,100 units proposed by Landcom:

– Windsor Road / Commercial Road;

– Schofields Road / Cudgegong Road; and

– Schofields Road / Tallawong Road.

The exception to this is the Terry Road / Schofields Road intersection which is estimated to perform at Level of Service E during the 2036 AM peak as a result of the additional approved 533 lots (excluding the 1,100 units in the Concept Proposal).

To accommodate the additional vehicle movements arising from the extra 533 lots, the right turn bay of the northern approach at this intersection would need to be extended from 40m to 120m. The SIDRA modelling with the extended right turn bay confirmed that the intersection would be expected to operate with Level of Service D or better under all modelling scenarios. However, the modelling confirms that the extension to the right turn bay is not needed as a result of the subject development and would therefore need to be provided by others.

Appendix A – Intersection Performance Summary

MOVEMENT SUMMARY

Site: [Cudgegong Road AM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Schofields Road												
5	T1	928	0.1	0.307	5.3	LOS A	9.8	68.5	0.32	0.29	0.32	63.6
6	R2	75	0.0	0.416	81.3	LOS F	3.8	26.5	0.99	0.74	0.99	26.2
Approach		1003	0.1	0.416	11.0	LOS B	9.8	68.5	0.37	0.32	0.37	57.5
North: Cudgegong Road												
7	L2	201	0.0	0.427	55.9	LOS E	12.3	85.9	0.89	0.80	0.89	32.1
9	R2	42	0.0	0.179	69.2	LOS E	2.8	19.4	0.93	0.74	0.93	28.5
Approach		243	0.0	0.427	58.2	LOS E	12.3	85.9	0.90	0.79	0.90	31.4
West: Schofields Road												
10	L2	105	0.0	0.410	18.1	LOS B	17.0	119.1	0.49	0.50	0.49	52.1
11	T1	957	0.0	0.410	11.8	LOS B	17.4	121.7	0.49	0.47	0.49	56.6
Approach		1062	0.0	0.410	12.4	LOS B	17.4	121.7	0.49	0.47	0.49	56.1
All Vehicles		2308	0.0	0.427	16.6	LOS B	17.4	121.7	0.48	0.44	0.48	52.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Cudgegong Road AM (+533)]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Schofields Road												
5	T1	944	0.1	0.450	22.0	LOS C	20.5	143.5	0.65	0.58	0.65	49.2
6	R2	91	0.0	0.316	73.8	LOS E	4.3	30.3	0.96	0.75	0.96	27.6
Approach		1035	0.1	0.450	26.6	LOS C	20.5	143.5	0.68	0.60	0.68	46.0
North: Cudgegong Road												
7	L2	251	0.0	0.451	51.0	LOS D	14.8	103.3	0.86	0.81	0.86	33.3
9	R2	67	0.0	0.271	69.2	LOS E	4.5	31.2	0.94	0.76	0.94	28.2
Approach		318	0.0	0.451	54.8	LOS D	14.8	103.3	0.88	0.80	0.88	32.1
West: Schofields Road												
10	L2	105	0.0	0.456	21.4	LOS C	20.4	142.9	0.56	0.56	0.56	49.7
11	T1	1007	0.0	0.456	15.2	LOS B	20.8	145.5	0.56	0.53	0.56	53.6
Approach		1112	0.0	0.456	15.7	LOS B	20.8	145.5	0.56	0.53	0.56	53.2
All Vehicles		2465	0.0	0.456	25.3	LOS C	20.8	145.5	0.65	0.59	0.65	46.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Cudgegong Road AM (+533 +1100)]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Schofields Road												
5	T1	944	0.1	0.313	5.3	LOS A	10.0	70.0	0.32	0.29	0.32	63.4
6	R2	157	0.0	0.545	75.5	LOS E	7.7	53.8	0.98	0.78	0.98	27.1
Approach		1101	0.1	0.545	15.3	LOS B	10.0	70.0	0.42	0.36	0.42	53.2
North: Cudgegong Road												
7	L2	251	0.0	0.451	51.0	LOS D	14.8	103.3	0.86	0.81	0.86	33.3
9	R2	67	0.0	0.271	69.2	LOS E	4.5	31.2	0.94	0.76	0.94	28.2
Approach		318	0.0	0.451	54.8	LOS D	14.8	103.3	0.88	0.80	0.88	32.1
West: Schofields Road												
10	L2	111	0.0	0.543	22.6	LOS C	26.3	184.4	0.61	0.59	0.61	48.8
11	T1	1212	0.0	0.543	16.4	LOS B	26.8	187.5	0.61	0.58	0.61	52.2
Approach		1323	0.0	0.543	16.9	LOS B	26.8	187.5	0.61	0.58	0.61	51.9
All Vehicles		2742	0.0	0.545	20.7	LOS C	26.8	187.5	0.56	0.52	0.56	48.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Cudgegong Road PM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Schofields Road												
5	T1	909	0.1	0.301	5.2	LOS A	9.5	66.6	0.32	0.29	0.32	63.6
6	R2	116	0.0	0.495	78.4	LOS E	5.8	40.3	0.99	0.76	0.99	26.8
Approach		1025	0.1	0.495	13.5	LOS B	9.5	66.6	0.39	0.34	0.39	55.0
North: Cudgegong Road												
7	L2	166	0.0	0.327	52.1	LOS D	9.6	67.4	0.84	0.78	0.84	33.2
9	R2	26	0.0	0.111	68.4	LOS E	1.7	11.9	0.92	0.72	0.92	28.6
Approach		192	0.0	0.327	54.3	LOS D	9.6	67.4	0.85	0.78	0.85	32.5
West: Schofields Road												
10	L2	113	0.0	0.491	20.5	LOS C	22.4	157.0	0.55	0.55	0.55	50.5
11	T1	1122	0.0	0.491	14.2	LOS B	22.9	160.0	0.56	0.53	0.56	54.6
Approach		1235	0.0	0.491	14.8	LOS B	22.9	160.0	0.56	0.53	0.56	54.2
All Vehicles		2452	0.0	0.495	17.3	LOS B	22.9	160.0	0.51	0.47	0.51	51.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Cudgegong Road PM (+533)]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Schofields Road												
5	T1	959	0.1	0.318	5.3	LOS A	10.2	71.5	0.32	0.29	0.32	63.1
6	R2	166	0.0	0.512	73.3	LOS E	8.0	56.0	0.97	0.78	0.97	27.5
Approach		1125	0.1	0.512	15.4	LOS B	10.2	71.5	0.42	0.36	0.42	53.0
North: Cudgegong Road												
7	L2	119	0.0	0.209	46.5	LOS D	6.4	44.6	0.78	0.76	0.78	34.9
9	R2	40	0.0	0.170	69.1	LOS E	2.6	18.5	0.93	0.74	0.93	28.3
Approach		159	0.0	0.209	52.2	LOS D	6.4	44.6	0.82	0.75	0.82	33.0
West: Schofields Road												
10	L2	138	0.0	0.529	23.5	LOS C	25.5	178.2	0.61	0.61	0.61	48.2
11	T1	1125	0.0	0.529	17.2	LOS B	25.9	181.3	0.62	0.58	0.62	52.1
Approach		1263	0.0	0.529	17.9	LOS B	25.9	181.3	0.62	0.59	0.62	51.7
All Vehicles		2547	0.0	0.529	18.9	LOS B	25.9	181.3	0.54	0.50	0.54	50.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Cudgegong Road PM (+533 +1100)]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Schofields Road												
5	T1	959	0.1	0.318	5.3	LOS A	10.2	71.5	0.32	0.29	0.32	63.1
6	R2	250	0.0	0.578	68.3	LOS E	11.8	82.5	0.96	0.80	0.96	28.4
Approach		1209	0.1	0.578	18.4	LOS B	11.8	82.5	0.46	0.40	0.46	50.4
North: Cudgegong Road												
7	L2	166	0.0	0.258	42.9	LOS D	8.6	60.1	0.76	0.76	0.76	36.2
9	R2	26	0.0	0.111	68.4	LOS E	1.7	11.9	0.92	0.72	0.92	28.3
Approach		192	0.0	0.258	46.3	LOS D	8.6	60.1	0.78	0.76	0.78	34.9
West: Schofields Road												
10	L2	155	0.0	0.575	27.4	LOS C	28.8	201.8	0.68	0.67	0.68	45.6
11	T1	1127	0.0	0.575	21.2	LOS C	29.3	204.9	0.69	0.64	0.69	49.2
Approach		1282	0.0	0.575	21.9	LOS C	29.3	204.9	0.69	0.65	0.69	48.7
All Vehicles		2683	0.0	0.578	22.1	LOS C	29.3	204.9	0.59	0.54	0.59	48.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Tallawong Road AM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tallawong Road												
1	L2	92	0.0	0.121	32.8	LOS C	3.8	26.8	0.66	0.73	0.66	39.7
2	T1	205	0.0	0.481	46.3	LOS D	11.6	81.2	0.88	0.73	0.88	34.3
3	R2	26	0.0	0.094	61.0	LOS E	1.6	10.9	0.89	0.71	0.89	30.9
Approach		323	0.0	0.481	43.7	LOS D	11.6	81.2	0.82	0.73	0.82	35.4
East: Schofields Road												
4	L2	45	0.0	0.048	24.8	LOS B	1.5	10.6	0.53	0.69	0.53	44.6
5	T1	902	0.1	0.490	41.5	LOS C	16.5	115.5	0.86	0.74	0.86	39.1
6	R2	24	0.0	0.122	68.4	LOS E	1.5	10.6	0.94	0.71	0.94	29.2
Approach		972	0.1	0.490	41.4	LOS C	16.5	115.5	0.85	0.74	0.85	39.0
North: Tallawong Road												
7	L2	97	0.0	0.128	32.9	LOS C	4.1	28.4	0.66	0.73	0.66	39.7
8	T1	308	0.0	0.469	46.1	LOS D	13.5	94.7	0.88	0.73	0.88	34.4
9	R2	131	0.0	0.469	65.1	LOS E	8.3	58.0	0.96	0.79	0.96	29.9
Approach		536	0.0	0.469	48.3	LOS D	13.5	94.7	0.86	0.74	0.86	34.0
West: Schofields Road												
10	L2	139	0.0	0.148	25.9	LOS B	4.9	34.6	0.56	0.72	0.56	44.1
11	T1	834	0.1	0.453	41.0	LOS C	15.0	105.2	0.85	0.73	0.85	39.4
12	R2	97	0.0	0.487	71.7	LOS F	6.4	44.9	0.99	0.78	0.99	28.4
Approach		1069	0.1	0.487	41.8	LOS C	15.0	105.2	0.83	0.73	0.83	38.5
All Vehicles		2900	0.1	0.490	43.1	LOS D	16.5	115.5	0.84	0.73	0.84	37.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Tallawong Road AM (+533)]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tallawong Road												
1	L2	92	0.0	0.128	34.9	LOS C	4.0	27.8	0.68	0.73	0.68	38.8
2	T1	205	0.0	0.512	48.2	LOS D	11.8	82.9	0.90	0.74	0.90	33.8
3	R2	26	0.0	0.086	59.0	LOS E	1.5	10.7	0.88	0.71	0.88	31.4
Approach		323	0.0	0.512	45.3	LOS D	11.8	82.9	0.83	0.74	0.83	34.8
East: Schofields Road												
4	L2	45	0.0	0.046	23.2	LOS B	1.5	10.2	0.51	0.68	0.51	45.5
5	T1	929	0.1	0.494	40.9	LOS C	16.9	118.4	0.86	0.74	0.86	39.3
6	R2	24	0.0	0.130	69.6	LOS E	1.5	10.8	0.94	0.71	0.94	28.9
Approach		999	0.1	0.494	40.8	LOS C	16.9	118.4	0.85	0.74	0.85	39.2
North: Tallawong Road												
7	L2	149	0.0	0.209	36.0	LOS C	6.7	47.0	0.71	0.75	0.71	38.0
8	T1	308	0.0	0.496	48.0	LOS D	13.8	96.7	0.89	0.74	0.89	33.8
9	R2	157	0.0	0.514	63.9	LOS E	9.9	69.4	0.96	0.80	0.96	30.1
Approach		615	0.0	0.514	49.1	LOS D	13.8	96.7	0.87	0.76	0.87	33.6
West: Schofields Road												
10	L2	139	0.0	0.142	24.2	LOS B	4.7	33.0	0.54	0.72	0.54	44.9
11	T1	837	0.1	0.444	40.1	LOS C	14.9	104.5	0.84	0.72	0.84	39.7
12	R2	97	0.0	0.521	73.0	LOS F	6.5	45.4	0.99	0.78	0.99	28.1
Approach		1073	0.1	0.521	41.0	LOS C	14.9	104.5	0.82	0.73	0.82	38.8
All Vehicles		3009	0.1	0.521	43.1	LOS D	16.9	118.4	0.84	0.74	0.84	37.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Tallawong Road AM (+533 +1100)]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tallawong Road												
1	L2	92	0.0	0.133	36.3	LOS C	4.1	28.4	0.70	0.73	0.70	38.3
2	T1	205	0.0	0.528	49.2	LOS D	12.0	83.8	0.91	0.75	0.91	33.5
3	R2	26	0.0	0.068	53.3	LOS D	1.4	10.0	0.84	0.70	0.84	33.0
Approach		323	0.0	0.528	45.8	LOS D	12.0	83.8	0.84	0.74	0.84	34.6
East: Schofields Road												
4	L2	45	0.0	0.045	22.2	LOS B	1.4	9.8	0.49	0.68	0.49	46.1
5	T1	929	0.1	0.542	44.5	LOS D	17.7	123.7	0.90	0.77	0.90	37.8
6	R2	24	0.0	0.140	70.8	LOS F	1.6	10.9	0.95	0.71	0.95	28.7
Approach		999	0.1	0.542	44.2	LOS D	17.7	123.7	0.88	0.76	0.88	37.8
North: Tallawong Road												
7	L2	260	0.0	0.550	54.0	LOS D	15.4	107.6	0.92	0.83	0.92	31.7
8	T1	308	0.0	0.511	48.9	LOS D	14.0	97.7	0.90	0.75	0.90	33.5
9	R2	214	0.0	0.555	59.5	LOS E	13.2	92.1	0.95	0.82	0.95	31.0
Approach		782	0.0	0.555	53.5	LOS D	15.4	107.6	0.92	0.79	0.92	32.2
West: Schofields Road												
10	L2	139	0.0	0.138	23.2	LOS B	4.6	32.0	0.52	0.71	0.52	45.5
11	T1	840	0.1	0.490	43.7	LOS D	15.7	109.7	0.88	0.75	0.88	38.2
12	R2	97	0.0	0.562	74.3	LOS F	6.6	45.9	1.00	0.78	1.00	27.8
Approach		1076	0.1	0.562	43.8	LOS D	15.7	109.7	0.84	0.75	0.84	37.7
All Vehicles		3180	0.1	0.562	46.5	LOS D	17.7	123.7	0.87	0.76	0.87	35.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Tallawong Road PM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tallawong Road												
1	L2	31	0.0	0.038	29.3	LOS C	1.2	8.1	0.60	0.68	0.60	39.8
2	T1	471	0.0	0.771	45.2	LOS D	28.6	200.0	0.95	0.85	0.96	34.7
3	R2	25	0.0	0.071	55.1	LOS D	1.4	9.8	0.85	0.70	0.85	31.6
Approach		526	0.0	0.771	44.7	LOS D	28.6	200.0	0.92	0.83	0.94	34.8
East: Schofields Road												
4	L2	48	0.0	0.054	26.1	LOS B	1.7	12.1	0.56	0.68	0.56	41.7
5	T1	596	0.2	0.419	48.0	LOS D	11.4	79.7	0.89	0.74	0.89	33.7
6	R2	82	0.0	0.688	79.5	LOS F	5.9	41.1	1.00	0.82	1.11	26.0
Approach		726	0.1	0.688	50.1	LOS D	11.4	79.7	0.88	0.75	0.90	33.0
North: Tallawong Road												
7	L2	42	0.0	0.052	29.5	LOS C	1.6	11.3	0.60	0.69	0.60	39.7
8	T1	246	0.0	0.293	36.5	LOS C	9.4	65.9	0.77	0.64	0.77	37.8
9	R2	271	0.0	0.755	65.5	LOS E	18.1	126.7	1.00	0.87	1.06	29.0
Approach		559	0.0	0.755	50.0	LOS D	18.1	126.7	0.87	0.75	0.90	33.1
West: Schofields Road												
10	L2	319	0.0	0.359	29.9	LOS C	13.5	94.3	0.67	0.76	0.67	40.0
11	T1	1063	0.1	0.748	53.7	LOS D	22.7	158.9	0.99	0.87	1.01	32.0
12	R2	40	0.0	0.335	76.2	LOS F	2.7	19.1	0.99	0.74	0.99	26.5
Approach		1422	0.1	0.748	49.0	LOS D	22.7	158.9	0.92	0.84	0.93	33.3
All Vehicles		3234	0.1	0.771	48.7	LOS D	28.6	200.0	0.90	0.80	0.92	33.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Tallawong Road PM (+533)]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tallawong Road												
1	L2	31	0.0	0.038	29.9	LOS C	1.2	8.3	0.61	0.68	0.61	39.5
2	T1	471	0.0	0.771	45.2	LOS D	28.6	200.0	0.95	0.85	0.96	34.7
3	R2	25	0.0	0.068	54.1	LOS D	1.4	9.7	0.84	0.70	0.84	31.8
Approach		526	0.0	0.771	44.7	LOS D	28.6	200.0	0.92	0.83	0.94	34.8
East: Schofields Road												
4	L2	48	0.0	0.054	25.5	LOS B	1.7	11.9	0.55	0.68	0.55	42.0
5	T1	611	0.2	0.429	48.1	LOS D	11.7	82.0	0.90	0.75	0.90	33.6
6	R2	82	0.0	0.774	82.6	LOS F	6.0	42.2	1.00	0.86	1.23	25.4
Approach		741	0.1	0.774	50.5	LOS D	11.7	82.0	0.88	0.75	0.91	32.9
North: Tallawong Road												
7	L2	45	0.0	0.057	30.1	LOS C	1.8	12.4	0.61	0.70	0.61	39.4
8	T1	246	0.0	0.192	35.7	LOS C	5.9	41.6	0.76	0.62	0.76	38.1
9	R2	285	0.0	0.768	65.4	LOS E	19.2	134.1	1.00	0.88	1.07	29.0
Approach		577	0.0	0.768	50.0	LOS D	19.2	134.1	0.87	0.75	0.90	33.1
West: Schofields Road												
10	L2	319	0.0	0.354	29.2	LOS C	13.3	93.0	0.66	0.76	0.66	40.3
11	T1	1117	0.1	0.785	55.7	LOS D	24.6	172.0	1.00	0.90	1.05	31.4
12	R2	40	0.0	0.377	77.7	LOS F	2.8	19.4	1.00	0.74	1.00	26.2
Approach		1476	0.1	0.785	50.6	LOS D	24.6	172.0	0.93	0.87	0.97	32.8
All Vehicles		3320	0.1	0.785	49.5	LOS D	28.6	200.0	0.91	0.82	0.94	33.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Tallawong Road PM (+533 +1100)]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tallawong Road												
1	L2	31	0.0	0.040	31.1	LOS C	1.2	8.5	0.62	0.69	0.62	39.0
2	T1	471	0.0	0.807	49.2	LOS D	30.1	210.4	0.97	0.89	1.02	33.4
3	R2	25	0.0	0.066	53.2	LOS D	1.4	9.6	0.84	0.70	0.84	32.1
Approach		526	0.0	0.807	48.3	LOS D	30.1	210.4	0.94	0.87	0.99	33.7
East: Schofields Road												
4	L2	48	0.0	0.052	24.4	LOS B	1.7	11.6	0.54	0.67	0.54	42.5
5	T1	611	0.2	0.417	47.2	LOS D	11.6	81.1	0.89	0.74	0.89	33.9
6	R2	82	0.0	0.774	82.6	LOS F	6.0	42.2	1.00	0.86	1.23	25.4
Approach		741	0.1	0.774	49.6	LOS D	11.6	81.1	0.88	0.75	0.90	33.1
North: Tallawong Road												
7	L2	51	0.0	0.066	31.5	LOS C	2.0	14.2	0.63	0.70	0.63	38.8
8	T1	246	0.0	0.201	37.3	LOS C	6.1	42.5	0.77	0.63	0.77	37.5
9	R2	311	0.0	0.807	67.0	LOS E	21.4	149.9	1.00	0.90	1.10	28.7
Approach		607	0.0	0.807	52.0	LOS D	21.4	149.9	0.88	0.77	0.93	32.5
West: Schofields Road												
10	L2	319	0.0	0.343	27.9	LOS B	12.9	90.3	0.65	0.76	0.65	40.9
11	T1	1161	0.1	0.793	55.5	LOS D	25.6	179.3	1.00	0.91	1.06	31.5
12	R2	40	0.0	0.377	77.7	LOS F	2.8	19.4	1.00	0.74	1.00	26.2
Approach		1520	0.1	0.793	50.3	LOS D	25.6	179.3	0.92	0.87	0.97	32.9
All Vehicles		3395	0.1	0.807	50.1	LOS D	30.1	210.4	0.91	0.83	0.95	33.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Commercial Road AM]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Windsor Road												
1	L2	14	0.0	0.007	7.6	LOS A	0.0	0.0	0.00	0.60	0.00	66.2
2	T1	964	0.0	0.233	6.4	LOS A	6.4	44.8	0.37	0.33	0.37	70.2
3	R2	21	0.0	0.113	69.0	LOS E	0.6	4.3	0.98	0.67	0.98	29.7
Approach		999	0.0	0.233	7.7	LOS A	6.4	44.8	0.38	0.34	0.38	68.2
East: Commercial Road												
4	L2	88	0.0	0.137	11.3	LOS A	1.8	12.4	0.42	0.67	0.42	54.2
6	R2	178	0.0	0.287	53.4	LOS D	4.6	32.4	0.92	0.77	0.92	33.4
Approach		266	0.0	0.287	39.4	LOS C	4.6	32.4	0.75	0.74	0.75	38.3
North: Windsor Road												
7	L2	221	0.0	0.131	7.7	LOS A	0.8	5.5	0.12	0.64	0.12	59.2
8	T1	1823	0.0	0.554	14.2	LOS A	22.3	156.4	0.62	0.56	0.62	61.0
Approach		2044	0.0	0.554	13.5	LOS A	22.3	156.4	0.57	0.57	0.57	60.8
West: Commercial Road												
10	L2	145	0.0	0.131	6.6	LOS A	0.9	6.0	0.19	0.60	0.19	58.3
Approach		145	0.0	0.131	6.6	LOS A	0.9	6.0	0.19	0.60	0.19	58.3
All Vehicles		3455	0.0	0.554	13.6	LOS A	22.3	156.4	0.51	0.52	0.51	59.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Commercial Road AM (+533)]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Windsor Road												
1	L2	14	0.0	0.008	7.6	LOS A	0.0	0.3	0.10	0.62	0.10	59.3
2	T1	964	0.0	0.304	15.9	LOS B	10.1	70.9	0.59	0.51	0.59	59.4
3	R2	21	0.0	0.113	69.0	LOS E	0.6	4.3	0.98	0.67	0.98	29.7
Approach		999	0.0	0.304	16.9	LOS B	10.1	70.9	0.59	0.51	0.59	58.2
East: Commercial Road												
4	L2	88	0.0	0.091	13.7	LOS A	2.1	14.4	0.44	0.67	0.44	52.4
5	T1	2	0.0	0.276	45.9	LOS D	4.6	32.2	0.90	0.77	0.90	32.6
6	R2	178	0.0	0.276	52.0	LOS D	4.6	32.3	0.91	0.77	0.91	33.9
Approach		268	0.0	0.276	39.3	LOS C	4.6	32.3	0.75	0.73	0.75	38.3
North: Windsor Road												
7	L2	221	0.0	0.153	9.3	LOS A	2.3	16.4	0.24	0.67	0.24	57.8
8	T1	1823	0.0	0.744	29.1	LOS C	30.9	216.5	0.88	0.79	0.88	49.0
Approach		2044	0.0	0.744	26.9	LOS B	30.9	216.5	0.81	0.77	0.81	49.8
West: Commercial Road												
10	L2	145	0.0	0.291	15.7	LOS B	3.2	22.7	0.60	0.70	0.60	51.2
11	T1	9	0.0	0.291	10.1	LOS A	3.2	22.7	0.60	0.70	0.60	48.0
Approach		155	0.0	0.291	15.3	LOS B	3.2	22.7	0.60	0.70	0.60	51.0
All Vehicles		3466	0.0	0.744	24.5	LOS B	30.9	216.5	0.73	0.69	0.73	50.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Commercial Road AM (+533 +1100)]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Windsor Road												
1	L2	14	0.0	0.008	7.6	LOS A	0.0	0.3	0.10	0.62	0.10	59.3
2	T1	964	0.0	0.304	15.9	LOS B	10.1	70.9	0.59	0.51	0.59	59.4
3	R2	21	0.0	0.113	69.0	LOS E	0.6	4.3	0.98	0.67	0.98	29.7
Approach		999	0.0	0.304	16.9	LOS B	10.1	70.9	0.59	0.51	0.59	58.2
East: Commercial Road												
4	L2	88	0.0	0.091	13.7	LOS A	2.1	14.4	0.44	0.67	0.44	52.4
5	T1	4	0.0	0.183	35.7	LOS C	4.0	27.7	0.80	0.74	0.80	36.0
6	R2	178	0.0	0.183	41.2	LOS C	4.2	29.1	0.80	0.75	0.80	37.6
Approach		271	0.0	0.183	32.1	LOS C	4.2	29.1	0.68	0.72	0.68	41.4
North: Windsor Road												
7	L2	221	0.0	0.166	10.9	LOS A	3.2	22.6	0.31	0.68	0.31	56.3
8	T1	1823	0.0	0.744	29.1	LOS C	30.9	216.5	0.88	0.79	0.88	49.0
Approach		2044	0.0	0.744	27.1	LOS B	30.9	216.5	0.82	0.78	0.82	49.7
West: Commercial Road												
10	L2	145	0.0	0.383	21.9	LOS B	4.9	34.2	0.69	0.72	0.69	47.3
11	T1	18	0.0	0.383	16.3	LOS B	4.9	34.2	0.69	0.72	0.69	44.6
Approach		163	0.0	0.383	21.3	LOS B	4.9	34.2	0.69	0.72	0.69	47.0
All Vehicles		3477	0.0	0.744	24.3	LOS B	30.9	216.5	0.73	0.69	0.73	50.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Commercial Road PM]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Windsor Road												
1	L2	140	0.0	0.075	7.6	LOS A	0.0	0.0	0.00	0.60	0.00	66.2
2	T1	2229	0.0	0.557	8.7	LOS A	21.2	148.5	0.51	0.47	0.51	67.3
3	R2	82	0.0	0.379	69.4	LOS E	2.5	17.2	1.00	0.73	1.00	29.6
Approach		2452	0.0	0.557	10.7	LOS A	21.2	148.5	0.50	0.49	0.50	64.5
East: Commercial Road												
4	L2	60	0.0	0.083	8.8	LOS A	0.8	5.7	0.31	0.63	0.31	56.3
6	R2	233	0.0	0.376	54.2	LOS D	6.2	43.1	0.93	0.78	0.93	33.2
Approach		293	0.0	0.376	44.9	LOS D	6.2	43.1	0.81	0.75	0.81	36.2
North: Windsor Road												
7	L2	140	0.0	0.085	7.8	LOS A	0.6	4.5	0.13	0.64	0.13	59.1
8	T1	1522	0.0	0.437	13.7	LOS A	15.9	111.6	0.58	0.52	0.58	61.6
Approach		1662	0.0	0.437	13.2	LOS A	15.9	111.6	0.54	0.53	0.54	61.4
West: Commercial Road												
10	L2	27	0.0	0.036	8.0	LOS A	0.3	2.1	0.25	0.60	0.25	57.0
Approach		27	0.0	0.036	8.0	LOS A	0.3	2.1	0.25	0.60	0.25	57.0
All Vehicles		4434	0.0	0.557	13.9	LOS A	21.2	148.5	0.53	0.52	0.53	60.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Commercial Road PM (+533)]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Windsor Road												
1	L2	140	0.0	0.085	7.7	LOS A	0.5	3.2	0.11	0.64	0.11	59.2
2	T1	2229	0.0	0.556	8.7	LOS A	21.2	148.2	0.51	0.47	0.51	67.3
3	R2	82	0.0	0.379	69.4	LOS E	2.5	17.2	1.00	0.73	1.00	29.6
Approach		2452	0.0	0.556	10.7	LOS A	21.2	148.2	0.51	0.49	0.51	64.0
East: Commercial Road												
4	L2	60	0.0	0.083	8.8	LOS A	0.8	5.7	0.31	0.63	0.31	56.3
5	T1	7	0.0	0.386	47.9	LOS D	6.4	44.5	0.93	0.78	0.93	32.1
6	R2	233	0.0	0.386	53.9	LOS D	6.4	44.5	0.93	0.78	0.93	33.3
Approach		300	0.0	0.386	44.8	LOS D	6.4	44.5	0.81	0.75	0.81	36.2
North: Windsor Road												
7	L2	140	0.0	0.116	14.6	LOS B	2.9	20.6	0.40	0.68	0.40	53.3
8	T1	1522	0.0	0.437	13.7	LOS A	15.9	111.6	0.58	0.52	0.58	61.6
Approach		1662	0.0	0.437	13.8	LOS A	15.9	111.6	0.57	0.53	0.57	60.8
West: Commercial Road												
10	L2	31	0.0	0.041	8.2	LOS A	0.3	2.4	0.26	0.61	0.26	56.4
Approach		31	0.0	0.041	8.2	LOS A	0.3	2.4	0.26	0.61	0.26	56.4
All Vehicles		4444	0.0	0.556	14.1	LOS A	21.2	148.2	0.55	0.52	0.55	59.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Commercial Road PM (+533 +1100)]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Windsor Road												
1	L2	140	0.0	0.086	7.7	LOS A	0.5	3.2	0.11	0.64	0.11	59.2
2	T1	2229	0.0	0.556	8.7	LOS A	21.2	148.2	0.51	0.47	0.51	67.3
3	R2	82	0.0	0.379	69.4	LOS E	2.5	17.2	1.00	0.73	1.00	29.6
Approach		2452	0.0	0.556	10.7	LOS A	21.2	148.2	0.51	0.49	0.51	64.0
East: Commercial Road												
4	L2	60	0.0	0.083	8.8	LOS A	0.8	5.7	0.31	0.63	0.31	56.3
5	T1	14	0.0	0.395	48.0	LOS D	6.6	45.9	0.93	0.78	0.93	32.2
6	R2	233	0.0	0.395	54.0	LOS D	6.6	45.9	0.94	0.78	0.94	33.3
Approach		306	0.0	0.395	44.9	LOS D	6.6	45.9	0.81	0.75	0.81	36.2
North: Windsor Road												
7	L2	140	0.0	0.116	14.6	LOS B	2.9	20.6	0.40	0.68	0.40	53.3
8	T1	1522	0.0	0.437	13.7	LOS A	15.9	111.6	0.58	0.52	0.58	61.6
Approach		1662	0.0	0.437	13.8	LOS A	15.9	111.6	0.57	0.53	0.57	60.8
West: Commercial Road												
10	L2	34	0.0	0.045	8.2	LOS A	0.4	2.7	0.26	0.61	0.26	56.1
Approach		34	0.0	0.045	8.2	LOS A	0.4	2.7	0.26	0.61	0.26	56.1
All Vehicles		4454	0.0	0.556	14.2	LOS A	21.2	148.2	0.55	0.52	0.55	59.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Terry Road AM]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Ponds Boulevarde												
1	L2	3	0.0	0.004	27.5	LOS B	0.1	0.7	0.61	0.62	0.61	42.2
2	T1	251	0.0	0.429	32.7	LOS C	11.2	78.1	0.81	0.69	0.81	39.2
3	R2	106	0.0	0.429	58.4	LOS E	5.9	41.1	0.96	0.78	0.96	31.4
Approach		360	0.0	0.429	40.3	LOS C	11.2	78.1	0.86	0.71	0.86	36.6
East: Schofields Road												
4	L2	115	0.0	0.132	25.8	LOS B	3.7	26.2	0.60	0.72	0.60	44.1
5	T1	768	0.1	0.695	41.4	LOS C	20.1	140.9	0.95	0.82	0.95	39.1
6	R2	1	0.0	0.011	66.5	LOS E	0.1	0.4	0.97	0.59	0.97	29.5
Approach		884	0.1	0.695	39.4	LOS C	20.1	140.9	0.91	0.81	0.91	39.6
North: Terry Road												
7	L2	11	0.0	0.013	25.9	LOS B	0.3	2.4	0.59	0.64	0.59	43.4
8	T1	478	0.0	0.924	59.6	LOS E	31.8	222.5	0.95	1.07	1.26	30.5
9	R2	233	0.0	0.939	82.5	LOS F	16.8	117.3	1.00	1.06	1.49	26.0
Approach		721	0.0	0.939	66.5	LOS E	31.8	222.5	0.96	1.06	1.32	29.0
West: Schofields Road												
10	L2	73	0.0	0.084	25.3	LOS B	2.3	16.2	0.58	0.71	0.58	44.4
11	T1	1002	0.1	0.907	59.2	LOS E	33.7	235.6	1.00	1.05	1.24	32.8
12	R2	84	0.0	0.907	81.6	LOS F	5.8	40.3	1.00	0.95	1.57	26.3
Approach		1159	0.1	0.907	58.7	LOS E	33.7	235.6	0.97	1.02	1.23	32.8
All Vehicles		3124	0.1	0.939	52.9	LOS D	33.7	235.6	0.94	0.93	1.12	33.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Terry Road AM (+533)]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Ponds Boulevarde												
1	L2	3	0.0	0.004	28.7	LOS C	0.1	0.8	0.63	0.62	0.63	41.5
2	T1	251	0.0	0.451	34.5	LOS C	11.5	80.2	0.83	0.70	0.83	38.5
3	R2	106	0.0	0.382	56.1	LOS D	5.7	40.1	0.95	0.78	0.95	32.0
Approach		360	0.0	0.451	40.8	LOS C	11.5	80.2	0.86	0.72	0.86	36.4
East: Schofields Road												
4	L2	115	0.0	0.128	24.6	LOS B	3.6	25.4	0.58	0.72	0.58	44.7
5	T1	785	0.1	0.711	41.6	LOS C	20.7	144.8	0.96	0.83	0.96	38.9
6	R2	18	0.0	0.193	68.1	LOS E	1.1	7.5	0.99	0.70	0.99	28.2
Approach		918	0.1	0.711	40.0	LOS C	20.7	144.8	0.91	0.81	0.91	39.3
North: Terry Road												
7	L2	63	0.0	0.082	27.9	LOS B	2.2	15.3	0.63	0.70	0.63	41.2
8	T1	478	0.0	0.982	83.4	LOS F	37.5	262.6	0.97	1.23	1.49	25.5
9	R2	259	0.0	0.930	79.2	LOS F	18.4	128.5	1.00	1.04	1.44	26.6
Approach		800	0.0	0.982	77.7	LOS F	37.5	262.6	0.95	1.13	1.41	26.7
West: Schofields Road												
10	L2	75	0.0	0.083	24.1	LOS B	2.3	16.1	0.57	0.70	0.57	44.9
11	T1	1055	0.1	0.955	72.9	LOS F	39.7	278.1	1.00	1.15	1.38	29.2
12	R2	84	0.0	0.907	81.6	LOS F	5.8	40.3	1.00	0.95	1.57	26.3
Approach		1214	0.1	0.955	70.5	LOS E	39.7	278.1	0.97	1.11	1.35	29.6
All Vehicles		3292	0.1	0.982	60.5	LOS E	39.7	278.1	0.94	0.99	1.19	31.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Terry Road AM (+533 +1100)]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Ponds Boulevarde												
1	L2	3	0.0	0.004	29.4	LOS C	0.1	0.8	0.63	0.63	0.63	41.2
2	T1	251	0.0	0.467	35.3	LOS C	11.6	81.2	0.84	0.71	0.84	38.2
3	R2	106	0.0	0.404	57.3	LOS E	5.8	40.6	0.96	0.78	0.96	31.7
Approach		360	0.0	0.467	41.8	LOS C	11.6	81.2	0.87	0.73	0.87	36.0
East: Schofields Road												
4	L2	115	0.0	0.126	24.0	LOS B	3.6	25.0	0.57	0.72	0.57	45.1
5	T1	821	0.1	0.702	40.1	LOS C	21.3	149.4	0.95	0.82	0.95	39.4
6	R2	18	0.0	0.193	68.1	LOS E	1.1	7.5	0.99	0.70	0.99	28.2
Approach		954	0.1	0.702	38.7	LOS C	21.3	149.4	0.90	0.81	0.90	39.7
North: Terry Road												
7	L2	63	0.0	0.083	28.6	LOS C	2.2	15.6	0.64	0.70	0.64	40.9
8	T1	478	0.0	1.003	99.2	LOS F	42.4	297.1	1.00	1.32	1.61	23.0
9	R2	259	0.0	0.999	105.4	LOS F	21.5	150.7	1.00	1.16	1.70	22.4
Approach		800	0.0	1.003	95.6	LOS F	42.4	297.1	0.97	1.22	1.56	23.6
West: Schofields Road												
10	L2	75	0.0	0.082	23.5	LOS B	2.3	15.9	0.56	0.70	0.56	45.3
11	T1	1165	0.1	0.996	91.5	LOS F	49.6	347.3	1.00	1.27	1.53	25.3
12	R2	84	0.0	0.907	81.6	LOS F	5.8	40.3	1.00	0.95	1.57	26.3
Approach		1324	0.1	0.996	87.0	LOS F	49.6	347.3	0.97	1.22	1.48	26.0
All Vehicles		3438	0.1	1.003	70.9	LOS F	49.6	347.3	0.94	1.05	1.27	28.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Terry Road PM]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Ponds Boulevarde												
1	L2	48	0.0	0.058	25.2	LOS B	1.6	11.0	0.59	0.69	0.59	43.3
2	T1	556	0.0	0.806	37.7	LOS C	29.6	207.3	0.94	0.87	0.99	37.2
3	R2	9	0.0	0.056	60.3	LOS E	0.5	3.6	0.94	0.67	0.94	30.9
Approach		614	0.0	0.806	37.1	LOS C	29.6	207.3	0.91	0.86	0.96	37.5
East: Schofields Road												
4	L2	134	0.0	0.169	29.2	LOS C	4.8	33.4	0.66	0.74	0.66	42.4
5	T1	636	0.2	0.575	39.7	LOS C	16.0	111.7	0.91	0.78	0.91	39.8
6	R2	1	0.0	0.011	66.5	LOS E	0.1	0.4	0.97	0.59	0.97	29.5
Approach		771	0.1	0.575	37.9	LOS C	16.0	111.7	0.87	0.77	0.87	40.2
North: Terry Road												
7	L2	11	0.0	0.012	23.0	LOS B	0.3	2.2	0.55	0.64	0.55	45.0
8	T1	427	0.0	0.695	32.1	LOS C	19.9	139.3	0.86	0.75	0.86	39.5
9	R2	133	0.0	0.779	68.7	LOS E	8.3	57.8	1.00	0.89	1.20	28.9
Approach		571	0.0	0.779	40.4	LOS C	19.9	139.3	0.88	0.78	0.93	36.5
West: Schofields Road												
10	L2	375	0.0	0.475	33.1	LOS C	15.7	109.6	0.77	0.81	0.77	40.6
11	T1	884	0.1	0.800	46.0	LOS D	25.2	176.6	0.99	0.91	1.06	37.2
12	R2	29	0.0	0.317	69.8	LOS E	1.8	12.5	1.00	0.72	1.00	28.8
Approach		1288	0.1	0.800	42.8	LOS D	25.2	176.6	0.93	0.88	0.98	37.9
All Vehicles		3243	0.1	0.806	40.1	LOS C	29.6	207.3	0.90	0.83	0.94	38.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Terry Road PM (+533)]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Ponds Boulevarde												
1	L2	48	0.0	0.059	25.8	LOS B	1.6	11.1	0.60	0.69	0.60	43.0
2	T1	556	0.0	0.824	40.1	LOS C	30.6	214.5	0.95	0.90	1.02	36.4
3	R2	9	0.0	0.051	59.1	LOS E	0.5	3.6	0.93	0.67	0.93	31.2
Approach		614	0.0	0.824	39.3	LOS C	30.6	214.5	0.92	0.88	0.99	36.7
East: Schofields Road												
4	L2	134	0.0	0.166	28.6	LOS C	4.7	32.9	0.65	0.74	0.65	42.7
5	T1	688	0.2	0.623	40.3	LOS C	17.6	123.0	0.93	0.80	0.93	39.3
6	R2	54	0.0	0.578	70.5	LOS F	3.3	23.3	1.00	0.77	1.06	27.7
Approach		876	0.1	0.623	40.4	LOS C	17.6	123.0	0.89	0.79	0.89	38.7
North: Terry Road												
7	L2	14	0.0	0.016	23.6	LOS B	0.4	2.9	0.56	0.64	0.56	44.3
8	T1	427	0.0	0.720	33.0	LOS C	20.2	141.3	0.87	0.76	0.87	39.1
9	R2	147	0.0	0.794	68.4	LOS E	9.2	64.3	1.00	0.90	1.21	28.9
Approach		588	0.0	0.794	41.6	LOS C	20.2	141.3	0.89	0.79	0.95	36.0
West: Schofields Road												
10	L2	401	0.0	0.498	32.7	LOS C	16.8	117.7	0.77	0.81	0.77	40.6
11	T1	887	0.1	0.803	46.2	LOS D	25.4	177.8	0.99	0.92	1.07	37.1
12	R2	29	0.0	0.317	69.8	LOS E	1.8	12.5	1.00	0.72	1.00	28.8
Approach		1318	0.1	0.803	42.6	LOS D	25.4	177.8	0.93	0.88	0.98	37.9
All Vehicles		3396	0.1	0.824	41.3	LOS C	30.6	214.5	0.91	0.84	0.95	37.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Terry Road PM (+533 +1100)]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Ponds Boulevarde												
1	L2	48	0.0	0.059	25.8	LOS B	1.6	11.1	0.60	0.69	0.60	43.0
2	T1	556	0.0	0.824	40.1	LOS C	30.6	214.5	0.95	0.90	1.02	36.4
3	R2	9	0.0	0.051	59.1	LOS E	0.5	3.6	0.93	0.67	0.93	31.2
Approach		614	0.0	0.824	39.3	LOS C	30.6	214.5	0.92	0.88	0.99	36.7
East: Schofields Road												
4	L2	134	0.0	0.166	28.6	LOS C	4.7	32.9	0.65	0.74	0.65	42.7
5	T1	777	0.1	0.703	41.5	LOS C	20.4	142.9	0.95	0.83	0.95	38.4
6	R2	54	0.0	0.578	70.5	LOS F	3.3	23.3	1.00	0.77	1.06	27.7
Approach		964	0.1	0.703	41.3	LOS C	20.4	142.9	0.91	0.81	0.92	38.1
North: Terry Road												
7	L2	14	0.0	0.016	23.6	LOS B	0.4	2.9	0.56	0.64	0.56	44.3
8	T1	427	0.0	0.720	33.0	LOS C	20.2	141.3	0.87	0.76	0.87	39.1
9	R2	147	0.0	0.794	68.4	LOS E	9.2	64.3	1.00	0.90	1.21	28.9
Approach		588	0.0	0.794	41.6	LOS C	20.2	141.3	0.89	0.79	0.95	36.0
West: Schofields Road												
10	L2	401	0.0	0.498	32.7	LOS C	16.8	117.7	0.77	0.81	0.77	40.6
11	T1	893	0.1	0.808	46.6	LOS D	25.7	179.9	0.99	0.92	1.07	37.0
12	R2	29	0.0	0.317	69.8	LOS E	1.8	12.5	1.00	0.72	1.00	28.8
Approach		1323	0.1	0.808	42.9	LOS D	25.7	179.9	0.93	0.88	0.98	37.8
All Vehicles		3489	0.1	0.824	41.6	LOS C	30.6	214.5	0.92	0.85	0.96	37.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Terry Road AM - N RT Ext]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Ponds Boulevarde												
1	L2	3	0.0	0.005	30.7	LOS C	0.1	0.8	0.65	0.63	0.65	40.6
2	T1	251	0.0	0.507	38.0	LOS C	12.1	84.4	0.87	0.74	0.87	37.1
3	R2	106	0.0	0.382	56.1	LOS D	5.7	40.1	0.95	0.78	0.95	32.0
Approach		360	0.0	0.507	43.3	LOS D	12.1	84.4	0.89	0.75	0.89	35.5
East: Schofields Road												
4	L2	115	0.0	0.122	22.9	LOS B	3.4	24.1	0.55	0.71	0.55	45.7
5	T1	768	0.1	0.639	38.4	LOS C	19.4	135.6	0.92	0.80	0.92	40.3
6	R2	1	0.0	0.010	65.1	LOS E	0.1	0.4	0.96	0.59	0.96	29.9
Approach		884	0.1	0.639	36.4	LOS C	19.4	135.6	0.87	0.79	0.87	40.9
North: Terry Road												
7	L2	11	0.0	0.014	29.0	LOS C	0.4	2.6	0.63	0.65	0.63	41.9
8	T1	478	0.0	0.874	53.3	LOS D	30.1	210.5	1.00	1.01	1.18	32.2
9	R2	233	0.0	0.835	66.3	LOS E	14.6	102.3	1.00	0.93	1.22	29.4
Approach		721	0.0	0.874	57.1	LOS E	30.1	210.5	0.99	0.98	1.18	31.4
West: Schofields Road												
10	L2	73	0.0	0.077	22.4	LOS B	2.1	14.9	0.54	0.70	0.54	45.9
11	T1	1002	0.1	0.834	46.5	LOS D	29.4	205.9	1.00	0.95	1.10	37.0
12	R2	84	0.0	0.777	73.4	LOS F	5.4	37.6	1.00	0.86	1.26	28.0
Approach		1159	0.1	0.834	47.0	LOS D	29.4	205.9	0.97	0.93	1.07	36.6
All Vehicles		3124	0.1	0.874	45.9	LOS D	30.1	210.5	0.94	0.88	1.02	36.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Terry Road AM (+533) - N RT Ext]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Ponds Boulevarde												
1	L2	3	0.0	0.005	30.7	LOS C	0.1	0.8	0.65	0.63	0.65	40.6
2	T1	251	0.0	0.490	37.1	LOS C	11.9	83.3	0.86	0.73	0.86	37.5
3	R2	106	0.0	0.362	55.0	LOS D	5.7	39.6	0.94	0.78	0.94	32.3
Approach		360	0.0	0.490	42.4	LOS C	11.9	83.3	0.88	0.74	0.88	35.8
East: Schofields Road												
4	L2	115	0.0	0.122	22.9	LOS B	3.4	24.1	0.55	0.71	0.55	45.7
5	T1	785	0.1	0.671	39.6	LOS C	20.2	141.2	0.94	0.81	0.94	39.7
6	R2	18	0.0	0.193	68.1	LOS E	1.1	7.5	0.99	0.70	0.99	28.2
Approach		918	0.1	0.671	38.1	LOS C	20.2	141.2	0.89	0.80	0.89	40.1
North: Terry Road												
7	L2	63	0.0	0.087	29.9	LOS C	2.3	16.0	0.66	0.70	0.66	40.3
8	T1	478	0.0	0.892	55.4	LOS D	30.7	215.1	1.00	1.04	1.22	31.6
9	R2	259	0.0	0.881	70.1	LOS E	17.0	119.2	1.00	0.97	1.30	28.5
Approach		800	0.0	0.892	58.2	LOS E	30.7	215.1	0.97	0.99	1.20	31.0
West: Schofields Road												
10	L2	75	0.0	0.079	22.4	LOS B	2.2	15.3	0.54	0.70	0.54	45.9
11	T1	1055	0.1	0.902	56.8	LOS E	34.9	244.4	1.00	1.04	1.22	33.4
12	R2	84	0.0	0.907	81.6	LOS F	5.8	40.3	1.00	0.95	1.57	26.3
Approach		1214	0.1	0.907	56.4	LOS D	34.9	244.4	0.97	1.01	1.20	33.4
All Vehicles		3292	0.1	0.907	50.2	LOS D	34.9	244.4	0.94	0.92	1.08	34.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Terry Road AM (+533 +1100) - N RT Ext]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Ponds Boulevarde												
1	L2	3	0.0	0.005	31.4	LOS C	0.1	0.8	0.66	0.63	0.66	40.3
2	T1	251	0.0	0.507	38.0	LOS C	12.1	84.4	0.87	0.74	0.87	37.1
3	R2	106	0.0	0.382	56.1	LOS D	5.7	40.1	0.95	0.78	0.95	32.0
Approach		360	0.0	0.507	43.3	LOS D	12.1	84.4	0.89	0.75	0.89	35.5
East: Schofields Road												
4	L2	115	0.0	0.120	22.3	LOS B	3.4	23.7	0.54	0.71	0.54	46.0
5	T1	821	0.1	0.665	38.1	LOS C	20.8	145.5	0.92	0.81	0.92	40.3
6	R2	18	0.0	0.193	68.1	LOS E	1.1	7.5	0.99	0.70	0.99	28.2
Approach		954	0.1	0.665	36.8	LOS C	20.8	145.5	0.88	0.79	0.88	40.5
North: Terry Road												
7	L2	63	0.0	0.089	30.6	LOS C	2.3	16.3	0.67	0.71	0.67	40.0
8	T1	478	0.0	0.919	61.8	LOS E	32.6	228.2	1.00	1.10	1.29	30.0
9	R2	259	0.0	0.930	79.2	LOS F	18.4	128.5	1.00	1.04	1.44	26.6
Approach		800	0.0	0.930	65.0	LOS E	32.6	228.2	0.97	1.05	1.29	29.4
West: Schofields Road												
10	L2	75	0.0	0.078	21.9	LOS B	2.2	15.1	0.53	0.70	0.53	46.2
11	T1	1165	0.1	0.944	66.7	LOS E	42.6	298.1	1.00	1.13	1.32	30.5
12	R2	84	0.0	0.907	81.6	LOS F	5.8	40.3	1.00	0.95	1.57	26.3
Approach		1324	0.1	0.944	65.2	LOS E	42.6	298.1	0.97	1.09	1.29	30.8
All Vehicles		3438	0.1	0.944	55.0	LOS D	42.6	298.1	0.94	0.96	1.14	33.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Terry Road PM - N RT Ext]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Ponds Boulevarde												
1	L2	48	0.0	0.058	25.2	LOS B	1.6	11.0	0.59	0.69	0.59	43.3
2	T1	556	0.0	0.806	37.7	LOS C	29.6	207.3	0.94	0.87	0.99	37.2
3	R2	9	0.0	0.056	60.3	LOS E	0.5	3.6	0.94	0.67	0.94	30.9
Approach		614	0.0	0.806	37.1	LOS C	29.6	207.3	0.91	0.86	0.96	37.5
East: Schofields Road												
4	L2	134	0.0	0.169	29.2	LOS C	4.8	33.4	0.66	0.74	0.66	42.4
5	T1	636	0.2	0.575	39.7	LOS C	16.0	111.7	0.91	0.78	0.91	39.8
6	R2	1	0.0	0.011	66.5	LOS E	0.1	0.4	0.97	0.59	0.97	29.5
Approach		771	0.1	0.575	37.9	LOS C	16.0	111.7	0.87	0.77	0.87	40.2
North: Terry Road												
7	L2	11	0.0	0.012	23.0	LOS B	0.3	2.2	0.55	0.64	0.55	45.0
8	T1	427	0.0	0.588	32.1	LOS C	19.9	139.3	0.86	0.75	0.86	39.5
9	R2	133	0.0	0.779	68.7	LOS E	8.3	57.8	1.00	0.89	1.20	28.9
Approach		571	0.0	0.779	40.4	LOS C	19.9	139.3	0.88	0.78	0.93	36.5
West: Schofields Road												
10	L2	375	0.0	0.475	33.1	LOS C	15.7	109.6	0.77	0.81	0.77	40.6
11	T1	884	0.1	0.800	46.0	LOS D	25.2	176.6	0.99	0.91	1.06	37.2
12	R2	29	0.0	0.317	69.8	LOS E	1.8	12.5	1.00	0.72	1.00	28.8
Approach		1288	0.1	0.800	42.8	LOS D	25.2	176.6	0.93	0.88	0.98	37.9
All Vehicles		3243	0.1	0.806	40.1	LOS C	29.6	207.3	0.90	0.83	0.94	38.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Terry Road PM (+533) - N RT Ext]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Ponds Boulevarde												
1	L2	48	0.0	0.059	25.8	LOS B	1.6	11.1	0.60	0.69	0.60	43.0
2	T1	556	0.0	0.824	40.1	LOS C	30.6	214.5	0.95	0.90	1.02	36.4
3	R2	9	0.0	0.051	59.1	LOS E	0.5	3.6	0.93	0.67	0.93	31.2
Approach		614	0.0	0.824	39.3	LOS C	30.6	214.5	0.92	0.88	0.99	36.7
East: Schofields Road												
4	L2	134	0.0	0.166	28.6	LOS C	4.7	32.9	0.65	0.74	0.65	42.7
5	T1	688	0.2	0.623	40.3	LOS C	17.6	123.0	0.93	0.80	0.93	39.3
6	R2	54	0.0	0.578	70.5	LOS F	3.3	23.3	1.00	0.77	1.06	27.7
Approach		876	0.1	0.623	40.4	LOS C	17.6	123.0	0.89	0.79	0.89	38.7
North: Terry Road												
7	L2	14	0.0	0.016	23.6	LOS B	0.4	2.9	0.56	0.64	0.56	44.3
8	T1	427	0.0	0.603	33.0	LOS C	20.2	141.3	0.87	0.76	0.87	39.1
9	R2	147	0.0	0.794	68.4	LOS E	9.2	64.3	1.00	0.90	1.21	28.9
Approach		588	0.0	0.794	41.6	LOS C	20.2	141.3	0.89	0.79	0.95	36.0
West: Schofields Road												
10	L2	401	0.0	0.498	32.7	LOS C	16.8	117.7	0.77	0.81	0.77	40.6
11	T1	887	0.1	0.803	46.2	LOS D	25.4	177.8	0.99	0.92	1.07	37.1
12	R2	29	0.0	0.317	69.8	LOS E	1.8	12.5	1.00	0.72	1.00	28.8
Approach		1318	0.1	0.803	42.6	LOS D	25.4	177.8	0.93	0.88	0.98	37.9
All Vehicles		3396	0.1	0.824	41.3	LOS C	30.6	214.5	0.91	0.84	0.95	37.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Terry Road PM (+533 +1100) - N RT Ext]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Ponds Boulevarde												
1	L2	48	0.0	0.059	25.8	LOS B	1.6	11.1	0.60	0.69	0.60	43.0
2	T1	556	0.0	0.824	40.1	LOS C	30.6	214.5	0.95	0.90	1.02	36.4
3	R2	9	0.0	0.051	59.1	LOS E	0.5	3.6	0.93	0.67	0.93	31.2
Approach		614	0.0	0.824	39.3	LOS C	30.6	214.5	0.92	0.88	0.99	36.7
East: Schofields Road												
4	L2	134	0.0	0.166	28.6	LOS C	4.7	32.9	0.65	0.74	0.65	42.7
5	T1	777	0.1	0.703	41.5	LOS C	20.4	142.9	0.95	0.83	0.95	38.4
6	R2	54	0.0	0.578	70.5	LOS F	3.3	23.3	1.00	0.77	1.06	27.7
Approach		964	0.1	0.703	41.3	LOS C	20.4	142.9	0.91	0.81	0.92	38.1
North: Terry Road												
7	L2	14	0.0	0.016	23.6	LOS B	0.4	2.9	0.56	0.64	0.56	44.3
8	T1	427	0.0	0.720	33.0	LOS C	20.2	141.3	0.87	0.76	0.87	39.1
9	R2	147	0.0	0.794	68.4	LOS E	9.2	64.3	1.00	0.90	1.21	28.9
Approach		588	0.0	0.794	41.6	LOS C	20.2	141.3	0.89	0.79	0.95	36.0
West: Schofields Road												
10	L2	401	0.0	0.498	32.7	LOS C	16.8	117.7	0.77	0.81	0.77	40.6
11	T1	893	0.1	0.808	46.6	LOS D	25.7	179.9	0.99	0.92	1.07	37.0
12	R2	29	0.0	0.317	69.8	LOS E	1.8	12.5	1.00	0.72	1.00	28.8
Approach		1323	0.1	0.808	42.9	LOS D	25.7	179.9	0.93	0.88	0.98	37.8
All Vehicles		3489	0.1	0.824	41.6	LOS C	30.6	214.5	0.92	0.85	0.96	37.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.