

Transport Assessment

Horsley Drive Business Park Stage 2, Horsley Park
State Significant Development Modification

Ref: 1223r02
16/06/2020

Document Control

Project No: 1223r02

Project: State Significant Development Application, Horsley Drive Stage 2, Horsley Park

Client: Charter Hall

File Reference: 1223r02v4 TA_Horsley Drive Business Park Stage 2 MOD, Issue

Revision History

Revision	Date	Details	Author	Approved by
-	20/02/2020	Draft	V. Cheng	R.B Madden
I	21/02/2020	Draft	V. Cheng / R.B Madden	R.B Madden
II	26/02/2020	Issue	V. Cheng / R.B Madden	R.B Madden
III	20/05/2020	Draft	V. Cheng / R.B Madden	R.B Madden
IV	16/06/2020	Issue	V. Cheng / R.B Madden	R.B Madden

This document has been prepared for the sole use of the Client and for a specific purpose, as expressly stated in the document. Ason Group does not accept any responsibility for any use of or reliance on the contents on this report by any third party. This document has been prepared based on the Client's description of its requirements, information provided by the Client and other third parties.

Table of Contents

1	INTRODUCTION.....	3
1.1	OVERVIEW.....	3
1.2	RESPONSE TO SUBMISSION	4
1.3	REFERENCE DOCUMENTS.....	10
2	THE EXISTING SITE	12
2.1	SITE LOCATION	12
2.2	EXISTING SITE APPROVAL.....	12
2.3	APPROVED TRAFFIC GENERATION.....	13
3	THE ROAD NETWORK.....	14
3.1	ROAD HIERARCHY.....	14
3.2	HEAVY VEHICLE ACCESS	15
3.3	THE HORSLEY DRIVE UPGRADE	16
4	EXISTING & BASELINE ROAD NETWORK PERFORMANCE.....	18
4.1	BASELINE (WITHOUT DEVELOPMENT) SCENARIOS	18
4.2	LIZARD LOG PRECINCT TRAFFIC GENERATION	18
4.3	BACKGROUND TRAFFIC GROWTH.....	18
4.4	2026 HORSLEY DRIVE INTERSECTION UPGRADES	20
4.5	EXISTING TRAFFIC FLOWS	22
4.6	EXISTING INTERSECTION PERFORMANCE	25
5	PUBLIC & ACTIVE TRANSPORT	29
5.1	BUS SERVICES.....	29
5.2	PEDESTRIAN AND CYCLE NETWORK	29
5.3	EXISTING MODE SHARE	31
6	THE PROPOSAL.....	32
6.1	THE PROPOSAL.....	32
7	TRAFFIC ASSESSMENT	34
7.1	TRAFFIC GENERATION.....	34
7.2	TRIP DISTRIBUTION	38
7.3	STANDARD TRAFFIC IMPACT ASSESSMENT	41
7.4	SENSITIVITY TEST TRAFFIC IMPACTS	43
8	PARKING & SERVICING REQUIREMENTS	45
8.1	PROPOSED CAR PARKING.....	45
8.2	OTHER CAR PARKING.....	45
8.3	ACCESSIBLE PARKING	46
8.4	OTHER PARKING	46
9	DESIGN COMMENTARY	47
9.1	RELEVANT DESIGN STANDARDS.....	47
9.2	ACCESS ROAD.....	47
9.3	CFC ACCESS DRIVEWAYS AND INTERNAL CIRCULATION	47
9.4	WAREHOUSE ACCESS DRIVEWAYS AND INTERNAL CIRCULATION.....	48
9.5	PARKING SPACES.....	48
9.6	DESIGN SUMMARY	49
10	CONCLUSIONS.....	50
10.1	CONCLUSIONS	50

Appendices

Appendix A: SIDRA Outputs

Appendix B: Swept Path Analysis

1 Introduction

1.1 Overview

Ason Group has been commissioned by Charter Hall (the applicant) to prepare this Transport Assessment (TA) in support of a Modification Application (Mod) to the approved Concept Master Plan and Stage 1 Development Application (DA) for the Horsley Drive Business Park (HDBP) Stage 2 (SSD-7664) (the Proposal).

The modifications include:

- Provision of an access roundabout intersection with Cowpasture Road and Trivett Street.
- Alterations to proposed Lots resulting in a reduction in total Gross Floor Area (GFA) from 87,960m² (approved) to 76,293m² (proposed) which consists of:
 - 44,713m² of Customer Fulfilment Centre GFA,
 - 16,640m² of Warehouse 1 GFA
 - 14,940m² of Warehouse 2 GFA.
- Reduction in number of Lots from 4 to 3 through consolidation of southern Lots.
- Provision of a Customer Fulfilment Centre (CFC) on southern lot. The CFC will be a specialist warehouse facility used for the distribution of goods. The northern lots would accommodate traditional warehouse development.

The detailed design of the CFC is the subject of a separate State Significant Development Application (SSDA) (reference: SS-10404), which is also currently being assessed.

It is worthy of note that Ason Group undertook the assessment for the approved HDBP Stage 2 Concept Plan, which was detailed in report in the report entitled *Traffic Impact Assessment Report, Proposed Warehouse / Industrial Facility, Horsley Drive Business Park Stage 2, Horsley Park*, Version 2, 02/12/2016 (Ason 2016 Report). Extensive consultation was undertaken with both Fairfield Council (Council) and Transport for New South Wales (TfNSW) (formerly Roads and Maritime Services (RMS)) as part of this assessment to agree the methodology and scope of works to be covered by the Ason 2016 Report.

The key purpose of this TA is to provide an update to this assessment, following the proposed changes to the Concept Plan as part of this Mod.

1.2 Response to Submission

The Mod was submitted in February 2020, with Requests for Further Information (RFI) received subsequently from Fairfield City Council and TfNSW. The following **Table 1** and **Table 2** details the comments received; and Ason Group's response to each.

Table 1: SSDA 7664 Fairfield Council RFI Response

Heading	RFI	Response / Comment
Traffic	The following issues shall be satisfactorily addressed prior to determination:	
	The development application shall be referred to Transport for NSW (formerly the Roads and Maritime Services) for review and comments. Any issues raised by Transport for NSW shall be satisfactorily addressed and any conditions set by them shall be complied with.	Comments from TfNSW with regard to the application have been received. Refer to Table 2.
	The proposed parking rate of 1 space for every 300m ² of warehouses of GFA shall be justified and clarification is required regarding this matter. This parking rate shall be consistent with the parking rate which is adopted for Horsley Drive (HDBP) Stage 1 for the warehouse development.	It is critical to note that the approved car parking rate of 1 car space for every 300m ² GFA for the HDBP has been adopted as this is rate that is applicable to the Site under the approved Concept Plan. Therefore, adoption of this rate for the northern warehouses for this Mod is consistent with the previously approved SSDA 7664 parking rates.
	The traffic generation rates for calculating the traffic generation by the proposed development shall be based on the RMS Guide to traffic generating developments updated traffic surveys (TDT 2013/04a). In this instance, the applicant has estimated the traffic generation for the Customer Fulfilment Centre (CFC) based on the known operational data of a similar facility. It is also mentioned that the applicant has provided Ason Group with their delivery vehicle data from a similar facility located in Australia. Additional information shall be provided in regard to where the operational data are obtained from.	Based on RMS Guide's traffic generation rates for warehouses as discussed in Section 7.1.1 (and adopted for the northern warehouses), the CFC's GFA of 44,713m ² would generate up to 70 vehicles per hour during the AM and PM peaks. However, it is important to note that the CFC would not function as a typical warehouse development and will have a unique use. As such, the traffic generation assessment has been based on data jointly provided by the end-user and TM-Insight, who collectively have significant experience in the operation of industrial and logistics developments all over Australia, as well as internationally, and has been derived from the forecast operational requirements of the development. Adopting this methodology, results in an estimated traffic generation of 127 vehicles per hour during the AM peak and 167 vehicles per hour during the PM peak for the CFC, as discussed in Section 7.1 . Therefore, the traffic generation adopted has resulted in a more conservative modelling assessment being undertaken and is considered wholly appropriate in this instance.
	Cowpasture Road, between Victoria Street and Newton Road is classified as a collector road under Council's road hierarchy. The subject development is expected to generate approximately 3,225 vehicles per day which is considered to have significant impacts on the adjoining road network. SIDRA intersection files (electronic copy of the files) showing the analysis of the potential traffic impacts of the development	The CFC would operate 24 hours a day, with the peak hours for the Site (01:30-2:30pm, 3:00-4:00am and 11:00pm-12:00am) well outside of key network peak hours (07.00-09.00am and 04.00-06.00pm). Further the existing approved HDBP has an accepted traffic generation threshold of 1,863 vehicle movements per day. Therefore, the Proposal represents an increase of 1,362 vehicles, which equates to an average of 57 vehicle movements per hour 29 in / 28 out). This volume

	proposal on adjoining road network (key intersections in the locality) under the existing and forecasted conditions shall be submitted to Council for assessment. In addition, the applicant shall investigate the feasibility of widening Cowpasture Road at/near the site and this information shall be provided to Council.	of additional traffic over that already approved would not materially impact capacity of Cowpasture Road in the vicinity of the Site. Nevertheless, a mid-block capacity assessment of Cowpasture Road has been undertaken to demonstrate the impact of the Proposal of capacity along Cowpasture Road between Victoria Street and Newton Road. Taking the northbound and southbound peak hour traffic volumes at the Victoria Street / Cowpasture Road roundabout intersection, the following mid-block traffic volumes can be estimated: Table: Existing Peak Hour Mid-Block Hourly Volumes <table><tr><th>Direction</th><th>AM Peak</th><th>LOS</th><th>PM Peak</th><th>LOS</th></tr><tr><td>Northbound</td><td>514</td><td>C</td><td>410</td><td>C</td></tr><tr><td>Southbound</td><td>581</td><td>C</td><td>536</td><td>C</td></tr></table> The mid-block LOS has been determined using the RMS Guide Table 4.4 Urban road peak hour flows per direction for one lane. Considering the trip distribution and the peak hour generation of the entire Estate traffic, the resulting mid-block volumes and LOS are the following: Table: Future MOD Mid-Block Hourly Volumes <table><tr><th>Direction</th><th>AM Peak</th><th>LOS</th><th>PM Peak</th><th>LOS</th></tr><tr><td>Northbound</td><td>617</td><td>D</td><td>492</td><td>C</td></tr><tr><td>Southbound</td><td>642</td><td>D</td><td>660</td><td>D</td></tr></table> As such, the LOS would decrease from C to D during the AM and PM peak. This is still a satisfactory outcome for the mid-block assessment. Importantly, the mid-block assessment only shows the increased southbound movement results in only 17-60 vehicles over the LOS C threshold indicating it would operate close to a LOS C. It is noteworthy that the existing mid-block volumes operated at a LOS C that was already close to the threshold of a LOS D (600 veh/hr). As such, the future mid-block would operate at a similar LOS. Therefore, the increased traffic flows per hour along Cowpasture Road is acceptable under the mid-block assessment. Electronic SIDRA files will be provided.	Direction	AM Peak	LOS	PM Peak	LOS	Northbound	514	C	410	C	Southbound	581	C	536	C	Direction	AM Peak	LOS	PM Peak	LOS	Northbound	617	D	492	C	Southbound	642	D	660	D
Direction	AM Peak	LOS	PM Peak	LOS																												
Northbound	514	C	410	C																												
Southbound	581	C	536	C																												
Direction	AM Peak	LOS	PM Peak	LOS																												
Northbound	617	D	492	C																												
Southbound	642	D	660	D																												
	The applicant shall justify that the sight distance requirement for commercial vehicles entering and exiting from the Estate Road complies with Figure 3.3 of AS 2890.2:2018.	Sight distance for the commercial vehicle exit driveways on the Estate Road has adequate sight distance requirements of 69m which equates to a minimum 5s gap for a 50km/hr road as per AS2890.2.2018 Figure 3.3.																														
Provision of warehouses on the northern lot	The submitted architectural plans shall indicate the dimensions of the proposed vehicle accesses, internal access road width, loading bays/hardstand areas, line markings (to clarify the extent of the loading area and the direction of travel) car parking and disabled spaces and ramp grades to and from various parking and loading areas of the site. This information shall be submitted to Council for assessment.	This application relates to the modification of a Concept Plan Approval. Detailed information such as line marking would be considered as part of further, detailed applications for the individual Lots.																														

	Concerns are raised regarding the number and the spacing of the driveways proposed for the warehouses. The potential conflicts between vehicles and heavy vehicles entering and exiting the site shall be addressed.	We note that there are concerns for the close proximity of the driveways. However, Lot 2 & 3's truck driveways have a heavy vehicle traffic generation peak of 5 trucks per hour. The Lot 2 and 3 carpark driveways would each have around 18-21 vehicles entering and exiting during the peak hour. The number of car trips would be focused around the commuter peaks of 7-9am and 4-6pm reducing the conflicts between heavy and light vehicles. Nonetheless, there is expected to be low traffic generation across each of the Lot 2 and 3 driveways, minimising interactions between light and heavy vehicles. Each driveway has clear sight distances along the Estate Road allowing drivers to undertake safe turning movements in and out of the driveways. Further, the Lot 2 and Lot 3 warehouse plans are currently concept plans with no set tenants. Separate applications will consider in more detail all elements of the proposed layout, including the driveway design. Finally, the access driveways off the Estate Road are proposed in a similar manner to that delivered on Burilda Close (HDBP Stage1) and therefore, for the purposes of the Concept Plan, are considered to be acceptable.
	Architectural plans show that traffic signal system is to be proposed to manage one-way traffic flow within the site. Council has not approved the use of traffic signal system within the development site in Fairfield Local Government Area. Additional information shall be provided to Council how the potential conflicts between vehicles will be managed within the site in the event of a power failure or when traffic signal system/lift system is malfunctioning. In this instance, the applicant shall demonstrate that the proposed system would not adversely affect the safe, efficient and effective use of the site.	As above, the detailed design and operational characteristics of the individual warehouses would be subject to individual application processes. For the purposes of consideration of the Concept Plan, it is clear that an appropriate management solution could be implemented to manage one-way flow within the internal workings of the Site. This would include an Operational Management Plan for each Lot to be drafted during the Occupation Certificate stage, detailing how heavy vehicles would operate within the Site. With specific regard to Lot 3's proposed traffic signal system, the operational management plan would require signages along the access road to stop at the signal line and contact the warehouse management in the event of a signal failure. The site management would provide a traffic controller to coordinate movements around the corner until the signal system is repaired. Mirrors and line marking will be provided. Based on the low traffic generating nature of traditional warehouse developments, the signal system is entirely appropriate and facilitates the ultimate utilisation of the spaces within the Lot. When the detailed application is commenced for this Lot, the end user would be better understood, the application would reflect the appropriate layout accordingly.
	Considering the number of trucks and delivery vehicles which are expected to service the site on a daily basis, a loading dock management plan is required. The loading dock management plan is to ensure that trucks will be accommodated within the site without impacting traffic flow into, within and out of the site. Additional measures may be required to prevent additional trucks or commercial vehicles from entering the site when all of the loading bays are occupied.	As above, this Mod relates to a Concept Plan approval. Detailed documentation would such an Operational Management Plan should form part of a Condition of Consent for the Occupation Certificate relating to the individual buildings.
	Information on the plans shows that loading bays at/near the north-western and south-eastern corners of Lot 2 will be clear to allow a B-Double vehicle turn. Additional information shall be provided to Council for clarification	This will be managed as part of the Operational Management Plan for the individual Lots, which would be expected to be implemented as part of Conditions of Consent. A booking system would be implemented and managed by the respective Site Managers.

	No other information is provided regarding the provision of designated loading bays for 26m B-Double vehicles to service the site. Service vehicles shall only undertake loading and unloading activities from the designated loading areas and shall not obstruct the car parking areas and traffic flow within the site. Further information shall be provided to Council for assessment.	As with any other industrial development loading of a larger vehicle such a B-double would be managed on-site, in accordance with the operational management plan. With regard to the docks to be serviced by B-double vehicles; swept path analysis shows that B-doubles can exit the docks. For incoming B-double vehicles, it is expected that they would be uncoupled, with the trailers manoeuvred into the bays as AVs. This is standard practice and will not impact internal traffic flow in an unacceptable manner when considered against the traffic generation. Alternatively, B-doubles would be side loaded where appropriate. This level of detail would be confirmed during the detailed design phases for each warehouse. For the purpose of this Concept Plan, it is reiterated that the internal layout of each of the lots have been designed (and will be delivered) in accordance with the relevant standards.
Proposed Customer Fulfilment Centre (CFC) on the southern lot	The CFC proposes the following 5 access driveways to and from the site: • Heavy vehicle entry driveway: 11.7m wide • Heavy vehicle exit driveway: 8m wide • Delivery vehicle entry driveway: 12.6m wide • Delivery vehicle exit driveway: 8m wide • Staff entry driveway: 4m wide • Staff exit driveway: 6m wide The information related to the turning path analysis is not insufficient to help determine whether there is sufficient capacity at the site to accommodate the largest vehicle (26m B-Double vehicle). Turning path analysis indicating how the largest vehicle can manoeuvre into, within and out of the site shall be submitted to Council for assessment. Swept path analysis shall also demonstrate how the heavy vehicles can satisfactorily turn into and out of the loading bays.	The CFC access driveway layout has been revised. Please see Appendix B for the swept paths into and out of driveways and loading docks. The final proposed design of the CFC will be assessed in more detail in the separate SSDA-10404 for the CFC.
	Clarification is required regarding the truck entry/exit driveway which is located at the western end of the Estate Road. The applicant shall indicate whether this is a combined entry/exit driveway. In addition, the proposed driveway location is directly adjacent to the driveway of the adjoining property. There will be potential conflicts between vehicles entering and exiting the two sites. The applicant shall review the location of the proposed driveway to minimise potential conflicting movements.	The driveway located at the western end of the Estate Road has been amended to be a single exit driveway for CFC trucks and vans only. It should be noted that the detailed locations for access points should be subject to separate, detailed SSD applications and should be considered at the appropriate stage. However, noting the low traffic generation expected for the Lot 2 and 3 developments within HDBP Stage 2, the concept of multiple access point is considered acceptable. Further, it is a consistent approach to that delivered on Burilda Close (HDBP Stage1).
	Considering the number of trucks and delivery vehicles which are expected to attend the site on a daily basis, a loading dock management plan is required. The loading dock management plan is to ensure that trucks will be accommodated within the site without impacting traffic flow into, within and out of the site. Additional measures may be required to prevent additional trucks or commercial vehicles from entering the site when all of the loading bays are occupied.	Agreed – it is recommended that a Condition Consent be implemented requiring an Operational Management Plan be implemented for the individual Lots at the appropriate stage (i.e prior to occupation).
	No information is provided regarding the provision of designated loading bays for 26m B-Double vehicles to service the site. Service vehicles shall	As with any other industrial development loading of a larger vehicle such a B-double would be managed on-

	only undertake loading and unloading activities from the designated loading areas and shall not obstruct the car parking areas and traffic flow within the site. Further information shall be provided to Council for assessment.	site, in accordance with the operational management plan. With regard to the docks to be serviced by B-double vehicles; swept path analysis shows that B-doubles can exit the docks. For incoming B-double vehicles, it is expected that they would be uncoupled, with the trailers manoeuvred into the bays as AVs or side-loaded where appropriate which will be subject to an Operational Management Plan. This is standard practice and will not impact internal traffic flow in an unacceptable manner when considered against the traffic generation. Finally, it should be noted that all carparking areas and circulation roads are separated from heavy vehicle movements.
	The submitted architectural plans shall show the dimensions of the proposed vehicle accesses, internal access road width, loading bays, trailer parking bays, car parking, van parking, bicycle parking, motorcycle parking, disabled spaces and ramp grades to and from various parking and loading areas of the site. This information shall be submitted to Council for assessment.	The architectural plans have now been updated to reflect a revised CFC design. It is important to note that each of the individual lots of the HDBP Stage 2 will each undergo a separate detailed SSD Application. Note that it is considered unnecessary to provide dimensions for all parking bays – all loading bays, trailer parking bays, car parking, van parking, bicycle parking, motorcycle parking and disabled spaces have been designed with regard to the Australian Standards and it is expected that this would be required as part of any Condition of Consent and would be subsequently certified by a qualified professional.
	A review of the site plan indicates that parking spaces are proposed in a stacked arrangement near the south-western corner of the site. According to the Fairfield City Wide DCP, Council generally does not favour the use of stacked parking within the site unless further justification is provided. In this regard, the applicant is required to submit Council further information in regard to the management of stacked parking. The applicant shall demonstrate that the provision of stacked parking arrangement will not adversely affect the safe, efficient and effective use of the site.	The south-western corner of the Site has now been revised to provide for trucks. Trailer parking bays are proposed along the western side of the Site. Stacked parking is only proposed at the van pen parking area. These spaces would be operated by staff who are skilled heavy vehicle drivers who would park the vehicles there for storage or for waiting purposes, in line with the operational management plan.
Intersection of Cowpasture Road and Trivet Street	Road safety audit shall be undertaken by an accredited Road Safety Auditor (a qualified person) to identify whether there are issues/risks associated with the installation of a roundabout at the intersection of Cowpasture Road and Trivet Street. A copy of the road safety audit report shall be submitted to Council for assessment.	This will be addressed as a Condition of Consent.
	The design of the road roundabout shall comply with the Austroads Guide to Road Design Part 4B: Roundabouts. Swept path analysis shall be provided to Council to demonstrate that the design of the roundabout is adequate to accommodate the largest vehicle manoeuvring at the roundabout intersection. In this instance, the largest vehicle entering and exiting the site would be 26m B-Double vehicle.	Please refer to Civil Engineer response.
	The installation of traffic control devices such as a roundabout, signs and line markings on a public/local road requires community support and approval from the Fairfield Traffic Committee. Should the road safety audit support the installation of a roundabout, the applicant requires	This will be addressed as part of a suitable Condition of Consent.

	to obtain approval from Council's Traffic and Transport Branch. The applicant shall provide Council the consultation outcome and the proposed option for assessment.	
	The installation of a roundabout requires changes to the access arrangements to the adjacent properties which will require consent from the affected stakeholders. The affected stakeholders shall be consulted regarding the proposed changes and the outcome of the consultation shall be submitted to Council for assessment.	This will be addressed as part of a suitable Condition of Consent.
Proposed Estate Road	The construction of an Estate Road to service the development shall be referred to Council's Subdivision Branch for review and assessment. The design of the Estate Road shall comply with Council's requirements.	This will be addressed as part of a suitable Condition of Consent.
	The applicant shall submit a swept path diagram showing the largest vehicle can turn into and out of the Estate Road without being impacted by the parked vehicles on the Estate Road.	Please see Appendix B for swept paths into and out of the Estate Road.
	As Chandos Road and Trivet Street are 5-tonne load limited streets, heavy vehicles shall be restricted from accessing these roads. Clarification is required regarding this matter.	Noted. Heavy vehicles shall be restricted from accessing Chandos Road and Trivet Street.

Table 2: SSDA 7664 TfNSW RFI Response

RFI No.	RFI	Response / Comment
1	Thank you for your correspondence via Major Projects Planning portal (ref: PAE-2659) on 1 April 2020, requesting Transport for NSW (TfNSW) to review and comment on the subject proposal. The documents exhibited in support of the proposal has been reviewed. It is noted that the proposal serves largely the purpose of making modifications to the approved development to support the southern portion of the site, which is another proposal (SSD 10404) under assessment concurrently. TfNSW had provided its submission (SYD19/01554/02) to SSD 10404 on 9 April 2020. Comments provided under SSD 10404 are relevant for consideration for the subject proposal. In particular, the comments regarding the proposed works at the intersection of Cowpasture Road and Trivett Street, Wetherill Park. As this location is under the care and control of Council, any proposed works will need to be undertaken in accordance with Council's requirements. Thank you again for the opportunity of providing advice for the above development application. If you require any further information, please don't hesitate to contact Billy Yung, Senior Transport Planner, via email at billy.yung@transport.nsw.gov.au. I hope this has been of assistance.	Noted. Addressed at part of the SSD-10404 application.

1.3 Reference Documents

1.3.1 Planning Controls

The Site lies within the Fairfield City Council (Council) Local Government Area (LGA), as such key references in preparing this TA include:

- *Fairfield Local Environmental Plan 2013* (the LEP);
- *Fairfield Development Control Plan 2013* (the DCP);
- *State Environmental Planning Policy (Western Sydney Parklands) 2009* (SEPP WSP).
- *State Environmental Planning Policy (Western Sydney Employment Area) 2009* (SEPP WSEA).
- Greater Sydney Commission (GSC), *Greater Sydney Region Plan*, March 2018;
- GSC, *Western City District Plan*, March 2018;
- TfNSW, *Future Transport Strategy 2056*, March 2018; and
- TfNSW, *Future Transport – Greater Sydney Services and Infrastructure Plan*, March 2018;

1.3.2 Traffic and Transport Guidelines and Standards

This TA also references the following:

- *RMS Guide to Traffic Generating Developments* (RMS Guide);
- *RMS Guide to Traffic Generating Developments – Updated Traffic Surveys* (RMS Guide Update);
- Austroads, *Road Design Guide*;
- Austroads, *Guide to Traffic Management – Part 12: Traffic Impacts of Development*;
- Austroads, *Guidelines for Planning and Assessment of Road Freight Access in Industrial Areas*;
- Australian Standard 2890.1: *Parking Facilities – Off-Street Car Parking* (AS 2890.1);
- Australian Standard 2890.2: *Parking Facilities – Off-Street Commercial Vehicle Facilities* (AS 2890.2);
- Australian Standard 2890.6: *Parking Facilities – Off-Street Parking for People with a Disability* (AS 2890.6);
- Austroads *Cycling aspects of Austroads Guides*.

1.3.3 Background Reports

A number of background reports have been referenced to provide more detailed information in regard to future traffic flows through the local road network providing access to the Site; and indeed, in regard to the existing Site approvals. These reports include:

- Ason 2016 Report;
- TRAFFIX, *Horsley Drive Business Park Traffic Impacts Assessment for a Part 4 Concept Plan Application* May 2012 (TRAFFIX Report);
- Road Delay Solutions, *The Horsley Drive Business Park Revised Structure Plan, Traffic Report December 2014* (Reference: 20140209); and
- Road Delay Solutions *Proposed Lot 2, Proposed Warehouse/Industrial Facilities, The Horsley Drive Business Park, Traffic Impact Report*, April 2016 (Reference: 20160263).
- SMEC *The Horsley Drive Upgrade Traffic Impact Assessment Report* June 2017 (SMEC Report).

2 The Existing Site

2.1 Site Location

The Horsley Drive Business Park (HDBP) comprises a substantial area of industrial/employment land under the Western Sydney Parkland Trust. It is generally located to the northwest of The Horsley Drive signalised intersection with Cowpasture Road. To the north and west of the Site are general farmlands and to the east and south are industrial developments. There is currently an existing access driveway to the Site which provides access to residential dwellings and, previously, access to the HDBP Stage 1 construction site. It is noted that the HDBP Stage 1 is now fully constructed and operational.

Access to HDBP Stage 1 is provided via the recently constructed Cowpasture Road / Burilda Close roundabout. Access to Stage 2 of the HDBP (the subject of this application) will be provided via a new intersection onto Cowpasture Road.

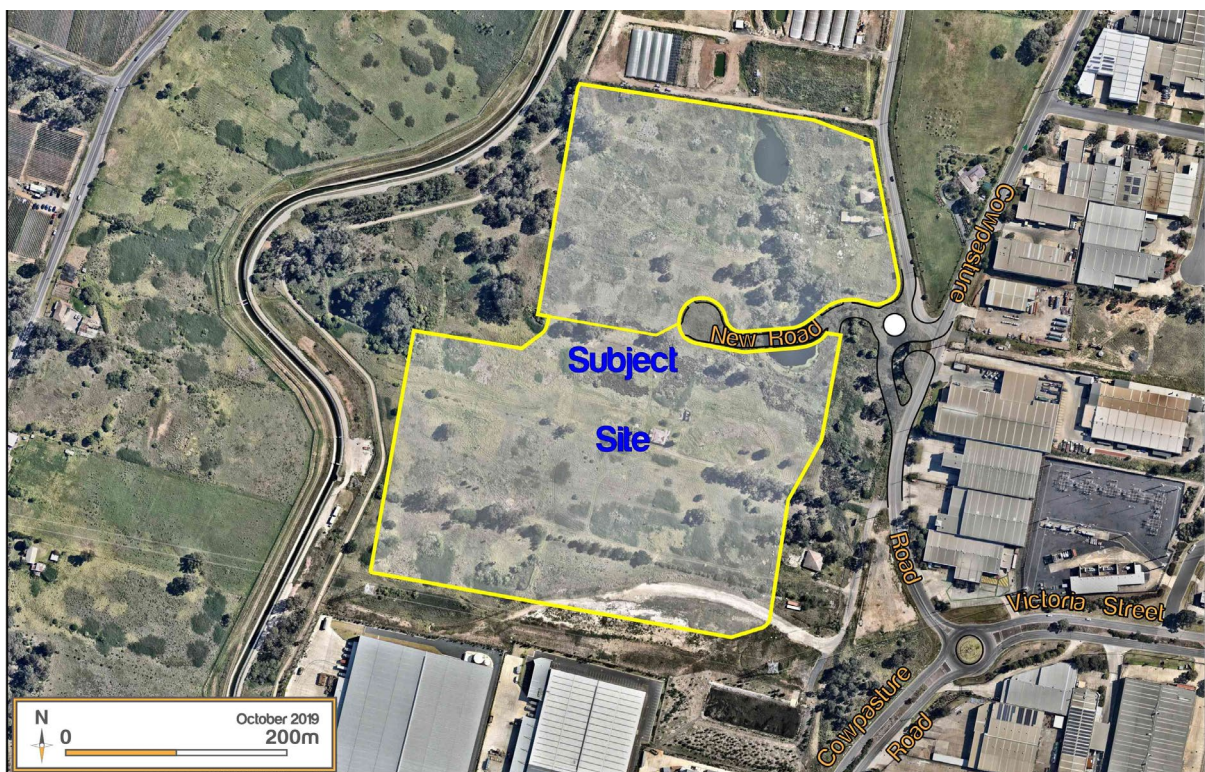


Figure 1: Site Location

2.2 Existing Site Approval

As noted, the application of which this TA supports is a Mod to an existing Concept Plan Approval. The HDBP Stage 2 was previously granted approval on 9 November 2017 (SSD 7664), comprising of approximately 87,960m² total building area which includes:

- 85,460m² of warehouse GFA across 4 separate warehouse buildings;
- 2,500m² ancillary office space GFA across 4 separate warehouse lots;
- Hardstand access and manoeuvring areas;
- On-site car parking for 385 cars; and
- A new access road from Cowpasture Road.

2.3 Approved Traffic Generation

With reference to the existing approval, and the Ason Report forecast that the HDBP Stage 2 would, once fully operational, generate:

- 138 vehicle trips in the AM peak hour
- 139 vehicle trips in the PM peak hour
- 1,863 vehicles per day

This traffic generation was approved and deemed to be acceptable by TfNSW and therefore represents a traffic generation “threshold” or “budget” on which any development on the Site should be considered against.

3 The Road Network

3.1 Road Hierarchy

The key roads and intersections in the vicinity of the Site are shown in **Figure 2**, and described further below.

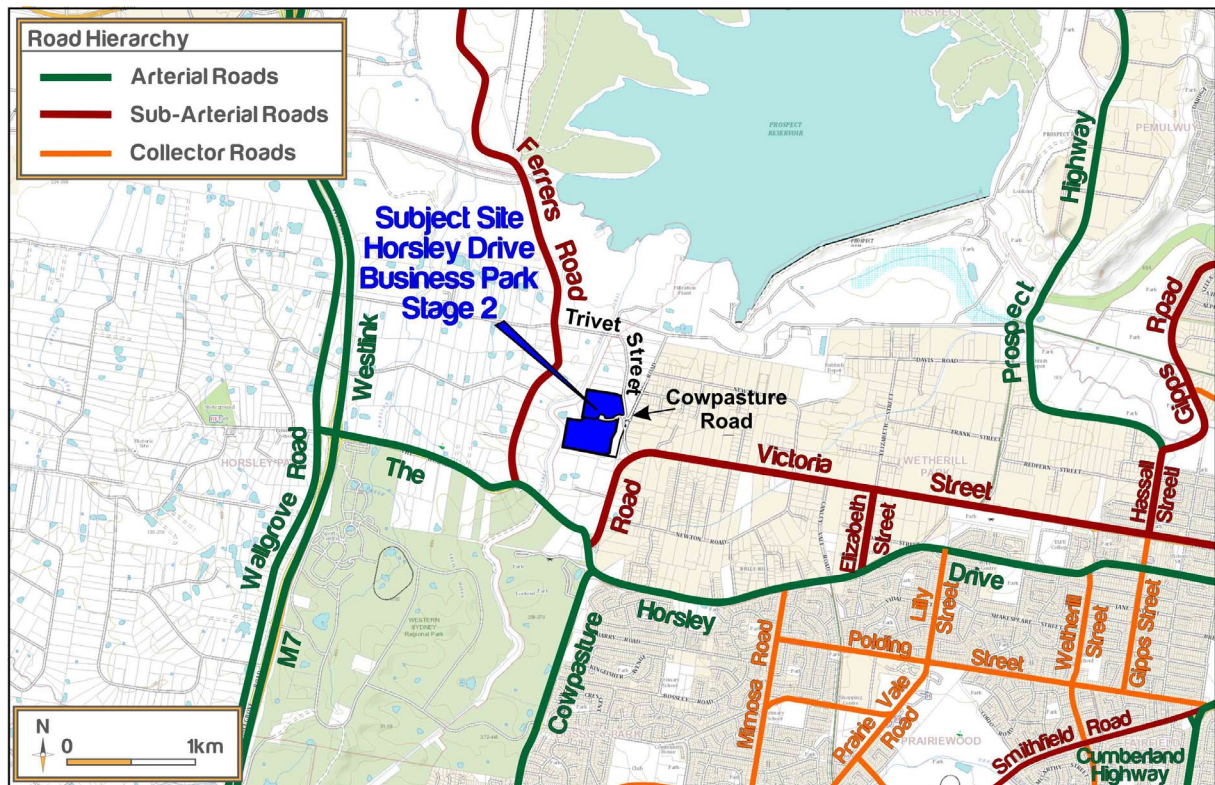


Figure 2: Road Hierarchy

3.1.1 M7 Motorway

A major arterial road that provides Sydney with key links to the M2, M4 and M5 motorways. It runs in a north-south direction to the west of the site and runs between M2 to the north and M5 to the south, with the M4 intersecting in between. It carries 2 lanes of traffic in each direction.

3.1.2 The Horsley Drive

A TfNSW State Road (MR 609) that runs in an east-west direction between the Hume Highway to the east, and Wallgrove Road to the west. It generally consists of 2 lanes of traffic on each direction and historically carried on average 38,136 vehicles per weekday in 2014 near the vicinity of the HDBP Stage 1.

It is understood that TfNSW has plans to upgrade The Horsley Drive between the M7 Motorway in Cowpasture Road, and that the upgraded configuration would comprise a four-lane divided road, with a wide median to allow for widening to six lanes when required. The works would include upgrades to the Ferrers Road and Cowpasture Road (north) signalised intersections, and the upgrade of the Cowpasture Road (south) intersection from a roundabout to traffic signals.

This is discussed further in the following sections, which deal with capacity analysis of the intersections within the study area.

3.1.3 Wallgrove Road

A classified road (MR 515) that generally runs in a north-south direction that is adjacent to the M7 Motorway. It generally carries 1 to 2 lanes of traffic in each direction.

3.1.4 Cowpasture Road

To the south of the Cowpasture Road and The Horsley Drive roundabout, Cowpasture Road is a State Road is a TfNSW State Road (MR 648). To the north of the signalised intersection with The Horsley Drive, Cowpasture Road is a collector road. Cowpasture Road generally carries 2 lanes of traffic in each direction within the vicinity of the HDBP.

3.1.5 Newton Road

A local road that runs in an east-west direction links Victoria Street to the east and Cowpasture Road to the west. It generally comprises of a single lane of undivided traffic in each direction.

3.1.6 Ferrers Road

A Regional Road (RR 7153) that runs in a north-south direction between Brabham Drive in the north to The Horsley Drive in the south. It carries a single lane of traffic in each direction.

3.1.7 Victoria Street

A Regional Road that runs in an east-west direction between Cowpasture Road in the east and Warren Road in the west. It carries 2 lanes of traffic in each direction within a divided carriageway.

3.2 Heavy Vehicle Access

The TfNSW Restricted Access Vehicle (RAV) details approved routes for 25/26m B-doubles which can be found in **Figure 3**. All heavy vehicles would enter and exit the Site via the approved TfNSW routes.

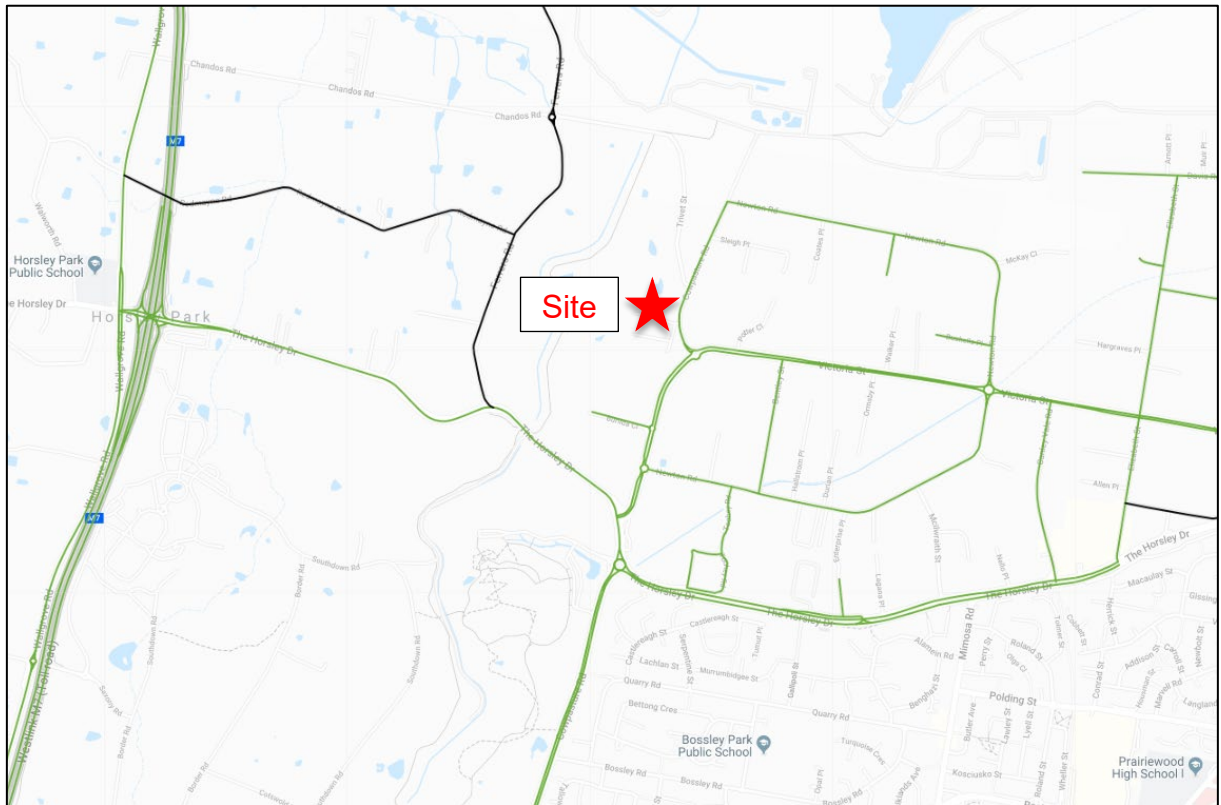


Figure 3: TfNSW RAV Approved 25/26m B-double Vehicle Routes

3.3 The Horsley Drive Upgrade

The NSW Government is well advanced in planning for an upgrade of The Horsley Drive between Cowpasture Road and the M7 Motorway (the HD Upgrade). The proposed upgrades would provide an improved east-west connection from the Western Sydney Employment Area (WSEA) and the M7 Motorway to the Smithfield Wetherill Park Industrial Area, within which lies the Site and the HDBP.

In summary, the proposed upgrade would include:

- Widening The Horsley Drive to 4 lanes four lanes (2 lanes per direction) with a central median capable of accommodated 2 additional lanes (1 lane per direction) in the future;
- An extra eastbound lane from west of Ferrers Road to Cowpasture Road;
- A pedestrian and cyclist shared path along The Horsley Drive, connecting to the Western Sydney Parklands cycleway;
- Upgrade of the Ferrers Road intersection and Cowpasture Road north intersection;
- Upgrade of the roundabout at The Horsley Drive and Cowpasture Road (southern section) to an intersection with traffic lights to improve traffic flow;

The following **Figure 4** showcases the proposed alignment and upgrades of The Horsley Drive.

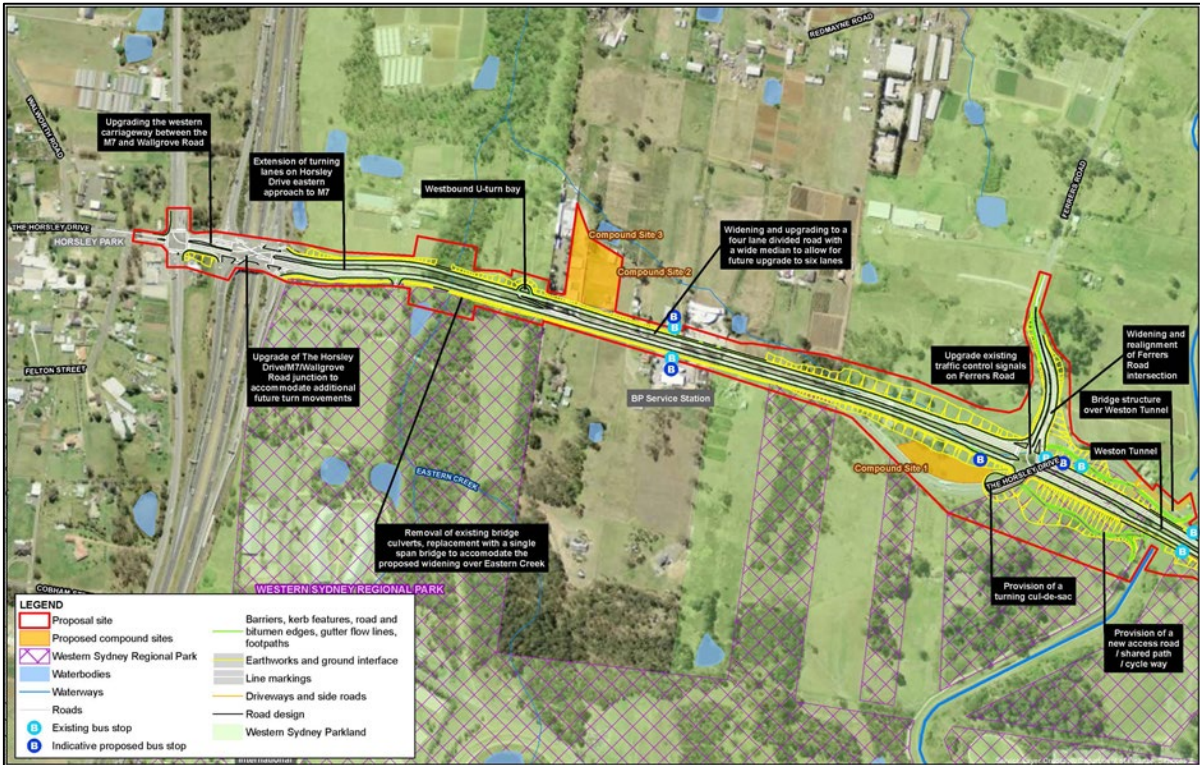


Figure 4: The Horsley Drive Upgrade – Concept Design

Notwithstanding the above, it is noted that land acquisition within the Western Sydney Parklands is currently required to proceed with the detailed design and construction. As such, it is not known when The Horsley Drive upgrades will proceed as it subject to the land acquisition, project approval and funding.

4 Existing & Baseline Road Network Performance

4.1 Baseline (Without Development) Scenarios

To determine the impact of the development, which is the subject of this application, analysis of the performance of the existing road network have been undertaken. Specifically, the following 'without-development' design scenarios have been assessed:

1. 2019 'Existing', which is based upon surveyed 2019 traffic volumes.
2. 2026 'Baseline', which includes the 'Existing' and 'Upgraded' design scenario with background traffic growth applied. It is noted that 2026 was the future year assessed as part of the Ason 2016 Report as well as being consistent with the assessment year adopted by the SMEC Report.

The assumptions applied to forecast design traffic volumes under design scenarios (1) and (2) above are outlined in the following sections.

4.2 Lizard Log Precinct Traffic Generation

It is noted that the Lizard Log Precinct is currently being developed, with the 'Novella' function centre nearing completion. It is expected that this area would be the most active during the weekend as the built form would include restaurants, function centres and leisure centres to complement the existing outdoor leisure facilities. As such, during the weekday peaks, this area would generate only a small number of vehicles. The SMEC Report, produced in support of the HD Upgrades, assumes that only 50 vehicles per hour (two-way) would be generated in the AM and PM peak. An additional left in/left out access is proposed along The Horsley Drive between Ferrers Road and Cowpasture Road.

Therefore, as part of this assessment, it is assumed that 15 vehicles per hour would use the left in/left out access on The Horsley Drive and 35 vehicles per hour would utilise The Horsley Drive / Cowpasture Road / Lizard Log Access Road intersection. This has been adopted as part of the applied as part of the 2026 assessment.

4.3 Background Traffic Growth

It is considered unlikely that any notable regional traffic growth would occur on the study road network to the north of the signalised intersection of The Horsley Drive with Cowpasture Road (i.e. Cowpasture Road (north), Victoria Street, Newton Road, etc). This assumption is based on the following:

- This northern network does not include any TfNSW classified regional roads that are intended to carry regional traffic.

- The catchment area surrounding the northern network is essentially 'built-out', except for the parcels of land of HDBP Stage 2, which are being analysed directly as part of this assessment and therefore should be excluded from background traffic growth.

Regional traffic growth would be more likely to occur on The Horsley Drive as it is a TfNSW road corridor designed to service regional traffic and provides a more direct and convenient connection between the M7 and the Cumberland Highway.

To provided consistency with the Ason 2016 Report, for the 2026 assessment, background traffic growth has been applied to the following intersections:

- The Horsley Drive x Cowpasture Road Roundabout
- Cowpasture Road x The Horsley Drive Signals
- The Horsley Drive x Ferrers Road Signals

These intersections have been assessed assuming the levels of background traffic growth that were adopted as part of SMEC Report as outlined in **Table 3**. It is noted that these rates were provided by TfNSW from the Sydney GMA Strategic Traffic Forecasting Model (STFM) showing peak period traffic volume forecast by direction of travel on The Horsley Drive in 2014, 2026 and 2036.

Table 3: Assumed AM Peak 2026 Background Traffic Growth

Road	Location / Road Section	AM		PM	
		Northbound/ Westbound	Southbound /Eastbound	Northbound/ Westbound	Southbound/ Eastbound
The Horsley Drive	Between M7 Westlink Motorway and Cowpasture Road (north)	2.5% pa compound	3.0% pa compound	1.9% pa compound	2.9% pa compound
	East of Cowpasture Road (south)	3.1% pa compound	2.1% pa compound	1.3% pa compound	2.4% pa compound
Ferrers Road	North of The Horsley Drive	4.5% pa compound	2.7% pa compound	4.6% pa compound	2.1% pa compound
Cowpasture Road	South of The Horsley Drive	1.3% pa compound	2.9% pa compound	2.1% pa compound	1.0% pa compound
	North of The Horsley Drive	1.6% pa compound	1.8% pa compound	2.5% pa compound	0.7% pa compound

4.4 2026 Horsley Drive Intersection Upgrades

It is noted that baseline assessment of the existing layout of key intersections has illustrated that the HD Upgrades are required to facilitate the expected growth in the area. This was also found by the base case assessment provided within the SMEC Report. Therefore, the upgraded layouts have been adopted for the 2026 modelling of The Horsley Drive.

These SIDRA layouts have been adopted from SMEC Report.

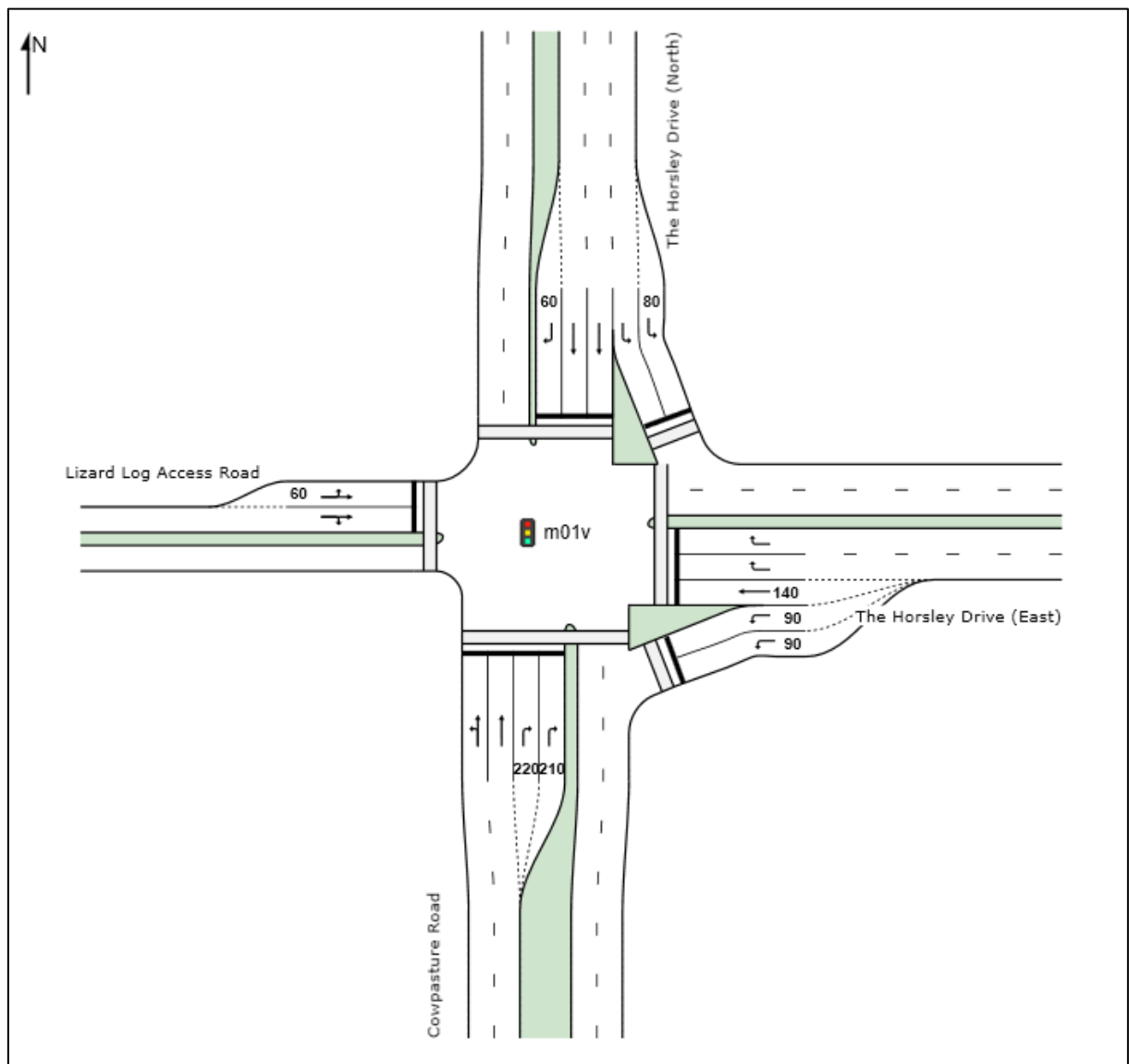


Figure 5: The Horsley Drive / Cowpasture Road / Lizard Log Access Road Upgraded Intersection

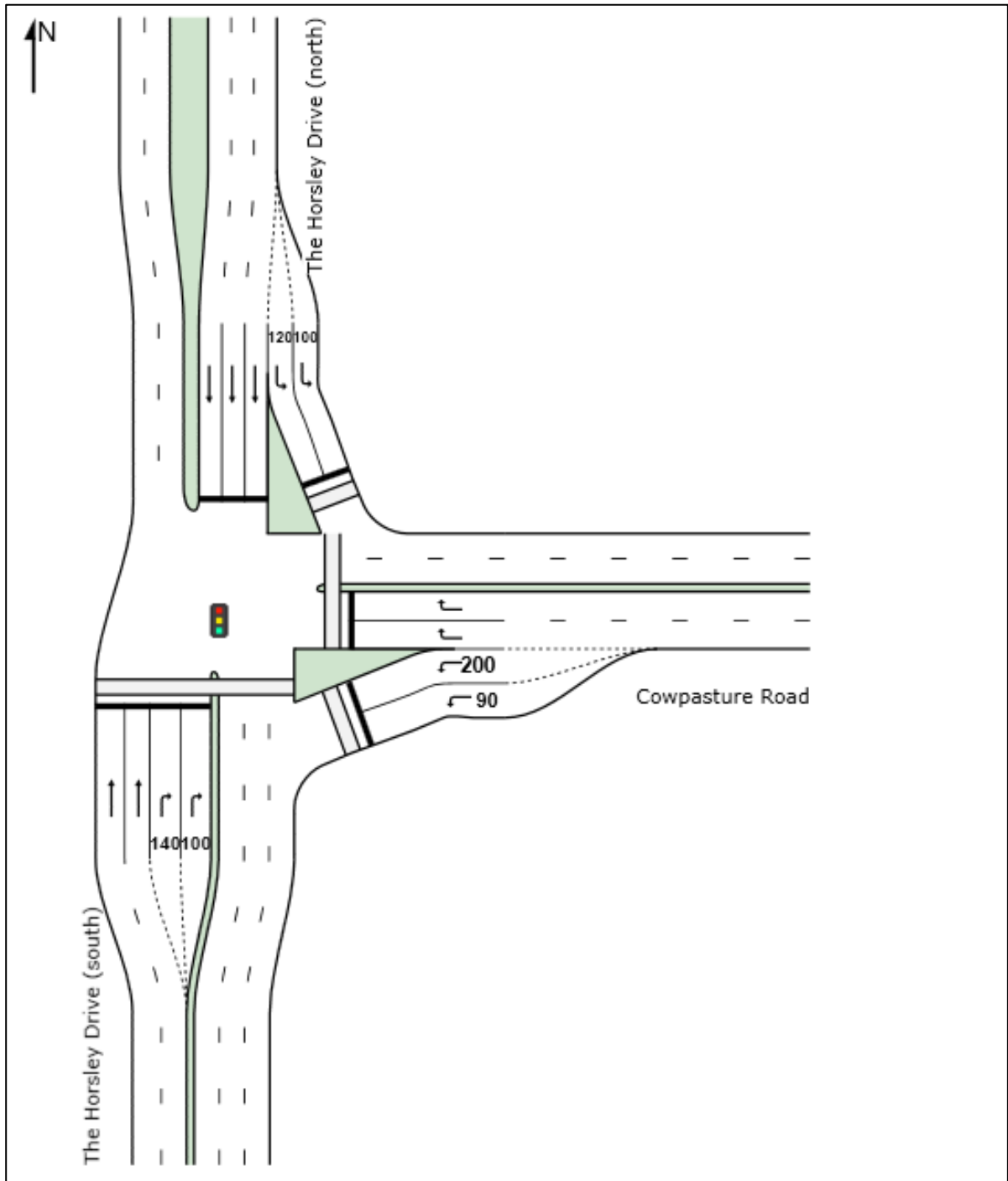


Figure 6: The Horsley Drive / Cowpasture Road Upgraded Intersection

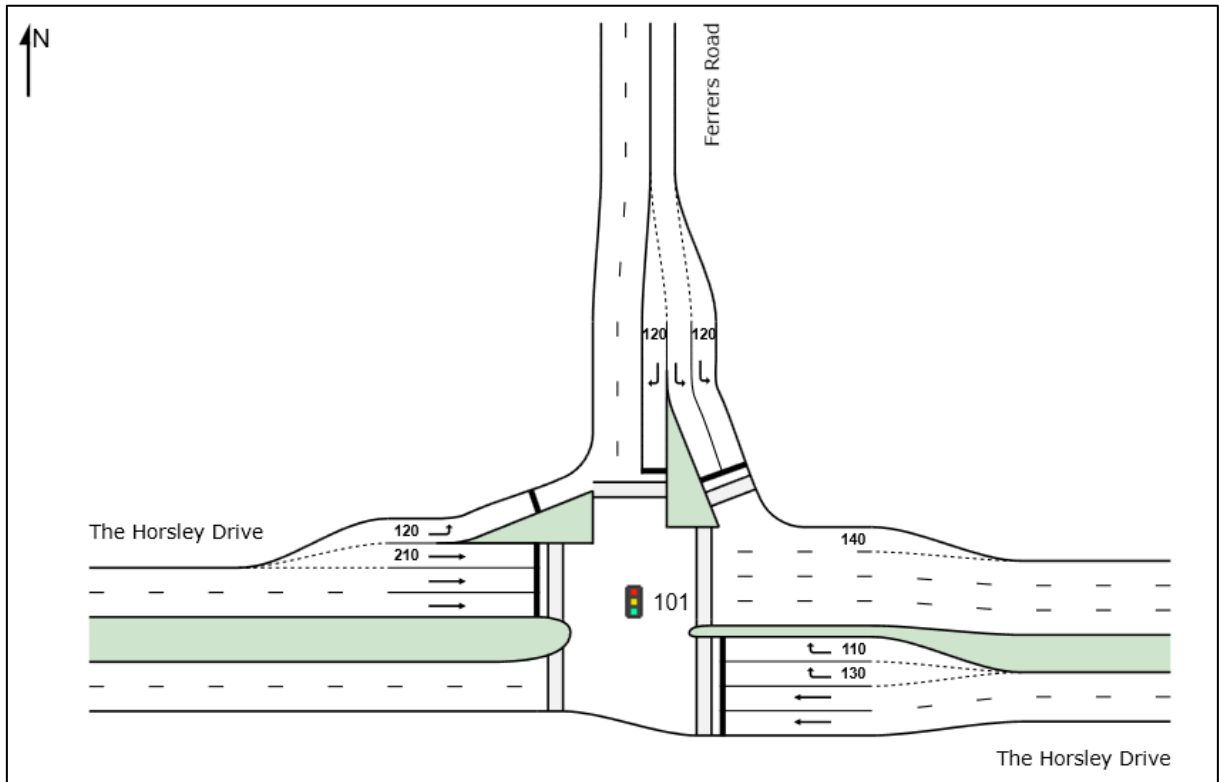


Figure 7: The Horsley Drive / Ferrers Road Upgraded Intersection

4.5 Existing Traffic Flows

4.5.1 Traffic Surveys and Peak Hour Traffic Volumes

Traffic surveys were undertaken in December 2019, including extended AM and PM peak period intersection surveys. While local traffic volumes are expected to grow in future years, the surveys provide significant context in regard to the traffic generation of the broader area, and for a comparison between previously forecast traffic volumes and actual traffic volumes.

AM peak hour and PM peak hour traffic volumes through the key intersections are shown in **Figure 8** and **Figure 9** respectively.

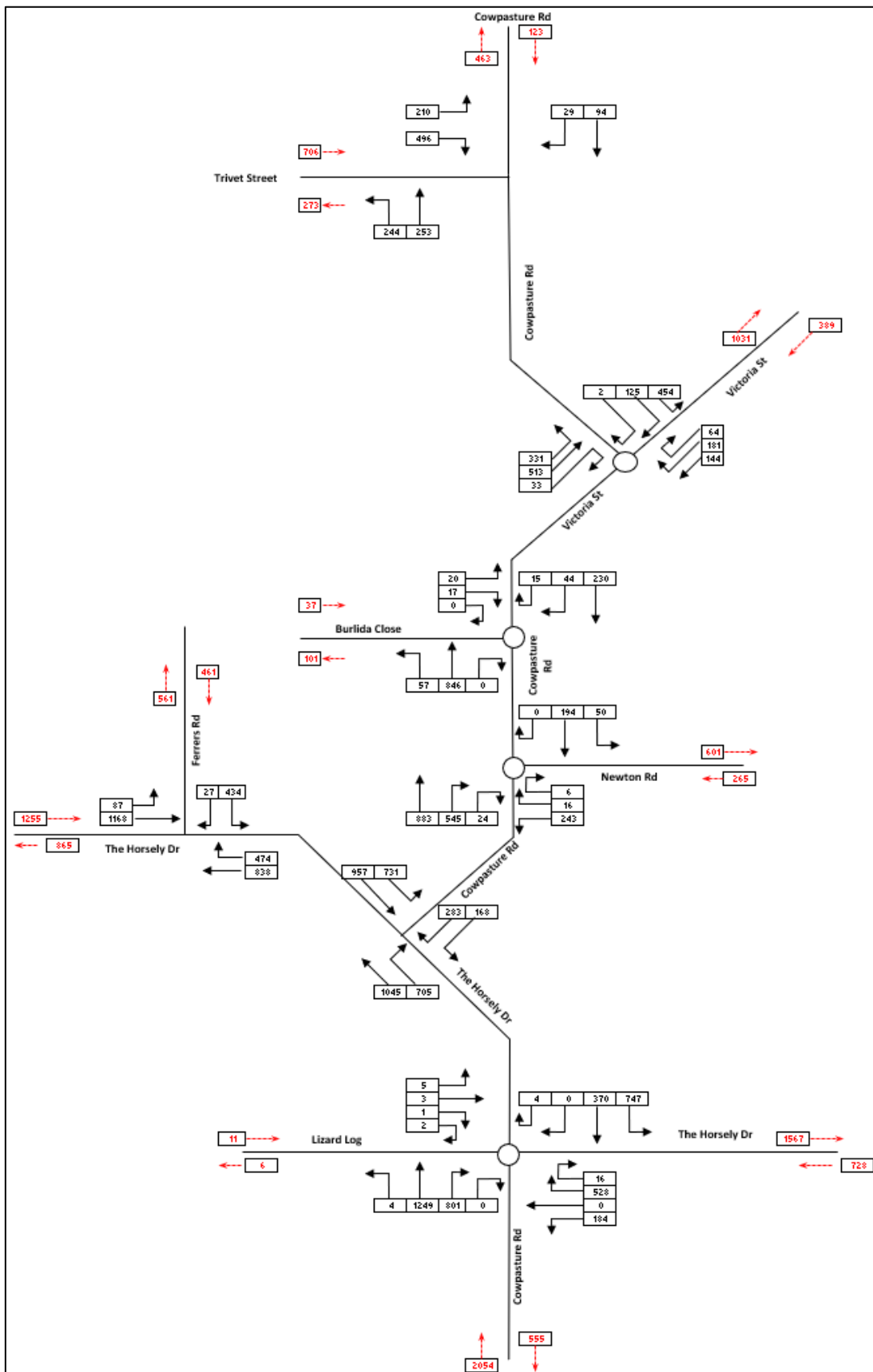


Figure 8: Existing AM Peak Hour Traffic Volumes

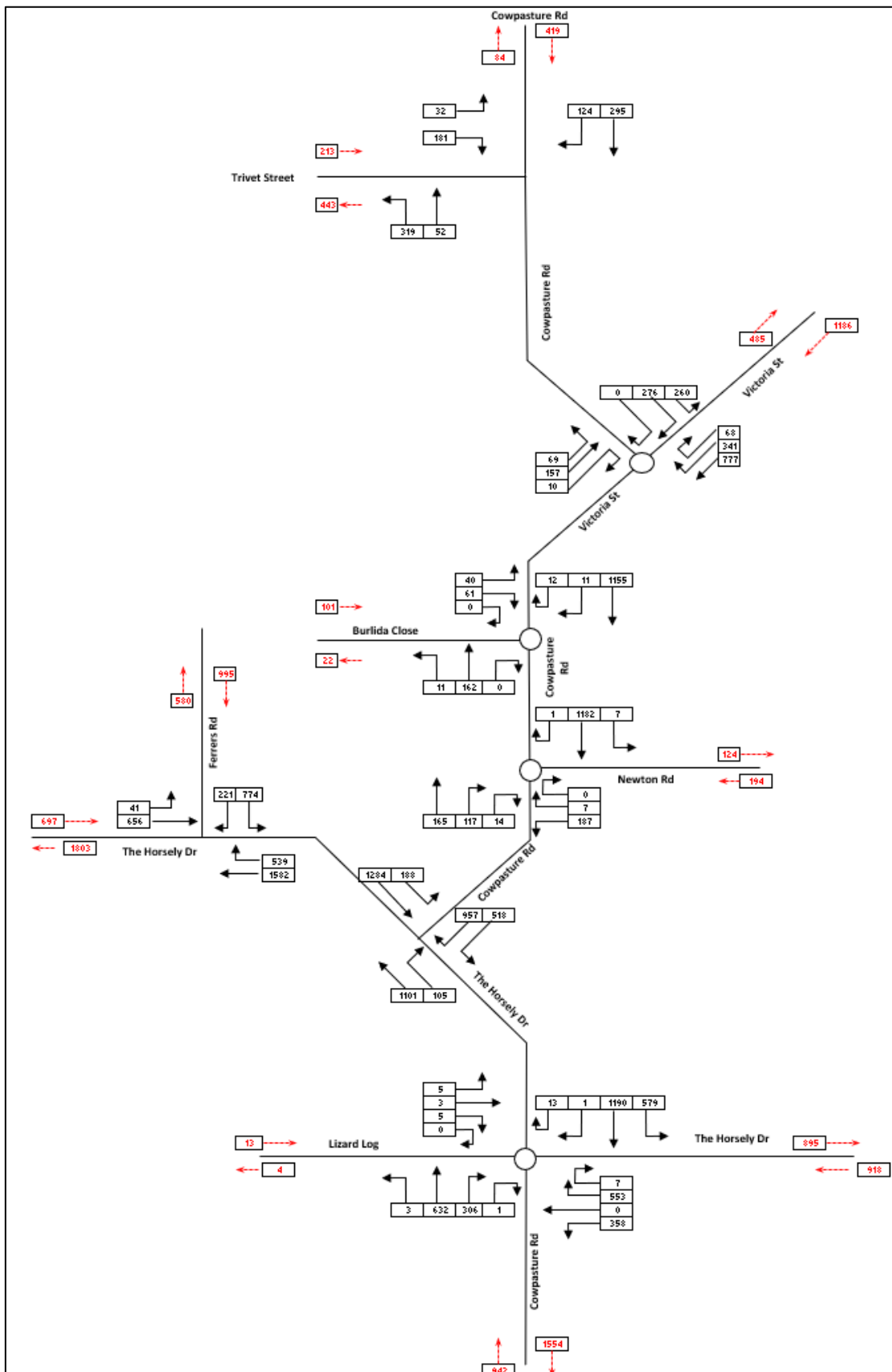


Figure 9: Existing PM Peak Hour Traffic Volumes

4.6 Existing Intersection Performance

4.6.1 2019 Baseline SIDRA Performance Testing

The key intersections identified for assessment as part of this study include:

- The Horsley Drive / Cowpasture Road Roundabout
- Cowpasture Road / The Horsley Drive Signals
- Cowpasture Road / Newton Road Roundabout
- Cowpasture Road / Burilda Close Roundabout
- Cowpasture Road / Victoria Street Roundabout
- Cowpasture Road / Trivet Street Intersection
- The Horsley Drive / Ferrers Road Signals

The performance of the key intersections has been analysed using the TfNSW approved SIDRA intersection modelling software. SIDRA provides a range of performance measures, in particular:

- **Degree of Saturation (DOS):** DOS is defined as the ratio of demand (arrival) flow to capacity.
- **Average Vehicle Delay (AVD):** AVD (or average delay per vehicle in seconds) provides a measure of the operational performance of an intersection and is used to determine an intersection's Level of Service (see below).
- **Level of Service (LOS):** LOS is a comparative measure that provides an indication of the operating performance of an intersection based on AVD. For signalised and roundabout intersections, the SIDRA reported LOS is based on the average delay to all vehicles, while at priority-controlled intersections the SIDRA reported LOS is based on the worst approach delay.

Table 4 provides a recommended baseline for assessment as per the RMS Guide.

The local network performance is provided in **Table 5** which presents the SIDRA intersection network modelling results of the key intersections under the existing "baseline" scenario.

Table 4: RMS Level of Service Summary

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

Table 5: Local Network Performance, 2019 Baseline Scenario

Intersection	Control Type	Period	DOS	AVD	LOS
The Horsley Dr x Cowpasture Rd	Roundabout	AM	1.006	59.6	E
		PM	1.278	373.9	F
Cowpasture Rd x The Horsley Dr	Signals	AM	1.030	43.9	D
		PM	1.066	58.7	E
Cowpasture Rd x Newton Rd	Roundabout	AM	0.185	16.3	B
		PM	0.988	34.2	C
Cowpasture Rd x Burilda Close	Roundabout	AM	0.065	12.7	A
		PM	0.410	11.5	A
Cowpasture Rd x Victoria Street	Roundabout	AM	0.846	24.5	B
		PM	0.151	15.2	B
Cowpasture Rd x Trivet Street	Priority	AM	0.926	30.2	C
		PM	0.365	14.9	B
The Horsley Dr x Ferrers Road	Signals	AM	1.235	62.3	E
		PM	1.432	48.3	D

With regard to Table 5:

- The analysis indicates that the key intersections along The Horsley Drive under the “baseline” scenario are operating at Level of Service (LoS) D or worse.

- The Horsley Drive / Cowpasture Road Roundabout operates unsatisfactorily during the PM peak due to heavy through traffic volumes to and from the northern and southern legs impacting movement on the eastern leg.
- All other key intersections within the Wetherill Park industrial area are operating satisfactorily with a LoS C or higher. Relevant SIDRA Outputs are attached at **Appendix A**.

4.6.2 2026 Baseline SIDRA Performance Testing

The results of the intersection modelling undertaken for the 2026 'Baseline' design scenario are outlined in **Table 6**. As noted, the concept designs provided by the SMEC Report have been adopted.

Table 6: Local Network Performance, 2026 Baseline Scenario

Intersection	Scenario	Control Type	Period	DOS	AVD	LOS
The Horsley Dr x Cowpasture Rd (South)	Do Nothing	Roundabout	AM	1.141	88.3	F
			PM	2.515	371.9	F
	Interim Upgrades	Signals	AM	1.014	62.0	E
			PM	1.099	67.8	E
Cowpasture Rd x The Horsley Dr (North)	Do Nothing	Signals	AM	1.483	144.4	F
			PM	1.246	156.5	F
	Interim Upgrades	Signals	AM	0.795	27.1	B
			PM	1.036	83.5	F
The Horsley Dr x Ferrers Road	Do Nothing	Signals	AM	1.467	108.4	F
			PM	1.901	93.2	F
	Interim Upgrades	Signals	AM	0.729	23.0	B
			PM	0.818	24.8	B

With regard to Table 6:

- Under the "Do Nothing" baseline scenario, all intersections would be operating satisfactorily and it is clear that upgrades are required to accommodate the expected background traffic growth forecast for the area.
- The Horsley Drive / Ferrers Road intersection would operate well following the interim proposed upgrades
- The northern and southern Horsley Drive / Cowpasture Road intersections have been assessed as a network. It is noted that when considered in isolation, both intersections operate satisfactorily with spare capacity. However, as is shown, when considered as a network, the intersections operate unsatisfactorily and over capacity, except for the morning peak at the northern intersection (which operates at LOS B).

This is a result of downstream flows impacting the arrival and departure rate of traffic. This has a notable impact to northbound traffic at the northern intersection. Providing the additional capacity, as identified by the SMEC Report, for the 2036 upgrades, at the northern intersection improves the operation of both intersections in 2026, when assessed as a network.

Finally, the SMEC Report reported that under the interim upgrades (2026), both these intersection would operate satisfactorily, with some spare capacity and acceptable queues. These results were derived utilising Paramics modelling software, rather than through SIDRA analysis.

The modelling analysis undertaken therefore has illustrated that the required upgrades can be delivered as part of the HD Upgrade to accommodate the future background traffic demand.

5 Public & Active Transport

The section details the available public and active transport opportunities near the vicinity of the Site.

Figure 10 showcases the surrounding transport modes near the Site.

5.1 Bus Services

The existing bus services within the vicinity of the Site include Route 835 which provides a direct service between UWS to Prairiewood (connecting to St Mary's Train Station) which is within 800m walking distance to the Site. This service runs at a 30-minute headway during the AM and PM peak periods. Route 814 is a Fairfield to Smithfield Loop Service which connects the Site directly to Fairfield Train Station with 2 bus stops located within a 400m radius of the Site. This service operates at 30-minute frequencies during the peak hour and at an hourly interval during the interpeak periods.

5.2 Pedestrian and Cycle Network

The existing cycle network in the vicinity of the Site is also shown in Figure 10. Off road bike paths are provided to the west of the Site providing a north-south connection, with The Horsley drive providing the main east-west connection.

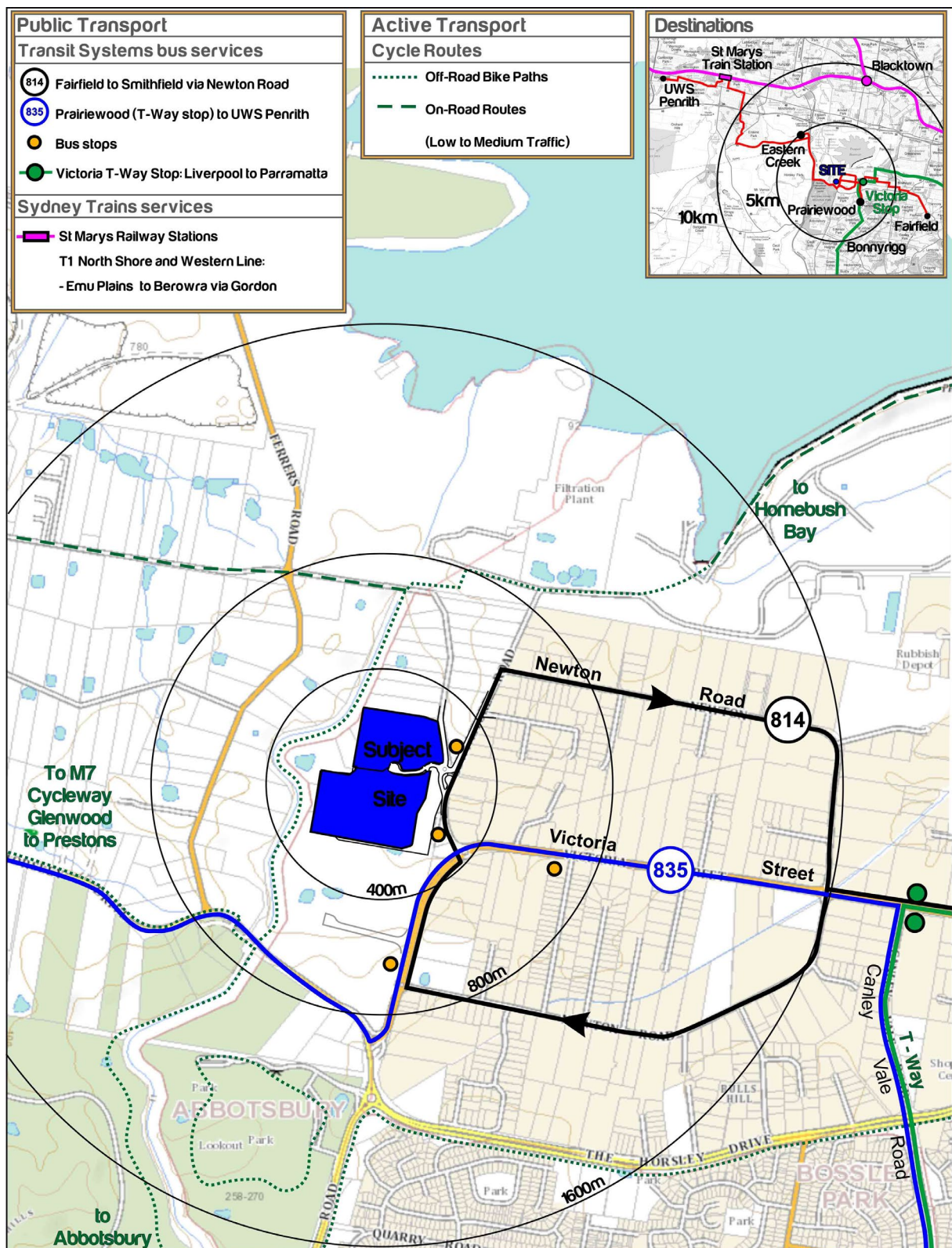


Figure 10: Public & Active Transport Network

5.3 Existing Mode Share

The Journey to Work (JTW) data published by Australian Bureau of Statistics (ABS) of employee mode share in the area (Destination Zone (DZ) 115184209) is shown in **Figure 11**. The data indicates that approximately 96.5% of employees travel to work via private vehicle (driver or passenger) and 3.5% travelling to work via heavy vehicles, with minimal usage of public transport or non-vehicle alternatives.

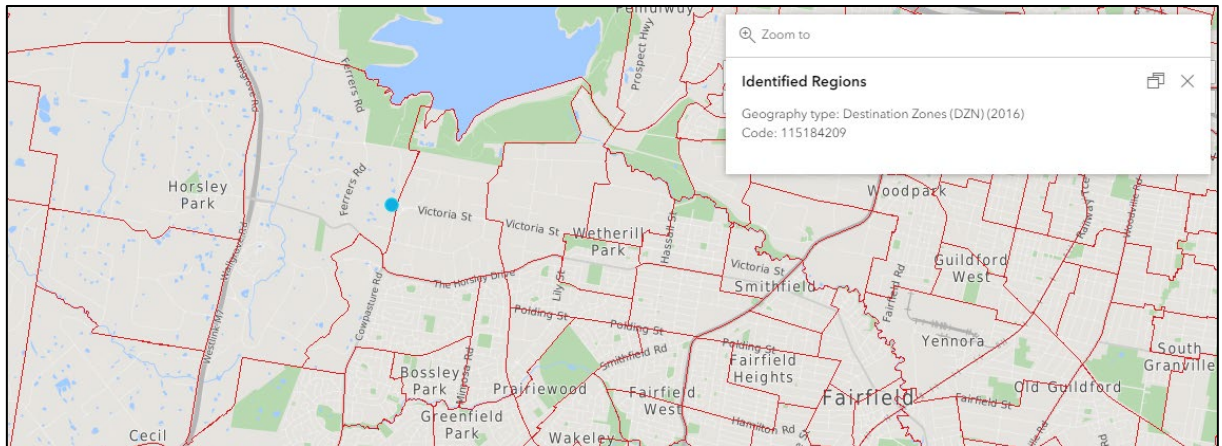


Figure 11: ABS Destination Zone

6 The Proposal

6.1 The Proposal

A detailed description of the proposed development is included in the Environmental Impact Assessment, prepared separately. In summary, this Mod proposes the modification of the HDBP Stage 2 Concept Plan.

As discussed in previous Sections, the current SSDA Concept Plan (SSD-7664) was approved to provide for up to 87,960m² of GFA for general industrial, light industrial, warehouse and distribution and ancillary office land uses.

In summary, this Mod seeks to modify the Concept plan as follows:

- Modify Site layout to provide for a total of 76,293m² GFA which consists of:
 - 2 warehouse buildings (Warehouse 1 and 2) with a combined total area of 31,580m² on the Site's northernmost Lots which consists of:
 - 16,640m² of Warehouse 1 GFA
 - 14,940m² of Warehouse 2 GFA
 - A specialist CFC warehouse with 24 hour/day, seven day/week operation with 44,713m² of warehouse and office GFA.
- Provision of an access roundabout into the Site with Cowpasture Road and Trivett Street.

The detailed design of the proposed CFC is currently subject to a separate SSDA (SSD-10404).

Detailed Site plans are provided separately; a reduced version of the Site Plan is provided below for context.

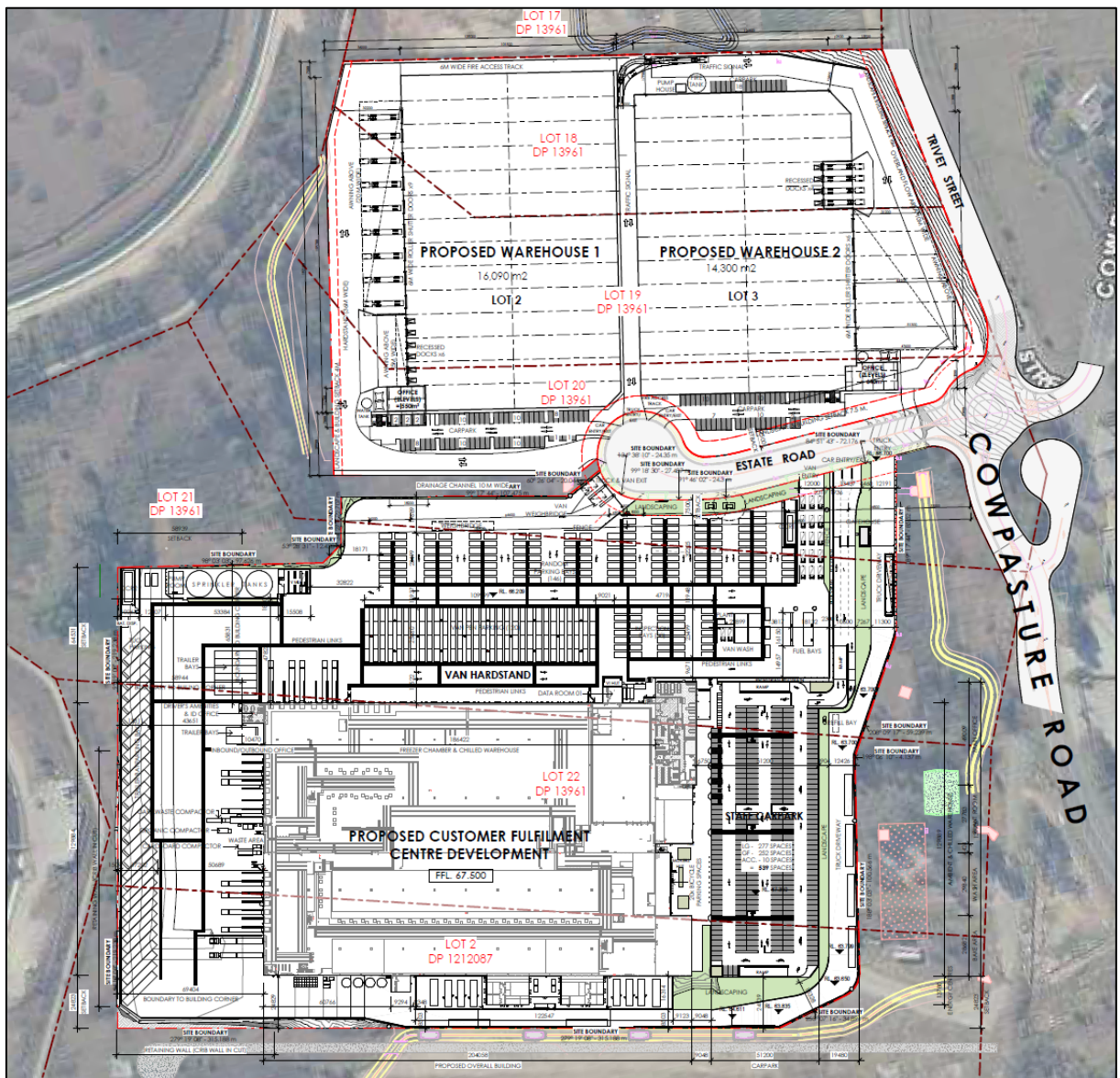


Figure 12: Site Plan

7 Traffic Assessment

7.1 Traffic Generation

7.1.1 Warehouse Vehicle Trip Rates

In terms of traffic generation, distribution and assignment, the same warehouse trip rate assumptions applied by the previously approved HDBP Stage 1 and Stage 2 have been adopted. In summary, the relevant assumptions are:

- RMS Guide Update derived traffic generation rates from the Erskine Park Industrial Estate and the Wonderland Business Park, Eastern Creek:
 - AM Peak Hour: 0.156 Trips / 100m² GFA
 - PM Peak Hour: 0.157 Trips / 100m² GFA
 - Daily: 2.100 Trips / 100m² GFA
- An arrival / departure profile of 75% / 25% in the AM Peak, and the reverse in the PM peak, was assumed, as was a heavy vehicle percentage of 20%.

Application of the RMS Guide Update rates estimates that the Warehouses 1 and 2 of the HDBP Stage 2 would generate the following:

Table 7: Warehouse Traffic Generation Rates

Site	Yield (m ²)	AM Peak	PM Peak	Daily
Warehouse 1	16,640	26	26	349
Warehouse 2	14,940	23	24	314
Total	31,580	49	50	663

7.1.2 CFC Staff Vehicle Trips

It is worthy of note that, given the detailed assessment undertaken for SSD-10404 (being assessed separately), the traffic generation characteristics of the CFC are already understood, which would include traffic generation being distributed over a 24-hour period. The applicant has provided the expected staff numbers, shift times and truck/van movements throughout this 24-hour period that have been adopted for this assessment.

The main worker shifts are at the following times:

- Day Shift: 4:00am – 2:00pm
- Night Shift: 2:00pm – 12:00am
- Maintenance Shift 12:00am – 4:00am
- Office Shift: 8:30am – 5:00pm

The following table details the forecast staff per shift as per the end-user's data:

Table 8: CFC Staff per Shift

Location	Function	Employees	Shift Split	Day	Night	Maintenance	Office
Warehouse	Operations	277	50% Day	139	139	40	-
	OSP Engineering	27	50% Night	14	14	-	-
	Subtotal	304	-	152	152	40	-
Office	Main Office	36	90% Day 10% Night	-	4	-	32
	SD Office and Support	12	50% Day 50% Night	-	6	-	6
	Subtotal	48	-	-	10	-	38
Transport	Office	12	90% Day 10% Night	-	1	-	11
	Drivers	248	50% Day 50% Night	124	124	-	-
	Subtotal	260	-	124	125	-	11
Total	-	612	-	276	287	40	49

It is assumed that some of the Day, Night and Maintenance shift workers would travel as passengers to Site. The RMS Guide Update provides details in relation to the principal mode of travel used by staff at the Erskine Park and Eastern Creek warehouses surveyed by TfNSW. These surveys indicate that 90% of all shift workers would be travelling via private vehicles with 8.2% travelling as passengers.

However, for a conservative measure, it is assumed that all typical office workers would arrive via their own personal vehicles without carpooling with 75% arriving and 25% exiting during the AM peak and vice versa for the PM peak. As such, the staff vehicle trips would be as follows:

Table 9: CFC Light Vehicle Trips

Time	Inbound Vehicle Trips	Outbound Vehicle Trips	Total
4:00am	248	36	284
8:30am	37	12	49
1:30-2:00pm	258	-	258
2:00-2:30pm	-	248	248
5:00pm	12	37	49
12:00am	36	258	294
TOTAL	591	591	1,182

Therefore, the peak road network vehicle staff trips for the AM and PM peak are:

- AM Peak Hour: 37 vehicles in / 12 vehicles out
- PM Peak Hour: 12 vehicles in / 37 vehicles out
- Daily: 1,182 vehicles per day

7.1.3 CFC Servicing Vehicle Trips

The applicant has also provided Ason Group with their delivery vehicle data from a similar facility located in Australia. This data showcases heavy vehicle and van movements all throughout the 24-hour period operation. The following details the peak delivery vehicle movements in the AM, PM and Site peak:

Table 10: CFC Delivery Vehicle Trips

Period	Inbound Vans	Outbound Vans	Inbound Heavy Vehicles	Outbound Heavy Vehicles	Total
AM Peak	36	36	3	3	78
PM Peak	57	57	2	2	118
Site Peak (Prior to 2:00pm Shift Change)	57	57	4	4	122
Daily	589	589	101	101	1,380

7.1.4 Total HDBP Stage 2 Traffic Generation

Considering all of the above information, the total traffic generation of the Site during the critical road network hours would be:

Table 11: Total HDBP Stage 2 Traffic Generation

Land Use	AM Peak	PM Peak	Daily
Warehouse	49	50	663
CFC Staff	49	49	1,182
CFC Deliveries	78	118	1,380
Total	176	217	3,225

As discussed in Section 2.3, the traffic generation approved as part of SSD-7664 is as follows:

- 138 vehicle trips in the AM peak hour
- 139 vehicle trips in the PM peak hour
- 1,863 vehicles per day

During the critical peak hours this represents an increase of 28% (38 trips) in the morning peak hour and 56% (78 trips) in the evening peak hour. The impact of these trips is considered further in the below sections.

It is noted that the daily trips are expected to increase by 73% (1,362 trips). However, the CFC will be operational over a 24-hour period and the traffic generation of the Site would be spread over a much longer period.

7.1.5 Modal Splits

Table 12 presents the relevant mode share details and the results of the application of the person-based RMS Guide surveyed warehouse percentages to the Proposal. The total trips were determined by assuming that the traffic generation to and from the development was 90% of the total mode share.

Table 12: Peak Hourly and Daily Person Trips by Transport Mode

Transport Mode	JTW Mode Share %	Peak Hour		Daily
		AM	PM	
Vehicle	90%	176	217	3,225
Car (as passenger)	8.2%	16	20	294
Bus	1.5%	3	4	54
Cycle	0.2%	0	0	4
Motorbike	0.1%	0	0	2
On Foot	0.2%	0	0	4
Other	0%	0	0	0
TOTAL	100%	196	241	3,583

7.2 Trip Distribution

The assumed assignment of Stage 2 traffic can be summarised as follows:

- 25% to/from The Horsley Drive (west)
- 20% to/from The Horsley Drive (east)
- 15% to/from Cowpasture Road (south)
- 15% to/from Trivet Street
- 15% to/from Victoria Street
- 10% to/from Ferrers Road

This trip assignment has been based off the previously approved Ason 2016 Report. The assumed trip distribution has been checked against the existing 2019 traffic flows which indicate similar traffic distribution in the area. The peak AM and PM trip distribution are shown in the following **Figure 13** and **Figure 14**:

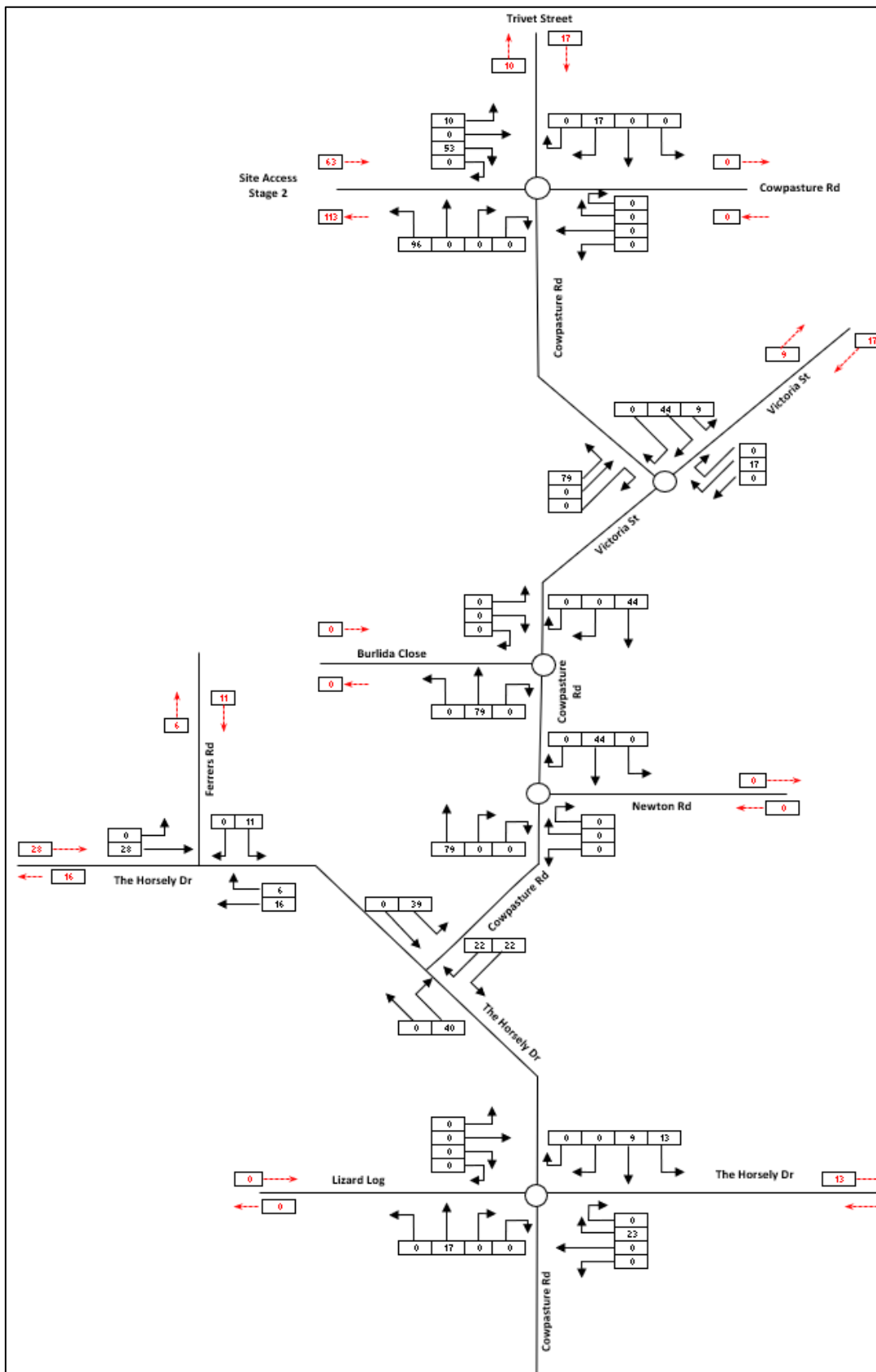


Figure 13: AM Peak Development Trip Distribution

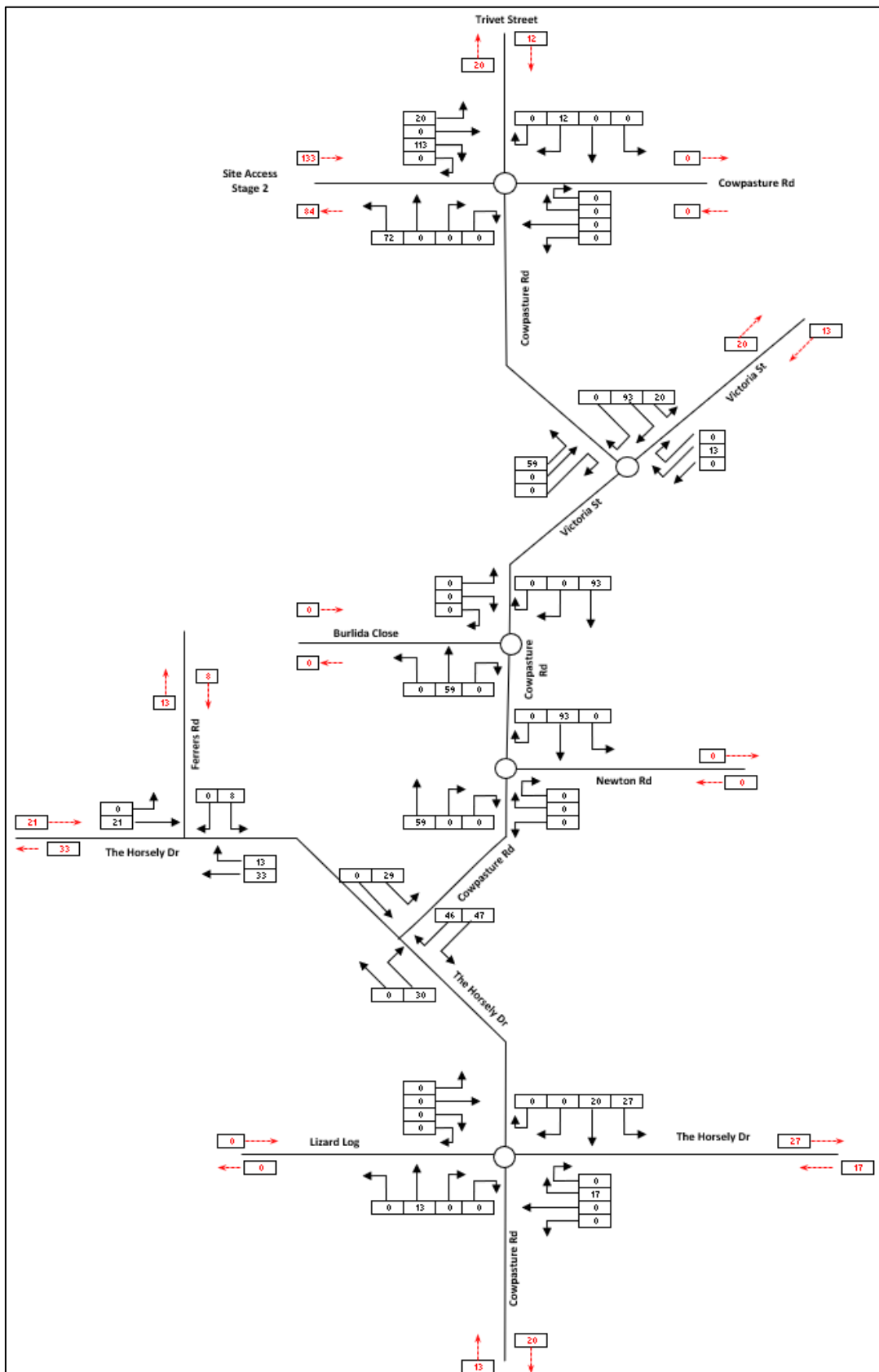


Figure 14: PM Peak Development Trip Distribution

7.3 Standard Traffic Impact Assessment

For the purpose of this report, a Standard Assessment of the Proposal has been undertaken, which is defined as the combination of 2019 Baseline traffic; (provided in Section 4); and HDBP Stage 2 traffic; which assesses the forecast development traffic associated with the Proposal.

The operation of the key intersections further to the introduction of the Proposal's traffic flows has again been assessed using SIDRA intersection analysis. The results of the assessment are summarised in **Table 13**, with the relevant SIDRA Outputs provided as Appendix A.

Table 13: 2019 Local Network Performance, With Development

Intersection	Control Type	Scenario	Period	DOS	AVD	LOS
The Horsley Dr x Cowpasture Rd (South)	Roundabout	Existing	AM	1.006	59.6	E
			PM	1.278	373.9	F
		With Dev	AM	1.018	66.3	E
			PM	1.385	456.7	F
Cowpasture Rd x The Horsley Dr (North)	Signals	Existing	AM	1.030	43.9	D
			PM	0.969	51.7	D
		With Dev	AM	1.057	48.3	D
			PM	0.988	56.5	D
Cowpasture Rd x Newton Rd	Roundabout	Existing	AM	0.185	16.3	B
			PM	0.792	16.6	B
		With Dev	AM	0.213	16.4	B
			PM	0.972	27.8	B
Cowpasture Rd x Burilda Close	Roundabout	Existing	AM	0.065	12.7	A
			PM	0.410	11.5	A
		With Dev	AM	0.068	12.9	A
			PM	0.442	11.5	A
Cowpasture Rd x Victoria Street	Roundabout	Existing	AM	0.846	24.5	B
			PM	0.151	15.2	B
		With Dev	AM	0.937	34.1	C
			PM	0.186	15.5	B
Cowpasture Rd x Trivet Street (plus Stage access as roundabout)	Priority	Existing	AM	0.926	30.2	C
			PM	0.365	14.9	B
	Roundabout	With Dev	AM	0.146	14.5	A
			PM	0.344	13.2	A
The Horsley Dr x Ferrers Road	Signals	Existing	AM	1.235	62.3	E
			PM	1.432	48.3	D
		With Dev	AM	1.270	67.7	E
			PM	1.433	49.1	D

With reference to Table 13, it can be seen that:

- The addition of development traffic generally does not have a material impact on the operation of the intersections across the network, with minimal increase in delay and LOS staying consistent.
- The exception is the Cowpasture Road / Victoria Street roundabout, which deteriorates from a LOS B to LOS C during the AM peak. Nevertheless, this intersection would still operate satisfactorily, and it is noted that this change in LOS is a result of an additional delay of 9.6 seconds.
- The SIDRA analysis indicates that the roundabout of The Horsley Drive / Cowpasture Road / Lizard Log Access Road would operate at a Level of Service of F regardless of the development traffic. However, the AVD increases from 373.9 seconds to of 456.7 seconds. It is note that intersections become very sensitive when already operating so poorly, and it is clear that this intersection requires upgrades, regardless of the development.

Further, the Ason 2016 Report assessment of this roundabout indicated that with the previous HDBP Stage 2 scheme, the AVD would be greater than 456.7 seconds. As such, the roundabout would require an interim upgrade. However, The Department of Planning, Industry and Environment and TfNSW did not support the Ason 2016 Report recommended roundabout upgrade based on road safety grounds and instead preferred for the existing roundabout layout to remain until the full upgrade of The Horsley Drive, which would have a more significant and long-term benefit for the road network.

- Finally, with the introduction of the Cowpasture Road / Trivet Street / Stage 2 Access Roundabout, the upgrade from the current priority controlled intersection, results in the intersection operating with an improved performance. The assess intersection layout is shown by **Figure 15**.

As such, it is concluded that the additional traffic generated by the proposed Mod beyond that already approved, is acceptable from a traffic planning perspective, and no additional upgrades would be required to accommodate the additional traffic generated.

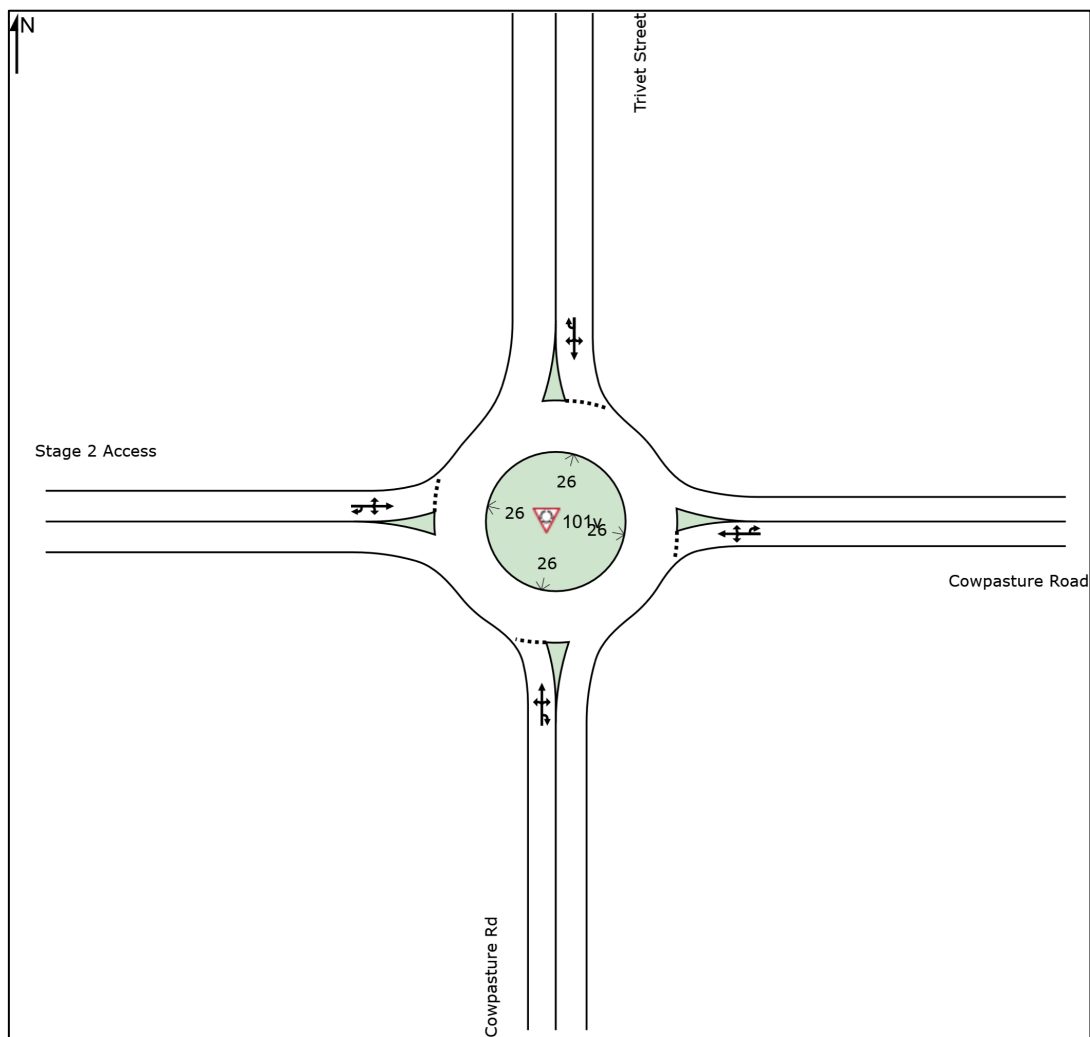


Figure 15: Cowpasture Road / Trivet Street / HDBP Stage 2 Access

7.4 Sensitivity Test Traffic Impacts

A sensitivity assessment of 2026 scenario of the Proposal has been undertaken which was previously undertaken as part of the Ason Group 2016 Report. The 2026 sensitivity test is defined as the combination of:

- 2026 Baseline traffic – which consists of 2019 existing (surveyed) traffic plus 7 years' traffic growth (provided in Section 4).
- HDBP Stage 2 traffic – forecast development traffic associated with the Proposal.

The operation of the key intersections has been assessed under these Sensitivity Test Assessment traffic forecast and the results are summarised in **Table 14**.

Table 14: Local Network Performance, 2026 Future Scenario

Intersection	Scenario	Control Type	Period	DOS	AVD	LOS
The Horsley Dr x Cowpasture Rd (South)	Baseline (HD Upgrade)	Signals	AM	1.014	62.0	E
			PM	1.099	67.8	E
	With Dev		AM	1.043	70.8	F
			PM	1.105	71.4	F
Cowpasture Rd x The Horsley Dr (North)	Baseline (HD Upgrade)	Signals	AM	0.795	27.1	B
			PM	1.036	83.5	F
	With Dev (HD Upgrade)		AM	0.783	29.0	C
			PM	1.054	90.2	F
The Horsley Dr x Ferrers Road	Baseline	Signals	AM	0.729	23.0	B
			PM	0.818	24.8	B
	With Dev (HD Upgrade)		AM	0.743	23.1	B
			PM	0.840	25.1	B

With regard to Table 14:

- The Horsley Drive / Ferrers Road intersection would operate in a consistent manner following the addition of development traffic, with minor increases in delay and LOS remaining unchanged.
- The northern Cowpasture Road / Horsley Drive intersection would also operate in a consistent manner. It is noted that the LOS would change from LOS B to LOS C. However, this is a result of an increase in delay of less than 2 seconds, which would not have a material impact to the operation of this intersection.
- Again, the southern Horsley Drive / Cowpasture Road intersection LOS changes, from a LOS E to LOS F. However, under the baseline (with HD Upgrade interim upgrade) this intersection is approaching a LOS, and as discussed in Section 4, the SIDRA network analysis would indicate that further upgrades are required from that identified by the SMEC Report. It is noteworthy that the increase in LOS is a result of an increase in 9 seconds and 3.6 seconds in the morning and afternoon peaks respectively.

As such, it is concluded that the additional traffic generated by the proposed Mod beyond that already approved, is acceptable from a traffic planning perspective, and no additional upgrades would be required to accommodate the additional traffic generated.

8 Parking & Servicing Requirements

8.1 Proposed Car Parking

8.1.1 CFC Parking

It is noted that the parking requirement for the CFC has been provided with consideration for the number of staff to be located on the Site, and consideration for staff changeover of shift to ensure no impact to the operation of the external network during these periods.

The peak period for parking at the CFC will be during shift change over at 2:00pm, where night shift workers are arriving, prior to shift, and the morning shift workers are still on-site, as well as office staff. Based on the staff expected to drive to Site, as discussed in Section 7.1.2, it is anticipated that there would be some 248 staff parked on-site for the morning shift, with an arrival of 258 staff vehicles expected for the night shift. This would result in a peak of 506 shift worker light vehicles being on-site at any one time.

A total of 539 spaces are proposed for the CFC. The remaining 33 spaces would therefore be available to accommodate office staff vehicles and any visitors.

8.2 Other Car Parking

For the other warehouse development on the Site, the approved parking rates have been adopted. These are as follows:

- 1 space for every 300m² of warehouse GFA.
- 1 space for every 40m² for all office and ancillary GFA.

Table 15 presents the required parking based on the above rates.

Table 15: Approved Parking Rates

Building	Land Use	Yield (m ²)	Parking Requirement	Provision
Warehouse 1	Warehouse	16,090	54	68
	Office	550	14	
Warehouse 2	Warehouse	14,300	48	66
	Office	640	16	
Total	-	-	132	134

Application of the above rates to the proposed development yield results in a requirement of 132 car parking spaces. The parking for Warehouse 1 & 2 have been provided in accordance with the requirements of the approved parking rates for the HDBP Stage 2.

8.2.1 Total Car Parking

Table 16 summarises the total parking provision proposed as part of this Mod.

Table 16: Total Concept Plan Proposed Parking

Building	Proposed Parking
Warehouse 1	68
Warehouse 2	66
CFC	539
Total	673

8.3 Accessible Parking

Accessible parking is to be provided in accordance with the Disability (Access to Premises – Buildings) Standards 2010 from the Building Code of Australia, which provides the following rate of:

- 1 space for every 100 car parking spaces or part thereof.

This approach is consistent with that required by the DCP and the approved SSD. Application of this control results in the following requirements:

- Warehouse 1 – minimum of 1 accessible space
- Warehouse 2 – minimum of 1 accessible space
- CFC – minimum of 6 accessible spaces

In response, both Warehouse 1 & 2 provide 2 accessible car spaces and the CFC provide 10 spaces.

8.4 Other Parking

The CFC provides 20 bicycle parking spaces which are located near the carpark and the bakery along the perimeter of the building as per the DCP's guidelines. These bicycle spaces would encourage staff members to travel via the extensive bicycle network located along Eastern Creek and the M7 Westlink. Further to the above, a total of 29 motorcycle parking spaces will be provided for the CFC.

9 Design Commentary

9.1 Relevant Design Standards

The Site's access, car park and service areas have been designed to comply with the following relevant Australian Standards:

- AS2890.1 for car parking areas;
- AS2890.2 for commercial vehicle loading areas;
- AS2890.6 for accessible (disabled) parking.

9.2 Access Road

As shown in the site plan in Figure 1, access to Stage 2 of the HDBP will be provided via a new roundabout at the existing Cowpasture Road / Trivet Street intersection. The proposed intersection would upgrade the existing priority give-way intersection to a roundabout. This would improve the intersection's performance from a LoS C to LoS A. The roundabout would facilitate good visibility towards oncoming traffic on Cowpasture Road and Trivet Street and provide safer turning movements in and out of the access road. The roundabout would service up to 26m B-Double Vehicles.

This proposed new access road would provide access to Stage 2 of the HDBP only, terminating in a cul de sac approximately 150 metres to the west of Cowpasture Road / Trivet Street roundabout. The road carriageway (kerb-to-kerb) is approximately 13.3 metres wide, which is suitable for an industrial standard local access road and consistent with that constructed to service HDBP Stage 1.

9.3 CFC Access Driveways and Internal Circulation

The concept CFC plan provides the following 4 access driveways into the Site:

- | | |
|--------------------------------------|-------------|
| ▪ Heavy Vehicle Entry Driveway: | 11.7m width |
| ▪ Heavy Vehicle & Van Exit Driveway: | 21.5m width |
| ▪ Delivery Van Entry Driveway: | 12.5m width |
| ▪ Staff Entry/Exit Driveway: | 13.9m width |

Swept paths into and out of the heavy vehicle accesses have been tested with the largest vehicle expected to access the Site, a 26m B-double vehicle. Each driveway will be built according to Austroads and Australian Standards.

Delivery van loading docks and internal circulation has been tested using a 6.4m SRV. However, the van pen parking and van waiting bays have been tested using a custom 2m x 5.8m delivery vehicle

which represents the end-user's delivery van size which would be a Canter 515 FUSO. A kerb-to-kerb turning radius of 6.25m has been adopted which is more conservative than the listed 5.5m kerb-to-kerb turning radius in the Canter 515 FUSO specification sheet.

Internal circulation roads, ramps and parking have been assessed in accordance with AS2890.1 and AS2890.2. Heavy vehicle loading docks have been assessed with 19m AVs. The configuration of these driveways and internal circulation routes would be refined at detailed design stage (prior to the release of a Construction Certificate) in response to a suitable condition of consent.

All key swept path analysis of the proposed development can be found in **Appendix B**.

9.4 Warehouse Access Driveways and Internal Circulation

All access driveways are design in accordance with AS 2890.1 and AS 2890.2. Access to the light vehicle parking area are via minimum 6m wide driveways.

The proposed heavy crossovers have been tested with swept paths of 26m B-double vehicles. All internal circulation roads have been assessed with a 26m B-Double vehicle and loading docks have been tested with 19m AVs. It is expected that these accesses and loading bays can be refined further prior to the release of a Construction Certificate. Swept path analysis can be found in Appendix B of this report.

9.5 Parking Spaces

A detailed review of the car parking areas has been undertaken and the following characteristics are noteworthy:

- All staff and employee parking are to be provided in accordance with AS2890.1 for a Class 1A user, which requires a minimum space length of 5.4m, a minimum width of 2.4m and a minimum aisle width of 5.8m.
- All disabled and adaptable parking spaces are to be provided in accordance with AS2890.6, which requires a space with a clear width of 2.4m and located adjacent to a minimum shared area of 2.4m.
- All spaces located adjacent to obstructions greater than 150mm in height are to be provided with an additional width of 300mm. This includes any landscaping that exceeds 150mm.
- All carparking areas have been separated away from heavy vehicle access.

It is expected that any detailed construction drawings in relation to any modified areas of the car park or Site access would comply with these Standards. Furthermore, compliance with the above Standards would be expected to form a standard condition of consent to any development approval.

9.6 Design Summary

The internal configuration of the Site – including light and heavy vehicular access, car parking and servicing areas – would be designed generally in accordance with the requirements of the relevant Australian Standards (AS2890.1, AS2890.2 and AS2890.6).

As discussed, swept path analysis has been undertaken to confirm the acceptability of the internal road network. The internal road network is able to accommodate the circulation requirements of the largest anticipated heavy vehicle, the 26m B-Double Vehicle.

It is however envisaged that a condition of consent would be imposed requiring compliance with these standards and as such any minor amendments considered necessary (if any) can be dealt with prior to the release of a Construction Certificate.

10 Conclusions

10.1 Conclusions

The key findings of this Transport Assessment are:

- The Proposal generally seeks to modify the approved Concept Plan layout in response to specific end user requirements as well as modifications to the Stage 1 DA. The modifications generally seek approval for the provision of an access roundabout intersection with Cowpasture Road and Trivett Street, alterations to proposed Lots resulting in a reduction in total Gross Floor Area (GFA) from 87,960m² (approved) to 76,293m² (proposed) which consists of a 44,713m² Customer Fulfilment Centre (CFC) on the southern lot, a 16,640m² Warehouse 1 and a 14,940m² Warehouse 2 on the northern lots. The CFC will be a specialist warehouse facility used for the distribution of goods.
- Analysis demonstrates that the future traffic generation of the Horsley Drive Business Park (HDBP) Stage 2 will increase by 28% (38 trips) in the morning peak hour and 56% (78 trips) in the evening peak hour, beyond that currently approved.

The Proposal is expected to generate a total of 174 and 217 vehicle trips in the morning and afternoon peak hours, respectively.

- The Standard Traffic Impact Assessment analysis indicates that the addition of the Proposal's traffic does not have a material impact on the operation of the intersections across the network, with minimal increase in delay and Level of Service remaining consistent.

The exception is the Cowpasture Road / Victoria Street roundabout, which deteriorates from a LOS B to LOS C during the AM peak. Nevertheless, this intersection would still operate satisfactorily, and it is noted that this change in LOS is a result of an additional delay of 9.6 seconds.

- The Sensitivity Test Traffic Impact Assessment undertaken for 2026, concluded that:
 - The Horsley Drive / Ferraers Road intersection would operate in a consistent manner following the addition of development traffic, with minor increases in delay and LOS remaining unchanged.
 - The northern Cowpasture Road / Horsley Drive intersection would also operate in a consistent manner. It is noted that the LOS would change from LOS B to LOS C. However, this is a result of an increase in delay of less than 2 seconds, which would not have a material impact to the operation of this intersection.
 - The southern Horsley Drive / Cowpasture Road intersection LOS changes, from a LOS E to LOS F. However, under the baseline (with HD Upgrade interim upgrade) this intersection is approaching a LOS and, the SIDRA network analysis would indicate that further upgrades are

required from that identified by the SMEC Report. It is noteworthy that the increase in LOS is a result of an increase in 9 seconds and 3.6 seconds in the morning and afternoon peaks respectively.

- No changes are proposed to the approved car parking rates and detailed assessment of car parking provisions will be provided as part of subsequent Development Applications in relation to each Stage.

However, it is noted that the CFC would be provided with 539 spaces (above minimum requirement), to accommodate all staff parking demands known to be expected by the CFC.

- The site access, internal circulation and car parking arrangements have been developed with consideration of the requirements of the DCP and relevant Australian Standards (i.e. AS2890.1, AS2890.2 and AS2890.6). The access arrangements have been developed to permit entry and exit movements in a forward direction, separate commercial (heavy) vehicle and passenger vehicle traffic and minimise pedestrian crossing distances. Any minor amendments necessary would be undertaken at detailed design stage (prior to the release of a Construction Certificate) in response to a suitable condition of consent.

It is therefore concluded that the Proposal is supportable on transport planning grounds.

Appendix A

SIDRA Outputs

MOVEMENT SUMMARY

 **Site: m01 [2019 AM Existing - The Horsley Drive x Cowpasture Road]**

 **Network: N101 [2019 AM Existing]**

The Horsley Drive x Cowpasture Road
Site Category: (None)
Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV	Total	HV				Vehicles	Distance				
		veh/h	% veh/h		%	v/c	sec		veh	m				km/h
South: Cowpasture Road														
1	L2	4	25.0	4	25.0	0.003	3.5	LOS A	0.0	0.0	0.03	0.39	0.03	53.5
2	T1	1315	5.9	1315	5.9	0.887	9.5	LOS A	5.6	41.1	0.89	1.06	1.35	46.4
3	R2	843	3.9	843	3.9	0.887	18.3	LOS B	5.3	38.4	0.96	1.23	1.57	50.4
3u	U	1	0.0	1	0.0	0.887	20.8	LOS B	5.3	38.4	0.96	1.23	1.57	50.8
Approach		2163	5.2	2163	5.2	0.887	13.0	LOS A	5.6	41.1	0.91	1.13	1.44	48.5
East: The Horsley Drive (East)														
4	L2	194	12.0	194	12.0	0.339	4.9	LOS A	1.1	8.7	0.68	0.66	0.68	54.5
5	T1	1	0.0	1	0.0	0.339	5.2	LOS A	1.1	8.7	0.68	0.66	0.68	45.5
6	R2	556	10.6	556	10.6	0.339	11.6	LOS A	1.1	8.7	0.69	0.70	0.69	45.0
6u	U	17	6.2	17	6.2	0.339	14.3	LOS A	1.0	7.8	0.70	0.74	0.70	53.9
Approach		767	10.8	767	10.8	0.339	10.0	LOS A	1.1	8.7	0.69	0.69	0.69	48.4
North: The Horsley Drive (North)														
7	L2	786	9.4	763	9.5	1.006	59.6	LOS E	15.0	113.3	1.00	2.05	3.46	25.3
8	T1	389	14.9	378	15.0	0.735	17.4	LOS B	3.0	23.9	0.89	1.08	1.29	47.2
9	R2	1	0.0	1	0.0	0.735	23.8	LOS B	3.0	23.9	0.89	1.08	1.29	26.9
9u	U	4	25.0	4	25.2	0.735	27.7	LOS B	3.0	23.9	0.89	1.08	1.29	25.6
Approach		1181	11.2	1147 ^{N1}	11.4	1.006	45.6	LOS D	15.0	113.3	0.96	1.72	2.73	30.0
West: Lizard Log Access Road														
10	L2	5	20.0	5	20.0	0.046	26.7	LOS B	0.1	0.7	0.94	0.95	0.94	11.7
11	T1	3	0.0	3	0.0	0.025	15.8	LOS B	0.1	0.4	0.98	0.86	0.98	41.7
12	R2	1	0.0	1	0.0	0.025	20.6	LOS B	0.1	0.4	0.98	0.86	0.98	42.3
12u	U	2	4.0	2	4.0	0.025	27.8	LOS B	0.1	0.4	0.98	0.86	0.98	17.0
Approach		12	9.8	12	9.8	0.046	23.4	LOS B	0.1	0.7	0.96	0.90	0.96	25.9
All Vehicles		4123	8.0	4089 ^{N1}	8.0	1.006	21.6	LOS B	15.0	113.3	0.89	1.21	1.66	41.7

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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.

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

MOVEMENT SUMMARY

 **Site: m01 [2019 PM Existing - The Horsley Drive x Cowpasture Road]**

 **Network: N101 [2019 PM Existing]**

The Horsley Drive x Cowpasture Road
Site Category: (None)
Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV	Total	HV				Vehicles	Distance				
		veh/h	% veh/h	%	v/c				sec	veh				
South: Cowpasture Road														
1	L2	3	0.0	3	0.0	0.002	3.3	LOS A	0.0	0.0	0.03	0.39	0.03	53.6
2	T1	665	9.5	665	9.5	0.413	4.5	LOS A	1.1	8.1	0.61	0.47	0.61	48.5
3	R2	322	8.2	322	8.2	0.413	11.1	LOS A	1.0	7.3	0.63	0.72	0.63	54.2
3u	U	1	0.0	1	0.0	0.413	13.5	LOS A	1.0	7.3	0.63	0.72	0.63	55.7
Approach		992	9.0	992	9.0	0.413	6.6	LOS A	1.1	8.1	0.62	0.55	0.62	51.1
East: The Horsley Drive (East)														
4	L2	377	3.1	377	3.1	1.278	365.2	LOS F	49.2	354.3	1.00	3.65	6.68	8.7
5	T1	1	0.0	1	0.0	1.278	365.6	LOS F	49.2	354.3	1.00	3.65	6.68	5.6
6	R2	582	4.2	582	4.2	1.278	371.6	LOS F	49.2	354.3	1.00	3.34	6.27	5.1
6u	U	7	0.0	7	0.0	1.278	373.9	LOS F	33.5	243.0	1.00	3.18	6.05	9.0
Approach		967	3.7	967	3.7	1.278	369.1	LOS F	49.2	354.3	1.00	3.46	6.43	6.6
North: The Horsley Drive (North)														
7	L2	609	4.3	609	4.3	0.561	5.7	LOS A	1.7	12.6	0.50	0.60	0.52	57.1
8	T1	1253	4.0	1252	4.0	0.884	8.3	LOS A	6.9	49.9	0.76	0.76	0.98	57.0
9	R2	1	100.0	1	100.0	0.884	18.6	LOS B	6.9	49.9	0.76	0.76	0.98	33.6
9u	U	14	7.7	14	7.7	0.884	18.0	LOS B	6.9	49.9	0.76	0.76	0.98	36.5
Approach		1877	4.2	1877	4.2	0.884	7.5	LOS A	6.9	49.9	0.67	0.71	0.83	57.0
West: Lizard Log Access Road														
10	L2	5	20.0	5	20.0	0.010	5.1	LOS A	0.0	0.1	0.68	0.60	0.68	27.3
11	T1	3	0.0	3	0.0	0.011	2.6	LOS A	0.0	0.1	0.68	0.59	0.68	51.9
12	R2	5	0.0	5	0.0	0.011	7.4	LOS A	0.0	0.1	0.68	0.59	0.68	52.8
12u	U	1	0.0	1	0.0	0.011	14.5	LOS B	0.0	0.1	0.68	0.59	0.68	21.0
Approach		15	7.1	15	7.1	0.011	6.1	LOS A	0.0	0.1	0.68	0.59	0.68	45.4
All Vehicles		3851	5.3	3850 ^{N1}	5.3	1.278	98.1	LOS F	49.2	354.3	0.74	1.36	2.18	18.6

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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.

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

MOVEMENT SUMMARY

 **Site: [2019 AM Existing - Cowpasture Road x The Horsley Drive]**

 **Network: N101 [2019 AM Existing]**

Horsley Drive x Cowpasture Rd

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 122 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV	Total	HV				Vehicles	Distance				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: The Horsley Drive (south)														
2	T1	1100	7.6	1100	7.6	0.404	7.8	LOS A	8.2	61.0	0.45	0.40	0.45	52.6
3	R2	742	7.4	742	7.4	0.750	30.5	LOS C	7.8	58.2	0.97	0.86	1.01	15.7
Approach		1842	7.5	1842	7.5	0.750	16.9	LOS B	8.2	61.0	0.66	0.59	0.67	41.3
East: Cowpasture Road														
4	L2	177	33.9	177	33.9	0.285	17.4	LOS B	3.2	28.6	0.56	0.68	0.56	24.4
6	R2	301	64.7	301	64.7	0.588	54.4	LOS D	5.2	56.1	0.96	0.81	0.96	28.8
Approach		478	53.3	478	53.3	0.588	40.7	LOS C	5.2	56.1	0.81	0.76	0.81	28.2
North: The Horsley Drive (north)														
7	L2	769	27.5	769	27.5	0.445	15.6	LOS B	5.4	46.3	0.63	0.75	0.63	45.2
8	T1	1007	6.9	1007	6.9	1.030	116.4	LOS F	34.7	257.2	1.00	1.44	1.72	16.8
Approach		1777	15.8	1777	15.8	1.030	72.8	LOS F	34.7	257.2	0.84	1.14	1.25	23.1
All Vehicles		4097	16.4	4097	16.4	1.030	43.9	LOS D	34.7	257.2	0.75	0.85	0.94	28.9

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

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

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

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

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

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

Movement Performance - Pedestrians							
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate
		ped/h	sec		Pedestrian	Distance	
					ped	m	
P1	South Full Crossing	26	55.2	LOS E	0.1	0.1	0.95
P2	East Full Crossing	26	33.2	LOS D	0.1	0.1	0.74
P3S	North Slip/Bypass Lane Crossing	26	19.9	LOS B	0.0	0.0	0.80
All Pedestrians		79	36.1	LOS D			0.83

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: [2019 PM Existing - Cowpasture Road x The Horsley Drive]

 Network: N101 [2019 PM Existing]

Horsley Drive x Cowpasture Rd

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 145 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total	HV %	v/c	sec		Vehicles veh	Distance m			km/h
South: The Horsley Drive (south)													
2	T1	1159	5.8	1042	6.1	0.451	17.2	LOS B	12.4	91.4	0.60	0.54	45.8
3	R2	111	21.0	100	21.8	0.311	73.6	LOS F	2.1	17.3	0.97	0.75	7.7
Approach		1269	7.1	1142 ^{N1}	7.5	0.451	22.2	LOS B	12.4	91.4	0.63	0.56	41.9
East: Cowpasture Road													
4	L2	545	4.6	545	4.6	0.648	35.6	LOS C	15.6	113.7	0.84	0.95	15.8
6	R2	1007	11.6	1007	11.6	0.885	65.6	LOS E	23.4	179.8	1.00	0.97	27.1
Approach		1553	9.2	1552 ^{N1}	9.2	0.885	55.1	LOS D	23.4	179.8	0.94	0.96	25.1
North: The Horsley Drive (north)													
7	L2	198	59.0	198	59.0	0.092	9.6	LOS A	0.8	8.5	0.21	0.59	50.8
8	T1	1352	3.8	1352	3.8	0.969	79.1	LOS F	39.8	287.4	1.00	1.17	22.0
Approach		1549	10.9	1549	10.9	0.969	70.2	LOS E	39.8	287.4	0.90	1.10	23.7
All Vehicles		4372	9.2	4244 ^{N1}	9.5	0.969	51.7	LOS D	39.8	287.4	0.84	0.90	27.9

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

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

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

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

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

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

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate
		ped/h	sec		Pedestrian ped	Distance m	
P1	South Full Crossing	26	46.5	LOS E	0.1	0.1	0.80
P2	East Full Crossing	26	28.6	LOS C	0.1	0.1	0.63
P3S	North Slip/Bypass Lane Crossing	26	62.9	LOS F	0.1	0.1	0.93
All Pedestrians		79	46.0	LOS E			0.79

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: [2019 AM Existing - Cowpasture Road x Newton Road]



Network: N101 [2019 AM Existing]

Cowpasture Road x Newton Road

Site Category: (None)

Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV %	Total	HV %				Vehicles	Distance				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Cowpasture Road														
2	T1	929	16.5	929	16.5	0.507	4.5	LOS A	2.0	15.7	0.17	0.41	0.17	43.5
3	R2	574	17.6	574	17.6	0.507	9.3	LOS A	1.9	15.5	0.18	0.58	0.18	50.2
3u	U	25	37.5	25	37.5	0.507	11.7	LOS A	1.9	15.5	0.18	0.58	0.18	37.9
Approach		1528	17.3	1528	17.3	0.507	6.4	LOS A	2.0	15.7	0.17	0.47	0.17	47.5
East: Newton Road														
4	L2	256	54.3	256	54.3	0.357	6.2	LOS A	0.7	6.8	0.48	0.66	0.48	49.5
6	R2	17	31.3	17	31.3	0.357	10.6	LOS A	0.7	6.8	0.48	0.66	0.48	49.5
6u	U	6	33.3	6	33.3	0.357	12.8	LOS A	0.7	6.8	0.48	0.66	0.48	54.6
Approach		279	52.5	279	52.5	0.357	6.6	LOS A	0.7	6.8	0.48	0.66	0.48	49.7
North: Cowpasture Road														
7	L2	53	22.0	53	22.0	0.185	9.7	LOS A	0.6	5.6	0.75	0.66	0.75	46.4
8	T1	204	46.9	204	46.9	0.185	10.8	LOS A	0.6	5.6	0.75	0.67	0.75	29.1
9u	U	1	0.0	1	0.0	0.185	16.3	LOS B	0.6	5.5	0.75	0.68	0.75	28.9
Approach		258	41.6	258	41.6	0.185	10.6	LOS A	0.6	5.6	0.75	0.67	0.75	35.9
All Vehicles		2065	25.1	2065	25.1	0.507	7.0	LOS A	2.0	15.7	0.29	0.52	0.29	46.7

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Tuesday, 21 January 2020 11:24:04 AM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020

Modelling\Network\AG1223m08_Network 2019 Scenarios.sip8

MOVEMENT SUMMARY



Site: [2019 PM Existing - Cowpasture Road x Newton Road]



Network: N101 [2019 PM Existing]

Cowpasture Road x Newton Road

Site Category: (None)

Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV	Total	HV				Vehicles	Distance				
		veh/h	% veh/h	%	v/c				sec	veh				
South: Cowpasture Road														
2	T1	174	53.9	169	55.0	0.115	4.7	LOS A	0.3	2.9	0.08	0.39	0.08	45.0
3	R2	123	35.0	118	36.1	0.115	9.3	LOS A	0.3	2.3	0.08	0.60	0.08	49.1
3u	U	15	14.3	14	14.8	0.115	11.2	LOS A	0.3	2.3	0.08	0.60	0.08	37.8
Approach		312	44.6	301 ^{N1}	45.7	0.115	6.8	LOS A	0.3	2.9	0.08	0.48	0.08	47.4
East: Newton Road														
4	L2	197	24.6	197	24.6	0.571	10.6	LOS A	0.7	5.9	0.70	0.93	0.94	44.7
6	R2	7	0.0	7	0.0	0.571	14.5	LOS A	0.7	5.9	0.70	0.93	0.94	44.7
6u	U	1	0.0	1	0.0	0.571	16.6	LOS B	0.7	5.9	0.70	0.93	0.94	52.8
Approach		205	23.6	205	23.6	0.571	10.8	LOS A	0.7	5.9	0.70	0.93	0.94	44.8
North: Cowpasture Road														
7	L2	7	57.1	7	57.1	0.792	6.2	LOS A	1.6	11.7	0.44	0.50	0.44	48.1
8	T1	1244	6.9	1244	6.9	0.792	5.4	LOS A	1.6	11.7	0.45	0.50	0.45	35.6
9u	U	1	100.0	1	100.0	0.792	13.9	LOS A	1.5	11.4	0.45	0.51	0.45	35.5
Approach		1253	7.2	1252 ^{N1}	7.2	0.792	5.4	LOS A	1.6	11.7	0.45	0.50	0.45	35.8
All Vehicles		1769	15.7	1759 ^{N1}	15.8	0.792	6.3	LOS A	1.6	11.7	0.41	0.55	0.44	40.7

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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.

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Thursday, 20 February 2020 5:29:51 PM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020 Modelling\Network\AG1223m08_Network 2019 Scenarios.sip8

MOVEMENT SUMMARY

 Site: [2019 AM Existing - Cowpasture Road x Burilda Close]

 Network: N101 [2019 AM Existing]

Cowpasture Road x Burilda Close
Site Category: (None)
Roundabout

Movement Performance - Vehicles															
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total	HV	Total	HV										
		veh/h	%	veh/h	%										v/c
South: Cowpasture Road															
1	L2	60	21.1	60	21.1	0.334	4.7	LOS A	0.9	6.9	0.25	0.42	0.25	43.6	
2	T1	891	16.7	891	16.7	0.334	4.7	LOS A	0.9	6.9	0.26	0.42	0.26	38.2	
Approach		951	16.9	950	16.9	0.334	4.7	LOS A	0.9	6.9	0.26	0.42	0.26	38.9	
North: Cowpasture Road															
8	T1	242	41.7	242	41.7	0.114	4.6	LOS A	0.3	2.6	0.13	0.42	0.13	47.7	
9	R2	46	27.3	46	27.3	0.114	9.2	LOS A	0.3	2.5	0.14	0.50	0.14	47.1	
9u	U	16	46.7	16	46.7	0.114	11.6	LOS A	0.3	2.5	0.14	0.50	0.14	45.5	
Approach		304	39.8	304	39.8	0.114	5.7	LOS A	0.3	2.6	0.13	0.44	0.13	47.5	
West: Stage 1 Access															
10	L2	21	50.0	21	50.0	0.065	6.0	LOS A	0.1	0.8	0.49	0.74	0.49	36.8	
12	R2	18	64.7	18	64.7	0.065	10.9	LOS A	0.1	0.8	0.49	0.74	0.49	36.8	
12u	U	1	0.0	1	0.0	0.065	12.7	LOS A	0.1	0.8	0.49	0.74	0.49	47.4	
Approach		40	55.3	40	55.3	0.065	8.4	LOS A	0.1	0.8	0.49	0.74	0.49	37.2	
All Vehicles		1295	23.5	1295	23.5	0.334	5.1	LOS A	0.9	6.9	0.23	0.43	0.23	41.9	

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Tuesday, 21 January 2020 11:24:04 AM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020 Modelling\Network\AG1223m08_Network 2019 Scenarios.sip8

MOVEMENT SUMMARY

 Site: [2019 AM Existing - Cowpasture Road x Burilda Close]

 Network: N101 [2019 AM Existing]

Cowpasture Road x Burilda Close
Site Category: (None)
Roundabout

Movement Performance - Vehicles															
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total	HV	Total	HV										v/c
South: Cowpasture Road															
1	L2	60	21.1	60	21.1	0.334	4.7	LOS A	0.9	6.9	0.25	0.42	0.25	43.6	
2	T1	891	16.7	891	16.7	0.334	4.7	LOS A	0.9	6.9	0.26	0.42	0.26	38.2	
Approach		951	16.9	950	16.9	0.334	4.7	LOS A	0.9	6.9	0.26	0.42	0.26	38.9	
North: Cowpasture Road															
8	T1	242	41.7	242	41.7	0.114	4.6	LOS A	0.3	2.6	0.13	0.42	0.13	47.7	
9	R2	46	27.3	46	27.3	0.114	9.2	LOS A	0.3	2.5	0.14	0.50	0.14	47.1	
9u	U	16	46.7	16	46.7	0.114	11.6	LOS A	0.3	2.5	0.14	0.50	0.14	45.5	
Approach		304	39.8	304	39.8	0.114	5.7	LOS A	0.3	2.6	0.13	0.44	0.13	47.5	
West: Stage 1 Access															
10	L2	21	50.0	21	50.0	0.065	6.0	LOS A	0.1	0.8	0.49	0.74	0.49	36.8	
12	R2	18	64.7	18	64.7	0.065	10.9	LOS A	0.1	0.8	0.49	0.74	0.49	36.8	
12u	U	1	0.0	1	0.0	0.065	12.7	LOS A	0.1	0.8	0.49	0.74	0.49	47.4	
Approach		40	55.3	40	55.3	0.065	8.4	LOS A	0.1	0.8	0.49	0.74	0.49	37.2	
All Vehicles		1295	23.5	1295	23.5	0.334	5.1	LOS A	0.9	6.9	0.23	0.43	0.23	41.9	

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Tuesday, 21 January 2020 11:24:04 AM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020 Modelling\Network\AG1223m08_Network 2019 Scenarios.sip8

MOVEMENT SUMMARY

 **Site: [2019 AM Existing - Cowpasture Road x Burilda Close]**

 **Network: N101 [2019 AM Existing]**

Cowpasture Road x Burilda Close
Site Category: (None)
Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV	Total	HV				Vehicles	Distance				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Cowpasture Road														
1	L2	60	21.1	60	21.1	0.334	4.7	LOS A	0.9	6.9	0.25	0.42	0.25	43.6
2	T1	891	16.7	891	16.7	0.334	4.7	LOS A	0.9	6.9	0.26	0.42	0.26	38.2
Approach		951	16.9	950	16.9	0.334	4.7	LOS A	0.9	6.9	0.26	0.42	0.26	38.9
North: Cowpasture Road														
8	T1	242	41.7	242	41.7	0.114	4.6	LOS A	0.3	2.6	0.13	0.42	0.13	47.7
9	R2	46	27.3	46	27.3	0.114	9.2	LOS A	0.3	2.5	0.14	0.50	0.14	47.1
9u	U	16	46.7	16	46.7	0.114	11.6	LOS A	0.3	2.5	0.14	0.50	0.14	45.5
Approach		304	39.8	304	39.8	0.114	5.7	LOS A	0.3	2.6	0.13	0.44	0.13	47.5
West: Stage 1 Access														
10	L2	21	50.0	21	50.0	0.065	6.0	LOS A	0.1	0.8	0.49	0.74	0.49	36.8
12	R2	18	64.7	18	64.7	0.065	10.9	LOS A	0.1	0.8	0.49	0.74	0.49	36.8
12u	U	1	0.0	1	0.0	0.065	12.7	LOS A	0.1	0.8	0.49	0.74	0.49	47.4
Approach		40	55.3	40	55.3	0.065	8.4	LOS A	0.1	0.8	0.49	0.74	0.49	37.2
All Vehicles		1295	23.5	1295	23.5	0.334	5.1	LOS A	0.9	6.9	0.23	0.43	0.23	41.9

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Tuesday, 21 January 2020 11:24:04 AM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020

Modelling\Network\AG1223m08_Network 2019 Scenarios.sip8

MOVEMENT SUMMARY

 **Site: 101 [2019 PM Existing - Cowpasture Road x Victoria Street]**

 **Network: N101 [2019 PM Existing]**

Cowpasture Road x Victoria Street
Site Category: (None)
Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV	Total	HV				Vehicles	Distance				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
NorthEast: Victoria Street														
25	T1	818	8.6	818	8.6	0.556	6.6	LOS A	2.0	15.2	0.72	0.65	0.73	47.0
26	R2	359	2.3	359	2.3	0.556	11.6	LOS A	2.0	14.6	0.74	0.75	0.76	44.9
26u	U	72	19.1	72	19.1	0.556	14.3	LOS A	2.0	14.6	0.74	0.75	0.76	51.7
Approach		1248	7.4	1248	7.4	0.556	8.4	LOS A	2.0	15.2	0.73	0.69	0.74	46.8
NorthWest: Cowpasture Road														
27	L2	274	4.2	274	4.2	0.561	5.9	LOS A	1.5	10.7	0.56	0.73	0.59	50.1
29	R2	291	6.2	291	6.2	0.561	10.8	LOS A	1.5	10.7	0.56	0.73	0.59	41.2
29u	U	1	0.0	1	0.0	0.561	12.7	LOS A	1.5	10.7	0.56	0.73	0.59	41.2
Approach		565	5.2	565	5.2	0.561	8.4	LOS A	1.5	10.7	0.56	0.73	0.59	47.1
SouthWest: Victoria Street														
30	L2	73	21.7	71	22.0	0.151	6.7	LOS A	0.4	3.6	0.65	0.64	0.65	44.6
31	T1	165	41.4	162	41.8	0.151	7.7	LOS A	0.4	3.6	0.66	0.67	0.66	51.5
32u	U	11	50.0	10	50.4	0.151	15.2	LOS B	0.4	3.5	0.67	0.69	0.67	43.1
Approach		248	36.0	243 ^{N1}	36.4	0.151	7.7	LOS A	0.4	3.6	0.66	0.66	0.66	50.1
All Vehicles		2062	10.3	2057 ^{N1}	10.3	0.561	8.3	LOS A	2.0	15.2	0.68	0.70	0.69	47.4

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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.

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Thursday, 20 February 2020 5:29:51 PM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020 Modelling\Network\AG1223m08_Network 2019 Scenarios.sip8

MOVEMENT SUMMARY

 **Site: 101 [2019 AM Existing - Cowpasture Road x Trivet Street]**

 **Network: N101 [2019 AM Existing]**

Int 6_Cowpasture Rd_Trivet St
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV	Total	HV				Vehicles	Distance				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Cowpasture Rd														
1	L2	257	4.1	257	4.1	0.276	5.6	LOS A	0.0	0.0	0.00	0.29	0.00	54.4
2	T1	266	16.2	266	16.2	0.276	0.0	LOS A	0.0	0.0	0.00	0.29	0.00	54.6
Approach		523	10.3	523	10.3	0.276	2.8	NA	0.0	0.0	0.00	0.29	0.00	54.5
North: Cowpasture Rd														
8	T1	99	42.6	99	42.6	0.092	1.2	LOS A	0.1	1.2	0.31	0.18	0.31	47.8
9	R2	31	13.8	31	13.8	0.092	8.6	LOS A	0.1	1.2	0.31	0.18	0.31	53.6
Approach		129	35.8	129	35.8	0.092	2.9	NA	0.1	1.2	0.31	0.18	0.31	50.6
West: Trivet St														
10	L2	221	2.9	221	2.9	0.209	9.6	LOS A	0.4	2.6	0.42	0.90	0.42	48.1
12	R2	522	1.6	522	1.6	0.926	30.2	LOS C	5.6	40.1	0.86	1.84	3.47	31.5
Approach		743	2.0	743	2.0	0.926	24.1	LOS B	5.6	40.1	0.73	1.56	2.56	36.1
All Vehicles		1396	8.2	1396	8.2	0.926	14.1	NA	5.6	40.1	0.42	0.96	1.39	42.7

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

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

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

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

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

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

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Tuesday, 21 January 2020 11:24:04 AM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020

Modelling\Network\AG1223m08_Network 2019 Scenarios.sip8

MOVEMENT SUMMARY

 **Site: 101 [2019 PM Existing - Cowpasture Road x Trivet Street]**

 **Network: N101 [2019 PM Existing]**

Int 6_Cowpasture Rd_Trivet St
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV	Total	HV									
South: Cowpasture Rd														
1	L2	336	1.3	335	1.3	0.201	5.6	LOS A	0.0	0.0	0.00	0.50	0.00	52.6
2	T1	55	23.1	54	23.0	0.201	0.0	LOS A	0.0	0.0	0.00	0.50	0.00	51.5
Approach		391	4.3	389 ^{N1}	4.3	0.201	4.8	NA	0.0	0.0	0.00	0.50	0.00	52.5
North: Cowpasture Rd														
8	T1	311	6.8	311	6.8	0.262	1.0	LOS A	0.5	3.6	0.35	0.20	0.35	47.9
9	R2	131	1.6	131	1.6	0.262	7.5	LOS A	0.5	3.6	0.35	0.20	0.35	54.4
Approach		441	5.3	441	5.3	0.262	2.9	NA	0.5	3.6	0.35	0.20	0.35	51.5
West: Trivet St														
10	L2	34	0.0	34	0.0	0.025	8.2	LOS A	0.0	0.3	0.15	0.90	0.15	48.9
12	R2	191	2.8	191	2.8	0.365	14.9	LOS B	0.6	4.5	0.65	1.06	0.84	42.0
Approach		224	2.3	224	2.3	0.365	13.9	LOS A	0.6	4.5	0.58	1.03	0.74	43.2
All Vehicles		1056	4.3	1054 ^{N1}	4.3	0.365	5.9	NA	0.6	4.5	0.27	0.49	0.30	49.9

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

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

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

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

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

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

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

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Thursday, 20 February 2020 5:29:51 PM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020 Modelling\Network\AG1223m08_Network 2019 Scenarios.sip8

MOVEMENT SUMMARY



Site: m01 [2026 AM Baseline - The Horsley Drive x Cowpasture Road]



Network: N101 [2026 AM Existing Do Nothing]

The Horsley Drive x Cowpasture Road

Site Category: (None)

Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m			km/h
South: Cowpasture Road													
1	L2	14	0.0	14	0.0	0.007	3.3	LOS A	0.0	0.1	0.07	0.07	53.3
2	T1	1445	5.9	1445	5.9	1.100	101.8	LOS F	40.5	297.6	1.00	4.36	14.8
3	R2	1029	3.9	1029	3.9	1.100	112.1	LOS F	30.8	223.1	1.00	3.85	22.8
3u	U	1	0.0	1	0.0	1.100	114.5	LOS F	30.8	223.1	1.00	3.85	22.9
Approach		2489	5.0	2489	5.0	1.100	105.5	LOS F	40.5	297.6	0.99	4.13	18.6
East: The Horsley Drive (East)													
4	L2	224	11.7	224	11.7	0.418	4.9	LOS A	1.4	11.1	0.71	0.71	54.3
5	T1	9	0.0	9	0.0	0.418	5.3	LOS A	1.4	11.1	0.71	0.71	45.3
6	R2	695	10.5	695	10.5	0.418	11.7	LOS A	1.4	11.1	0.72	0.72	44.8
6u	U	20	5.3	20	5.3	0.418	14.4	LOS A	1.3	10.0	0.73	0.73	53.8
Approach		948	10.5	948	10.5	0.418	10.1	LOS A	1.4	11.1	0.72	0.72	48.1
North: The Horsley Drive (North)													
7	L2	967	9.4	715	10.7	1.141	161.2	LOS F	20.9	159.9	1.00	3.41	12.3
8	T1	479	14.9	357	16.9	0.867	34.5	LOS C	4.6	36.5	0.96	1.31	35.9
9	R2	9	0.0	7	0.0	0.867	40.7	LOS C	4.6	36.5	0.96	1.31	19.2
9u	U	5	20.0	4	22.4	0.867	44.6	LOS D	4.6	36.5	0.96	1.31	16.4
Approach		1461	11.2	1083 ^{N1}	12.7	1.141	118.2	LOS F	20.9	159.9	0.98	2.70	15.9
West: Lizard Log Access Road													
10	L2	5	20.0	5	20.0	0.064	31.2	LOS C	0.1	0.7	0.97	0.97	10.5
11	T1	7	0.0	7	0.0	0.135	26.8	LOS B	0.2	1.6	0.97	0.97	35.1
12	R2	5	0.0	5	0.0	0.135	31.6	LOS C	0.2	1.6	0.97	0.97	35.6
12u	U	2	0.0	2	0.0	0.135	38.8	LOS C	0.2	1.6	0.97	0.97	14.2
Approach		20	5.3	20	5.3	0.135	30.5	LOS C	0.2	1.6	0.97	0.97	28.4
All Vehicles		4919	7.9	4541 ^{N1}	8.6	1.141	88.3	LOS F	40.5	297.6	0.94	3.06	20.3

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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.

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

MOVEMENT SUMMARY



Site: m01 [2026 PM Baseline - The Horsley Drive x Cowpasture Road]



Network: N101 [2026 PM Existing Do Nothing]

The Horsley Drive x Cowpasture Road

Site Category: (None)

Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV	Total	HV									
South: Cowpasture Road														
1	L2	13	0.0	13	0.0	0.007	3.3	LOS A	0.0	0.1	0.07	0.38	0.07	53.3
2	T1	776	9.4	776	9.4	0.417	4.1	LOS A	1.1	8.3	0.50	0.44	0.50	49.3
3	R2	345	8.2	345	8.2	0.417	10.6	LOS A	1.0	7.7	0.53	0.63	0.53	54.9
3u	U	1	0.0	1	0.0	0.417	13.0	LOS A	1.0	7.7	0.53	0.63	0.53	56.4
Approach		1135	8.9	1135	8.9	0.417	6.0	LOS A	1.1	8.3	0.51	0.49	0.51	51.7
East: The Horsley Drive (East)														
4	L2	445	3.1	445	3.1	2.515	1416.9	LOS F	115.5	831.7	1.00	5.39	11.60	2.5
5	T1	9	0.0	9	0.0	2.515	1417.3	LOS F	115.5	831.7	1.00	5.39	11.60	1.6
6	R2	643	4.1	643	4.1	2.515	1424.6	LOS F	115.5	831.7	1.00	4.67	10.47	1.4
6u	U	8	0.0	8	0.0	2.515	1427.7	LOS F	75.3	544.9	1.00	4.29	9.88	2.6
Approach		1106	3.6	1106	3.6	2.515	1421.5	LOS F	115.5	831.7	1.00	4.96	10.93	1.9
North: The Horsley Drive (North)														
7	L2	744	4.4	674	4.4	0.630	6.7	LOS A	2.2	16.2	0.56	0.66	0.62	55.8
8	T1	1531	4.1	1387	4.1	0.994	23.3	LOS B	16.2	117.1	0.98	1.37	2.09	42.8
9	R2	11	10.0	10	10.1	0.994	30.7	LOS C	16.2	117.1	0.98	1.37	2.09	23.5
9u	U	16	6.7	14	6.7	0.994	33.1	LOS C	16.2	117.1	0.98	1.37	2.09	21.4
Approach		2301	4.2	2085 ^{N1}	4.3	0.994	18.0	LOS B	16.2	117.1	0.84	1.14	1.62	46.0
West: Lizard Log Access Road														
10	L2	5	20.0	5	20.0	0.010	5.1	LOS A	0.0	0.1	0.67	0.59	0.67	27.5
11	T1	7	0.0	7	0.0	0.021	2.5	LOS A	0.0	0.3	0.67	0.57	0.67	52.4
12	R2	9	0.0	9	0.0	0.021	7.3	LOS A	0.0	0.3	0.67	0.57	0.67	53.4
12u	U	1	0.0	1	0.0	0.021	14.5	LOS A	0.0	0.3	0.67	0.57	0.67	21.0
Approach		23	4.5	23	4.5	0.021	5.6	LOS A	0.0	0.3	0.67	0.58	0.67	48.8
All Vehicles		4565	5.2	4349 ^{N1}	5.5	2.515	371.9	LOS F	115.5	831.7	0.79	1.94	3.69	6.2

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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.

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

MOVEMENT SUMMARY

 Site: [2026 AM Baseline - Cowpasture Road x The Horsley Drive]  Network: N101 [2026 AM Existing Do Nothing]

Horsley Drive x Cowpasture Rd

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 122 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV	Total	HV				Vehicles	Distance				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: The Horsley Drive (south)														
2	T1	1320	7.5	1240	7.6	0.456	8.2	LOS A	9.7	72.6	0.47	0.43	0.47	52.2
3	R2	882	7.4	829	7.5	0.838	36.0	LOS C	9.9	74.1	1.00	0.92	1.13	22.7
Approach		2202	7.5	2068 ^{N1}	7.6	0.838	19.4	LOS B	9.9	74.1	0.68	0.62	0.74	40.7
East: Cowpasture Road														
4	L2	200	33.7	200	33.7	0.479	20.1	LOS B	4.4	39.3	0.66	0.73	0.66	22.6
6	R2	333	66.5	333	66.5	0.656	55.9	LOS D	5.8	64.2	0.98	0.84	1.01	28.5
Approach		533	54.2	533	54.2	0.656	42.4	LOS C	5.8	64.2	0.86	0.80	0.88	27.6
North: The Horsley Drive (north)														
7	L2	946	27.5	946	27.5	0.547	16.3	LOS B	7.1	61.7	0.68	0.77	0.68	44.7
8	T1	1248	6.8	1248	6.8	1.483	492.0	LOS F	104.3	773.0	1.00	2.81	3.59	5.0
Approach		2195	15.7	2195	15.7	1.483	286.9	LOS F	104.3	773.0	0.86	1.93	2.34	8.8
All Vehicles		4929	16.2	4796 ^{N1}	16.6	1.483	144.4	LOS F	104.3	773.0	0.78	1.24	1.48	14.2

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

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

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

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.

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

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Distance m	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped			
P1	South Full Crossing	26	55.2	LOS E	0.1	0.1	0.95	0.95
P2	East Full Crossing	26	33.2	LOS D	0.1	0.1	0.74	0.74
P3S	North Slip/Bypass Lane Crossing	26	19.9	LOS B	0.0	0.0	0.80	0.80
All Pedestrians		79	36.1	LOS D			0.83	0.83

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: [2026 PM Baseline - Cowpasture Road x The Horsley Drive]



Network: N101 [2026 PM Existing Do Nothing]

Horsley Drive x Cowpasture Rd

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV % veh/h	Total HV	%	v/c	sec		veh	Distance m			km/h
South: The Horsley Drive (south)													
2	T1	1335	5.8	980	6.6	0.376	10.6	LOS A	8.9	65.8	0.47	0.42	50.3
3	R2	126	20.8	95	23.4	0.288	70.7	LOS F	1.9	16.0	0.97	0.75	14.2
Approach		1461	7.1	1076 ^{N1}	8.1	0.376	15.9	LOS B	8.9	65.8	0.52	0.45	45.8
East: Cowpasture Road													
4	L2	573	5.3	573	5.3	0.797	46.8	LOS D	17.9	131.2	0.96	1.06	13.0
6	R2	1198	10.3	1198	10.3	1.246	294.6	LOS F	59.7	454.7	1.00	1.66	9.4
Approach		1771	8.7	1771	8.7	1.246	214.5	LOS F	59.7	454.7	0.99	1.47	9.7
North: The Horsley Drive (north)													
7	L2	242	59.1	242	59.1	0.110	8.9	LOS A	0.9	9.0	0.18	0.59	47.4
8	T1	1660	3.8	1660	3.8	1.153	207.2	LOS F	81.5	589.2	1.00	1.80	10.7
Approach		1902	10.8	1902	10.8	1.153	182.0	LOS F	81.5	589.2	0.90	1.65	12.1
All Vehicles		5134	9.0	4748 ^{N1}	9.8	1.246	156.5	LOS F	81.5	589.2	0.84	1.31	13.5

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

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

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

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.

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate
		ped/h	sec		Pedestrian ped	Distance m	
P1	South Full Crossing	26	51.5	LOS E	0.1	0.1	0.86
P2	East Full Crossing	26	20.7	LOS C	0.1	0.1	0.54
P3S	North Slip/Bypass Lane Crossing	26	60.4	LOS F	0.1	0.1	0.93
All Pedestrians		79	44.2	LOS E			0.78

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

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

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

MOVEMENT SUMMARY



Site: 101 [2026 AM Existing - Ferrers Road x The Horsley Drive]

The Horsley Drive x Ferrers Road

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Deg. HV %	Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: The Horsley Drive												
5	T1	1052	26.0	0.373	2.4	LOS A	7.7	65.8	0.24	0.22	0.24	57.7
6	R2	593	9.9	1.467	489.3	LOS F	124.9	949.0	1.00	1.85	3.23	6.4
Approach		1644	20.2	1.467	177.9	LOS F	124.9	949.0	0.51	0.80	1.31	14.9
North: Ferrers Road												
7	L2	551	9.8	0.798	35.0	LOS C	30.3	230.1	0.91	0.88	0.93	37.7
9	R2	39	29.7	0.297	73.3	LOS F	2.6	22.9	0.98	0.74	0.98	26.6
Approach		589	11.1	0.798	37.6	LOS C	30.3	230.1	0.91	0.87	0.93	36.7
West: The Horsley Drive												
10	L2	113	11.2	0.951	69.2	LOS E	68.0	546.0	1.00	1.10	1.23	28.7
11	T1	1521	18.1	0.951	63.5	LOS E	68.2	551.4	1.00	1.10	1.23	29.3
Approach		1634	17.6	0.951	63.9	LOS E	68.2	551.4	1.00	1.10	1.23	29.3
All Vehicles		3867	17.7	1.467	108.4	LOS F	124.9	949.0	0.78	0.94	1.22	21.2

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 Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	11	64.2	LOS F	0.0	0.0	0.96	0.96
P3	North Full Crossing	11	21.2	LOS C	0.0	0.0	0.55	0.55
All Pedestrians		21	42.7	LOS E			0.75	0.75

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

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

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

MOVEMENT SUMMARY



Site: 101 [2026 PM Existing - Ferrers Road x The Horsley Drive]

The Horsley Drive x Ferrers Road

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 139 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Deg. HV %	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: The Horsley Drive												
5	T1	1903	8.1	0.854	13.0	LOS A	54.2	406.0	0.63	0.61	0.65	49.5
6	R2	647	8.9	1.010	87.2	LOS F	45.6	343.3	1.00	1.11	1.50	21.0
Approach		2551	8.3	1.010	31.8	LOS C	54.2	406.0	0.73	0.74	0.87	36.8
North: Ferrers Road												
7	L2	942	4.2	0.834	24.7	LOS B	35.3	256.4	0.84	0.94	1.00	42.3
9	R2	319	8.6	1.901	871.0	LOS F	85.8	644.6	1.00	2.16	4.23	3.8
Approach		1261	5.3	1.901	238.8	LOS F	85.8	644.6	0.88	1.25	1.82	11.9
West: The Horsley Drive												
10	L2	53	32.0	0.889	69.0	LOS E	33.4	273.5	1.00	1.02	1.19	28.6
11	T1	853	18.3	0.889	63.0	LOS E	34.0	274.9	1.00	1.03	1.19	29.5
Approach		905	19.1	0.889	63.3	LOS E	34.0	274.9	1.00	1.03	1.19	29.4
All Vehicles		4717	9.6	1.901	93.2	LOS F	85.8	644.6	0.82	0.93	1.18	22.9

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

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

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

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

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

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	11	61.8	LOS F	0.0	0.0	0.94	0.94
P3	North Full Crossing	11	38.9	LOS D	0.0	0.0	0.75	0.75
All Pedestrians		21	50.3	LOS E			0.85	0.85

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

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

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Tuesday, 21 January 2020 12:27:37 PM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020 Modelling\Network\AG1223m08_Network 2026 Scenarios.sip8

MOVEMENT SUMMARY



Site: m01v [2026 AM Base - RMS Upgrade - The Horsley Drive x Cowpasture Road]



Network: N101 [2026 AM Existing RMS Upgrades]

The Horsley Drive x Cowpasture Road

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV	Total	HV				Vehicles	Distance				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Cowpasture Road														
1	L2	14	0.0	14	0.0	1.014	98.5	LOS F	40.5	297.6	1.00	1.38	1.60	16.9
2	T1	1445	5.9	1445	5.9	1.014	94.2	LOS F	40.5	297.6	1.00	1.40	1.62	15.1
3	R2	1029	3.9	1029	3.9	0.916	62.7	LOS E	20.2	146.0	1.00	1.03	1.29	30.3
Approach		2488	5.0	2488	5.0	1.014	81.2	LOS F	40.5	297.6	1.00	1.24	1.48	21.3
East: The Horsley Drive (East)														
4	L2	224	11.7	224	11.7	0.136	23.6	LOS B	2.1	16.0	0.60	0.71	0.60	42.9
5	T1	9	0.0	9	0.0	0.043	50.7	LOS D	0.3	2.0	0.92	0.65	0.92	24.8
6	R2	715	10.3	715	10.3	0.928	71.3	LOS F	15.3	116.9	1.00	1.06	1.41	18.5
Approach		948	10.5	948	10.5	0.928	59.8	LOS E	15.3	116.9	0.91	0.98	1.21	23.6
North: The Horsley Drive (North)														
7	L2	967	9.4	967	9.4	0.627	14.3	LOS A	6.0	45.5	0.41	0.68	0.41	44.3
8	T1	484	15.0	484	15.0	0.904	64.0	LOS E	9.3	73.8	1.00	1.07	1.40	24.9
9	R2	9	0.0	9	0.0	0.090	63.5	LOS E	0.3	2.3	1.00	0.67	1.00	12.2
Approach		1461	11.2	1461	11.2	0.904	31.1	LOS C	9.3	73.8	0.61	0.81	0.74	35.0
West: Lizard Log Access Road														
10	L2	5	20.0	5	20.0	0.050	49.5	LOS D	0.3	2.6	0.91	0.65	0.91	7.7
11	T1	7	0.0	7	0.0	0.050	44.2	LOS D	0.3	2.6	0.91	0.65	0.91	27.3
12	R2	7	0.0	7	0.0	0.050	36.1	LOS C	0.2	1.4	0.91	0.64	0.91	30.2
Approach		20	5.3	20	5.3	0.050	42.6	LOS D	0.3	2.6	0.91	0.64	0.91	24.3
All Vehicles		4918	7.9	4918	7.9	1.014	62.0	LOS E	40.5	297.6	0.86	1.06	1.21	24.5

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

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

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

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

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

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		Pedestrian ped	m		
P1	South Full Crossing	26	49.2	LOS E	0.1	0.1	0.95	0.95
P2	East Full Crossing	26	49.2	LOS E	0.1	0.1	0.95	0.95
P2S	East Slip/Bypass Lane Crossing	26	49.2	LOS E	0.1	0.1	0.95	0.95
P3	North Full Crossing	26	49.2	LOS E	0.1	0.1	0.95	0.95
P3S	North Slip/Bypass Lane Crossing	26	49.2	LOS E	0.1	0.1	0.95	0.95
P4	West Full Crossing	26	49.2	LOS E	0.1	0.1	0.95	0.95
All Pedestrians		158	49.2	LOS E			0.95	0.95

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Wednesday, 19 February 2020 4:43:11 PM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020
Modelling\Network\AG1223m08_Network 2026 Scenarios.sip8

MOVEMENT SUMMARY



Site: m01v [2026 PM Base - RMS Upgrade - The Horsley Drive x Cowpasture Road]



Network: N101 [2026 PM Existing RMS Upgrades]

The Horsley Drive x Cowpasture Road

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		veh	m				km/h
South: Cowpasture Road														
1	L2	13	0.0	13	0.0	0.589	38.8	LOS C	12.9	97.3	0.81	0.72	0.81	30.7
2	T1	776	9.4	776	9.4	0.589	33.5	LOS C	13.5	102.0	0.81	0.72	0.81	29.2
3	R2	346	8.2	346	8.2	1.099	185.3	LOS F	13.1	98.4	1.00	1.31	1.99	14.6
Approach		1135	8.9	1135	8.9	1.099	79.9	LOS F	13.5	102.0	0.87	0.90	1.17	20.0
East: The Horsley Drive (East)														
4	L2	445	3.1	445	3.1	0.507	59.4	LOS E	8.7	62.3	0.92	0.82	0.92	30.9
5	T1	9	0.0	9	0.0	0.044	67.7	LOS E	0.4	2.7	0.92	0.66	0.92	20.9
6	R2	653	4.0	653	4.0	1.061	159.2	LOS F	24.3	175.7	1.00	1.25	1.78	9.8
Approach		1107	3.6	1107	3.6	1.061	118.3	LOS F	24.3	175.7	0.97	1.07	1.43	16.0
North: The Horsley Drive (North)														
7	L2	744	4.4	744	4.4	0.290	13.3	LOS A	4.5	33.0	0.30	0.65	0.30	46.3
8	T1	1546	4.1	1546	4.1	0.898	48.9	LOS D	22.1	160.0	0.98	0.96	1.07	29.4
9	R2	11	10.0	11	10.0	0.068	79.6	LOS F	0.5	3.6	1.00	0.69	1.00	10.2
Approach		2301	4.2	2301	4.2	0.898	37.5	LOS C	22.1	160.0	0.76	0.86	0.82	33.2
West: Lizard Log Access Road														
10	L2	5	20.0	5	20.0	0.066	67.4	LOS E	0.5	3.8	0.92	0.66	0.92	5.9
11	T1	7	0.0	7	0.0	0.066	63.8	LOS E	0.5	3.8	0.92	0.66	0.92	22.1
12	R2	9	0.0	9	0.0	0.067	53.5	LOS D	0.3	2.3	0.82	0.63	0.82	24.4
Approach		22	4.8	22	4.8	0.067	60.2	LOS E	0.5	3.8	0.88	0.65	0.88	19.9
All Vehicles		4565	5.2	4565	5.2	1.099	67.8	LOS E	24.3	175.7	0.84	0.92	1.05	23.1

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

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

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

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

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

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		
P1	South Full Crossing	26	69.2	LOS F	0.1	0.1	0.96	0.96
P2	East Full Crossing	26	69.2	LOS F	0.1	0.1	0.96	0.96
P2S	East Slip/Bypass Lane Crossing	26	69.2	LOS F	0.1	0.1	0.96	0.96
P3	North Full Crossing	26	69.2	LOS F	0.1	0.1	0.96	0.96
P3S	North Slip/Bypass Lane Crossing	26	69.2	LOS F	0.1	0.1	0.96	0.96
P4	West Full Crossing	26	69.2	LOS F	0.1	0.1	0.96	0.96

All Pedestrians	158	69.2 LOS F	0.96	0.96
-----------------	-----	------------	------	------

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

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

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Wednesday, 19 February 2020 6:04:25 PM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020
Modelling\Network\AG1223m08_Network 2026 Scenarios.sip8

MOVEMENT SUMMARY



Site: [2026 AM Existing - RMS Upgrade - Cowpasture Road x The Horsley Drive]



Network: N101 [2026 AM Existing RMS Upgrades]

Horsley Drive x Cowpasture Rd

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		veh	m				km/h
South: The Horsley Drive (south)														
2	T1	1320	7.5	1320	7.5	0.501	6.4	LOS A	7.1	52.9	0.36	0.33	0.36	53.8
3	R2	882	7.4	882	7.4	0.780	45.6	LOS D	14.1	104.7	1.00	0.90	1.04	20.0
Approach		2202	7.5	2202	7.5	0.780	22.1	LOS B	14.1	104.7	0.62	0.55	0.63	39.2
East: Cowpasture Road														
4	L2	200	33.7	200	33.7	0.106	15.1	LOS B	1.4	12.7	0.46	0.63	0.46	26.3
6	R2	333	66.5	333	66.5	0.525	44.7	LOS D	4.9	53.6	0.92	0.80	0.92	31.5
Approach		533	54.2	533	54.2	0.525	33.6	LOS C	4.9	53.6	0.75	0.74	0.75	30.7
North: The Horsley Drive (north)														
7	L2	946	27.5	946	27.5	0.493	18.5	LOS B	8.5	73.2	0.59	0.75	0.59	43.5
8	T1	1248	6.8	1248	6.8	0.795	39.8	LOS C	13.4	99.1	0.97	0.92	1.06	32.2
Approach		2195	15.7	2195	15.7	0.795	30.6	LOS C	13.4	99.1	0.81	0.85	0.86	36.9
All Vehicles		4929	16.2	4929	16.2	0.795	27.1	LOS B	14.1	104.7	0.71	0.70	0.75	37.1

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

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

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

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

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

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		
P1	South Full Crossing	26	49.2	LOS E	0.1	0.1	0.95	0.95
P2	East Full Crossing	26	32.9	LOS D	0.1	0.1	0.77	0.77
P2S	East Slip/Bypass Lane Crossing	26	28.4	LOS C	0.1	0.1	0.72	0.72
P3S	North Slip/Bypass Lane Crossing	26	29.1	LOS C	0.1	0.1	0.73	0.73
All Pedestrians		105	34.9	LOS D			0.79	0.79

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: [2026 PM Existing - RMS Upgrade - Cowpasture Road x The Horsley Drive]



Network: N101 [2026 PM Existing RMS Upgrades]

Horsley Drive x Cowpasture Rd

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total	HV %	v/c	sec		veh	Distance m			km/h
South: The Horsley Drive (south)													
2	T1	1335	5.8	1287	5.8	0.532	16.3	LOS B	15.2	112.0	0.57	0.52	46.4
3	R2	126	20.8	122	21.1	0.548	82.7	LOS F	2.8	22.8	1.00	0.76	12.9
Approach		1461	7.1	1409 ^{N1}	7.2	0.548	22.0	LOS B	15.2	112.0	0.61	0.54	42.2
East: Cowpasture Road													
4	L2	573	5.3	573	5.3	0.478	38.2	LOS C	12.2	89.5	0.78	0.79	15.1
6	R2	1198	10.3	1198	10.3	1.035	131.3	LOS F	41.2	313.7	1.00	1.21	17.8
Approach		1771	8.7	1771	8.7	1.035	101.2	LOS F	41.2	313.7	0.93	1.07	17.5
North: The Horsley Drive (north)													
7	L2	242	59.1	242	59.1	0.105	8.2	LOS A	0.7	7.4	0.14	0.58	47.9
8	T1	1660	3.8	1660	3.8	1.036	127.7	LOS F	56.6	409.1	1.00	1.40	15.8
Approach		1902	10.8	1902	10.8	1.036	112.5	LOS F	56.6	409.1	0.89	1.29	17.6
All Vehicles		5134	9.0	5082 ^{N1}	9.1	1.036	83.5	LOS F	56.6	409.1	0.83	1.01	21.4

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

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

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

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

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

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

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate
		ped/h	sec		Pedestrian ped	Distance m	
P1	South Full Crossing	26	49.7	LOS E	0.1	0.1	0.81
P2	East Full Crossing	26	23.0	LOS C	0.1	0.1	0.55
P2S	East Slip/Bypass Lane Crossing	26	19.8	LOS B	0.1	0.1	0.51
P3S	North Slip/Bypass Lane Crossing	26	69.2	LOS F	0.1	0.1	0.96
All Pedestrians		105	40.4	LOS E			0.71

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.

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020
Modelling\Network\AG1223m08_Network 2026 Scenarios.sip8

MOVEMENT SUMMARY



Site: 101 [2026 AM Base - RMS Upgrade - Ferrers Road x The Horsley Drive]

The Horsley Drive x Ferrers Road

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: The Horsley Drive												
5	T1	1052	26.0	0.432	5.6	LOS A	10.0	85.4	0.43	0.38	0.43	54.9
6	R2	593	9.9	0.712	45.0	LOS D	13.8	104.9	0.97	0.86	1.02	34.2
Approach		1644	20.2	0.712	19.8	LOS B	13.8	104.9	0.62	0.56	0.64	45.1
North: Ferrers Road												
7	L2	551	9.8	0.392	25.0	LOS B	9.9	75.3	0.70	0.76	0.70	42.0
9	R2	39	29.7	0.169	47.1	LOS D	1.7	15.0	0.91	0.73	0.91	33.2
Approach		589	11.1	0.392	26.5	LOS B	9.9	75.3	0.71	0.76	0.71	41.3
West: The Horsley Drive												
10	L2	113	11.2	0.152	24.3	LOS B	3.3	25.5	0.64	0.72	0.64	42.4
11	T1	1521	18.1	0.729	24.8	LOS B	22.2	179.6	0.87	0.77	0.87	42.7
Approach		1634	17.6	0.729	24.8	LOS B	22.2	179.6	0.85	0.77	0.85	42.7
All Vehicles		3867	17.7	0.729	23.0	LOS B	22.2	179.6	0.73	0.68	0.74	43.4

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 Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P21	East Stage 1	11	44.2	LOS E	0.0	0.0	0.94	0.94
P22	East Stage 2	11	44.2	LOS E	0.0	0.0	0.94	0.94
P3	North Full Crossing	11	20.5	LOS C	0.0	0.0	0.64	0.64
P3S	North Slip/Bypass Lane Crossing	11	18.6	LOS B	0.0	0.0	0.61	0.61
P41	West Stage 1	11	42.3	LOS E	0.0	0.0	0.92	0.92
P42	West Stage 2	11	39.6	LOS D	0.0	0.0	0.89	0.89
All Pedestrians		63	34.9	LOS D			0.82	0.82

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.

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020
Modelling\Network\AG1223m08_Network 2026 Scenarios.sip8

MOVEMENT SUMMARY



Site: 101 [2026 PM Base - RMS Upgrade - Ferrers Road x The Horsley Drive]

The Horsley Drive x Ferrers Road

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 105 seconds (Site Optimum Cycle Time - Minimum Delay)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Deg. Satn HV % 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: The Horsley Drive											
5	T1	1903	8.1 0.818	14.1	LOS A	37.4	279.8	0.77	0.72	0.78	48.8
6	R2	647	8.9 0.608	39.5	LOS C	14.3	107.6	0.91	0.83	0.91	36.1
Approach		2551	8.3 0.818	20.6	LOS B	37.4	279.8	0.81	0.75	0.81	44.8
North: Ferrers Road											
7	L2	942	4.2 0.492	18.4	LOS B	15.3	111.0	0.60	0.75	0.60	45.6
9	R2	319	8.6 0.797	51.6	LOS D	16.8	126.0	1.00	0.91	1.13	32.2
Approach		1261	5.3 0.797	26.8	LOS B	16.8	126.0	0.70	0.79	0.73	41.2
West: The Horsley Drive											
10	L2	53	32.0 0.118	35.1	LOS C	2.0	17.6	0.76	0.72	0.76	37.4
11	T1	853	18.3 0.596	33.9	LOS C	13.6	109.9	0.90	0.77	0.90	38.6
Approach		905	19.1 0.596	34.0	LOS C	13.6	109.9	0.89	0.76	0.89	38.5
All Vehicles		4717	9.6 0.818	24.8	LOS B	37.4	279.8	0.79	0.76	0.81	42.5

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 Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P21	East Stage 1	11	38.6	LOS D	0.0	0.0	0.86	0.86
P22	East Stage 2	11	38.6	LOS D	0.0	0.0	0.86	0.86
P3	North Full Crossing	11	31.3	LOS D	0.0	0.0	0.77	0.77
P3S	North Slip/Bypass Lane Crossing	11	29.0	LOS C	0.0	0.0	0.74	0.74
P41	West Stage 1	11	36.9	LOS D	0.0	0.0	0.84	0.84
P42	West Stage 2	11	34.4	LOS D	0.0	0.0	0.81	0.81
All Pedestrians		63	34.8	LOS D			0.81	0.81

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

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

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

MOVEMENT SUMMARY



Site: m01 [2019 AM Existing + Dev - The Horsley Drive x Cowpasture Road]



Network: N101 [2019 AM Existing + Dev]

The Horsley Drive x Cowpasture Road

Site Category: (None)

Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV	Total	HV									
		veh/h	% veh/h		%	v/c	sec		veh	m				km/h
South: Cowpasture Road														
1	L2	4	25.0	4	25.0	0.003	3.5	LOS A	0.0	0.0	0.03	0.39	0.03	53.5
2	T1	1333	6.0	1333	6.0	0.905	10.5	LOS A	6.2	45.5	0.91	1.13	1.48	45.3
3	R2	843	3.9	843	3.9	0.905	19.7	LOS B	5.8	42.2	0.98	1.29	1.72	49.5
3u	U	1	0.0	1	0.0	0.905	22.1	LOS B	5.8	42.2	0.98	1.29	1.72	49.9
Approach		2181	5.2	2181	5.2	0.905	14.1	LOS A	6.2	45.5	0.93	1.19	1.57	47.5
East: The Horsley Drive (East)														
4	L2	194	12.0	194	12.0	0.351	4.9	LOS A	1.2	9.0	0.69	0.67	0.69	54.4
5	T1	1	0.0	1	0.0	0.351	5.3	LOS A	1.2	9.0	0.69	0.67	0.69	45.4
6	R2	579	10.7	579	10.7	0.351	11.7	LOS A	1.2	9.0	0.70	0.71	0.70	44.9
6u	U	17	6.3	17	6.3	0.351	14.4	LOS A	1.1	8.1	0.70	0.74	0.70	53.9
Approach		791	10.9	791	10.9	0.351	10.1	LOS A	1.2	9.0	0.70	0.70	0.70	48.3
North: The Horsley Drive (North)														
7	L2	800	9.5	765	9.6	1.018	66.3	LOS E	16.3	123.6	1.00	2.16	3.72	23.6
8	T1	399	14.8	382	15.0	0.748	18.1	LOS B	3.2	24.9	0.90	1.09	1.32	46.6
9	R2	1	0.0	1	0.0	0.748	24.5	LOS B	3.2	24.9	0.90	1.09	1.32	26.5
9u	U	4	25.0	4	25.4	0.748	28.4	LOS B	3.2	24.9	0.90	1.09	1.32	25.0
Approach		1204	11.3	1152 ^{N1}	11.5	1.018	50.1	LOS D	16.3	123.6	0.97	1.80	2.91	28.4
West: Lizard Log Access Road														
10	L2	5	20.0	5	20.0	0.054	29.8	LOS C	0.1	0.7	0.95	0.95	0.95	10.8
11	T1	3	0.0	3	0.0	0.028	16.9	LOS B	0.1	0.5	0.97	0.88	0.97	40.9
12	R2	1	0.0	1	0.0	0.028	21.7	LOS B	0.1	0.5	0.97	0.88	0.97	41.5
12u	U	2	0.0	2	0.0	0.028	28.9	LOS C	0.1	0.5	0.97	0.88	0.97	16.7
Approach		12	9.1	12	9.1	0.054	25.4	LOS B	0.1	0.7	0.96	0.92	0.96	24.9
All Vehicles		4187	8.0	4135 ^{N1}	8.1	1.018	23.4	LOS B	16.3	123.6	0.90	1.27	1.77	40.4

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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.

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

MOVEMENT SUMMARY



Site: m01 [2019 PM Existing + Dev - The Horsley Drive x Cowpasture Road]



Network: N101 [2019 PM Existing + Dev]

The Horsley Drive x Cowpasture Road

Site Category: (None)

Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV	Total	HV									
South: Cowpasture Road														
1	L2	3	0.0	3	0.0	0.002	3.3	LOS A	0.0	0.0	0.03	0.39	0.03	53.6
2	T1	678	9.5	678	9.5	0.413	4.4	LOS A	1.1	8.1	0.60	0.47	0.60	48.6
3	R2	322	8.2	322	8.2	0.413	11.1	LOS A	1.0	7.3	0.62	0.71	0.62	54.3
3u	U	1	0.0	1	0.0	0.413	13.4	LOS A	1.0	7.3	0.62	0.71	0.62	55.8
Approach		1004	9.0	1004	9.0	0.413	6.5	LOS A	1.1	8.1	0.61	0.55	0.61	51.2
East: The Horsley Drive (East)														
4	L2	377	3.1	377	3.1	1.385	448.2	LOS F	57.3	412.9	1.00	4.02	7.54	7.3
5	T1	1	0.0	1	0.0	1.385	448.6	LOS F	57.3	412.9	1.00	4.02	7.54	4.7
6	R2	600	4.2	600	4.2	1.385	454.5	LOS F	57.3	412.9	1.00	3.66	7.05	4.2
6u	U	7	0.0	7	0.0	1.385	456.7	LOS F	38.9	281.8	1.00	3.46	6.78	7.5
Approach		985	3.7	985	3.7	1.385	452.1	LOS F	57.3	412.9	1.00	3.80	7.24	5.4
North: The Horsley Drive (North)														
7	L2	637	4.5	637	4.5	0.585	5.9	LOS A	1.9	13.8	0.51	0.61	0.54	56.8
8	T1	1274	4.1	1273	4.1	0.898	8.8	LOS A	7.4	53.9	0.78	0.79	1.03	56.4
9	R2	1	100.0	1	100.0	0.898	19.2	LOS B	7.4	53.9	0.78	0.79	1.03	33.1
9u	U	14	7.7	14	7.7	0.898	18.6	LOS B	7.4	53.9	0.78	0.79	1.03	35.7
Approach		1925	4.3	1925	4.3	0.898	7.9	LOS A	7.4	53.9	0.69	0.73	0.87	56.4
West: Lizard Log Access Road														
10	L2	5	20.0	5	20.0	0.010	5.1	LOS A	0.0	0.1	0.68	0.60	0.68	27.5
11	T1	3	0.0	3	0.0	0.011	2.5	LOS A	0.0	0.1	0.67	0.58	0.67	51.9
12	R2	5	0.0	5	0.0	0.011	7.3	LOS A	0.0	0.1	0.67	0.58	0.67	52.9
12u	U	1	0.0	1	0.0	0.011	14.5	LOS A	0.0	0.1	0.67	0.58	0.67	21.0
Approach		15	7.1	15	7.1	0.011	6.0	LOS A	0.0	0.1	0.67	0.59	0.67	45.5
All Vehicles		3929	5.4	3929	5.4	1.385	118.9	LOS F	57.3	412.9	0.75	1.45	2.40	16.1

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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: [2019 AM Existing + Dev - Cowpasture Road x The Horsley Drive]



Network: N101 [2019 AM Existing + Dev]

Horsley Drive x Cowpasture Rd

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 122 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		veh	m				km/h
South: The Horsley Drive (south)														
2	T1	1100	7.6	1100	7.6	0.404	7.8	LOS A	8.2	61.0	0.45	0.40	0.45	52.6
3	R2	783	7.7	783	7.7	0.793	32.6	LOS C	8.7	65.1	0.99	0.89	1.06	15.0
Approach		1883	7.6	1883	7.6	0.793	18.1	LOS B	8.7	65.1	0.67	0.60	0.70	40.2
East: Cowpasture Road														
4	L2	200	31.6	200	31.6	0.339	18.0	LOS B	3.8	33.5	0.59	0.70	0.59	24.0
6	R2	321	61.0	321	61.0	0.616	54.7	LOS D	5.5	58.9	0.97	0.82	0.97	28.8
Approach		521	49.7	521	49.7	0.616	40.6	LOS C	5.5	58.9	0.82	0.77	0.82	28.1
North: The Horsley Drive (north)														
7	L2	811	26.4	811	26.4	0.465	15.7	LOS B	5.7	49.1	0.64	0.75	0.64	45.1
8	T1	1007	6.9	1007	6.9	1.057	134.8	LOS F	38.2	283.6	1.00	1.54	1.85	15.0
Approach		1818	15.6	1818	15.6	1.057	81.7	LOS F	38.2	283.6	0.84	1.19	1.31	21.4
All Vehicles		4222	16.2	4222	16.2	1.057	48.3	LOS D	38.2	283.6	0.76	0.88	0.98	27.3

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

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

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

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

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

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		
P1	South Full Crossing	26	55.2	LOS E	0.1	0.1	0.95	0.95
P2	East Full Crossing	26	33.2	LOS D	0.1	0.1	0.74	0.74
P3S	North Slip/Bypass Lane Crossing	26	19.9	LOS B	0.0	0.0	0.80	0.80
All Pedestrians		79	36.1	LOS D			0.83	0.83

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: [2019 PM Existing + Dev - Cowpasture Road x The Horsley Drive]



Network: N101 [2019 PM Existing + Dev]

Horsley Drive x Cowpasture Rd

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 145 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV % veh/h	Total HV %		v/c	sec		veh	m				km/h
South: The Horsley Drive (south)														
2	T1	1159	5.8	1004	6.2	0.440	17.6	LOS B	12.0	88.4	0.60	0.54	0.60	45.5
3	R2	141	17.9	123	18.9	0.376	74.1	LOS F	2.6	21.0	0.98	0.76	0.98	7.7
Approach		1300	7.1	1127 ^{N1}	7.6	0.440	23.8	LOS B	12.0	88.4	0.64	0.56	0.64	40.8
East: Cowpasture Road														
4	L2	594	5.0	593	5.0	0.700	37.2	LOS C	16.9	123.0	0.87	0.98	1.13	15.4
6	R2	1056	11.3	1055	11.3	0.906	69.5	LOS E	25.5	195.7	1.00	0.99	1.19	26.3
Approach		1649	9.0	1649	9.0	0.906	57.8	LOS E	25.5	195.7	0.95	0.99	1.17	24.3
North: The Horsley Drive (north)														
7	L2	228	51.6	228	51.6	0.103	9.4	LOS A	0.9	9.5	0.21	0.60	0.21	50.8
8	T1	1352	3.8	1352	3.8	0.988	90.1	LOS F	42.2	305.4	1.00	1.22	1.39	20.2
Approach		1580	10.7	1580	10.7	0.988	78.4	LOS F	42.2	305.4	0.89	1.13	1.22	22.1
All Vehicles		4529	9.1	4356 ^{N1}	9.4	0.988	56.5	LOS D	42.2	305.4	0.85	0.93	1.05	26.4

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

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

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

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

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

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

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate
		ped/h	sec		Pedestrian ped	Distance m	
P1	South Full Crossing	26	45.7	LOS E	0.1	0.1	0.79
P2	East Full Crossing	26	29.2	LOS C	0.1	0.1	0.64
P3S	North Slip/Bypass Lane Crossing	26	62.9	LOS F	0.1	0.1	0.93
All Pedestrians		79	45.9	LOS E			0.79

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: [2019 AM Existing + Dev - Cowpasture Road x Newton Road]



Network: N101 [2019 AM Existing + Dev]

Cowpasture Road x Newton Road

Site Category: (None)

Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV %	Total	HV %									
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Cowpasture Road														
2	T1	1012	15.9	1012	15.9	0.533	4.5	LOS A	2.2	17.5	0.17	0.41	0.17	43.2
3	R2	574	17.6	574	17.6	0.533	9.3	LOS A	2.1	17.2	0.19	0.57	0.19	50.3
3u	U	25	37.5	25	37.5	0.533	11.7	LOS A	2.1	17.2	0.19	0.57	0.19	38.2
Approach		1611	16.9	1610	16.9	0.533	6.3	LOS A	2.2	17.5	0.18	0.47	0.18	47.4
East: Newton Road														
4	L2	256	54.3	256	54.3	0.372	6.5	LOS A	0.7	7.0	0.51	0.70	0.51	49.3
6	R2	17	31.3	17	31.3	0.372	10.8	LOS A	0.7	7.0	0.51	0.70	0.51	49.3
6u	U	6	33.3	6	33.3	0.372	13.0	LOS A	0.7	7.0	0.51	0.70	0.51	54.5
Approach		279	52.5	279	52.5	0.372	6.9	LOS A	0.7	7.0	0.51	0.70	0.51	49.5
North: Cowpasture Road														
7	L2	53	22.0	53	22.0	0.213	9.8	LOS A	0.7	6.5	0.77	0.66	0.77	46.3
8	T1	251	39.9	251	39.9	0.213	10.7	LOS A	0.7	6.5	0.77	0.68	0.77	29.1
9u	U	1	0.0	1	0.0	0.213	16.4	LOS B	0.7	6.3	0.76	0.68	0.76	29.0
Approach		304	36.7	304	36.7	0.213	10.6	LOS A	0.7	6.5	0.77	0.67	0.77	35.1
All Vehicles		2194	24.1	2194	24.1	0.533	7.0	LOS A	2.2	17.5	0.30	0.53	0.30	46.4

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Wednesday, 22 January 2020 2:30:29 PM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020

Modelling\Network\AG1223m08_Network 2019 Scenarios.sip8

MOVEMENT SUMMARY



Site: [2019 PM Existing + Dev - Cowpasture Road x Newton Road]



Network: N101 [2019 PM Existing + Dev]

Cowpasture Road x Newton Road

Site Category: (None)

Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV	Total	HV				Vehicles	Distance				
		veh/h	% veh/h	%	v/c				sec	veh				
South: Cowpasture Road														
2	T1	235	41.3	224	42.7	0.132	4.6	LOS A	0.3	3.1	0.08	0.41	0.08	44.4
3	R2	123	35.0	117	36.4	0.132	9.3	LOS A	0.3	2.7	0.08	0.58	0.08	49.6
3u	U	15	14.3	14	15.0	0.132	11.2	LOS A	0.3	2.7	0.08	0.58	0.08	38.6
Approach		373	38.1	355 ^{N1}	39.5	0.132	6.4	LOS A	0.3	3.1	0.08	0.47	0.08	47.2
East: Newton Road														
4	L2	197	24.6	197	24.6	0.687	13.1	LOS A	0.8	6.8	0.72	0.99	1.12	42.2
6	R2	7	0.0	7	0.0	0.687	17.0	LOS B	0.8	6.8	0.72	0.99	1.12	42.2
6u	U	1	0.0	1	0.0	0.687	19.1	LOS B	0.8	6.8	0.72	0.99	1.12	50.9
Approach		205	23.6	205	23.6	0.687	13.3	LOS A	0.8	6.8	0.72	0.99	1.12	42.2
North: Cowpasture Road														
7	L2	7	57.1	7	57.1	0.972	17.3	LOS B	4.7	34.8	0.46	0.71	0.78	40.4
8	T1	1341	6.8	1341	6.8	0.972	17.8	LOS B	4.9	36.5	0.46	0.74	0.83	21.7
9u	U	1	100.0	1	100.0	0.972	27.8	LOS B	4.9	36.5	0.47	0.77	0.87	20.5
Approach		1349	7.2	1349	7.2	0.972	17.8	LOS B	4.9	36.5	0.46	0.74	0.83	21.9
All Vehicles		1927	14.9	1909 ^{N1}	15.1	0.972	15.2	LOS B	4.9	36.5	0.42	0.72	0.72	30.0

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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.

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Thursday, 20 February 2020 5:28:32 PM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020 Modelling\Network\AG1223m08_Network 2019 Scenarios.sip8

MOVEMENT SUMMARY



Site: [2019 AM Existing + Dev - Cowpasture Road x Burilda Close]



Network: N101 [2019 AM Existing + Dev]

Cowpasture Road x Burilda Close

Site Category: (None)

Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV %	Total	HV %									
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Cowpasture Road														
1	L2	60	21.1	60	21.1	0.361	4.7	LOS A	1.0	7.7	0.25	0.42	0.25	43.5
2	T1	973	16.0	973	16.0	0.361	4.7	LOS A	1.0	7.7	0.26	0.42	0.26	38.1
Approach		1033	16.3	1033	16.3	0.361	4.7	LOS A	1.0	7.7	0.26	0.42	0.26	38.7
North: Cowpasture Road														
8	T1	288	36.5	288	36.5	0.128	4.6	LOS A	0.3	2.9	0.14	0.42	0.14	47.9
9	R2	46	27.3	46	27.3	0.128	9.2	LOS A	0.3	2.8	0.14	0.49	0.14	47.4
9u	U	16	46.7	16	46.7	0.128	11.6	LOS A	0.3	2.8	0.14	0.49	0.14	46.0
Approach		351	35.7	351	35.7	0.128	5.5	LOS A	0.3	2.9	0.14	0.43	0.14	47.7
West: Stage 1 Access														
10	L2	21	50.0	21	50.0	0.068	6.3	LOS A	0.1	0.8	0.52	0.76	0.52	36.5
12	R2	18	64.7	18	64.7	0.068	11.2	LOS A	0.1	0.8	0.52	0.76	0.52	36.5
12u	U	1	0.0	1	0.0	0.068	12.9	LOS A	0.1	0.8	0.52	0.76	0.52	47.1
Approach		40	55.3	40	55.3	0.068	8.6	LOS A	0.1	0.8	0.52	0.76	0.52	36.9
All Vehicles		1423	22.2	1423	22.2	0.361	5.0	LOS A	1.0	7.7	0.24	0.43	0.24	41.9

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Wednesday, 22 January 2020 2:30:29 PM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020

Modelling\Network\AG1223m08_Network 2019 Scenarios.sip8

MOVEMENT SUMMARY



Site: [2019 PM Existing + Dev - Cowpasture Road x Burilda Close]



Network: N101 [2019 PM Existing + Dev]

Cowpasture Road x Burilda Close
Site Category: (None)
Roundabout

Movement Performance - Vehicles															
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total	HV	Total	HV										
		veh/h	% veh/h	%	v/c										sec
South: Cowpasture Road															
1	L2	12	63.6	11	64.9	0.088	4.9	LOS A	0.2	1.8	0.12	0.39	0.12	37.4	
2	T1	232	39.1	221	40.4	0.088	4.6	LOS A	0.2	1.8	0.13	0.39	0.13	40.1	
Approach		243	40.3	232 ^{N1}	41.6	0.088	4.6	LOS A	0.2	1.8	0.13	0.39	0.13	39.8	
North: Cowpasture Road															
8	T1	1313	6.5	1312	6.5	0.442	4.7	LOS A	1.4	10.4	0.29	0.42	0.29	47.2	
9	R2	12	36.4	12	36.3	0.442	9.9	LOS A	1.4	10.4	0.31	0.43	0.31	46.6	
9u	U	13	8.3	13	8.3	0.442	11.5	LOS A	1.4	10.4	0.31	0.43	0.31	46.9	
Approach		1337	6.8	1336 ^{N1}	6.8	0.442	4.8	LOS A	1.4	10.4	0.29	0.42	0.29	47.2	
West: Stage 1 Access															
10	L2	42	2.5	42	2.5	0.098	3.5	LOS A	0.1	0.7	0.22	0.58	0.22	38.5	
12	R2	64	11.5	64	11.5	0.098	8.0	LOS A	0.1	0.7	0.22	0.58	0.22	38.5	
12u	U	1	0.0	1	0.0	0.098	11.4	LOS A	0.1	0.7	0.22	0.58	0.22	48.8	
Approach		107	7.8	107	7.8	0.098	6.3	LOS A	0.1	0.7	0.22	0.58	0.22	38.7	
All Vehicles		1687	11.7	1676 ^{N1}	11.7	0.442	4.8	LOS A	1.4	10.4	0.26	0.43	0.26	46.0	

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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.

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Thursday, 20 February 2020 5:28:32 PM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020 Modelling\Network\AG1223m08_Network 2019 Scenarios.sip8

MOVEMENT SUMMARY



**Site: 101 [2019 AM Existing + Dev - Cowpasture Road
x Victoria Street]**



**Network: N101 [2019 AM
Existing + Dev]**

Cowpasture Road x Victoria Street

Site Category: (None)

Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV %	Total	HV %				Vehicles	Distance				
		veh/h		veh/h	%	v/c	sec		veh	m				km/h
NorthEast: Victoria Street														
25	T1	152	43.8	152	43.8	0.185	6.6	LOS A	0.5	4.5	0.55	0.57	0.55	48.8
26	R2	208	9.1	208	9.1	0.231	10.0	LOS A	0.7	5.2	0.52	0.65	0.52	44.7
26u	U	67	35.9	67	35.9	0.231	12.7	LOS A	0.7	5.2	0.52	0.65	0.52	50.9
Approach		427	25.6	427	25.6	0.231	9.2	LOS A	0.7	5.2	0.53	0.62	0.53	47.4
NorthWest: Cowpasture Road														
27	L2	487	4.3	487	4.3	0.937	24.4	LOS B	6.6	49.7	1.00	1.50	2.35	38.6
29	R2	178	21.3	178	21.3	0.937	30.2	LOS C	6.6	49.7	1.00	1.50	2.35	24.9
29u	U	2	50.0	2	50.0	0.937	34.1	LOS C	6.6	49.7	1.00	1.50	2.35	24.9
Approach		667	9.0	667	9.0	0.937	25.9	LOS B	6.6	49.7	1.00	1.50	2.35	36.2
SouthWest: Victoria Street														
30	L2	431	10.5	431	10.5	0.472	6.2	LOS A	1.6	12.2	0.66	0.64	0.66	44.8
31	T1	540	21.8	540	21.8	0.472	6.9	LOS A	1.6	12.2	0.68	0.67	0.68	51.9
32u	U	35	39.4	35	39.4	0.472	14.4	LOS A	1.5	12.4	0.69	0.68	0.69	43.2
Approach		1005	17.6	1005	17.6	0.472	6.8	LOS A	1.6	12.4	0.67	0.66	0.67	49.8
All Vehicles		2100	16.5	2100	16.5	0.937	13.4	LOS A	6.6	49.7	0.75	0.92	1.18	43.9

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Wednesday, 22 January 2020 2:30:29 PM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020 Modelling\Network\AG1223m08_Network 2019 Scenarios.sip8

MOVEMENT SUMMARY



Site: 101 [2019 PM Existing + Dev - Cowpasture Road
x Victoria Street]



Network: N101 [2019 PM
Existing + Dev]

Cowpasture Road x Victoria Street
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV	Total	HV				Vehicles	Distance				
		veh/h	% veh/h	veh/h	%	v/c	sec		veh	m				km/h
NorthEast: Victoria Street														
25	T1	818	8.6	818	8.6	0.626	8.7	LOS A	2.8	20.9	0.85	0.82	0.96	45.9
26	R2	372	2.5	372	2.5	0.626	14.2	LOS A	2.7	20.0	0.86	0.89	1.01	42.6
26u	U	72	19.1	72	19.1	0.626	17.0	LOS B	2.7	20.0	0.86	0.89	1.01	50.1
Approach		1261	7.4	1261	7.4	0.626	10.8	LOS A	2.8	20.9	0.86	0.85	0.98	45.3
NorthWest: Cowpasture Road														
27	L2	295	4.6	295	4.6	0.672	6.8	LOS A	2.3	16.9	0.66	0.78	0.73	49.4
29	R2	387	6.3	387	6.3	0.672	11.7	LOS A	2.3	16.9	0.66	0.78	0.73	40.0
29u	U	1	0.0	1	0.0	0.672	13.6	LOS A	2.3	16.9	0.66	0.78	0.73	40.0
Approach		683	5.5	683	5.5	0.672	9.6	LOS A	2.3	16.9	0.66	0.78	0.73	45.7
SouthWest: Victoria Street														
30	L2	134	14.2	129	14.5	0.186	6.6	LOS A	0.5	4.3	0.68	0.67	0.68	44.6
31	T1	165	41.4	160	42.1	0.186	8.0	LOS A	0.5	4.3	0.70	0.70	0.70	51.3
32u	U	11	50.0	10	50.7	0.186	15.5	LOS B	0.5	4.5	0.70	0.71	0.70	42.9
Approach		309	29.9	299 ^{N1}	30.6	0.186	7.7	LOS A	0.5	4.5	0.69	0.69	0.69	49.3
All Vehicles		2254	9.9	2243 ^{N1}	10.0	0.672	10.0	LOS A	2.8	20.9	0.77	0.81	0.86	46.0

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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.

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Thursday, 20 February 2020 5:28:32 PM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020 Modelling\Network\AG1223m08_Network 2019 Scenarios.sip8

MOVEMENT SUMMARY



Site: 101v [2019 AM Upgrade + Dev - Cowpasture Road x Trivet Street x Stage 2 Access]



Network: N101 [2019 AM Existing + Dev]

Int 6_Cowpasture Rd_Trivet St
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV %	Total	HV %				Vehicles	Distance				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Cowpasture Rd														
1	L2	100	9.5	100	9.5	0.418	4.0	LOS A	1.2	9.0	0.23	0.50	0.23	48.2
2	T1	257	4.1	257	4.1	0.418	4.1	LOS A	1.2	9.0	0.23	0.50	0.23	54.0
3	R2	266	16.2	266	16.2	0.418	9.5	LOS A	1.2	9.0	0.23	0.50	0.23	49.2
3u	U	1	0.0	1	0.0	0.418	11.6	LOS A	1.2	9.0	0.23	0.50	0.23	44.3
Approach		624	10.1	624	10.1	0.418	6.4	LOS A	1.2	9.0	0.23	0.50	0.23	51.4
East: Cowpasture Road														
4	L2	99	0.0	99	0.0	0.146	6.7	LOS A	0.4	2.6	0.67	0.70	0.67	37.9
5	T1	1	0.0	1	0.0	0.146	6.9	LOS A	0.4	2.6	0.67	0.70	0.67	49.3
6	R2	31	0.0	31	0.0	0.146	12.2	LOS A	0.4	2.6	0.67	0.70	0.67	52.6
6u	U	1	0.0	1	0.0	0.146	14.5	LOS A	0.4	2.6	0.67	0.70	0.67	51.0
Approach		132	0.0	132	0.0	0.146	8.0	LOS A	0.4	2.6	0.67	0.70	0.67	44.1
North: Trivet Street														
7	L2	221	0.0	221	0.0	0.586	5.3	LOS A	1.4	10.2	0.50	0.57	0.52	51.7
8	T1	522	1.6	522	1.6	0.586	5.4	LOS A	1.4	10.2	0.50	0.57	0.52	49.6
9	R2	17	25.0	17	25.0	0.586	11.2	LOS A	1.4	10.2	0.50	0.57	0.52	50.8
9u	U	1	0.0	1	0.0	0.586	12.9	LOS A	1.4	10.2	0.50	0.57	0.52	57.0
Approach		761	1.7	761	1.7	0.586	5.5	LOS A	1.4	10.2	0.50	0.57	0.52	50.4
West: Stage 2 Access														
10	L2	11	0.0	11	0.0	0.069	5.7	LOS A	0.1	1.0	0.53	0.69	0.53	49.2
11	T1	1	0.0	1	0.0	0.069	5.9	LOS A	0.1	1.0	0.53	0.69	0.53	46.7
12	R2	56	9.4	56	9.4	0.069	11.3	LOS A	0.1	1.0	0.53	0.69	0.53	38.8
12u	U	1	0.0	1	0.0	0.069	13.4	LOS A	0.1	1.0	0.53	0.69	0.53	50.0
Approach		68	7.7	68	7.7	0.069	10.4	LOS A	0.1	1.0	0.53	0.69	0.53	41.9
All Vehicles		1585	5.1	1585	5.1	0.586	6.3	LOS A	1.4	10.2	0.41	0.56	0.42	50.2

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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: 101v [2019 PM Upgrade + Dev - Cowpasture Road x Trivet Street x Stage 2 Access]



Network: N101 [2019 PM Existing + Dev]

Int 6_Cowpasture Rd_Trivet St
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV % veh/h	Total HV %		v/c	sec		veh	Distance m			km/h
South: Cowpasture Rd													
1	L2	74	5.7	73	5.7	0.343	4.4	LOS A	0.9	6.4	0.37	0.48	49.3
2	T1	336	1.3	331	1.3	0.343	4.5	LOS A	0.9	6.4	0.37	0.48	54.6
3	R2	55	23.1	54	23.1	0.343	10.1	LOS A	0.9	6.4	0.37	0.48	48.8
3u	U	1	0.0	1	0.0	0.343	12.0	LOS A	0.9	6.4	0.37	0.48	45.0
Approach		465	4.5	459 ^{N1}	4.5	0.343	5.1	LOS A	0.9	6.4	0.37	0.48	53.4
East: Cowpasture Road													
4	L2	247	8.5	247	8.5	0.344	5.7	LOS A	0.9	6.4	0.55	0.66	38.5
5	T1	1	0.0	1	0.0	0.344	5.6	LOS A	0.9	6.4	0.55	0.66	49.5
6	R2	131	1.6	131	1.6	0.344	11.0	LOS A	0.9	6.4	0.55	0.66	52.7
6u	U	1	0.0	1	0.0	0.344	13.2	LOS A	0.9	6.4	0.55	0.66	51.3
Approach		380	6.1	380	6.1	0.344	7.5	LOS A	0.9	6.4	0.55	0.66	46.3
North: Trivet Street													
7	L2	34	0.0	34	0.0	0.177	4.1	LOS A	0.3	1.8	0.24	0.44	53.0
8	T1	191	2.8	191	2.8	0.177	4.2	LOS A	0.3	1.8	0.24	0.44	51.3
9	R2	14	0.0	14	0.0	0.177	9.4	LOS A	0.3	1.8	0.24	0.44	55.8
9u	U	1	0.0	1	0.0	0.177	11.7	LOS A	0.3	1.8	0.24	0.44	58.1
Approach		239	2.2	239	2.2	0.177	4.5	LOS A	0.3	1.8	0.24	0.44	51.9
West: Stage 2 Access													
10	L2	21	0.0	21	0.0	0.136	5.6	LOS A	0.3	2.0	0.52	0.70	49.1
11	T1	1	0.0	1	0.0	0.136	5.7	LOS A	0.3	2.0	0.52	0.70	46.7
12	R2	118	7.1	118	7.1	0.136	11.1	LOS A	0.3	2.0	0.52	0.70	38.7
12u	U	1	0.0	1	0.0	0.136	13.3	LOS A	0.3	2.0	0.52	0.70	49.9
Approach		141	6.0	141	6.0	0.136	10.3	LOS A	0.3	2.0	0.52	0.70	41.6
All Vehicles		1225	4.7	1219 ^{N1}	4.8	0.344	6.3	LOS A	0.9	6.4	0.42	0.55	50.2

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

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

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

Roundabout Capacity Model: SIDRA Standard.

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.

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

MOVEMENT SUMMARY

 Site: m01v [2026 AM Base + Dev - RMS Upgrade - The Horsley Drive x Cowpasture Road]

 Network: N101 [2026 AM Existing + Dev RMS Upgrades]

The Horsley Drive x Cowpasture Road

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %									
South: Cowpasture Road														
1	L2	14	0.0	14	0.0	1.043	120.3	LOS F	49.1	361.1	1.00	1.46	1.69	14.5
2	T1	1463	6.0	1463	6.0	1.043	116.7	LOS F	49.1	361.1	1.00	1.47	1.71	12.7
3	R2	1029	3.9	1029	3.9	0.916	66.3	LOS E	21.7	156.8	1.00	1.02	1.27	29.4
Approach		2506	5.1	2506	5.1	1.043	96.0	LOS F	49.1	361.1	1.00	1.28	1.53	18.9
East: The Horsley Drive (East)														
4	L2	224	11.7	224	11.7	0.138	25.6	LOS B	2.3	17.6	0.61	0.71	0.61	41.9
5	T1	9	0.0	9	0.0	0.043	54.9	LOS D	0.3	2.2	0.92	0.65	0.92	23.7
6	R2	738	10.4	738	10.4	0.937	78.0	LOS F	18.1	137.9	1.00	1.07	1.40	17.4
Approach		972	10.6	972	10.6	0.937	65.7	LOS E	18.1	137.9	0.91	0.98	1.21	22.2
North: The Horsley Drive (North)														
7	L2	981	9.4	981	9.4	0.616	15.2	LOS B	6.7	50.6	0.41	0.69	0.41	43.6
8	T1	494	14.9	494	14.9	0.896	64.6	LOS E	9.9	78.1	1.00	1.00	1.28	24.8
9	R2	9	0.0	9	0.0	0.098	69.1	LOS E	0.4	2.5	1.00	0.67	1.00	11.4
Approach		1484	11.2	1484	11.2	0.896	32.0	LOS C	9.9	78.1	0.61	0.79	0.70	34.5
West: Lizard Log Access Road														
10	L2	5	20.0	5	20.0	0.048	53.8	LOS D	0.3	2.6	0.91	0.65	0.91	7.1
11	T1	7	0.0	7	0.0	0.048	47.2	LOS D	0.3	2.6	0.92	0.65	0.92	26.3
12	R2	7	0.0	7	0.0	0.048	41.1	LOS C	0.2	1.7	0.96	0.67	0.96	28.4
Approach		20	5.3	20	5.3	0.048	46.7	LOS D	0.3	2.6	0.93	0.66	0.93	23.0
All Vehicles		4982	8.0	4982	8.0	1.043	70.8	LOS F	49.1	361.1	0.87	1.08	1.22	22.5

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

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

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

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

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

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

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow		Average Delay	Level of Service	Average Back of Queue		Effective Stop Rate
		ped/h				Pedestrian	Distance	
				sec		ped	m	
P1	South Full Crossing	26		54.2	LOS E	0.1	0.1	0.95
P2	East Full Crossing	26		54.2	LOS E	0.1	0.1	0.95
P2S	East Slip/Bypass Lane Crossing	26		54.2	LOS E	0.1	0.1	0.95
P3	North Full Crossing	26		54.2	LOS E	0.1	0.1	0.95
P3S	North Slip/Bypass Lane Crossing	26		54.2	LOS E	0.1	0.1	0.95
P4	West Full Crossing	26		54.2	LOS E	0.1	0.1	0.95

All Pedestrians	158	54.2 LOS E	0.95	0.95
-----------------	-----	------------	------	------

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

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

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Thursday, 23 January 2020 10:11:24 AM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020
Modelling\Network\AG1223m08_Network 2026 Scenarios.sip8

MOVEMENT SUMMARY



Site: m01v [2026 PM Base + Dev - RMS Upgrade - The Horsley Drive x Cowpasture Road]



Network: N101 [2026 PM Existing + Dev RMS Upgrades]

The Horsley Drive x Cowpasture Road

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV % veh/h	Total HV %		v/c	sec		veh	m				km/h
South: Cowpasture Road														
1	L2	13	0.0	13	0.0	0.579	37.9	LOS C	12.8	96.4	0.80	0.71	0.80	31.1
2	T1	788	9.3	788	9.3	0.579	32.7	LOS C	13.7	103.3	0.80	0.71	0.80	29.6
3	R2	346	8.2	346	8.2	1.099	185.3	LOS F	13.1	98.4	1.00	1.31	1.99	14.6
Approach		1147	8.9	1147	8.9	1.099	78.8	LOS F	13.7	103.3	0.86	0.89	1.16	20.2
East: The Horsley Drive (East)														
4	L2	445	3.1	445	3.1	0.507	59.4	LOS E	8.7	62.3	0.92	0.82	0.92	30.9
5	T1	9	0.0	9	0.0	0.044	67.7	LOS E	0.4	2.7	0.92	0.66	0.92	20.9
6	R2	669	4.1	669	4.1	1.105	190.2	LOS F	27.6	199.8	1.00	1.34	1.94	8.4
Approach		1124	3.7	1124	3.7	1.105	137.4	LOS F	27.6	199.8	0.97	1.12	1.53	14.2
North: The Horsley Drive (North)														
7	L2	772	4.5	767	4.5	0.300	13.7	LOS A	4.9	35.9	0.32	0.66	0.32	45.9
8	T1	1567	4.2	1559	4.2	0.892	46.9	LOS D	22.1	160.0	0.97	0.95	1.05	30.1
9	R2	11	10.0	10	10.0	0.067	79.6	LOS F	0.5	3.6	1.00	0.69	1.00	10.2
Approach		2349	4.3	2337 ^{N1}	4.3	0.892	36.2	LOS C	22.1	160.0	0.76	0.85	0.81	33.8
West: Lizard Log Access Road														
10	L2	5	20.0	5	20.0	0.065	67.3	LOS E	0.5	3.8	0.92	0.66	0.92	5.9
11	T1	7	0.0	7	0.0	0.065	63.8	LOS E	0.5	3.8	0.92	0.66	0.92	22.1
12	R2	9	0.0	9	0.0	0.066	54.3	LOS D	0.3	2.4	0.83	0.63	0.83	24.2
Approach		22	4.8	22	4.8	0.066	60.6	LOS E	0.5	3.8	0.88	0.65	0.88	19.8
All Vehicles		4643	5.3	4630 ^{N1}	5.3	1.105	71.4	LOS F	27.6	199.8	0.83	0.93	1.07	22.3

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

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

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

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

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

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

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate
		ped/h	sec		Pedestrian	Distance	
					ped	m	
P1	South Full Crossing	26	69.2	LOS F	0.1	0.1	0.96
P2	East Full Crossing	26	69.2	LOS F	0.1	0.1	0.96
P2S	East Slip/Bypass Lane Crossing	26	69.2	LOS F	0.1	0.1	0.96
P3	North Full Crossing	26	69.2	LOS F	0.1	0.1	0.96
P3S	North Slip/Bypass Lane Crossing	26	69.2	LOS F	0.1	0.1	0.96
P4	West Full Crossing	26	69.2	LOS F	0.1	0.1	0.96

All Pedestrians	158	69.2 LOS F	0.96	0.96
-----------------	-----	------------	------	------

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

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

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

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ASON GROUP PTY LTD | Processed: Thursday, 23 January 2020 11:03:11 AM

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020
Modelling\Network\AG1223m08_Network 2026 Scenarios.sip8

MOVEMENT SUMMARY

 Site: [2026 AM Existing + Dev - RMS Upgrade - Cowpasture Road x The Horsley Drive]

 Network: N101 [2026 AM Existing + Dev RMS Upgrades]

Horsley Drive x Cowpasture Rd

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV	Total	HV				Vehicles	Distance				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: The Horsley Drive (south)														
2	T1	1320	7.5	1288	7.5	0.471	6.6	LOS A	7.5	56.2	0.36	0.33	0.36	53.6
3	R2	923	7.6	900	7.7	0.769	46.9	LOS D	15.2	113.3	0.99	0.89	1.01	19.6
Approach		2243	7.6	2188 ^{N1}	7.6	0.769	23.2	LOS B	15.2	113.3	0.62	0.56	0.63	38.4
East: Cowpasture Road														
4	L2	221	31.9	221	31.9	0.116	16.1	LOS B	1.7	15.2	0.46	0.64	0.46	25.5
6	R2	361	61.5	361	61.5	0.607	51.1	LOS D	6.0	63.9	0.95	0.82	0.95	29.9
Approach		582	50.3	582	50.3	0.607	37.8	LOS C	6.0	63.9	0.77	0.75	0.77	29.3
North: The Horsley Drive (north)														
7	L2	987	26.5	987	26.5	0.527	21.1	LOS B	10.2	88.0	0.63	0.77	0.63	42.2
8	T1	1248	6.8	1248	6.8	0.783	41.3	LOS C	14.1	104.8	0.96	0.90	1.02	31.6
Approach		2236	15.5	2236	15.5	0.783	32.4	LOS C	14.1	104.8	0.82	0.84	0.85	36.1
All Vehicles		5061	16.0	5006 ^{N1}	16.2	0.783	29.0	LOS C	15.2	113.3	0.72	0.71	0.74	36.1

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

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

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

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

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

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

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

Movement Performance - Pedestrians							
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate
		ped/h	sec		Pedestrian	Distance	
					ped	m	
P1	South Full Crossing	26	54.2	LOS E	0.1	0.1	0.95
P2	East Full Crossing	26	34.5	LOS D	0.1	0.1	0.76
P2S	East Slip/Bypass Lane Crossing	26	30.1	LOS D	0.1	0.1	0.71
P3S	North Slip/Bypass Lane Crossing	26	29.4	LOS C	0.1	0.1	0.70
All Pedestrians		105	37.1	LOS D			0.78

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

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

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

Organisation: ASON GROUP PTY LTD | Processed: Thursday, 23 January 2020 10:11:24 AM
Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020
Modelling\Network\AG1223m08_Network 2026 Scenarios.sip8

MOVEMENT SUMMARY

 Site: [2026 PM Existing + Dev - RMS Upgrade - Cowpasture Road x The Horsley Drive]

 Network: N101 [2026 PM Existing + Dev RMS Upgrades]

Horsley Drive x Cowpasture Rd

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV % veh/h	Total HV	%	v/c	sec		veh	Distance m			km/h
South: The Horsley Drive (south)													
2	T1	1335	5.8	1267	5.9	0.529	17.4	LOS B	15.2	111.5	0.57	0.52	45.7
3	R2	157	18.1	149	18.5	0.658	83.9	LOS F	3.4	27.9	1.00	0.80	12.8
Approach		1492	7.1	1416 ^{N1}	7.2	0.658	24.5	LOS B	15.2	111.5	0.62	0.55	40.7
East: Cowpasture Road													
4	L2	621	5.6	621	5.6	0.522	38.2	LOS C	13.2	97.0	0.79	0.79	15.1
6	R2	1246	10.1	1246	10.1	1.054	143.4	LOS F	44.8	341.0	1.00	1.25	16.7
Approach		1867	8.6	1867	8.6	1.054	108.4	LOS F	44.8	341.0	0.93	1.10	16.5
North: The Horsley Drive (north)													
7	L2	273	52.9	273	52.9	0.115	8.0	LOS A	0.8	8.1	0.14	0.58	48.4
8	T1	1660	3.8	1660	3.8	1.053	139.4	LOS F	58.7	424.2	1.00	1.45	14.7
Approach		1933	10.7	1933	10.7	1.053	120.9	LOS F	58.7	424.2	0.88	1.32	16.7
All Vehicles		5292	8.9	5216 ^{N1}	9.1	1.054	90.2	LOS F	58.7	424.2	0.83	1.03	20.2

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

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

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

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.

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate
		ped/h	sec		Pedestrian ped	Distance m	
P1	South Full Crossing	26	48.9	LOS E	0.1	0.1	0.81
P2	East Full Crossing	26	23.5	LOS C	0.1	0.1	0.56
P2S	East Slip/Bypass Lane Crossing	26	20.3	LOS C	0.1	0.1	0.52
P3S	North Slip/Bypass Lane Crossing	26	69.2	LOS F	0.1	0.1	0.96
All Pedestrians		105	40.5	LOS E			0.71

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.

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020
Modelling\Network\AG1223m08_Network 2026 Scenarios.sip8

MOVEMENT SUMMARY



Site: 101 [2026 AM Base + Dev - RMS Upgrade - Ferrers Road x The Horsley Drive]

The Horsley Drive x Ferrers Road

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: The Horsley Drive												
5	T1	1068	25.7	0.438	5.7	LOS A	10.2	87.1	0.43	0.39	0.43	54.9
6	R2	599	9.8	0.719	45.3	LOS D	14.0	106.5	0.98	0.87	1.03	34.1
Approach		1667	20.0	0.719	19.9	LOS B	14.0	106.5	0.63	0.56	0.64	45.0
North: Ferrers Road												
7	L2	562	9.6	0.399	25.1	LOS B	10.2	77.1	0.70	0.77	0.70	42.0
9	R2	39	29.7	0.169	47.1	LOS D	1.7	15.0	0.91	0.73	0.91	33.2
Approach		601	10.9	0.399	26.5	LOS B	10.2	77.1	0.71	0.76	0.71	41.3
West: The Horsley Drive												
10	L2	113	11.2	0.152	24.3	LOS B	3.3	25.5	0.64	0.72	0.64	42.4
11	T1	1551	17.9	0.743	25.2	LOS B	23.0	185.5	0.88	0.78	0.88	42.5
Approach		1663	17.4	0.743	25.2	LOS B	23.0	185.5	0.86	0.78	0.86	42.5
All Vehicles		3932	17.5	0.743	23.1	LOS B	23.0	185.5	0.74	0.68	0.75	43.3

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

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

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

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

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

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

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P21	East Stage 1	11	44.2	LOS E	0.0	0.0	0.94	0.94
P22	East Stage 2	11	44.2	LOS E	0.0	0.0	0.94	0.94
P3	North Full Crossing	11	20.5	LOS C	0.0	0.0	0.64	0.64
P3S	North Slip/Bypass Lane Crossing	11	18.6	LOS B	0.0	0.0	0.61	0.61
P41	West Stage 1	11	42.3	LOS E	0.0	0.0	0.92	0.92
P42	West Stage 2	11	39.6	LOS D	0.0	0.0	0.89	0.89
All Pedestrians		63	34.9	LOS D			0.82	0.82

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.

Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020
Modelling\Network\AG1223m08_Network 2026 Scenarios.sip8

MOVEMENT SUMMARY



Site: 101 [2026 PM Base + Dev - RMS Upgrade - Ferrers Road x The Horsley Drive]

The Horsley Drive x Ferrers Road

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: The Horsley Drive												
5	T1	1938	8.0	0.840	16.1	LOS B	40.0	299.0	0.78	0.76	0.82	47.5
6	R2	661	8.8	0.610	37.6	LOS C	13.9	104.3	0.91	0.83	0.91	36.8
Approach		2599	8.2	0.840	21.5	LOS B	40.0	299.0	0.81	0.77	0.84	44.2
North: Ferrers Road												
7	L2	951	4.2	0.497	17.9	LOS B	14.8	107.3	0.60	0.75	0.60	45.9
9	R2	319	8.6	0.828	52.5	LOS D	16.6	125.0	1.00	0.94	1.20	31.9
Approach		1269	5.3	0.828	26.6	LOS B	16.6	125.0	0.70	0.80	0.75	41.3
West: The Horsley Drive												
10	L2	53	32.0	0.120	34.2	LOS C	1.9	16.9	0.77	0.72	0.77	37.7
11	T1	875	17.9	0.622	33.1	LOS C	13.5	108.8	0.91	0.78	0.91	39.0
Approach		927	18.7	0.622	33.1	LOS C	13.5	108.8	0.90	0.77	0.90	38.9
All Vehicles		4796	9.5	0.840	25.1	LOS B	40.0	299.0	0.80	0.78	0.83	42.3

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 Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P21	East Stage 1	11	37.9	LOS D	0.0	0.0	0.87	0.87
P22	East Stage 2	11	37.9	LOS D	0.0	0.0	0.87	0.87
P3	North Full Crossing	11	30.4	LOS D	0.0	0.0	0.78	0.78
P3S	North Slip/Bypass Lane Crossing	11	28.1	LOS C	0.0	0.0	0.75	0.75
P41	West Stage 1	11	36.1	LOS D	0.0	0.0	0.85	0.85
P42	West Stage 2	11	33.6	LOS D	0.0	0.0	0.82	0.82
All Pedestrians		63	34.0	LOS D			0.82	0.82

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

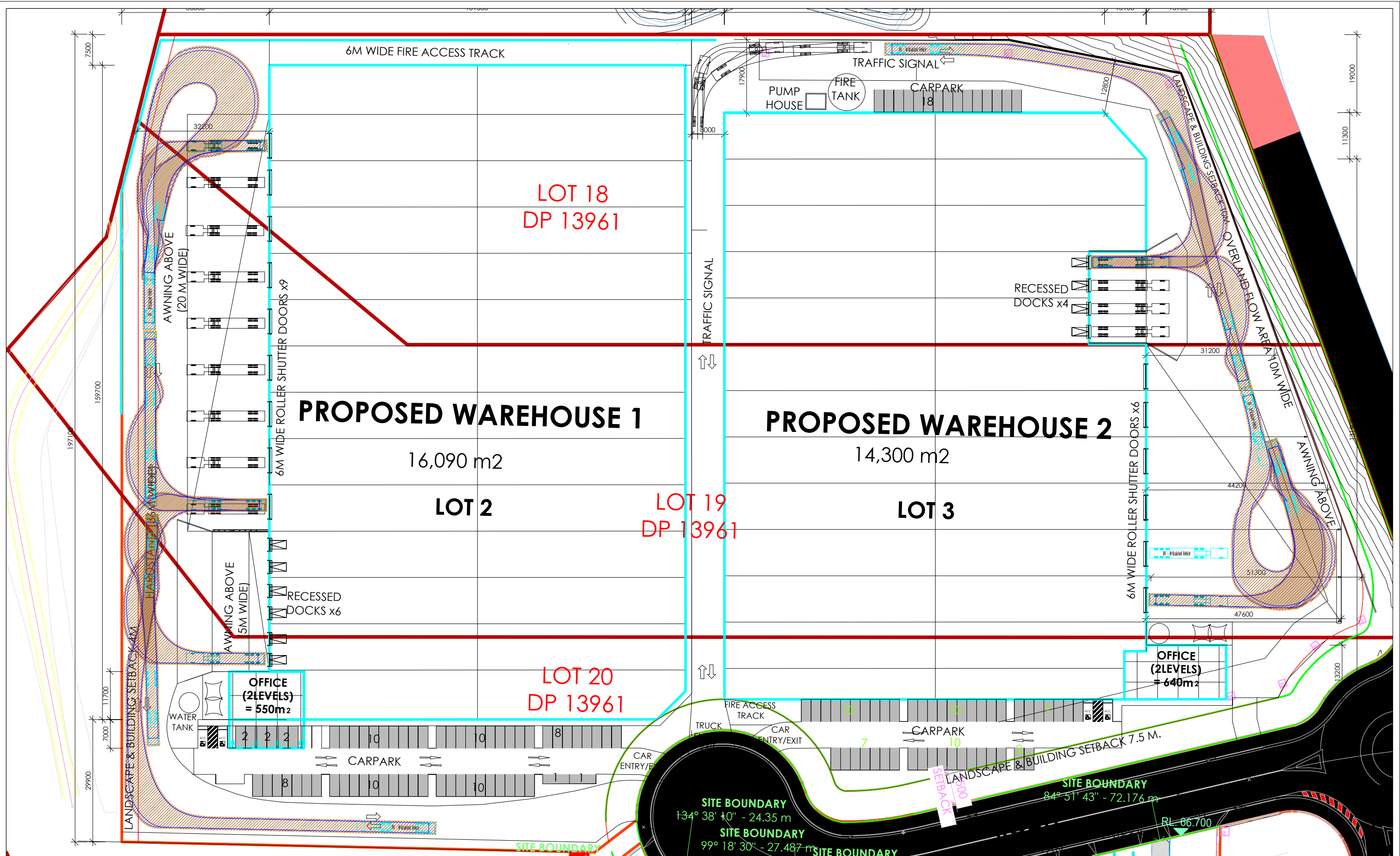
Pedestrian movement LOS values are based on average delay per pedestrian movement.

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

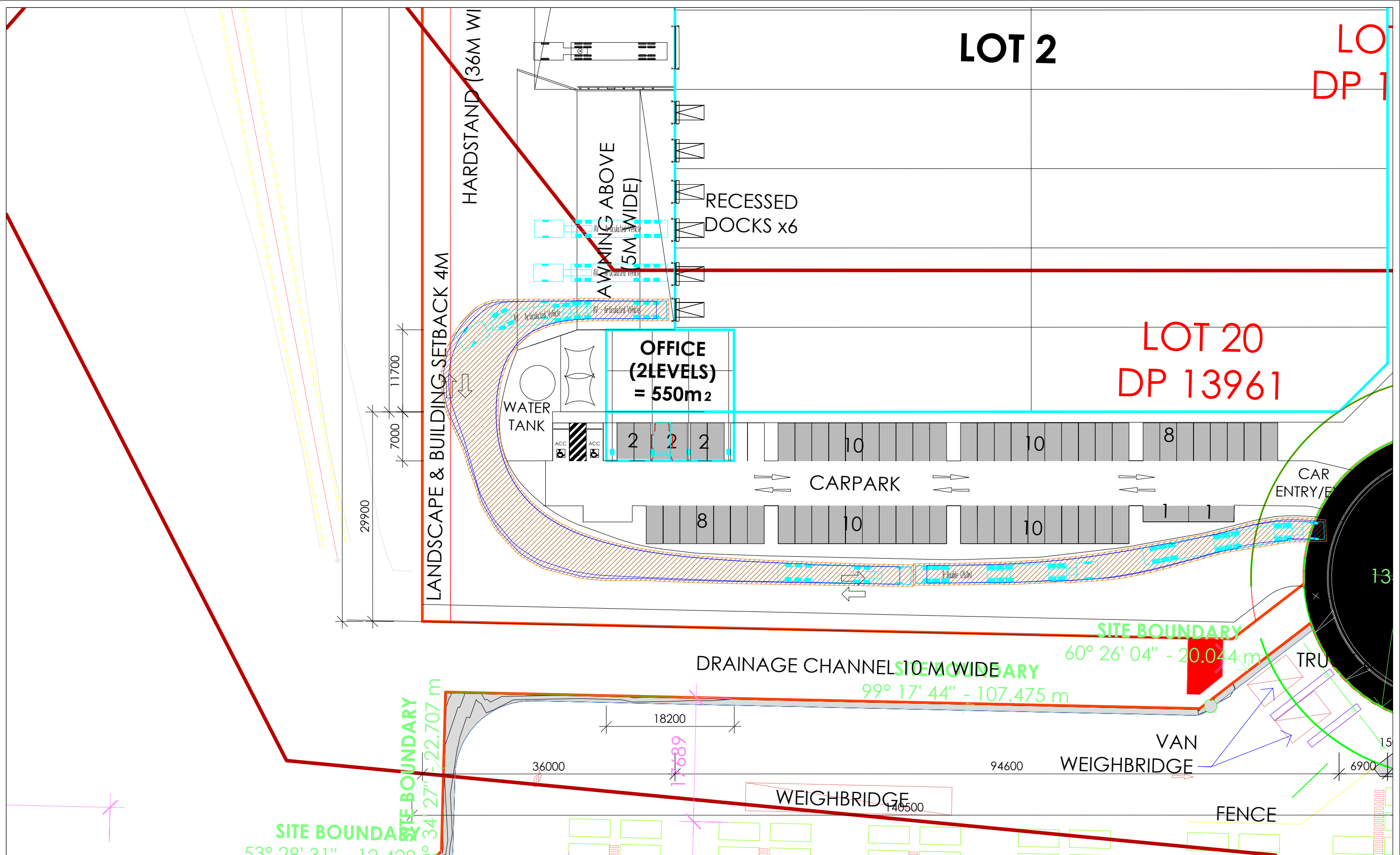
Project: C:\Users\RebeccaBMadden\AG\Ason Group\Ason Group Team Site - 1223\Projects\Modelling\2020
Modelling\Network\AG1223m08_Network 2026 Scenarios.sip8

Appendix B

Swept Path Analysis



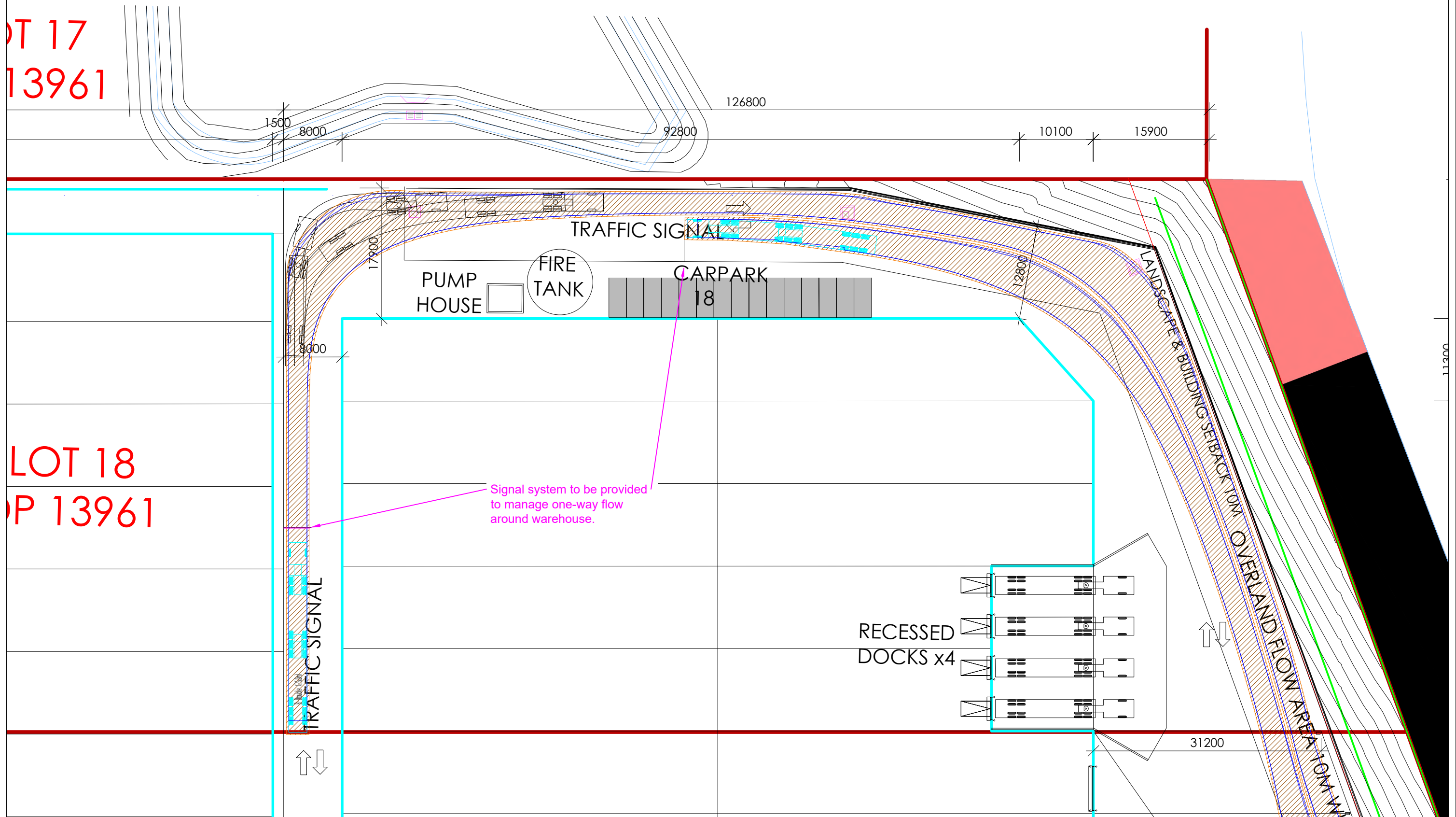
Revision notes:			Drawn By:		Project:		Date:		asongroup Suite 5.02, Level 5, 1 Castlereagh Street Sydney NSW 2000 info@asongroup.com.au	
Rev:	Date:	Notes:	VC		1223d07 Horsley Drive Business Park Stage 2		15/06/2020			
			Client:		Drawing Title:		Scale @ A3:			
			Charter Hall		Warehouse Site		n/a			
For information purposes only - not for construction							Drawing Number:			
							00			



Revision notes:			Drawn By: VC	Project: 1223d07 Horsley Drive Business Park Stage 2	Date: 15/06/2020	Scale @ A3: 1:500	Drawing Number: 02
Rev:	Date:	Notes:					
			Client: Charter Hall	Drawing Title: Warehouse 1: Two Way Flow			
For information purposes only - not for construction			asongroup Suite 5.02, Level 5, 1 Castlereagh Street Sydney NSW 2000 info@asongroup.com.au				

LOT 17
P 13961

LOT 18
P 13961



Revision notes:

Rev:	Date:	Notes:

For information purposes only - not for construction

Drawn By:

VC

Client:

Charter Hall

Project:

1223d07
Horsley Drive Business Park Stage 2

Drawing Title:

Warehouse 2

Date:

15/06/2020

Scale @ A3:

1:500

Drawing Number:

03

asongroup

Suite 5.02, Level 5, 1 Castlereagh Street
Sydney NSW 2000

info@asongroup.com.au

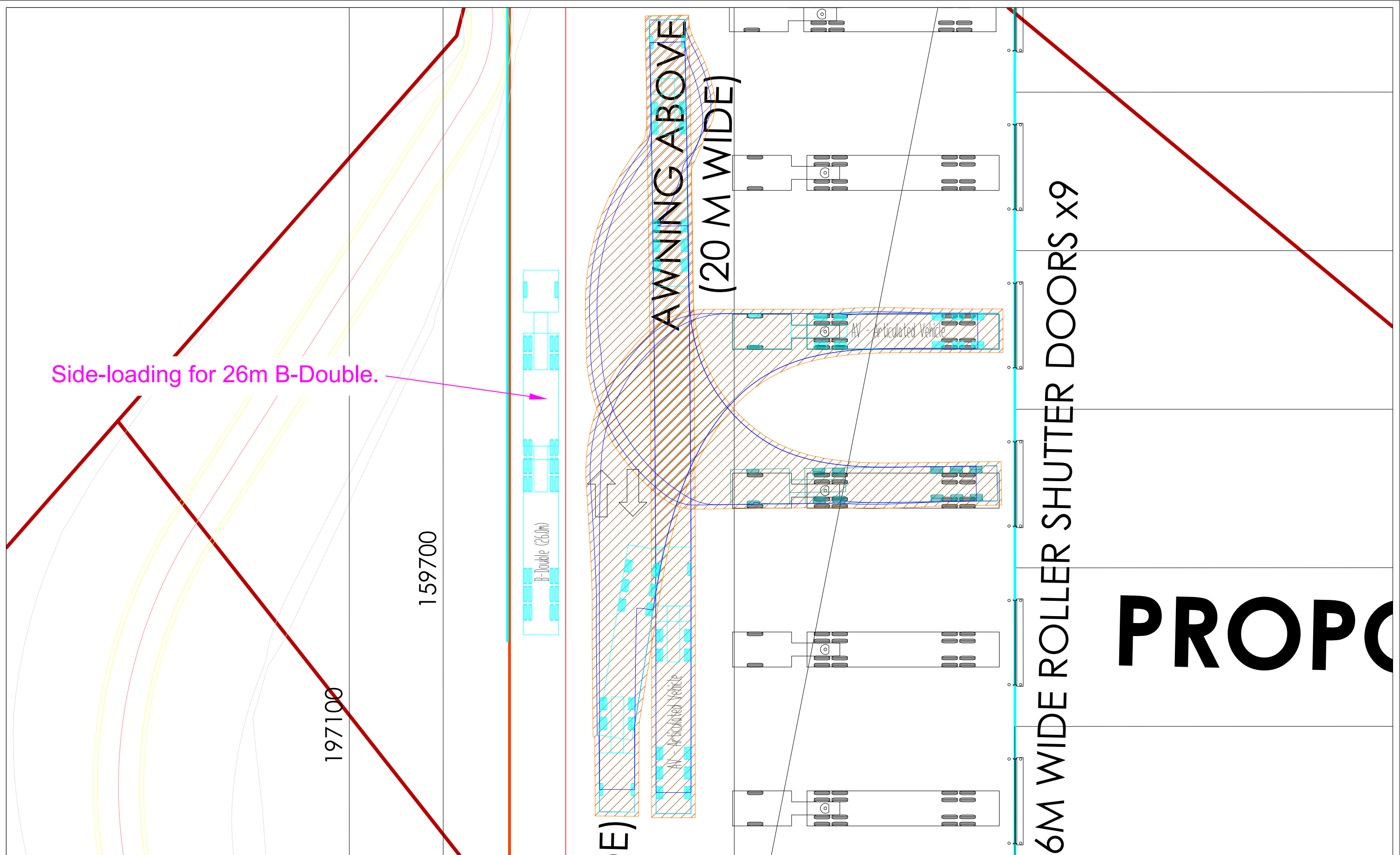
LOT 18
DP 13961

REHOUSE 1

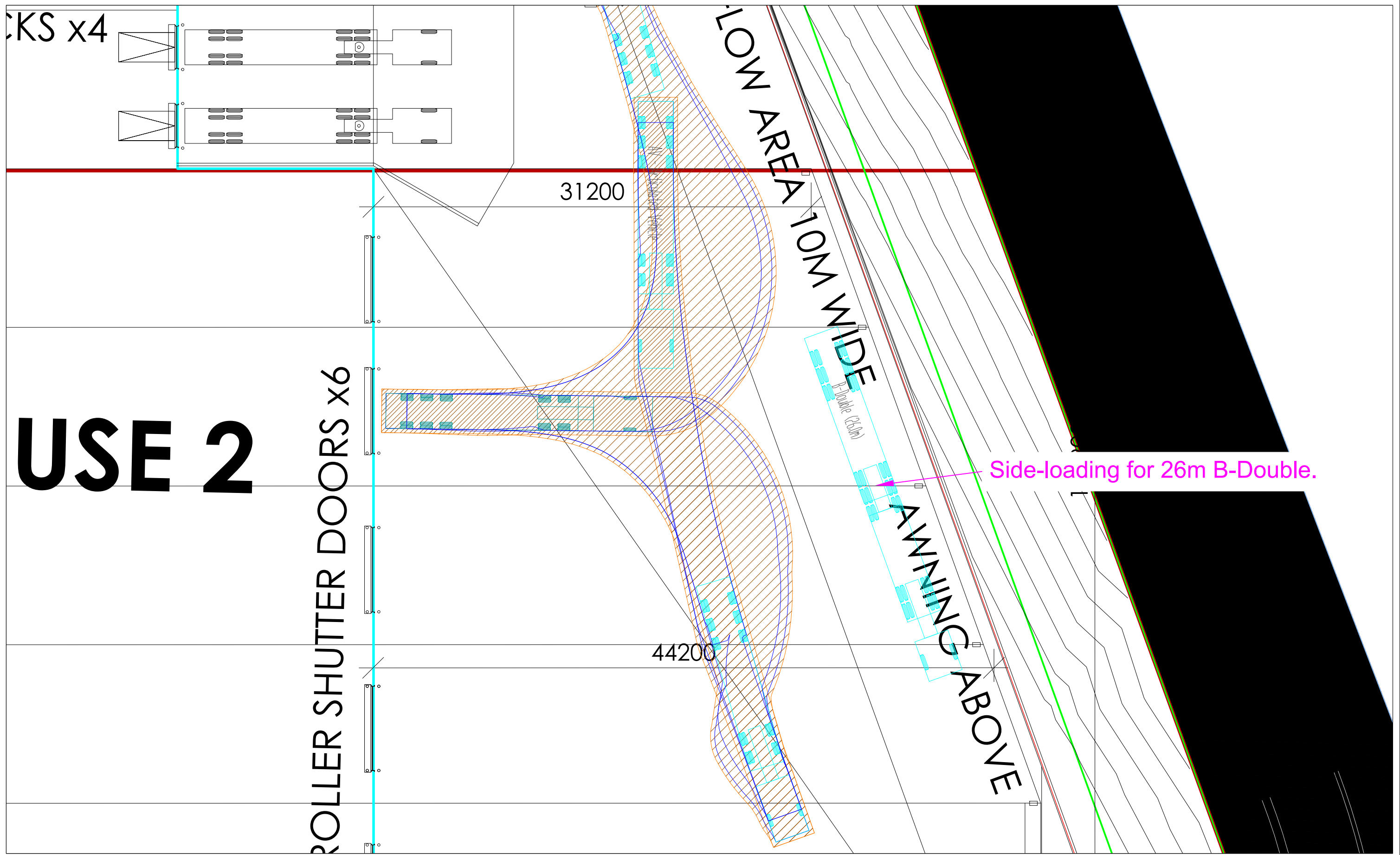
PROPOSED WAREHOUSE 2

Rev:	Date:	Notes:
------	-------	--------

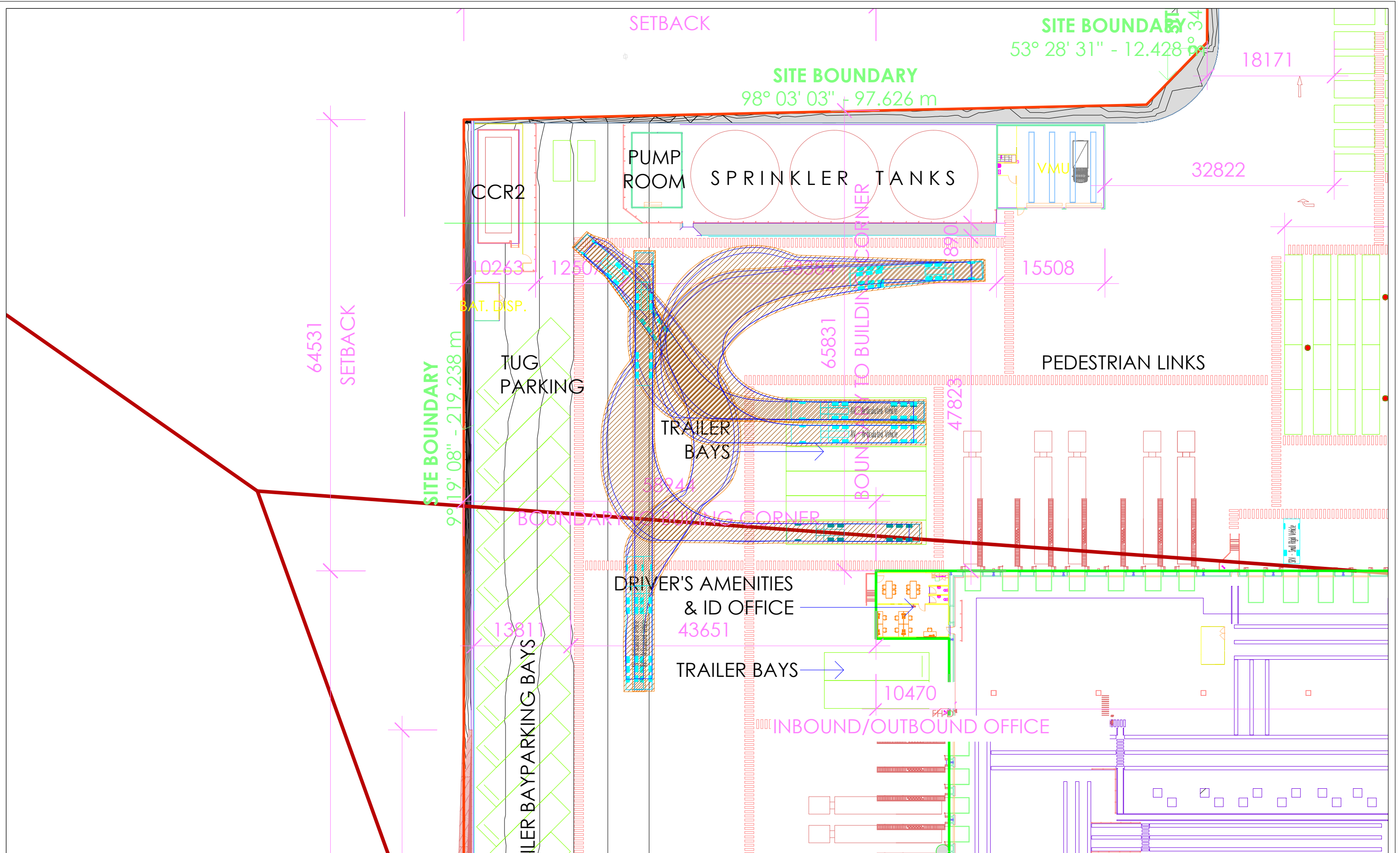
info@asongroup.com.au



Revision notes:			Drawn By:		Project:		Date:		 Suite 5.02, Level 5, 1 Castlereagh Street Sydney NSW 2000 info@asongroup.com.au	
Rev:	Date:	Notes:	VC		1223d07 Horsley Drive Business Park Stage 2		15/06/2020			
			Client:		Drawing Title:		Scale @ A3:			
			Charter Hall		Warehouse 1: 26m B-double Side Loading		1:200			
For information purposes only - not for construction							Drawing Number:			
							05			

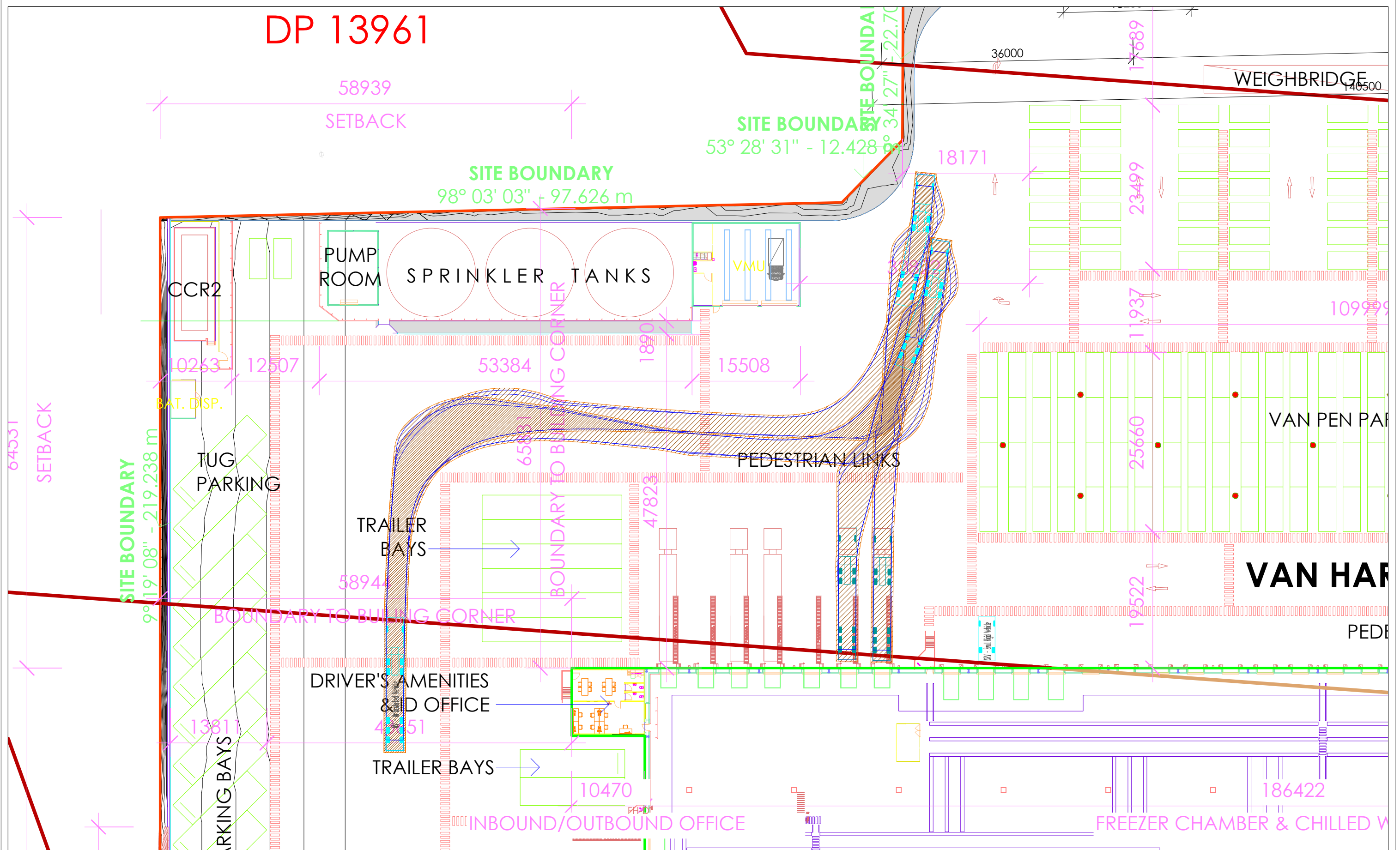


Revision notes:			Drawn By:		Project:		Date:		asongroup Suite 5.02, Level 5, 1 Castlereagh Street Sydney NSW 2000 info@asongroup.com.au	
Rev:	Date:	Notes:	VC		1223d07 Horsley Drive Business Park Stage 2		15/06/2020			
			Client:		Drawing Title:		Scale @ A3:			
			Charter Hall		Warehouse 2: 26m B-double Side Loading		1:200			
							Drawing Number:			
For information purposes only - not for construction							06			

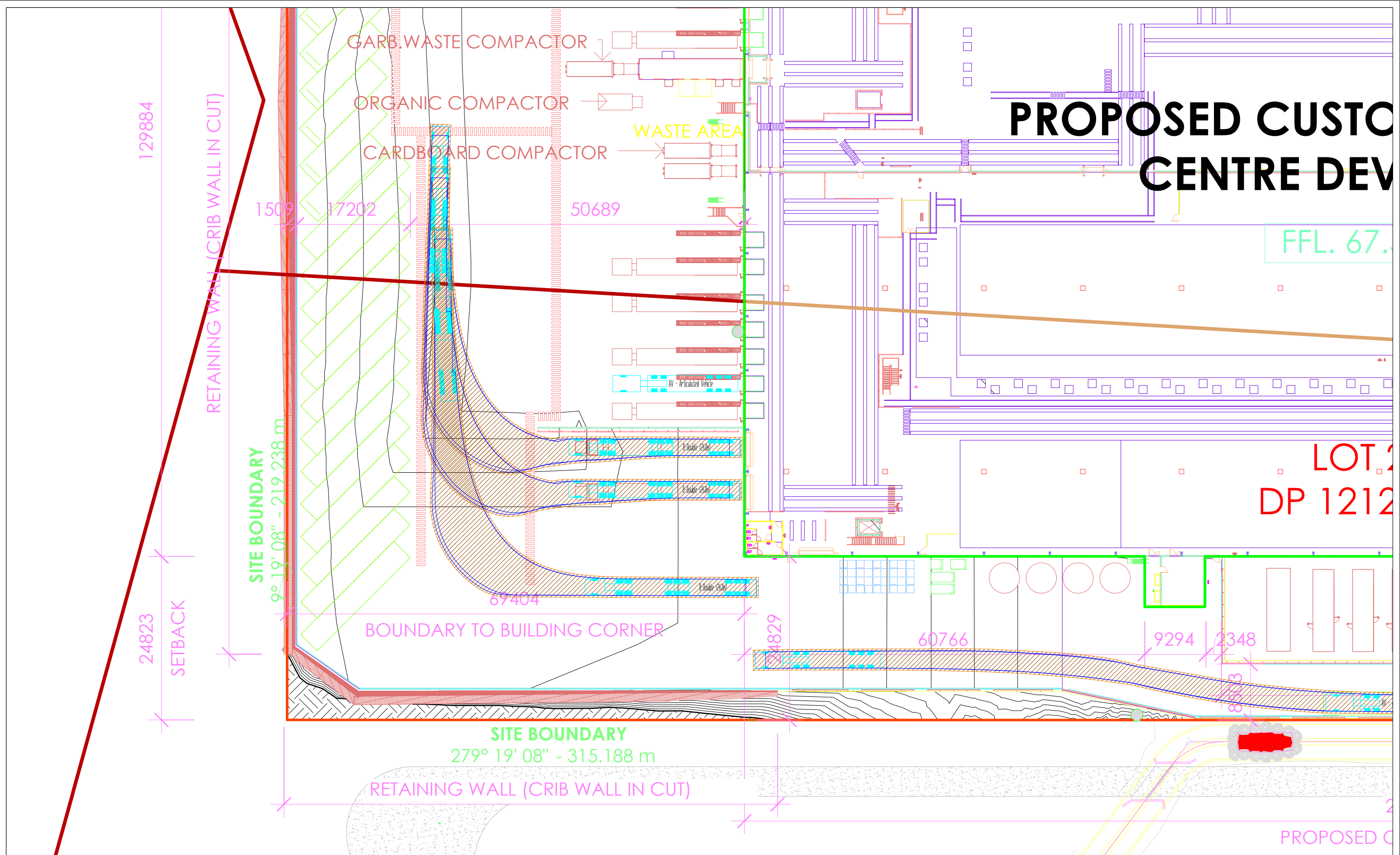


Revision notes:			Drawn By:		Project:		Date:		 Suite 5.02, Level 5, 1 Castlereagh Street Sydney NSW 2000 info@asongroup.com.au	
Rev:	Date:	Notes:	VC		1223d07 Horsley Drive Business Park Stage 2		15/06/2020			
			Client:		Drawing Title:		Scale @ A3:			
For information purposes only - not for construction			Charter Hall		Customer Fulfilment Centre 19m AV Loading Movements		1:500			
							Drawing Number:			
							AG.05			

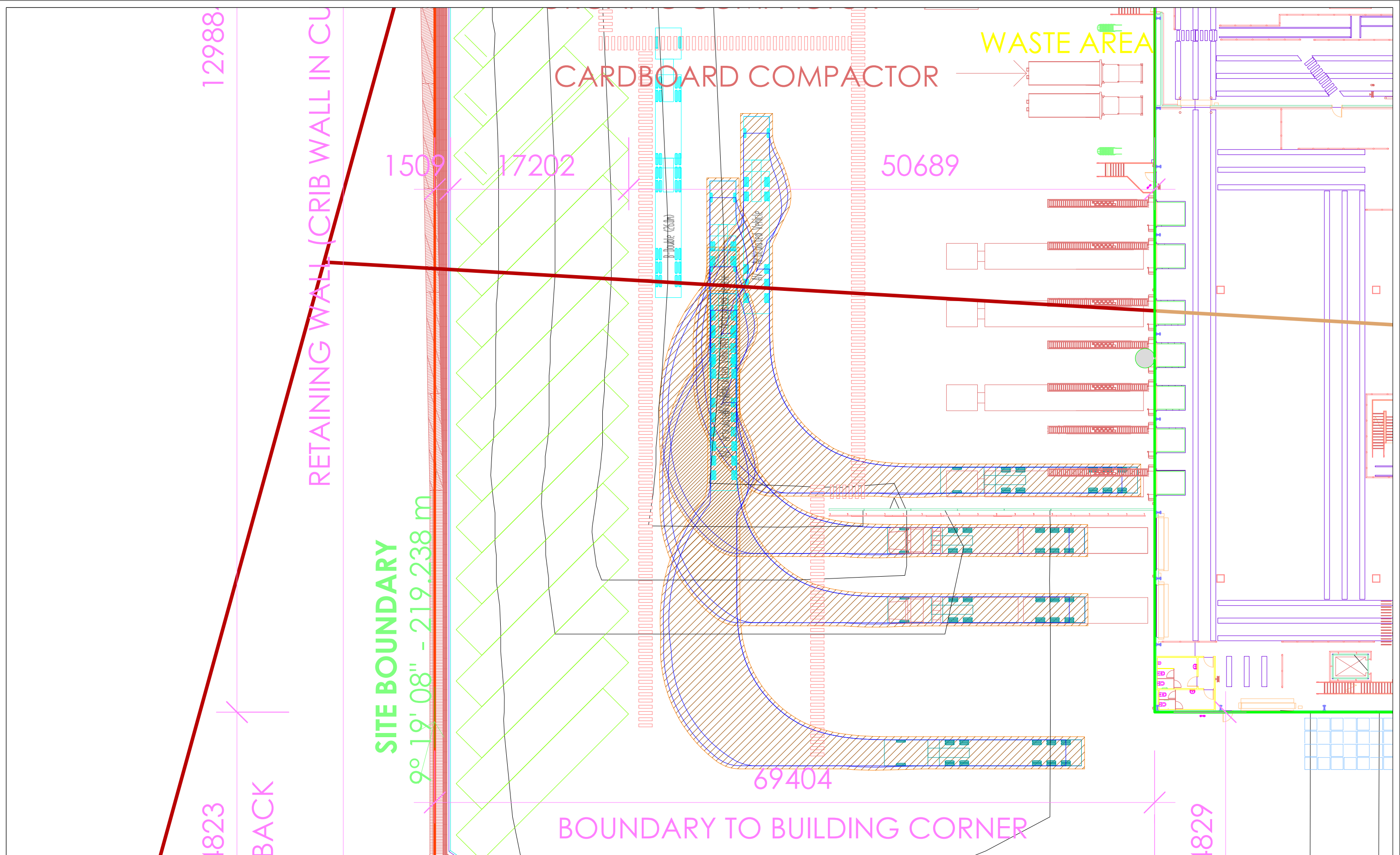
DP 13961



Revision notes:			Drawn By:		Project:		Date:		 Suite 5.02, Level 5, 1 Castlereagh Street Sydney NSW 2000 info@asongroup.com.au
Rev:	Date:	Notes:	VC		1223d07 Horsley Drive Business Park Stage 2		15/06/2020		
			Client:		Drawing Title:		Scale @ A3:		
For information purposes only - not for construction			Charter Hall		Customer Fulfilment Centre 19m AV Loading Movements		1:500		
							Drawing Number:		
							AG.06		

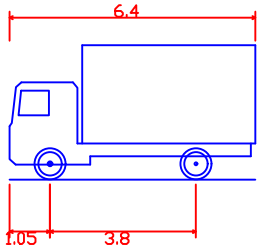


Revision notes:			Drawn By:		Project:		Date:		 Suite 5.02, Level 5, 1 Castlereagh Street Sydney NSW 2000 info@asongroup.com.au	
Rev:	Date:	Notes:	VC		1223d07 Horsley Drive Business Park Stage 2		15/06/2020			
			Client:		Drawing Title:		Scale @ A3:			
For information purposes only - not for construction			Charter Hall		Customer Fulfilment Centre Ambient Docks - 26m B-Double Exit Movements		n/a			
							Drawing Number:			
							AG.07			



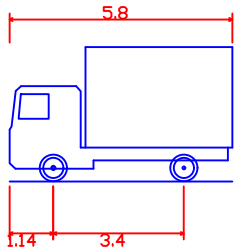
Revision notes:			Drawn By:		Project:		Date:		 Suite 5.02, Level 5, 1 Castlereagh Street Sydney NSW 2000 info@asongroup.com.au	
Rev:	Date:	Notes:	VC		1223d07 Horsley Drive Business Park Stage 2		15/06/2020			
			Client:		Drawing Title:		Scale @ A3:			
For information purposes only - not for construction			Charter Hall		Customer Fulfilment Centre Ambient Docks - 19m AV Reverse Movements		n/a			
							Drawing Number:			
							AG.08			

SRV - Small Rigid Vehicle



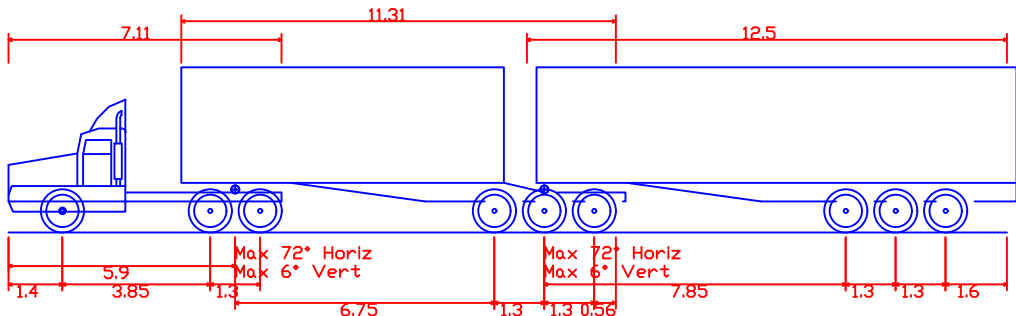
SRV - Small Rigid Vehicle
Overall Length 6.400m
Overall Width 2.330m
Overall Body Height 3.500m
Min Body Ground Clearance 0.398m
Track Width 2.330m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 7.100m

Delivery Van



Delivery Van
Overall Length 5.800m
Overall Width 2.000m
Overall Body Height 3.500m
Min Body Ground Clearance 0.340m
Track Width 2.000m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 6.250m

B-Double (26.0m)



B-Double (26.0m)
Overall Length 26.000m
Overall Width 2.500m
Overall Body Height 4.300m
Min Body Ground Clearance 0.540m
Track Width 2.500m
Lock-to-lock time 6.00s
Curb to Curb Turning Radius 15.000m

Revision notes:

Rev:	Date:	Notes:

For information purposes only - not for construction

Drawn By:

VC

Client:

Charter Hall

Project:

1223d07
Horsley Drive Business Park Stage 2

Drawing Title:

Customer Fulfilment Centre
Design Vehicles

Date:

15/06/2020

Scale @ A3:

n/a

Drawing Number:

AG.10

asongroup

Suite 5.02, Level 5, 1 Castlereagh Street
Sydney NSW 2000

info@asongroup.com.au