Reference: P0796l01v1

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16 March 2022

Frasers Property Telopea Developer Pty Ltd
Level 19, Building C, 1 Homebush Bay Drive,
Rhodes NSW 2138

Attn: Chris Koukoutaris – Senior Project Manager

RE: Telopea Concept Plan and Stage 1A Residential, Retail, Child Care and Aged Care – Adderton Road, Telopea – SSD-14378717

Transport and Accessibility Impact Assessment Addendum

Dear Chris,

Ason Group has been engaged by Frasers Property Telopea Developer Pty Ltd (Frasers) to provide traffic and transport consultancy services in support of the State Significant Development (SSD-14378717) application for the proposed Telopea Concept Plan and Stage 1A Residential, Retail, Child Care And Aged Care at Adderton Road, Telopea (the Site).

1. Background

As part of the SSD submission, Ason Group prepared a Transport and Accessibility Impact Assessment dated 20 July 2021 (reference: P0796r05, herein referred to as the 2021 TAIA). The 2021 TAIA referenced a number of transport assessments which were instrumental in providing for the broader Telopea Precinct's Rezoning Approval in 2018 and the subsequent awarding of the development contract for the Telopea CPA to the Affinity Consortium. Key documents referenced include:

- Telopea Urban Renewal Master Plan Traffic and Transport Assessment 2017, prepared by GTA Consultants (the Precinct TTA).
- Telopea Priority Estate – Transport Study, Calibration and Validation Report 2017, prepared by Jacobs (the Jacobs Report).
- Telopea Stage 1 Master Plan Traffic and Transport Assessment Addendum (Draft) 2017, prepared by GTA Consultants (the Precinct TTA Addendum).

The Environmental Impact Statement (EIS) for the SSD was exhibited in mid-to-late October to early November 2021. In response to the exhibition, a number of Requests for Further Information (RFIs) have been received.

The objective of this TAIA Addendum is to provide responses to the traffic and transport related RFIs received from City of Parramatta Council (Council), NSW Department of Planning, Industry and Environment (DPIE), and Transport for NSW (TfNSW).

2. Summary Response Matrix

Table 1, **Table 2** and **Table 3** provide our summary responses to the RFIs of Council, DPIE and TfNSW, respectively. It is noted that only the comments deemed relevant to Ason Group are listed in the following tables, with some traffic related comments being answered by others in Fraser's design team.

It is understood that these responses form part of a more comprehensive response matrix prepared by town planners Urbis. Where applicable, our response references following sections of this TAIA Addendum where further details relating to that response are provided.

TABLE 1 SUMMARY RESPONSE TO CITY OF PARRAMATTA RFI

Item	Comment	Response
7	**Traffic and Transport**	
7.1	That the Stage 1A scheme be revised to include additional visitor parking in line with RMS standards and Council DCP.	The proposed DCP residential visitor parking rate of 1 space per 5 dwellings is not considered appropriate nor sustainable in the context of the Precinct. Regarding this, it is noted that the TfNSW (formerly RMS) Guide states the following: "*Councils may wish to reduce this requirement for buildings located in close proximity to public transport, or where short-term unit leasing is expected.*" Telopea qualifies for such consideration, being immediately adjacent to the new Parramatta Light Rail (PLR) stop that is also well supported by bus services. Accordingly, the 2021 TAIA adopted a visitor car parking rate of 1 space per 10 dwellings, including any on-street parking available to encourage the use of public transport. It is noteworthy that this is the same rate for visitor parking recommended in the Melrose Park Transport Management & Accessibility Plan (TMAP) – for an almost identical urban renewal project – where a rate of 1 space per 10 units was recommended even though Stage 2 of the PLR was (and remains) not guaranteed. Furthermore, the reduced rate is justified on the basis that the Telopea CPA would also include retail parking and community facilities parking (subject to VPA) in the core of the Precinct. These facilities would be used by visitors for meeting at restaurants, cafes, community centres, etc., in conjunction with visitor parking in the residential buildings. Therefore, even without consideration of the substantial potential for shared parking at different times of the day given the peak demands for the different land use components in the Telopea CPA, it is our opinion that the rate of 1 visitor space per 10 dwellings, including on-street parking, is reasonable and acceptable.
7.4	That Stage 1A be amended to remove car parking access via Winter Street and sole basement car park access be via new internal road.	Stage 1A has been amended to remove the car parking access via Winter Street. The resulting reassignment of traffic due to the closure of the Winter St access has been assessed and analysis concludes that due to the minor volume of reassigned traffic, the network would continue to operate satisfactorily (refer to **Section 6** for further details of the SIDRA modelling).
7.5 Comments (Attachment B) - Parking Bays	The parking bays comply with the on-street parking standards in regards to dimensions. However, it is noted that the amount of on-street parking is very low especially near the light rail. A total of only 8 spaces are proposed in Sturt Street North with 4 on each side. This is unlikely to be adequate for the kiss and ride requirements for the light rail. All parking bays are to have time restricted parking to ensure that residents do not park in these spaces all day and that visitors have places to park. The parking bays are also not to be line marked as this restricts capacity.	The 8 parking spaces on Sturt Street North are considered sufficient to provide a functional Kiss n Ride facility noting that a significant proportion of future PLR users would come from the surrounding walking catchment. It is agreed that these spaces be time restricted.
7.5 Comments (Attachment B) - Stage 1A Vehicle Access	Council requests that access to the basement car park be solely from the new internal road Mews Street (via Sturt Street) and that basement access from Winter Street be removed. It is considered that Winter Street is very narrow and two-way traffic movements would be restricted due to any on-street parking. Further, there are issues with sight lines at the intersection of Adderton Road and Winter Street, and any additional traffic would	As mentioned above, Stage 1A has been amended to remove the car parking access via Winter Street, as shown on the architectural plans provided separately. The modifications required to facilitate this change were minimal, nonetheless, the revised plans have been reviewed and it is confirmed that the plans have

	be confronted with a substandard intersection. Access driveways into the site is to design in accordance with the Australian Standard AS 2890.1:2004. All vehicles are to enter and exit the site in a forward direction. On-site manoeuvring of vehicles into and out of the site and for critical manoeuvring areas within the basement carpark are to be demonstrated in accordance with Appendix B of AS 2890.1 – 2004 and to be submitted with the final DA.	been developed in accordance with relevant AS2890 Australian Standards.
7.5 Comments (Attachment B) - Sturt Street	The proposed signals at the intersection of Sturt Street/Marshall Street/Manson Street is subject to meeting TfNSW's warrants (ref. TfNSW Traffic Signal Design Guide Section 2 Warrants). Approval will also need to be obtained from Council and TfNSW under Parramatta's Traffic Committee process. Table 17 of the traffic report states that 40m right turn bays are provided on each approach to the new signals at Sturt Street/Manson Street intersection. This was not reflected in the concept engineering plans which only shows a right turn bay provided on Sturt Street eastbound and Manson Street northbound. The right turn bays are also less than 40m in length and the right turn from Sturt Street into Marshall Street is also restricted. The width of the westbound lane on Sturt Street at Marshall Street intersection is approx. 4.9m wide. This can cause safety issues as the width allows two vehicles to stop at the stop line when there is only one lane on the departure side. This can also increase intersection crashes as vehicles are merging within the intersection.	The implementation of traffic signals at the intersection of Sturt St / Manson St / Marshall St is consistent with the previous traffic studies undertaken for Telopea by transport consultants GTA, in particular the key 2018 Telopea Stage 1 Master Plan Traffic and Transport Assessment Addendum (the Precinct TTA Addendum) that supported the approved Planning Proposal. It is understood that early concept plans included signals at this intersection to provide optimally safe pedestrian crossings for school children, recognising the increased future use of the school (located to the southeast of the intersection) following delivery of the proposed Telopea Precinct development. Due to land constraints and vehicle design requirements, the signalised intersection is now proposed to provide single all-movements approach lanes on all arms. This arrangement has been assessed using SIDRA, which confirms that during the AM & PM peak hours the revised intersection layout would operate satisfactorily (refer to **Section 3** for further details of the SIDRA modelling). Signalisation does not form part of this detailed Stage 1A submission and therefore it is recommended that any warrant assessment for this intersection be deferred to the future detailed application stage that includes the upgrade of this intersection.
7.5 Comments (Attachment B) - Evans Road	Table 8 in the Traffic Report identifies that the signalisation and upgrades of Pennant Hills Road and Evans Road intersection is required to accommodate the future traffic growth in this precinct. Section 6.8 of the report states that the upgrade of this intersection is anticipated to be staged based on dwelling occupancies within the Telopea precinct and that details will be determined in consultation with TfNSW, Roads and Maritime and Council. The report further states that the interim intersection upgrade will be completed by Roads and Maritime (now TfNSW). The traffic report does not clearly outline the construction timeline of the staged intersection upgrades at Pennant Hills Road and Evans Road. This intersection is considered critical to provide improved regional connections to the growing Telopea precinct and priority should be given at this location.	As noted in the 2021 TAIA, upgrades at the Pennant Hills Rd intersection with Evans Rd are to be completed by TfNSW. As the comment suggests, issues at this intersection relate to wider regional trips travelling through the intersection, which is confirmed by the GTA studies that informed the approved Planning Proposal. However, it is noteworthy that the GTA studies also determined that further upgrades (above those to be delivered by TfNSW) at this intersection were not required by the Stage 1 Telopea proposal and accordingly the upgrade of this intersection is not required as part of this Stage 1A detailed submission.
7.5 Comments (Attachment B) - SIDRA Modelling	There are inconsistencies found in the SIDRA modelling undertaken. For example, Pennant Hills Road and Evans Road intersection performs at a LOS of E for both peaks in the base scenario (2016) however, it performs at a LOS of B and A for AM and PM peak respectively in the future base scenario (2036) although no intersection upgrades are proposed and there is background traffic growth. It is unclear why this intersection can perform better with additional traffic and no upgrades. The traffic report only provides SIDRA output summaries for Adderton Rd/New Link Rd intersection although modelling was undertaken at a number of intersections. The output summaries for all intersections modelled should be included in the report for assessment. This will help in determining the optimum layout at a number of intersections such as the length of turning bays.	The majority of upgrades that are proposed (and reported on in the 2021 TAIA) are consistent with the upgrades developed as part of the earlier GTA studies and presented in the Precinct TTA Addendum that supported the approved Planning Proposal. The GTA study assessed a 2036 baseline (i.e. without development traffic) that included upgrades considered necessary to address background traffic growth. Accordingly, the baseline SIDRA results presented do include upgrade works, which accounts for the improvement in performance. The 2021 TAIA adopted most of the upgrade works proposed by the Precinct TTA Addendum, noting that the 2021 TAIA – using updated and current traffic generation rates – forecast that the Telopea CPA would generate 30% fewer trips and therefore the upgrades developed by the 2018 Precinct TTA Addendum would satisfy the reduced traffic demands of the Telopea CPA Proposal.

		However, it is noted that the GTA developed upgrades have been modified as part of this application at the Adderton intersections with New Link Rd (following discussions with TfNSW) and Manson St (land constraints); therefore, SIDRA analysis was undertaken at these 2 intersections and hence why there are only results for these intersections in the 2021 TAIA.
7.5 Comments (Attachment B) - Parking & Access - Stage 1A	In accordance with the Telopea Precinct DCP rates as per Table 5, the proposed Stage 1A development is to provide minimum 372 residential parking spaces and 89 visitor parking spaces. The proposal provides a total of 416 on-site car parking spaces, including 372 residential car parking spaces and 44 visitor car parking spaces. On this basis, the proposed Stage 1A will have 42 visitor parking shortfall. Council supports increase in the visit parking provided to a minimum of 89 spaces. Based on the DCP, a minimum of 1 space is to be allocated to car share for developments with 50 or more dwellings. Given that Stage 1A of the Telopea Precinct is proposed to provide 443 residential dwellings, minimum one (1) car share space is to be provided. It is noted that the submitted Transport and Accessibility Impact Assessment report indicates that two (2) car share spaces adjacent to the site in Sturt Street will be provided which is supported. Bicycle parking is to be provided at the rate of minimum 1 bicycle storage space per dwelling for the residential component of the development and minimum 1 bicycle storage space per 15 dwellings for residential visitors. Therefore Stage 1A would be required to provide a minimum of 443 bicycle parking spaces for residential dwellings and 30 bicycle parking spaces for residential visitors are to be provided. It is noted that the submitted Transport and Accessibility Impact Assessment report indicates that 473 bicycle parking spaces will be provided which is supported. It is recommended that a Green Travel Plan be provided for the proposed development to encourage resident to use walking, cycling or public transport instead of private car. Table 5 Parramatta DCP 2011 – Section 4.3 Telopea car parking rates for residential	As mentioned above, the visitor parking rate of 1 space per 10 dwellings, including on-street parking, is reasonable and acceptable. Based on this rate, the current proposal for Stage 1A requires 45 visitor parking spaces. These 45 visitor parking spaces are to be provided as follows: • A minimum of 23 off-street parking spaces, within Stage 1A. • 22 on-street parking spaces along the upgraded Sturt Street adjacent to Stage 1A. It is noted that in addition to providing 22 of the 45 required visitor parking spaces, on-street parking along the section of upgraded Sturt Street would also provide for the 2 car share spaces. Furthermore, 1 bicycle parking space is provided per dwelling.
14	**Waste Management**	
14.2 Comments (Attachment B) - Waste Truck	Trucks are required to enter and exit in a forward direction and the use of a turn table is not permitted. Council requires trucks to be able to enter and exit in a forward within a threepoint turn. From the provided plans, it is not clear whether the waste holding area is located sub-street level. Further detail is required to understand the access, as access into areas below street level is generally not supported. Council also requires 4.5M clearance height throughout the truck's entire travel path. All paths travelled by a waste truck will need to be rated to support a 25t vehicle.	The use of a turntable for service vehicle trucks is acceptable as it is permitted under relevant Australian Standards and is used at a number of developments within Greater Sydney, including elsewhere in the City of Parramatta. Conversely, to design for a 12.5m HRV truck to enter in a forward direction, manoeuvre on-site for loading and then exit in a forward direction would result in a significant impact on the development and would represent a poor design outcome for a vehicle that only occasionally requires access to the Site.

TABLE 2 SUMMARY RESPONSE TO DPIE RFI

Item	Comment	Response
8	**Traffic and Car Parking**	
8.1	Review and respond to the Transport for New South Wales submission and the recommendations of Council's Technical Traffic Assessment.	With reference to Table 1 and Table 3, this has been completed.
8.2	Review the proposed use of Winter Street to provide vehicle access to the Stage 1A basement carpark, noting various issues raised in public submissions, including the narrow width of Winter Street and safety issues.	The latest Proposal has removed the access to Winter St. The resulting reassignment of traffic due to the closure of the Winter St access has been assessed and analysis concludes that due to the minor volume of reassigned traffic, the network would continue to operate satisfactorily (refer to Section 6 for further details of the SIDRA modelling).
8.3	Reconsider the proposed visitor car parking rate for Stage 1A and the proposed location of 23 visitor car parking spaces on-street, noting this is inconsistent the Telopea Precinct Development Control Plan (DCP) and the ADG.	With reference to our response to Item 7.1 in Table 1, the visitor parking rate of 1 space per 10 dwellings, including on-street parking, is reasonable and acceptable. Based on this rate, the current proposal for Stage 1A requires 45 visitor parking spaces. These 45 visitor parking spaces are to be provided as follows: • A minimum of 23 off-street parking spaces, within Stage 1A. • 22 on-street parking spaces along the upgraded Sturt Street adjacent to Stage 1A.
8.4	Review the figures and assessment in the TIA noting it refers to a proposal for 4,500 dwellings and 7,000 m2 retail rather than 4,700 dwellings and 7,785 m2 of retail.	The 2021 TAIA did assess 7,785 m2 of retail GFA; however, it is correct that only approx. 4,500 dwellings were assessed. The comparative traffic generation analysis for the 2021 TAIA concluded that the Proposal at the time would generate approx. 30% fewer peak hour trips (31.7% fewer during the AM peak and 27.9% fewer during the PM peak). The analysis has been revised for the Proposal with 4,700 dwellings and the analysis concludes the Proposal would generate approx. 27% fewer peak hour trips (28.6% fewer during the AM peak and 25.0% fewer during the PM peak). Accordingly, the conclusion of the 2021 TAIA still holds that the upgrades developed by the 2018 Precinct TTA Addendum would still satisfy the reduced traffic demands of the Proposal (refer to **Section 4** for further details of the traffic generation). For the 2 key intersections of Adderton Road with New Link Rd and Manson St, the traffic demand modelling and the SIDRA modelling has been revisited and the results conclude that both intersections would continue to operate satisfactorily (refer to **Section 5** & Section 6 for further details of the SIDRA modelling).

TABLE 3 SUMMARY RESPONSE TO TFNSW RFI

Item	Comment	Response
1.	It is noted that this SSD only seeks consent for the signalised intersection of Adderton Road/New Link Road but Section 6.8 of the submitted traffic report states "The road upgrades detailed in Section 6.2 above would be completed prior to the anticipated completion of Stage 1A in 2026/2027, as will the other key road network upgrades as detailed in Table 17 and of course the Parramatta Light Rail will have commenced services." Accordingly, SIDRA modelling and Warrants Assessments must be submitted for TfNSW review as part of this SSD.	Only the signalised intersection of Adderton Rd with New Link Rd is proposed to be delivered as part of this Stage 1A proposal. Due to the proximity of – and coordination with – the PLR, traffic signal control of this intersection is considered the only safe arrangement for the intersection. It is understood that this has been acknowledged for some time and as a result, earlier concept plans for this intersection, including those assessed by the GTA studies that informed the approved Planning Proposal, have proposed traffic signal control.
2.	A warrants assessment for Adderton Road/New Link Road, Adderton Road/Mason Street, Mason Street/Sturt Street and Shortland Street/Evans Road should be submitted to TfNSW for review. A warrant assessment will need to be undertaken as per the 'Traffic Signal Design Manual, Section 2 Warrants' and the applicant needs to confirm at which stage of the development proposal the warrants for signal will be met at each proposed location. It should be noted that the Road Network Upgrade Schedule in Section 5.12.2 of the submitted Traffic and Accessibility Impact Assessment (TAIA) report proposes most road upgrades to be completed by 2023. Warrants assessments should be carried out on the volume of traffic in the year that the signals are proposed to be operation, or signals should be installed if and when warrants are met.	Consistent with the comments above, the earlier GTA studies that informed the approved Planning Proposal adopted traffic signal control at these intersections; therefore, the current Proposal remains consistent with the earlier concept plans. Only the signalised intersection of Adderton Rd with New Link Rd is to be delivered as part of Stage 1A and again as mentioned above, traffic signal control is required on road safety grounds due to the proximity of, and coordination with, the PLR. The remaining signalised intersections are to be delivered as part of future detailed applications; therefore, it is recommended that any requirement to provide a warrant assessment be deferred to these future detailed applications.
3.	Revised Residential Trip Generation rates presented in Table 14 of the submitted TAIA indicate that traffic generation for residential uses represent a reduction from the trips assigned in the Precinct TTA Addendum by 35% due to close proximity to Telopea Station. Traffic generation rates for social housing have been similarly discounted from TTA Addendum rates. TfNSW is seeking further explanation to justify how these traffic generation rates were determined and what benchmarking was used. It is assumed that car parking will still be provided for the proposed social housing.	Section 5.5 of the 2021 TAIA covers in detail the justification for the residential trip rates adopted. With regard to benchmarking, it is noted that section 5.5 reference trip rates agreed with TfNSW as part of the development of the Melrose Park Transport Management & Accessibility Plan (TMAP). It is also noted that the trip rates effectively include a safety margin. For example, the adopted 0.25 peak hour trips per 'market' dwelling (consistent with the Melrose Park TMAP) could be 40% greater (0.35 peak hour trips per dwelling) and the total forecast volume of peak hour traffic generation would still be lower than that forecast by the Precinct TTA Addendum.
4.	Submitted SIDRA modelling showing the intersection performance of surrounding signalised intersections does not consider cumulative traffic impacts in Telopea to represent a cumulative impact assessment. It is noted in the submitted TAIA that "It is assumed all trips entering and exiting the New Link Road are associated with development trips as per the Precinct TTA Addendum's analysis. As such, these modelled New Link Road trips have been used as the basis of the trip distribution for the revised Telopea CPA Stage 1 traffic generation." New Link Road will provide a significant road connection between Adderton Road and the Telopea Town Centre and traffic modelling should consider background traffic growth in addition to development traffic to represent actual trip distributions.	The traffic demand modelling for the intersection of Adderton Rd with New Link Rd has adopted the traffic demand forecast by the 2018 Precinct TTA Addendum, which in turn included estimates of future traffic growth for year 2036. Accordingly, the SIDRA analysis undertaken includes development traffic and background traffic growth.
6.	SIDRA modelling for all proposed signalised intersections has not been submitted for review. Modelling should assess forecast impacts on road safety and capacity of the road network, including consideration of cumulative traffic impacts at key intersections using SIDRA or a similar traffic model as prescribed by TfNSW. The traffic modelling should consider the scenarios of baseline year, year 2026, 2031, 2036 and the year until the facility cease operation. Any intersection upgrade works assumed to be undertaken by TfNSW by a certain date on the classified road that are unfunded will need to be	The majority of upgrades that are proposed (and reported on in the 2021 TAIA) are consistent with the upgrades developed as part of the earlier GTA studies and presented in the Precinct TTA Addendum that supported the approved Planning Proposal. The 2021 TAIA adopted most of the upgrade works proposed by the Precinct TTA Addendum, noting that the 2021 TAIA – using updated and current traffic generation rates – forecast that the Telopea CPA would generate 30% fewer trips and therefore the

	removed from the traffic modelling. This is to ensure that an accurate assessment is undertaken of the cumulative impact of this development on the existing classified road network.	upgrades developed by the 2018 Precinct TTA Addendum would satisfy the reduced traffic demands of the current Proposal. However, it is noted that the GTA developed upgrades have been modified as part of this application at the Adderton intersections with Manson St and New Link Rd (following discussions with TfNSW); therefore, SIDRA analysis was undertaken at these 2 intersections and hence why there are only results for these intersections in the 2021 TAIA.
7.	It is noted that Section 2.3.1 of the TAIA states the following relating to Existing Road Network Performance – Traffic Surveys: *"At the above 5 mid-block locations, the following data were collected for 7 days, between 16 June to 23 June 2021"* Transport for NSW notes that the traffic survey undertaken by the proponent was during the COVID-19 pandemic. Traffic volumes across the Sydney road network throughout the year 2020, including when the survey was undertaken, were abnormally low due to the impacts of COVID-19. The use of a singular point of data collection may not be a true representation of the existing parking and traffic demand generated by the site as stated in Section 2.3.1. TfNSW recommends the proponent revises the TAIA to use traffic data from a wider sample of dates during a period pre-Covid or post-Covid. If the proponent is unable to source this data, the provided should be adjusted to account for reduced traffic volumes due to COVID-19.	The survey dates were outside of the Greater Sydney lockdown which did not come into place until 26 June 2021. Previously, the Parramatta local government area (LGA) where the surveys were undertaken was not restricted. In this regard, the surveys are considered to be reflective of standard conditions.
8.	There is little information about the expected flows of different populations in and out of the precinct, where their key destinations or origins would be, and how this aligns with different transport options including the Parramatta Light Rail (PLR). Such information affects viability of different transport options and their ability to accommodate the trip demand of the Telopea Concept Plan, in particular PLR, which has not been considered in the TAIA. The TAIA should be amended to undertake the following: • Detail key destinations/origins that would involve travel to or from the precinct and determine potential to use different modes of transport for these trips (including cost and time associated with the trips). • Model the transport options and potential trips generated based on mode share targets and desirability of modes for different destinations to determine how the full number of trips during the AM and PM peak periods of the Telopea Concept Plan will affect the passenger capacity of PLR and nearby bus services and active transport infrastructure, including identifying the ability of PLR/bus services ability to accommodate increased passenger volumes from the development.	Comprehensive information regarding mode share trips, key origins and destinations and their respective mode splits are provided in Sections 4 & 5 of the 2021 TAIA. These sections also include commentary on the PLR and the proximity of the PLR to the Proposal is accounted for in the trip rate assessment.
12.	The TAIA does not state that the proposed New Link Road across the PLR and proposed New Link Road/Adderton Rd/light rail intersection have been considered in the design and operation of PLR (including acceptance from the PLR SOM contractor) and therefore it is not clear if any potential impacts to light rail have been considered. The TAIA should confirm if the proposed New Link Road across the PLR and proposed New Link Road/Adderton Rd/light rail intersection have been considered in the design and operation of the PLR (including acceptance from the PLR SOM contractor) and identify their potential impacts to light rail and subsequent mitigation measures	The SIDRA modelling of Adderton Road / New Link Road / Light Rails level crossing intersection was carried out based on our discussion with TfNSW on 13 July 2021 meeting. In that meeting, TfNSW confirmed model input parameters with particular focus on PLR level crossing such as Light Rail operational frequencies, cycle time, signal phasing (with prioritising light rail movements), minimum green time and walk times for pedestrians, etc. Relevant meeting minutes are attached to the 2021 TAIA at Appendix A. It is our understanding that TfNSW will review modelling inputs / outcomes and forward them to the PLR SOM contractor for further review.
13.	TfNSW has previously advised that the proposed New Link Road/Adderton Rd/light rail intersection requires two exit lanes from the New Link Road to optimise the signal	The design of the intersection is in accordance with the GTA studies and the signed Memorandum Of

	operation. Left Lane = left turn : Right Lane = right turn. This has not been shown in the intersection design in the TAIA. If an alternative options to at-grade crossings through the Parramatta Light Rail corridor is not possible, the proposed New Link Road/Adderton Rd/light rail intersection should be amended in the TAIA to two exit lanes from the New Link Road in the configuration of Left Lane = left turn : Right Lane = right turn	Understanding with TfNSW that New Link Rd consist of a single approach and single departure lane. SIDRA modelling based on the demand inputs from the earlier GTA studies forecast that the intersection can operate satisfactorily with a single lane on the New Link Rd approach for left & right-turning traffic. Furthermore, it is our understanding that the New Road Link is intended to connect the areas of Telopea either side of the PLR and not to provide a 'regional' route for wider network traffic; therefore, it is recommended that the single approach lane be maintained to avoid the use of New Link Rd as a through traffic route.
14.	TfNSW has previously advised that the proposed New Link Road/Adderton Rd/light rail intersection requires two exit lanes from the New Link Road to optimise the signal operation. Left Lane = left turn : Right Lane = right turn. This has not been shown in the intersection design in the TAIA. TfNSW has also previously provided a copy of the signal phasing for the signals at Sunnyholt Road/ James Cook Drive (attached) which is a similar intersection layout to the proposed New Link Road/Adderton Rd/light rail intersection, instead involving a bus T-Way rather than a light rail. It is advised that the phasing is a result of the many delays we had following the initial phasing at the intersection. This should be provided to the proponent to support the aforementioned required intersection design change.	As discussed above, it is recommended that the single approach lane be maintained to avoid the use of New Link Rd as a through traffic route. Furthermore, the models were developed in accordance with the supplied TCS plan of Sunnyholt Road/ James Cook Drive intersection as per TfNSW advice. SIDRA modelling of the intersection confirms satisfactory performance in terms of delays and queues.
15.	It is noted that the proposed development is located immediately adjacent to the Parramatta Light Rail (PLR) corridor. It is advised that: • The introduction of additional at-grade signalised crossings across the Parramatta Light Rail corridor has the potential to impact service reliability and travel times. • Detailed intersection design in Figure 19 is unclear due to the images low resolution and unable to be adequately examined at this time. However, it appears that the only one 3m wide lane in each direction is proposed across the PLR corridor. The proponent should consider alternative options to at-grade crossings through the Parramatta Light Rail corridor in order to meet the precincts access requirements. The proponent needs to also consider a design which would enable buses to travel through the intersection to service the precinct.	Light Rail by its very nature is intended to operate in an environment that results in interaction with the vehicular traffic network; therefore, at grade crossings are common place. It is understood that the New Link Rd is intended to connect the communities of Telopea surrounding the existing train station that are currently separated by the existing rail line and there is no location within this area that could achieve this connection without it being at-grade.
16.	Mode share targets could be improved, particularly for cycling and walking. There is potential to reduce the trips generated by private vehicles (particularly local trips) and therefore improve the network performance, and reduce both on-street and off-street parking requirements. The TAIA should be amended to undertake the following: • Increase mode share targets for active transport and decrease mode share target for cars. • Consider how these mode share targets will change network requirements, with some contingency where needed. • Consider reducing the parking rates with a maximum rather than a minimum rate, and introducing parking management initiatives to de-incentivise driving where possible. • Clarify visitor bikes parking rates required and provided	Mode share targets have been set to reflect the proximity of the PLR; these are detailed in Section 4.4 of the 2021 TAIA and the affect the PLR would on reduce trip rates is covered in Section 5.5 of the 2021 TAIA. Discussion on the impact of the mode split is discussed in Section 5.10 of the TAIA. The car parking rates of the draft Telopea DCP have been adopted and this is covered in Section 6.4 of the 2021 TAIA. It is noted that the draft DCP proposes reduced car parking rates the intention of which is to manage traffic demand on the local road network. The visitor bicycle parking rates and provision are detailed in Table 28 of the 2021 TAIA.
17.	Additional cars will impact on reliability for buses that will use Sturt Street in the future (route 545 – 8 min service during the peak). TfNSW currently receives complaints about reliability for this route. Measures to minimise	The design of the Master Plan has accounted for all necessary bus movements. Regarding any potential impact on bus service timetables, it is important to consider the overall Public

	impact to the reliability of route 545 should be considered in the TAIA.	Transport Accessibility Level (PTAL) and the significant improvement to PTAL arising from the PLR and the reduced demand the PLR will have bus services such as the 545 service, which share Parramatta CBD as a key destination. Also, measures such as limiting the New Link Rd approach to a single lane discourages its use a through traffic route, thereby discouraging further vehicles from unnecessarily travelling through the precinct.
18.	The TAIA mentions green initiatives such as cycleways to support the development. It is advised that surrounding streets that are currently traversed by buses (Sturt/Marshal/ Evans) will not accommodate a cycleway and buses. The inability of Sturt/Marshal/ Evans streets to accommodate buses and cycleways needs to be considered in the TAIA and cycleways located on other streets instead.	Green initiatives are discussed in further detail, in particular cycleways, in Section 6.9 of the 2021 TAIA.
19.	The Stage 1A development includes 1xHRV and 1xSRV spaces to support the freight and servicing of the development. It is advised that this provision is considered inadequate to support the demand of the development and requires a third vehicle space. This could be in the form of a B99 vehicle space. The development should be amended to provide an additional freight and service vehicle space which could be in the form of a B99 vehicle space. It is also requested that the applicant be conditioned to prepare a Loading and Servicing Management Plan for the review and endorsement of TfNSW, prior to the issue of any Occupation Certificate. The plan needs to ensure that any potential impacts to the operation of the SLR from the development's loading and servicing vehicles are mitigated. Prior to the issue of any occupation certificate, the applicant shall prepare a detailed Loading and Servicing Management Plan in consultation with Customer Journey Planning within TfNSW. The plan shall ensure that any potential impacts to the operation of the PLR from the development's loading and servicing vehicles are mitigated. The applicant shall submit a copy of the final plan to the Executive Director Customer Journey Planning for endorsement. The Plan needs to specify, but not be limited to, the following: • Details of the development's loading and servicing profile, including the forecast loading and servicing traffic volumes by vehicle size, frequency, time of day and duration of stay; • Details of loading and servicing facilities that may be required either within the subject site or other sites in the immediate vicinity which adequately accommodate the forecast demand of the development so as to not rely on the kerbside restrictions to conduct the development's business; and • Details of measures to mitigate any potential impacts to the operation of the SLR from the development's loading and servicing vehicles. The Loading and Servicing Management Plan shall be implemented by the applicant following the issue of the Occupation Certificate.	The provision of loading bays is compliant with the relevant and applicable authorities and is therefore acceptable. Notwithstanding this, a Loading and Servicing Management Plan will be provided in response to a suitable condition of consent.
20.	Appendix B of the TAIA shows the proposed intersection upgrades to support the development. Several regular bus routes operate through these intersections along Pennant Hills Road. It is advised that the proposed upgraded intersection design of the following intersections involve the removal of bus priority infrastructure: • Pennant Hills Road and Marsden Road • Pennant Hills Road and Jenkins Road	These upgrades do not form part of the Stage 1A application and it is noted that the 2018 Precinct TTA Addendum established that upgrades at these intersections are required to address issue relating to background traffic (including background traffic growth) not the Telopea CPA. Accordingly, it is understood that TfNSW would be responsible for these upgrades.

	It is advised that bus priority infrastructure should be retained in aforementioned intersections and the inclusion of additional bus priority infrastructure for these intersections investigated.	
21.	Appendix B of the TAIA shows the proposed intersection upgrades to support the development. Several regular bus routes operate through these intersections along Pennant Hills Road and could benefit from an operational perspective from the inclusion of bus priority infrastructure. These intersections include: • Pennant Hills Road and Adderton Road • Pennant Hills Road and Coleman Avenue • Pennant Hills Road and Evans Road It is advised that the inclusion of bus priority infrastructure for the aforementioned intersections should be investigated.	These upgrades do not form part of the Stage 1A application and it is noted that the 2018 Precinct TTA Addendum established that upgrade at these intersections are required to address issues relating to background traffic (including background traffic growth) not the Telopea CPA. Accordingly, it is understood that TfNSW would be responsible for these upgrades.

3. Intersection of Sturt Street with Manson Street

The 2018 TTA Addendum proposed a signalised crossroads intersection that provided 2-lane approaches on all 4 arms, comprising a shared left & through lane with a dedicated right-turn bay. As part of the civil design review arising from this RFI process, it has been determined that due to land constraints combined with the manoeuvring requirements of design vehicles, the signalised intersection would need to be modified to provide a single all-movements approach lane on all 4 arms.

Using the SIDRA model for this intersection from the 2018 TTA Addendum, a SIDRA model has been developed for the revised consolidated approach arrangement. In summary, the model maintains the traffic volumes of the 2018 model and only the intersection configuration has been modified.

The results of the SIDRA modelling forecast that the intersection would continue to perform satisfactorily under the consolidated approach arrangement with forecast levels of service of B during both the morning and evening commuter peak hours. More detailed SIDRA results – including indicative layout and movement summaries – are appended to this TAIA Addendum at **Attachment 1**.

4. Additional Market Dwellings Traffic Generation

Firstly, Section 5.8 of the 2021 TAIA established the following:

- The 2018 Precinct TTA Addendum, using the conservatively high trip generation rates adopted by GTA at the time, forecast the Telopea Precinct to generate the following peak hour traffic volumes:
  - 1,571 trips during the AM Peak hour
  - 1,693 trips during the PM Peak hour
- Based on updated current trip rate data, the 2021 TAIA forecast the following peak hour traffic generation for the Proposal:
  - 1,073 trips during the AM Peak hour
  - 1,221 trips during the PM Peak hour
- The 2021 TAIA concluded that based on current trip rate data, there would be 30% fewer trips during the peak hours – compared with the Precinct TTA Addendum forecast – consisting of:
  - 31.7% fewer trips during the AM Peak hour
  - 27.9% fewer trips during the PM Peak hour

For the majority of the intersection upgrades, the Proposal adopted the upgrade works developed by the Precinct TTA Addendum, noting that the Telopea CPA was forecast to generate 30% fewer peak hour trips and therefore these upgrades would satisfy the reduced traffic demands of the Telopea CPA Proposal.

As part of this RFI process it has been confirmed that the 2021 TAIA assessed 4,504 dwellings; however, the Telopea CPA proposes 4,700 dwellings. The difference of 196 dwellings consists entirely of market dwellings. Application of the 0.25 peak hour trip rate (AM & PM) from the 2021 TAIA to these 196 dwellings results in an additional forecast peak hour traffic generation of 49 trips.

Accounting for these additional 49 trips provides the following peak hour comparative assessment with the 2018 Precinct TTA Addendum that informed the approved Planning Proposal:

- Based on updated current trip rate data, the peak hour traffic generation of the Proposal (with 4,700 dwellings) is as follows:
  - 1,122 trips during the AM Peak hour
  - 1,270 trips during the PM Peak hour
- Based on current trip rate data, there would be approximately 27% fewer trips during the peak hours – compared with the Precinct TTA Addendum forecast – consisting of:
  - 28.6% fewer trips during the AM Peak hour
  - 25.0% fewer trips during the PM Peak hour

The revised traffic generation above confirms that with the additional 196 dwellings included in the comparative traffic generation assessment, the peak hour traffic generation is still forecast to be significantly lower than the forecast traffic generation of the 2018 Precinct TTA Addendum and therefore the conclusion stands that the proposed upgrades that were developed as part of the Precinct TTA Addendum would satisfy the reduced traffic demands of the Telopea CPA Proposal.

5. Intersection of Adderton Road with New Link Road

The intersection of Adderton Road with New Link Road is 1 of 2 intersections of the study network that, as part of the 2021 TAIA study, did not fully rely on the SIDRA analysis undertaken in the 2018 Precinct TTA Addendum. This was due largely to a request from TfNSW that a more detailed assessment of this intersection be included as part of the 2021 TAIA study.

As the SIDRA analysis was being revisited at this intersection, the 2021 TAIA study took the opportunity to update the peak hour traffic demand volumes to reflect the reduced forecast traffic volumes based on the updated current trip rates. The SIDRA analysis – which was informed by discussions with TfNSW and assessed a number of scenarios – determined that the proposed signalised intersection would operate satisfactorily with a level of service of D or better under all the scenarios.

The SIDRA analysis at this intersection has been revisited to account for the 196 dwellings that were overlooked, and the additional 49 peak trips associated with these dwellings. Regarding this, it is noted the SIDRA results from the GTA studies indicate that only about 6% of development traffic would use the New Link Road, which appears reasonable having consideration that only 8% of traffic was expected to arrive from/depart to areas northwest of the Precinct, with the vast majority (66%) of traffic expected to arrive from/depart to areas to the south of the Precinct. Accordingly, only a small proportion of these 49 additional trips would be expected to use the intersection of Adderton Road with New Link Road.

Table 4 presents a summary of the results of the latest SIDRA analysis for the intersection of Adderton Road with New Link Road; for comparison, the results from the 2021 TAIA are also presented.

TABLE 4 ADDERTON RD / NEW LINK ROAD – SIDRA RESULTS

Scenario	Average Vehicle Delay (s)	Degree of Saturation	New Link Road Queue (m)	Level of Service
Future AM – 2021 TAIA	18.3	0.771	25	B
Future PM – 2021 TAIA	53.4	1.108	16	D
Future AM – 2022 TAIA Addendum	17.0	0.76	16	B
Future PM – 2022 TAIA Addendum	47.8	1.108	11	D

As expected, the results of the SIDRA analysis for the current scheme (including all 4,700 residential dwellings) are materially the same as the 2021 TAIA results for the 4,504 dwellings scheme, and importantly the results confirm that the intersection is forecast to continue to operate satisfactorily with a level of service of D or better. Detailed results for the latest 2022 SIDRA analysis of this intersection are appended at **Attachment 2**.

6. Intersection of Adderton Road with Manson Street

The intersection of Adderton Road with Manson Street is the second of 2 intersections of the study network that, as part of the 2021 TAIA study, did not fully rely on the SIDRA analysis undertaken in the 2018 Precinct TTA Addendum. This was largely due to modifications made to the proposed upgrade for this intersection compared with the upgrades proposed in the Precinct TTA Addendum.

As the SIDRA analysis was being revisited at this intersection, the 2021 TAIA study took the opportunity to update the peak hour traffic demand volumes to reflect the reduced forecast traffic volumes based on the updated current trip rates. The subsequent SIDRA analysis forecast that the intersection, "*would operate within acceptable parameters in both the AM and PM peak periods, with moderate delays*".

As part of this RFI process, the SIDRA analysis at this intersection has been revisited to account for the following:

- Discrepancies between the adopted layout for the SIDRA modelling and the proposed civil plans for the upgrade of the intersection. In summary, the SIDRA model now accurately reflects to the proposed upgrade works.
- The closure on the Winter Street access has resulted in a minor volume of traffic (27 trips during the morning peak hour and 21 trips during the evening peak hour) that have been reassigned at the intersection of Adderton Road with Manson Street.
- Additional trips at this intersection as a result of the additional 49 peak hour trips associated with the 196 dwellings that were overlooked as part of the 2021 TAIA study. In this regard, it is noted that 28% of these additional trips have been assigned to this intersection reflecting the 28% distribution of traffic arriving from/departing to the southwest as adopted by the 2018 Precinct TTA Addendum.

The results of the revisited SIDRA modelling forecast that the proposed signalised intersection of Adderton Road with Manson Street would continue to operate within acceptable parameters in both the AM and PM peak periods with moderate delays, with the results (appended at **Attachment 3**) showing levels of service of C and B during the AM and PM peak periods, respectively.

I trust the above satisfies your current requirements. Should you have any queries, please contact the undersigned.

Yours sincerely,

Piran Trethewey

Director

E: piran.trethewey@asongroup.com.au

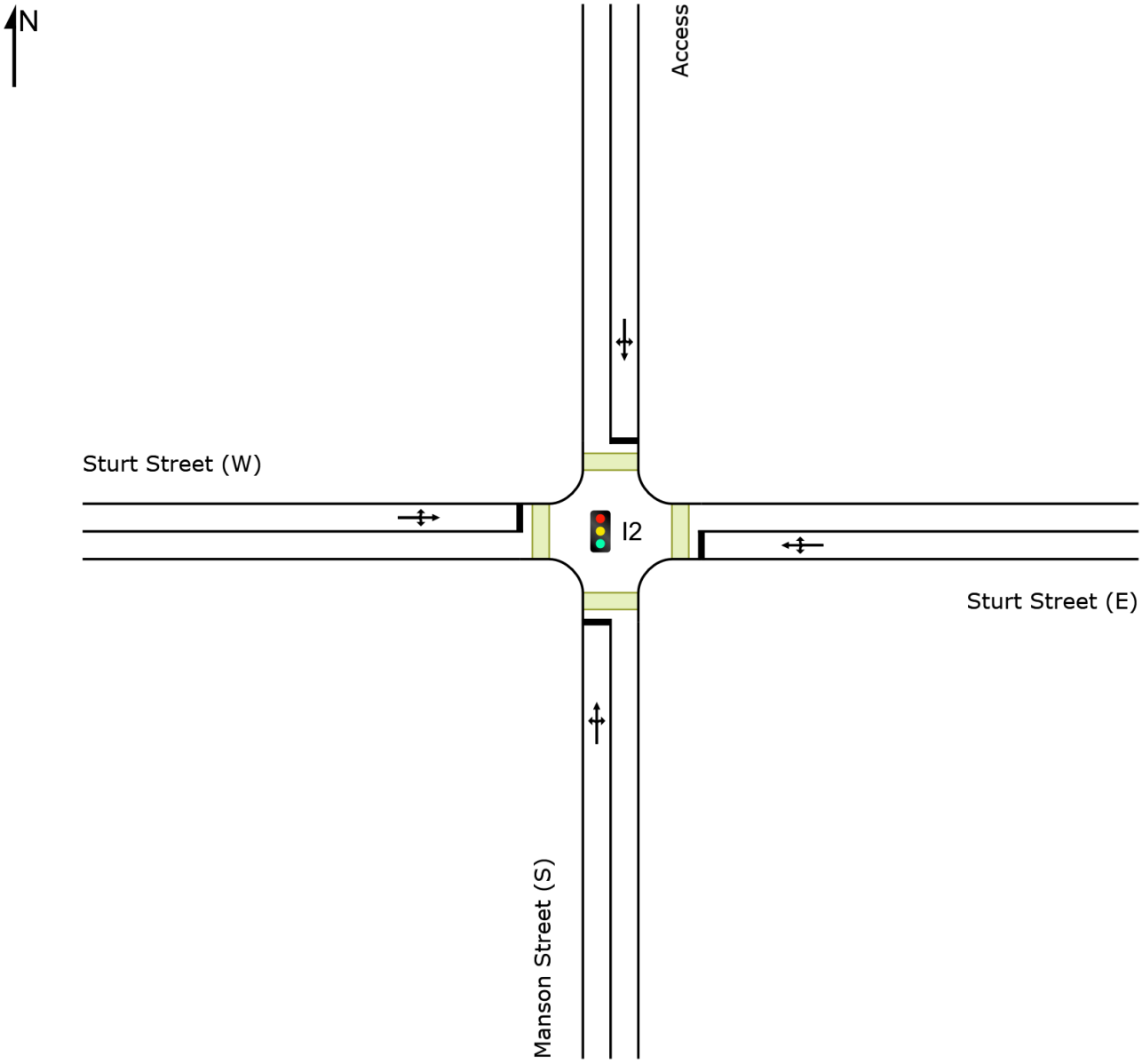
Attachment 1 – SIDRA Results, Sturt St / Manson St Intersection

SITE LAYOUT

Site: I2 [Sturt Street/ Manson Street/ Community Centre Access - AM (PD) consolidated approach (Site Folder: Manson St/Sturt St)]

Future Post Development
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Organisation: ASON GROUP PTY LTD | Licence: NETWORK / 1PC | Created: Tuesday, 1 March 2022 8:31:43 AM
Project: C:\Users\Arun Mohan\Desktop\Ason Group\P0796 - Telopea\Model\Ason Model - AddertonRd_NewLink Road\0796m03v1 Adderton Manson.sip9

MOVEMENT SUMMARY

Site: I2 [Sturt Street/ Manson Street/ Community Centre Access - AM (PD) consolidated approach (Site Folder: Manson St/Sturt St)]

Future Post Development
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Manson Street (S)														
1	L2	33	1	35	3.0	0.656	12.5	LOS A	14.1	99.5	0.63	0.73	0.63	35.4
2	T1	86	0	91	0.0	0.656	9.1	LOS A	14.1	99.5	0.63	0.73	0.63	35.3
3	R2	403	6	424	1.5	* 0.656	12.6	LOS A	14.1	99.5	0.63	0.73	0.63	35.2
Approach		522	7	549	1.3	0.656	12.0	LOS A	14.1	99.5	0.63	0.73	0.63	35.2
East: Sturt Street (E)														
4	L2	137	3	144	2.2	0.639	45.0	LOS D	8.1	59.0	0.98	0.83	1.01	34.2
5	T1	31	5	33	16.1	0.639	39.4	LOS C	8.1	59.0	0.98	0.83	1.01	34.8
6	R2	12	0	13	0.0	* 0.639	44.9	LOS D	8.1	59.0	0.98	0.83	1.01	34.0
Approach		180	8	189	4.4	0.639	44.0	LOS D	8.1	59.0	0.98	0.83	1.01	34.3
North: Access														
7	L2	47	0	49	0.0	0.182	10.4	LOS A	3.6	25.4	0.37	0.39	0.37	53.2
8	T1	185	0	195	0.0	0.182	4.9	LOS A	3.6	25.4	0.37	0.39	0.37	54.6
9	R2	1	0	1	0.0	0.182	10.3	LOS A	3.6	25.4	0.37	0.39	0.37	52.7
Approach		233	0	245	0.0	0.182	6.0	LOS A	3.6	25.4	0.37	0.39	0.37	54.3
West: Sturt Street (W)														
10	L2	2	0	2	0.0	0.309	47.4	LOS D	2.3	17.4	0.96	0.74	0.96	34.0
11	T1	28	5	29	17.9	0.309	41.9	LOS C	2.3	17.4	0.96	0.74	0.96	34.6
12	R2	21	0	22	0.0	0.309	47.3	LOS D	2.3	17.4	0.96	0.74	0.96	33.8
Approach		51	5	54	9.8	0.309	44.3	LOS D	2.3	17.4	0.96	0.74	0.96	34.2
All Vehicles		986	20	1038	2.0	0.656	18.1	LOS B	14.1	99.5	0.65	0.67	0.65	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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Manson Street (S)												
P1	Full	12	13	35.6	LOS D	0.0	0.0	0.89	0.89	57.6	28.6	0.50
East: Sturt Street (E)												

P2 Full	50	53	5.7	LOS A	0.0	0.0	0.36	0.36	27.7	28.6	1.03
North: Access											
P3 Full	50	53	35.6	LOS D	0.1	0.1	0.89	0.89	57.6	28.6	0.50
West: Sturt Street (W)											
P4 Full	50	53	5.7	LOS A	0.0	0.0	0.36	0.36	27.7	28.6	1.03
All Pedestrians	0	171	17.2	LOS B	0.1	0.1	0.56	0.56	39.2	28.6	0.73

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

MOVEMENT SUMMARY

Site: I2 [Sturt Street/ Manson Street/ Community Centre Access - PM (PD) consolidated approach (Site Folder: Manson St/Sturt St)]

Future Post Development
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Manson Street (S)														
1	L2	23	0	24	0.0	0.441	18.9	LOS B	10.1	71.0	0.69	0.66	0.69	33.8
2	T1	209	0	220	0.0	0.441	15.5	LOS B	10.1	71.0	0.69	0.66	0.69	33.7
3	R2	110	0	116	0.0	* 0.441	19.1	LOS B	10.1	71.0	0.69	0.66	0.69	33.6
Approach		342	0	360	0.0	0.441	16.9	LOS B	10.1	71.0	0.69	0.66	0.69	33.7
East: Sturt Street (E)														
4	L2	184	0	194	0.0	0.443	28.9	LOS C	9.5	67.3	0.80	0.78	0.80	40.2
5	T1	38	5	40	13.2	0.443	23.3	LOS B	9.5	67.3	0.80	0.78	0.80	41.0
6	R2	47	0	49	0.0	* 0.443	28.8	LOS C	9.5	67.3	0.80	0.78	0.80	39.9
Approach		269	5	283	1.9	0.443	28.1	LOS B	9.5	67.3	0.80	0.78	0.80	40.3
North: Access														
7	L2	17	0	18	0.0	0.123	18.3	LOS B	2.7	18.9	0.56	0.50	0.56	47.9
8	T1	92	0	97	0.0	0.123	12.7	LOS A	2.7	18.9	0.56	0.50	0.56	49.0
9	R2	2	0	2	0.0	0.123	18.2	LOS B	2.7	18.9	0.56	0.50	0.56	47.4
Approach		111	0	117	0.0	0.123	13.7	LOS A	2.7	18.9	0.56	0.50	0.56	48.8
West: Sturt Street (W)														
10	L2	1	0	1	0.0	0.100	28.6	LOS C	1.6	11.9	0.73	0.61	0.73	41.7
11	T1	34	5	36	14.7	0.100	23.1	LOS B	1.6	11.9	0.73	0.61	0.73	42.6
12	R2	13	0	14	0.0	0.100	28.5	LOS C	1.6	11.9	0.73	0.61	0.73	41.4
Approach		48	5	51	10.4	0.100	24.7	LOS B	1.6	11.9	0.73	0.61	0.73	42.2
All Vehicles		770	10	811	1.3	0.443	20.8	LOS B	10.1	71.0	0.71	0.68	0.71	38.0

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Manson Street (S)												
P1	Full	12	13	21.4	LOS C	0.0	0.0	0.69	0.69	43.4	28.6	0.66
East: Sturt Street (E)												

P2 Full	50	53	13.9	LOS B	0.1	0.1	0.56	0.56	35.9	28.6	0.80
North: Access											
P3 Full	50	53	21.4	LOS C	0.1	0.1	0.69	0.69	43.4	28.6	0.66
West: Sturt Street (W)											
P4 Full	50	53	13.9	LOS B	0.1	0.1	0.56	0.56	35.9	28.6	0.80
All Pedestrians	0	171	16.8	LOS B	0.1	0.1	0.61	0.61	38.8	28.6	0.74

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

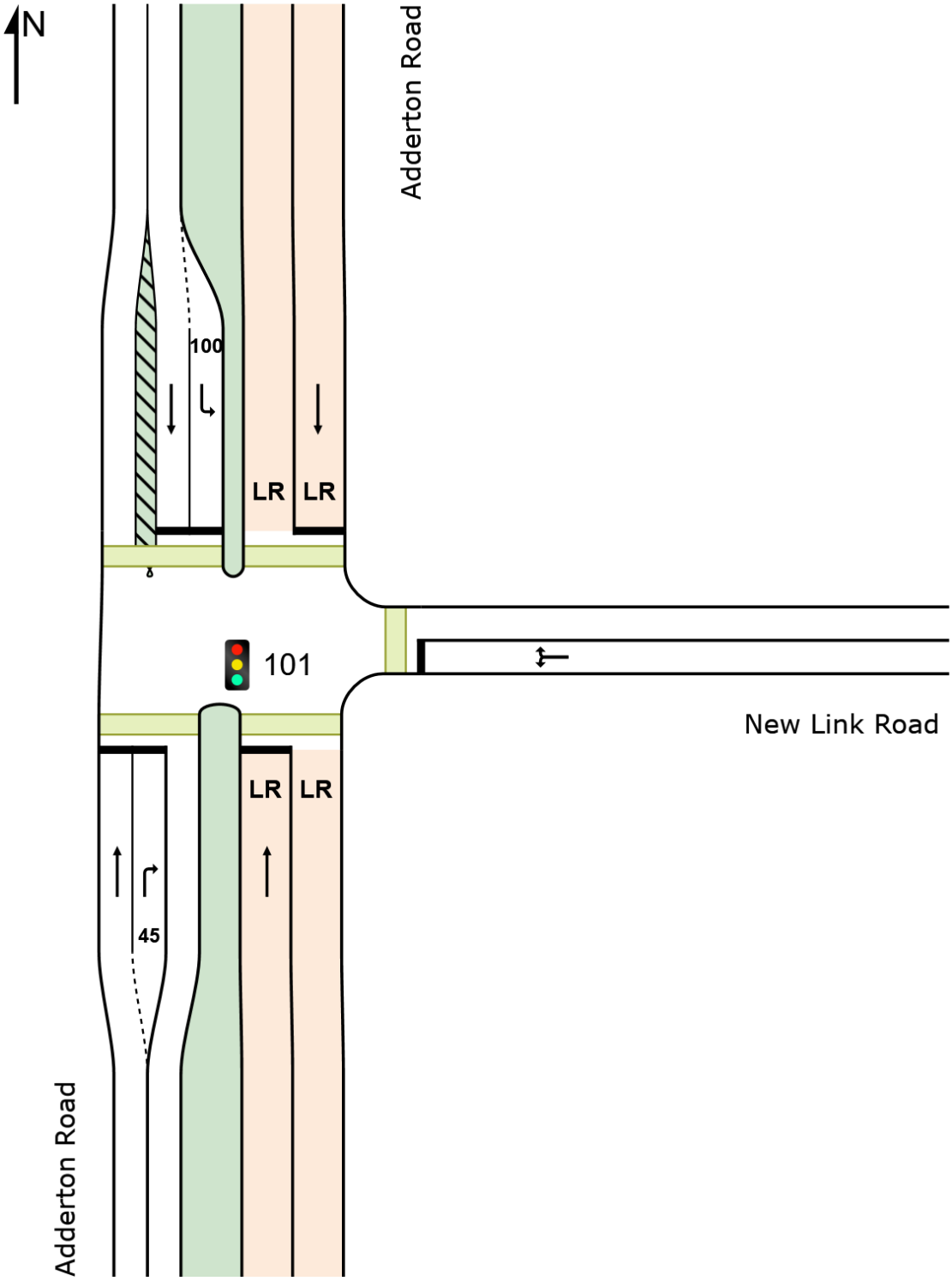
Attachment 2 – SIDRA Results, Adderton Rd / New Link Rd Intersection

SITE LAYOUT

Site: 101 [Adderton Rd / New Link Rd - Future AM - Reported (Site Folder: Adderton Rd / New Link Road)]

Adderton Road / New Link Road Future AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [Adderton Rd / New Link Rd - Future AM - Revised Demand (Site Folder: Adderton Rd / New Link Road)]

Adderton Road / New Link Road Future AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Adderton Road														
2	T1	451	18	475	4.0	0.324	6.0	LOS A	8.8	62.8	0.36	0.32	0.36	27.4
3	R2	15	8	16	56.0	0.119	58.9	LOS E	0.9	9.1	0.94	0.69	0.94	18.5
Approach		466	27	491	5.7	0.324	7.7	LOS A	8.8	62.8	0.38	0.34	0.38	27.0
East: New Link Road														
4	L2	3	0	3	0.0	*0.501	88.3	LOS F	2.3	16.2	1.00	0.81	1.03	16.4
6	R2	28	0	29	0.0	*0.501	87.8	LOS F	2.3	16.2	1.00	0.81	1.03	16.4
Approach		31	0	33	0.0	0.501	87.8	LOS F	2.3	16.2	1.00	0.81	1.03	16.4
North: Adderton Road														
7	L2	18	0	19	0.0	0.029	31.6	LOS C	0.7	5.0	0.68	0.66	0.68	28.1
8	T1	814	27	857	3.3	*0.757	19.3	LOS B	35.8	255.6	0.79	0.73	0.79	39.5
Approach		832	27	876	3.2	0.757	19.6	LOS B	35.8	255.6	0.79	0.73	0.79	39.1
All Vehicles		1329	54	1399	4.0	0.757	17.0	LOS B	35.8	255.6	0.65	0.59	0.65	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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Adderton Road												
P11	Stage 1	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	227.5	210.9	0.93
P12	Stage 2	200	211	54.6	LOS E	0.7	0.7	0.96	0.96	230.5	211.0	0.92
East: New Link Road												
P2	Full	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	225.6	208.6	0.92
North: Adderton Road												
P31	Stage 1	200	211	54.6	LOS E	0.7	0.7	0.96	0.96	230.5	211.0	0.92
P32	Stage 2	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	229.2	212.9	0.93
All Pedestrians		1000	1053	52.9	LOS E	0.7	0.7	0.94	0.94	228.7	210.9	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: 101 [Adderton Rd / New Link Rd - Future PM - Revised Demand (Site Folder: Adderton Rd / New Link Road)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Adderton Road														
2	T1	856	29	901	3.4	* 0.630	8.0	LOS A	23.9	171.1	0.51	0.48	0.51	27.0
3	R2	19	0	20	0.0	0.021	17.7	LOS B	0.5	3.8	0.50	0.59	0.50	29.5
Approach		875	29	921	3.4	0.630	8.2	LOS A	23.9	171.1	0.51	0.48	0.51	26.9
East: New Link Road														
4	L2	19	0	20	0.0	0.435	42.0	LOS C	1.6	11.4	1.00	0.72	1.00	25.2
6	R2	19	0	20	0.0	* 0.435	41.5	LOS C	1.6	11.4	1.00	0.72	1.00	25.2
Approach		38	0	40	0.0	0.435	41.7	LOS C	1.6	11.4	1.00	0.72	1.00	25.2
North: Adderton Road														
7	L2	16	0	17	0.0	0.181	67.0	LOS E	1.0	7.0	0.99	0.69	0.99	19.0
8	T1	337	16	355	4.8	1.084	150.5	LOS F	36.7	262.3	1.00	1.59	2.01	15.9
Approach		353	16	372	4.6	1.084	146.7	LOS F	36.7	262.3	1.00	1.55	1.97	16.0
All Vehicles		1266	46	1333	3.6	1.084	47.8	LOS D	36.7	262.3	0.66	0.78	0.93	22.6

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Adderton Road												
P11	Stage 1	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	227.5	210.9	0.93
P12	Stage 2	200	211	54.6	LOS E	0.7	0.7	0.96	0.96	230.5	211.0	0.92
East: New Link Road												
P2	Full	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	225.6	208.6	0.92
North: Adderton Road												
P31	Stage 1	200	211	54.6	LOS E	0.7	0.7	0.96	0.96	230.5	211.0	0.92
P32	Stage 2	200	211	51.8	LOS E	0.7	0.7	0.93	0.93	229.2	212.9	0.93
All Pedestrians		1000	1053	52.9	LOS E	0.7	0.7	0.94	0.94	228.7	210.9	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

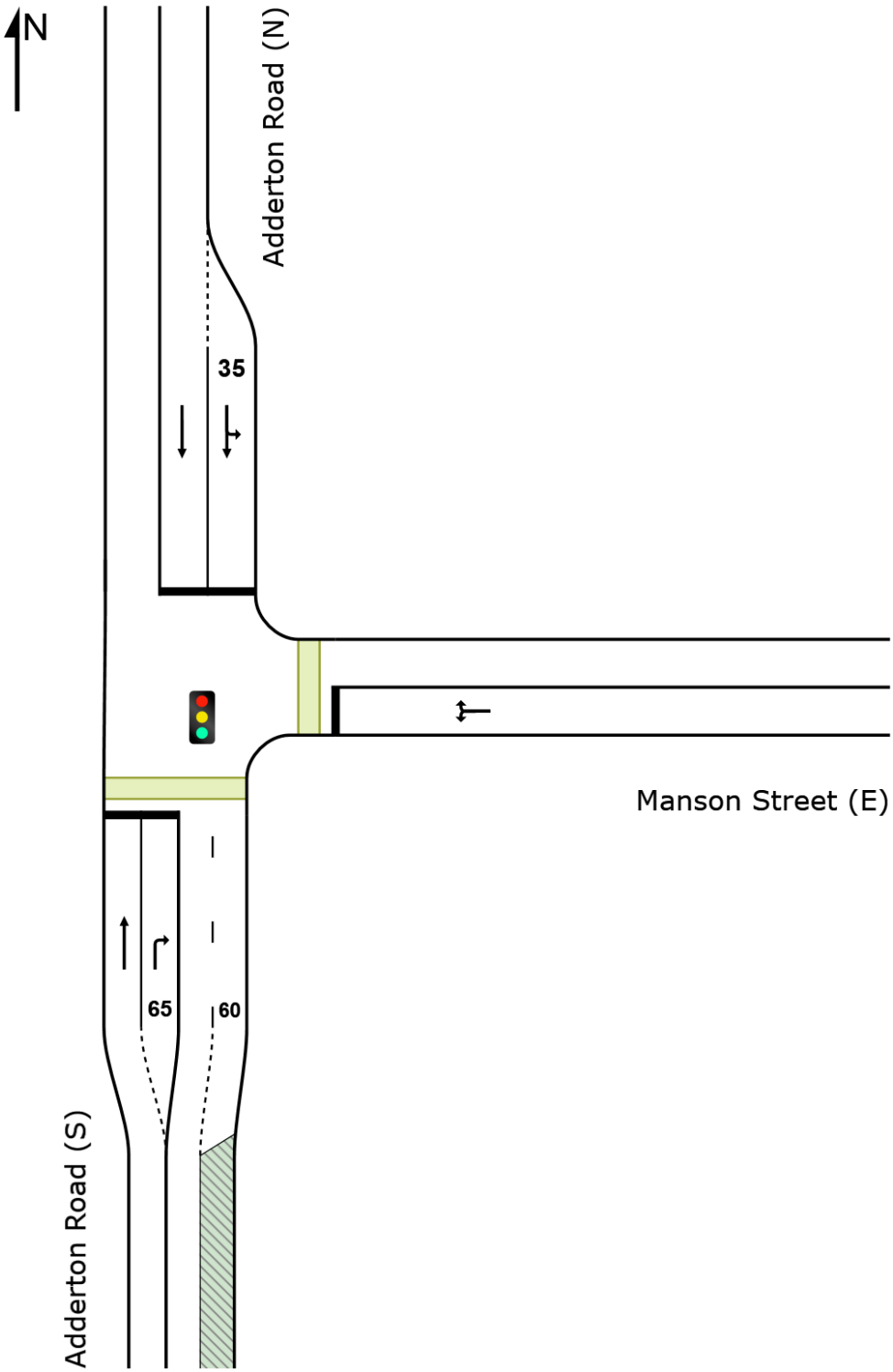
Attachment 3 – SIDRA Results, Adderton Rd / Manson St Intersection

SITE LAYOUT

Site: [Adderton Road / Manson Street - AM (JWP Design) - Reported Demand (Site Folder: Adderton Rd/Manson St)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



LANE SUMMARY

Site: [Adderton Road / Manson Street - AM (JWP Design) - Reassigned - Updated Phasing (Site Folder: Adderton Rd/ Manson St)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Adderton Road (S)													
Lane 1	428	0.2	1254	0.342	100	7.2	LOS A	7.7	53.8	Full	370	0.0	0.0
Lane 2	211	2.1	359	0.587	100	32.1	LOS C	7.4	52.6	Short	65	0.0	NA
Approach	639	0.8		0.587		15.4	LOS B	7.7	53.8				
East: Manson Street (E)													
Lane 1	425	0.8	573	0.742	100	35.6	LOS C	13.2	92.7	Full	350	0.0	0.0
Approach	425	0.8		0.742		35.6	LOS C	13.2	92.7				
North: Adderton Road (N)													
Lane 1	305	1.0	889	0.342	35[6]	20.4	LOS B	7.7	54.5	Short	35	0.0	NA
Lane 2	688	1.8	705[1]	0.976	100	59.9	LOS E	38.7	275.2	Full	500	0.0	0.0
Approach	993	1.5		0.976		47.8	LOS D	38.7	275.2				
Intersection	2057	1.2		0.976		35.2	LOS C	38.7	275.2				

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

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
6 Lane under-utilisation due to downstream effects

Approach Lane Flows (veh/h)

South: Adderton Road (S)

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	428	-	428	0.2	1254	0.342	100	NA	NA
Lane 2	-	211	211	2.1	359	0.587	100	0.0	1
Approach	428	211	639	0.8		0.587			

East: Manson Street (E)

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	366	59	425	0.8	573	0.742	100	NA	NA
Approach	366	59	425	0.8		0.742			

North: Adderton Road (N)

Mov. From N	L2	T1	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane

To Exit:	E	S			veh/h	v/c	%	%	No.
Lane 1	248	56	305	1.0	889	0.342	35[6]	45.6	2
Lane 2	-	688	688	1.8	705[1]	0.976	100	NA	NA
Approach	248	744	993	1.5		0.976			

	Total	%HV	Deg.Satn (v/c)
Intersection	2057	1.2	0.976

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

6 Lane under-utilisation due to downstream effects

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Adderton Road (S) Merge Type: **Priority**												
Exit Short Lane	1	60	0.0	688	694	3.00	2.00	422	1081	0.391	1.3	2.5
Merge Lane	2	-	100.0	Merge Lane is not Opposed				688	1800	0.382	0.0	0.0
East Exit: Manson Street (E) Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Adderton Road (N) Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

LANE SUMMARY

Site: [Adderton Road / Manson Street - PM (JWP Design) - Reassigned - Updated Phasing (Site Folder: Adderton Rd/ Manson St)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Adderton Road (S)													
Lane 1	817	0.3	1213	0.673	100	8.2	LOS A	15.8	110.5	Full	370	0.0	0.0
Lane 2	352	0.0	723	0.486	100	18.9	LOS B	6.9	48.5	Short	65	0.0	NA
Approach	1168	0.2		0.673		11.4	LOS A	15.8	110.5				
East: Manson Street (E)													
Lane 1	255	0.0	447	0.570	100	22.1	LOS B	4.4	30.5	Full	350	0.0	0.0
Approach	255	0.0		0.570		22.1	LOS B	4.4	30.5				
North: Adderton Road (N)													
Lane 1	104	0.4	436	0.239	35[6]	24.9	LOS B	2.6	18.3	Short	35	0.0	NA
Lane 2	304	0.9	446	0.682	100	25.0	LOS B	8.7	61.6	Full	500	0.0	0.0
Approach	408	0.7		0.682		25.0	LOS B	8.7	61.6				
Intersection	1832	0.3		0.682		15.9	LOS B	15.8	110.5				

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

6 Lane under-utilisation due to downstream effects

Approach Lane Flows (veh/h)

South: Adderton Road (S)

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	817	-	817	0.3	1213	0.673	100	NA	NA
Lane 2	-	352	352	0.0	723	0.486	100	0.0	1
Approach	817	352	1168	0.2		0.673			

East: Manson Street (E)

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	149	105	255	0.0	447	0.570	100	NA	NA
Approach	149	105	255	0.0		0.570			

North: Adderton Road (N)

Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	57	47	104	0.4	436	0.239	35[6]	0.0	2
Lane 2	-	304	304	0.9	446	0.682	100	NA	NA
Approach	57	352	408	0.7		0.682			

	Total	%HV	Deg.Satn (v/c)
Intersection	1832	0.3	0.682

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

6 Lane under-utilisation due to downstream effects

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Adderton Road (S) Merge Type: **Priority**												
Exit Short Lane	1	60	0.0	304	306	3.00	2.00	197	1489	0.132	0.4	0.6
Merge Lane	2	-	100.0	Merge Lane is not Opposed				304	1800	0.169	0.0	0.0
East Exit: Manson Street (E) Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Adderton Road (N) Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										