

Traffic Impact Assessment

Oakdale West Industrial Estate –SSD 7348 Modification 3 &
SSD 10397 Stage 2 Development Application

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Executive Summary

Ason Group has been engaged by Goodman Property Services (Aust) Pty Ltd (Goodman) to prepare a Traffic Impact Assessment (TIA) to assess the traffic and parking implications of:

- proposed Modification (MOD 3) to the recently approved (13 September 2019) SSD 7348 at Oakdale West Industrial Estate (OWE), and
- a Stage 2 Development Application (DA)— SSD 10397— in relation to Building 2B.

A brief summary of both assessments is outlined below, noting that this report focuses on MOD 3, whilst the TIA for the Stage 2 DA is included in **Appendix A**.

1.1.1 Modification 3

Modification 3 to the SSD7348 essentially involves changes to the built form of Precincts numbers 2 to 5 within the approved OWE. However, the Modification 3 mainly affects Precincts numbers 2 and 3, with some moderate changes to the Gross Floor Areas (GFAs) to Precinct numbers 4 and 5.

Details of the key changes resulted from MOD 3 compared to the 2019 approved masterplan can be summarised as follows:

- Estate road network re-configuration, including:
 - Construction and delivery of a proposed roundabout at Estate Road 01 and 03 intersection as well as construction and delivery of the revised Estate Road 03, and
 - Removal of Estate Road 04 and Estate Road 05.
- Rationalisation and re-sizing of warehouse buildings included in Precincts number 2 and 3,
- Minor changes to the GFAs related to Precincts number 4 and 5, and
- Changes to the overall Estate-wide levels for cut and fill process related to the additional road network changes.

This TIA has been prepared to primarily review and assess any relevant changes resulted from MOD 3 when compared to the 2019 approved masterplan.

Furthermore, MOD 3 is expected to follow the MOD 2 application which is currently under review by the Department of Planning Industrial and Environment (DPIE). It is noted that MOD 2 has been related to the changes primarily involving Precinct number 1 of the OWE.

Accordingly, a brief summary of the key findings of this TIA are as follows:

- Estate wide vehicular traffic generation post completion of MOD 3 has been compared with the traffic generation post completion of MOD 2 and the original 2019 approval and it is outlined in the following Table for context:

Time Period	Original Approval	MOD 2	MOD 3	Difference
AM Peak	775	679 (688)	1,108 (1,360)	333 (585)
PM Peak	775	679 (688)	879 (1,044)	104 (269)
Daily	8,992	8,850 (9,294)	9,776 (11,324)	784 (2,332)

Note: 1) Figures in brackets () relates to 'peak seasonal' changes.

- According to the SIDRA analysis undertaken for the MOD 3 the traffic impact of the Estate post completion of MOD 3 will not result in any additional infrastructure upgrade requirements and the approved intersection layouts can accommodate the proposed MOD 3 related traffic.
- Individual buildings will be designed to meet the approved parking requirements, as outlined Condition B13 of the approval.
- Internal Estate-road reconfiguration, access crossovers and service vehicle access for buildings impacted with the MOD 3 have been designed to cater for 26.0 m B-Double trucks, and
- MOD 3 will not result in any material implications on the construction process when compared to the Construction Environmental Management Plan – and supporting studies, including Construction Traffic Management Plan(s) — prepared in support of the development.

Furthermore, attached to this TIA is a traffic report which is intended to accompany the MOD 3 submission related to a separate Development Application for the proposed Building 2B within the revised Master Plan.

1.1.2 Stage 2 DA

Stage 2 DA only applies to Building 2B of the modification plan. Proposal for Building 2B provides for the following key characteristics:

- 206,968 m² GFA (200,668 m² GLA) of warehouse and office floorspace,
- Sum of 4 car parking access crossovers on Estate Road 03,
- A primary entry and exit access crossover to hardstand area at the northern end of the site,
- A secondary exit only crossover at the southern end of the site, and

- Total of 1,127 car parking bays and 128 bicycle parking spaces plus 54 motorcycle bays.

A separate annexure has been prepared and attached in Appendix A of this report which deals with the Stage 2 DA.

In summary, the following key findings are noteworthy:

- Traffic impact of the Stage 2 DA (Building 2B) have been assessed as part of the MOD 3 and will not have any additional impacts from MOD assessment. In this regard, it is noted that development of Building 2B will not result in requirements for any additional road upgrades beyond that already identified and approved,
- Stage 2 DA will provide ample car parking bays as required by Condition B13 of the approval,
- A preliminary Sustainable Travel Plan has been prepared to promote non-car travel modes, including identifying pedestrian and cyclist facilities to service the relevant Stage of the Development.

1 Introduction

Ason Group has been engaged by Goodman Property Services (Aust) Pty Ltd (Goodman) to prepare a Traffic Impact Assessment (TIA) to assess the traffic and parking implications of:

- proposed modifications (MOD 3) to the recently approved (13 September 2019) SSD 7348 at Oakdale West Industrial Estate (OWE), and
- a stage 2 Development Application (DA SSD 10397) in relation Building 2B.

1.1 Study Purpose

From the outset, it is critical to state that – given the recent DPIE approval of SSD 7348 – MOD 3 has been assessed in this TIA against the ‘benchmark’ conditions as detailed in the SSD application, given that these conditions have inherently been considered and validated by the key consent authorities, including the DPIE and Roads and Maritime Services (RMS).

This TIA therefore provides an assessment of the traffic characteristics of the Estate further to MOD 3, which have then been compared to the approved characteristics of the OWE to determine any significant departures from the current approval.

1.2 Reference Documents

In the preparation of this TIA, reference has been made to the following key transport standards and guidelines:

- RMS Guide to Traffic Generating Developments (RMS Guide).
- Austroads Guide to Road Design Part 3: Road Geometry (Austroads GRD3).
- Austroads Guide to Road Design Part: 4A Unsignalised and Signalised Intersections (Austroads GRD4A).
- Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis (Austroads GTM3).
- 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 2890.3: Parking Facilities – Bicycle Parking (AS 2890.3).
- Australian Standard 2890.6: Parking Facilities – Off Street Parking for People with Disabilities (AS 2890.6).

This TIA also references assessments relating to development within the OWE; the broader Oakdale Industrial Estate in which the OWE lies; and the Broader Western Sydney Employment Area, including:

- Ason Group, Traffic Impact Assessment Oakdale West Estate State Significant Development Application – Response to Submissions, 27 November 2018 (OWE TIA RTS)
- Ason Group, Traffic Impact Assessment Oakdale West Industrial Precinct State Significant Development Application prepared by Ason Group, 24 March 2017 (OWE TIA 2017).
- Ason Group, Traffic Impact Assessment Oakdale West Industrial Estate SSD MOD 2 prepared by Ason Group, 11 Oct 2019 (0950r01v10 SSD MOD 2 TIA).
- GHD, Erskine Park Traffic Modelling – Proposed Western North South Link Road, May 2016 (WNSLR Report).
- AECOM, Broader WSEA SLRN – Options Refinement (2014), 6 May 2014 (SLRN Options Report).
- GHD, Old Wallgrove Road Extension Interim Network Testing, 28 March 2014 (OWR Extension Report).
- GHD, Broader Western Sydney Employment Area – Transport Planning Preliminary Analysis, Exhibition Draft, June 2013 (BWSEA Transport Report).
- GHD, Old Wallgrove Road Upgrade (Roberts Road - M7 Motorway) Traffic and Transport Report, 30 April 2012 (OWR Upgrade Report).
- AECOM, Western Sydney Employment Area – Southern Link Road Network Strategic Transport Assessment, 18 April 2011 (SLRN Report).
- RMS, Southern Link Road / WSEA RNS Key Stakeholder Briefing, July 2019
- RMS, Trip Generation Surveys - Business Parks and Industrial Estate Data Report, August 2012

2 Oakdale West Estate Approval

OWE, as approved, is shown in its local context in **Figure 1**.

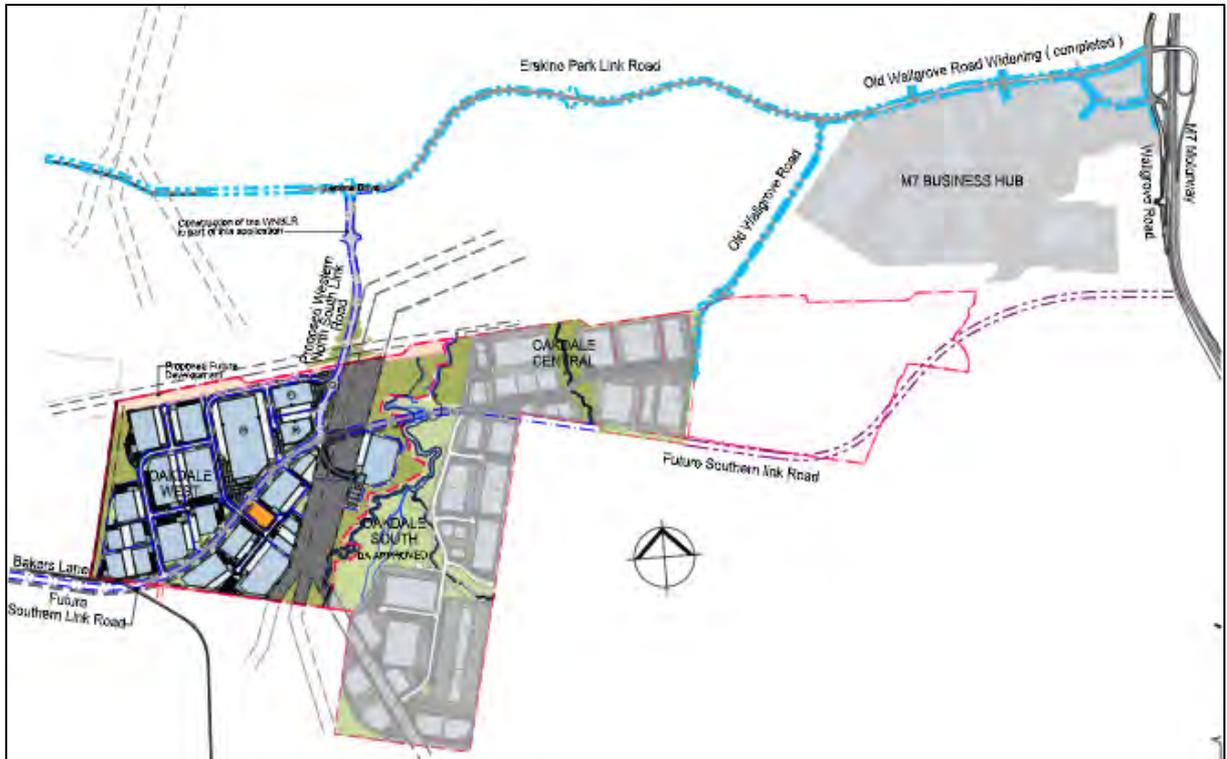


Figure 1: Oakdale West Estate Local Context

2.1 SSD 7348 Approval

The development (SSD 7348) was determined on 13 September 2019 and approved with Conditions of Consent. A copy of the approved and stamped Master Plan is provided in **Figure 2**. A summary of the SSD key characteristics – with specific considerations for Precincts 2 and 3 – is provided in the below table. It is again noteworthy that MOD 3 will have some minor impacts on all other precincts; however, the majority of changes will be at Precincts 2 and 3.

Table 1: SSDA 7348 Approval

SSD 7348 Approval	Oakdale West Estate	Precinct 2	Precinct 3	Precincts 2 & 3 Total
Warehouse GFA (m ²)	452,493	102,010	97,587	199,597
Office GFA (m ²)	22,776	5,101	4,879	9,980
Total GFA (m²)	475,269	107,111	102,466	209,577
Number of Parking Spaces	2,542	570	604	1,174

Note: Condition B9(c) of the approval excludes the footprints for Lots 2E, 2F, 2G, 2H, 2J and 4A from the approval and postpone further assessment to relevant DAs, however, their traffic impacts have inherently been reviewed, assessed and signed off as part of the approval. Hence this TIA refers to the approved traffic generation for these Lots.

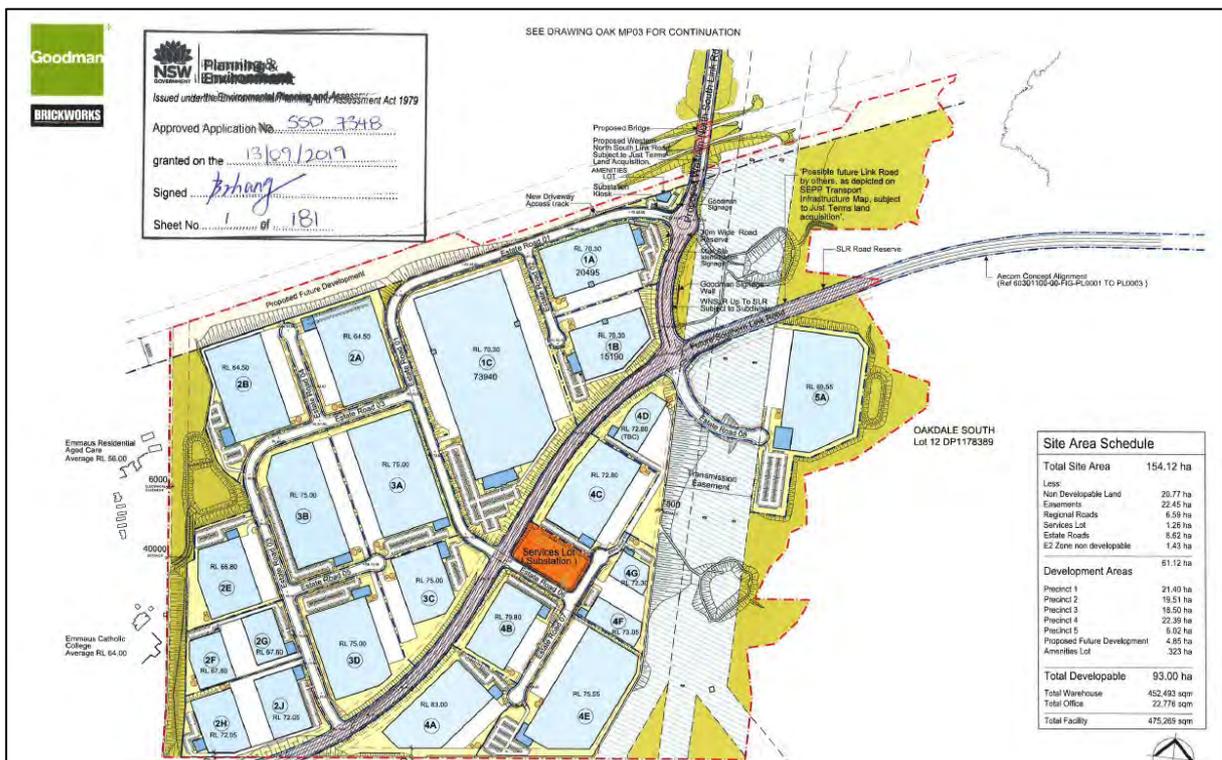


Figure 2: Approved Master Plan

A copy of the approved Precinct Plan is also shown in Figure 3.

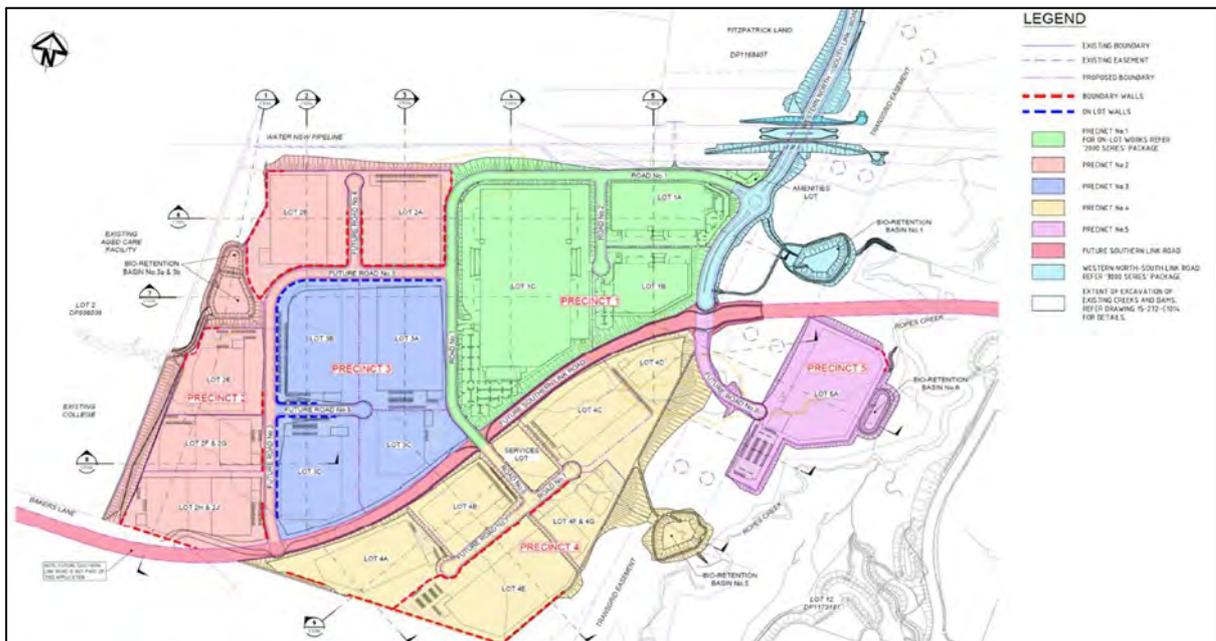


Figure 3: Approved Precinct Plan

2.2 Response to Secretary’s Environmental Assessment Report

Relevant responses to the Secretary’s Environmental Assessment Report (SEAR) SSD 10397 and SSD 7348 MOD 3 – dated 15 November 2019 – has been provided in the following table.

Table 2: Response to SEAR

No.	Comment	Ason Response
Traffic and Transport – including		
1	a Traffic Impact Assessment detailing all daily and peak traffic and transport movements likely to be generated (vehicle, public transport, pedestrian and cycle trips) during construction and operation of the development, including a description of vehicle access routes (construction and operation) and the impact on nearby intersections;	<p>This TIA has been prepared as a response to this comment. The Proposal is not anticipated to generate significant pedestrian and/or public transport trip during the construction or operation of MOD 3. However, details of daily and peak hour traffic generation of the MOD 3 has been reviewed (at operational phase) and outlined in section 5. Impact of the MOD 3 on the surrounding road network during the non-peak seasonal and peak seasonal periods have also been assessed and discussed in this section.</p> <p>Section 6 of this TIA provides an assessment of construction impacts associated with MOD 3. In summary, the quantum of cut to fill anticipated to deliver the site plan is less than that anticipated and approved in the original Concept and Stage 1 consent. Accordingly, the this is anticipated to result in reduction in traffic impacts on the wider network as a result of the revised earthworks plan.</p>
2	details of access to the site from the road network including intersection location, design and sight distance;	<p>Access to the revised precincts proposed by MOD 3 will be similar to the approved 2019 Master Plan.. Localised changes to the internal Estate Roads are detailed in section 3.3. Details regarding on-site design for the relevant DA for each building. In this regard, further discussion regarding access arrangements for Building 2B are provided in Appendix A.</p>

No.	Comment	Ason Response
Traffic and Transport – including		
3	an assessment of the predicted impacts on road safety and capacity of the road network to accommodate the development;	Section 5 of this TIA outlines the modelling results and reviews the traffic impact of the proposed MOD 3 on critical intersections. In accordance with the SIDRA results, no additional upgrades are required over the 2019 approval
4	detailed plans of the proposed site access and parking provision on site in accordance with the relevant Australian Standards and with reference to the approved concept plan (SSD 7348).;	MOD 3 parking provision in accordance with the approved SSD 7348 has been discussed in section 4. Access to the revised precincts proposed by MOD 3 will be similar to the approved concept plan with no changes. However, this comment does not seem to be directly relevant to the MOD 3 and review of access and parking design relevant to the subsequent stage detailed building DAs shall be undertaken as part of that subsequent stage assessment.
5	details of impact mitigation, management and monitoring measures.	As outlined in section 5, the traffic modelling undertaken as part of the MOD 3 suggests that no additional road upgrades will not be required as a result of the MOD 3 when compared to the approved concept plan . Furthermore, mitigation and management measures - if necessary - can be dealt with as part of the subsequent stage building applications.

2.3 Conditions of Consent

Conditions of consents relevant to this TIA, as well as brief response regarding MOD 3, are outlined in the following table.

Condition Number	Condition	Ason Response considering MOD 3
B13	The Applicant shall ensure the Concept Proposal provides car parking in accordance with the following rates: (a) 1 space per 300 m ² of warehouse GFA; (d) 1 space per 40 m ² of office GFA; and (e) 2 spaces for disability parking for every 100 car parking spaces.	No change to proposed car parking rates are proposed.
B14	The Applicant shall provide bicycle racks, and amenity and change room facilities for cyclists in accordance with Planning Guidelines for Walking and Cycling (December 2004, NSW Department of Infrastructure, Planning and Natural Resources and the Roads and Traffic Authority)	This is a detailed design matter that can be dealt with as part of future Development Applications for individual buildings.
C9	Future DAs shall be accompanied by a transport, access and parking assessment. The assessment must: (a) assess the impacts on the safety and capacity of the surrounding road network and access points during construction and operation of the relevant Stage; (b) demonstrate internal roads and car parking complies with relevant Australian Standards and the car parking rates in Condition B13; (c) detail the scope and timing of any required road upgrades to service the relevant Stage; and (d) detail measures to promote non-car travel modes, including a Sustainable Travel Plan identifying pedestrian and cyclist facilities to service the relevant Stage of the Development.	Noted. Future Development Applications shall be accompanied by a suitable transport assessment. This includes Stage 2 DA SSD 10397, attached in Appendix A .
D47	The Applicant must design and construct the intersections of the WNSLR with Estate Road 1 and Lockwood Road to the satisfaction of the relevant roads authority.	Noted. WNSLR and Estate Road 01 and Lockwood Road will be delivered as part of earlier

Condition Number	Condition	Ason Response considering MOD 3
		<p>stages of the project prior to MOD 3 and proposed to be delivered in line with these requirements.</p> <p>No change to the approved geometry is required as a result of MOD 3.</p>
D48	<p>Prior to the commencement of construction of the Lenore Drive/Grady Crescent/WNSLR intersection (the intersection), the Applicant must finalise the detailed design, including a Traffic Signal Plan, for the intersection works. The detailed design must:</p> <p>(a) cut back the median further with a taper in Grady Crescent to accommodate the dual B-Double swept paths turning from WNSLR onto Lenore Drive; and</p> <p>(b) include an angled pedestrian crossing on the south-eastern corner of the intersection so that pedestrians are not confused by the pedestrian lantern on the opposite side of the intersection.</p>	<p>Noted.</p> <p>No change to the approved geometry or signal phasing arrangements is required as a result of MOD 3.</p>
D49	<p>The Applicant must enter into a WAD for works at the intersection with TfNSW (former RMS). The WAD must be executed prior to the submission of the detailed design required under condition D48 to TfNSW for approval.</p>	<p>Noted.</p> <p>No change to the approved geometry or signal phasing arrangements is required as a result of MOD 3.</p>
D50	<p>The Applicant must design the proposed traffic control light at the intersection in accordance with Austroads guidelines, RMS Signal Design Manual and Australian Codes of Practice. The traffic control light design must be endorsed by a suitably qualified practitioner whose qualification has been approved by TfNSW (former RMS).</p>	<p>Noted.</p> <p>No change to the approved geometry or signal phasing arrangements is required as a result of MOD 3.</p>
D51	<p>The Applicant must submit the certified copies of the traffic signal design plans to TfNSW (former RMS) for approval prior to the issue of a Construction Certificate</p>	<p>Noted.</p> <p>No change to the approved geometry or signal phasing arrangements is required as a result of MOD 3.</p>
D52	<p>The Applicant must submit a request to TfNSW (former RMS) Network Operations Team to obtain relevant approvals to remove the signalised pedestrian crossing on the eastern leg of the intersection.</p>	<p>Noted.</p> <p>No change to the approved geometry or signal phasing arrangements is required as a result of MOD 3.</p>
D65	<p>Prior to the commencement of construction of Stage 1, the Applicant must prepare a Construction Traffic Management Plan (CTMP) to the satisfaction of the Planning Secretary. The CTMP must form part of the CEMP required by Condition D119 and must:</p> <p>(a) be prepared by a suitably qualified and experienced person(s); NSW Government 15 Oakdale West Estate Department of Planning, Industry and Environment (SSD 7348)</p> <p>(b) be prepared in consultation with Council, Mamre Anglican School, Emmaus Catholic College, Emmaus Catholic Care Village and Trinity Catholic Primary School;</p> <p>(c) detail specific measures to manage construction traffic to avoid school drop off and pick up times (Monday to Friday 8 am – 9.30 am and 2.30 pm – 4 pm) and Higher School Certificate exam periods, including any temporary infrastructure arrangements and traffic safety measures; (d) detail the measures to be implemented to ensure road safety and network efficiency during construction, including scheduling deliveries of heavy plant and equipment outside of peak periods, or during school holidays where possible;</p> <p>(e) detail heavy vehicle routes, access and parking arrangements;</p> <p>(f) include a Driver Code of Conduct to: i. minimise the impacts of construction on the local and regional road network; ii. minimise conflicts with other road users including the students, staff, visitors and residents of the neighbouring schools and aged care village; iii. minimise road traffic noise, both on Bakers Lane and from construction vehicles on Site; and iv.</p>	<p>A detailed Construction Environmental Management Plan (CEMP) – including a Construction Traffic Management Plan (CTMP) – has been prepared in response to the original approval. It is a requirement of the Plan to be updated in response to changing conditions / requirements and, accordingly, will be updated (if required) in response any approval of MOD 3.</p> <p>Notwithstanding, it should be emphasised that the changes proposed as part of MOD 3 are largely internal and thus do not have a material impact on construction traffic impacts or management thereof.</p> <p>Indeed, according to the advice provided by AT&L, no additional construction traffic movements are expected as a result of</p>

Condition Number	Condition	Ason Response considering MOD 3
	ensure truck drivers use specified routes and adhere to the speed restrictions on Bakers Lane; (g) include a program to monitor the effectiveness of these measures; and (h) detail procedures for early notification to residents and the community (including local schools), of any potential disruptions to routes.	MOD 3 when compared in context of MOD 1 and 2.
D67	The Applicant must design and construct the internal estate roads and intersections to accommodate the turning path of a B-Double, to the satisfaction of the Relevant Roads Authority.	All roads as part of the MOD 3 have been designed to cater for 26.0m B-Doubles as the design vehicle.
D68	Following the issue of a Subdivision Certificate, the estate roads shall be dedicated to the Relevant Roads Authority. Prior to any dedication, the Applicant shall ensure construction of the estate roads has been completed to the satisfaction of the Relevant Roads Authority and measures (such as a performance bond) are in place for any prescribed maintenance period, to the satisfaction of the Relevant Roads Authority.	Noted.

2.4 Approved Traffic Generation

Following traffic generation rates have been adopted as part of the approved OWE Master Plan studies:

- 1.892 vehicles per day per 100 m² of GFA, and
- 0.163 peak vehicles per hour per 100 m² GFA.

Accordingly, the approved TIA estimates the following traffic generation for the OWE:

Table 3: SSD 7348 Approved Traffic Generations

Precinct No.	SSD 7348 Approval		
	GFA (m ²)	AM / PM Peak Hour (vehicular traffic)	Daily (vehicular traffic)
Precinct 1	116,359	190	2,202
Precinct 2	105,425	172	1,995
Precinct 3	9,997	163	1,891
Precinct 4	120,988	197	2,289
Precinct 5	32,530	53	615
Total	475,269	775	8,992

Accordingly, the following peak hour and daily traffic figures readily have been approved for Precincts 2 and 3:

- AM and PM peak hour: 335 vehicular trips/hr
- Daily: 3,886 vehicular trips/day

2.5 Future Intersection Layouts

2.5.1 2026 Modelling Scenario (interim)

Indicative layouts of key intersections approved as part of the SSD 7348 approval are shown in **Figure 4**. Reference should be made to civil engineering drawings, prepared separately by AT&L, for detailed intersection and road designs.

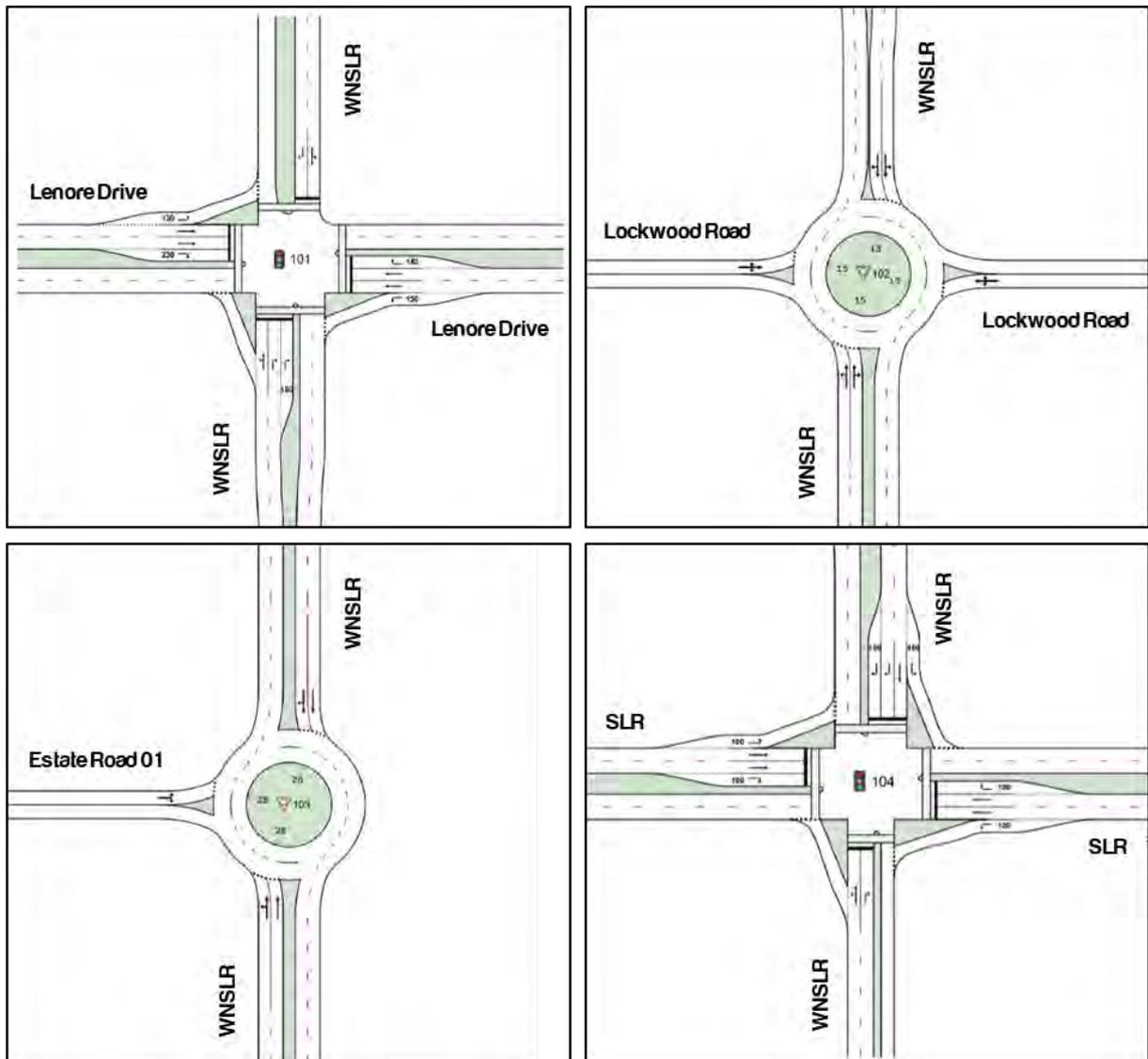


Figure 4: Approved Intersection Layouts – 2026 Modelling Scenario

2.5.2 2036 Modelling Scenario (Ultimate)

Furthermore, the original Concept Plan made allowances for potential – additional – upgrades to the Lenore Drive / WNSLR intersection by 2036, should this be deemed necessary by RMS at some point in the future. Accordingly, following intersection layout have previously been adopted for the ultimate modelling year (being 2036).

It is emphasised that additional upgrade works at this intersection are not proposed under this application and are generally attributed to additional background traffic growth to 2036. Notwithstanding, similar to the original submission, sufficient space is expected to be provided at this intersection to accommodate the additional turning lanes necessary (as documented in the engineering drawings submitted by AT&L) should these forecast traffic volumes be realised and improvement works be required at some point in the future.

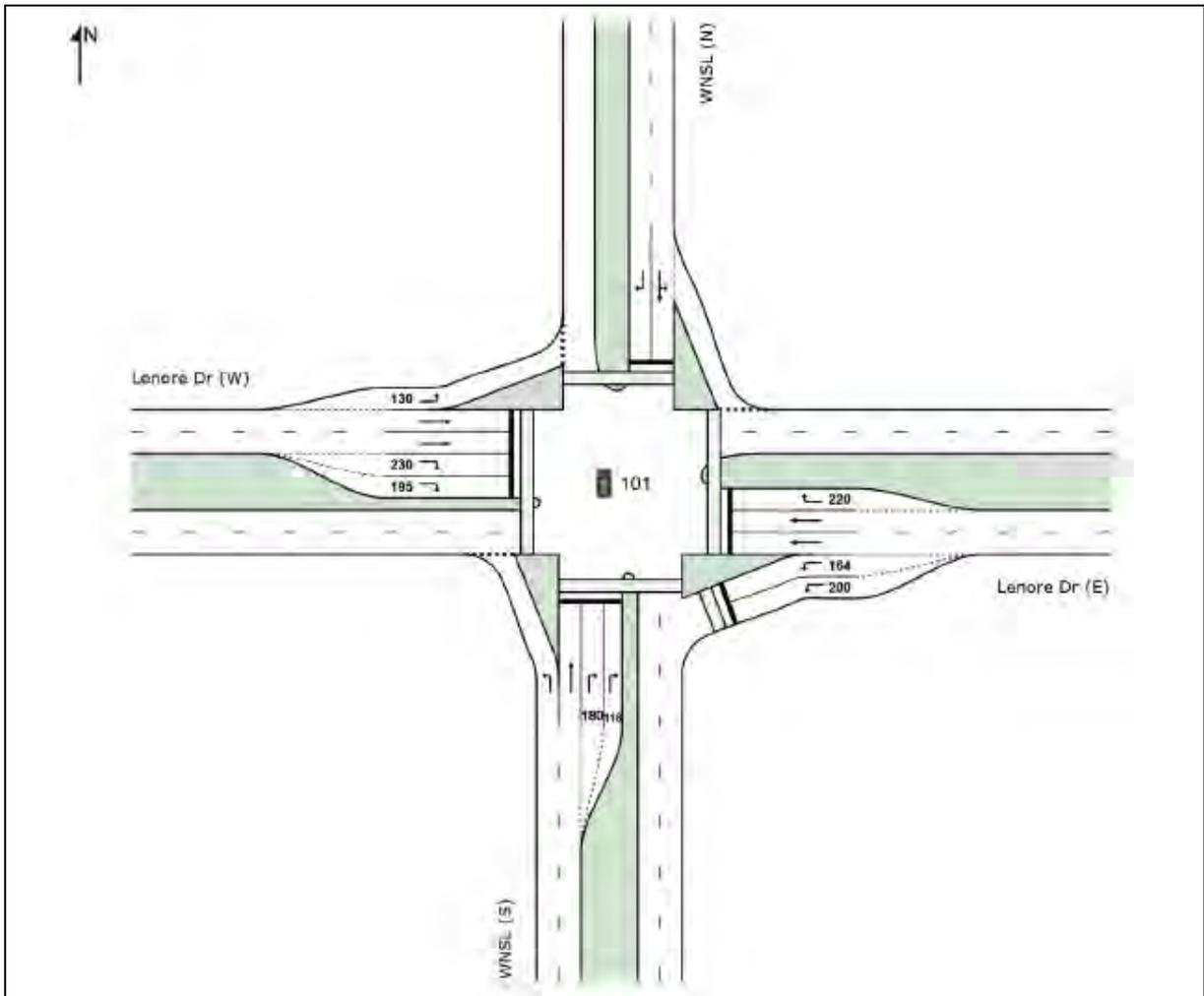


Figure 5: Lenore Drive / WNSLR intersection (Additional Upgrades) – 2036 Modelling Scenario

3 Modification 3 Description

3.1 MOD 3 Master Plan

Full details of MOD 3 are provided in the Environmental Impact Statement (EIS) which this TIA accompanies. A reduced scale of Master Plan further to MOD 3 is provided in **Figure 6** below.

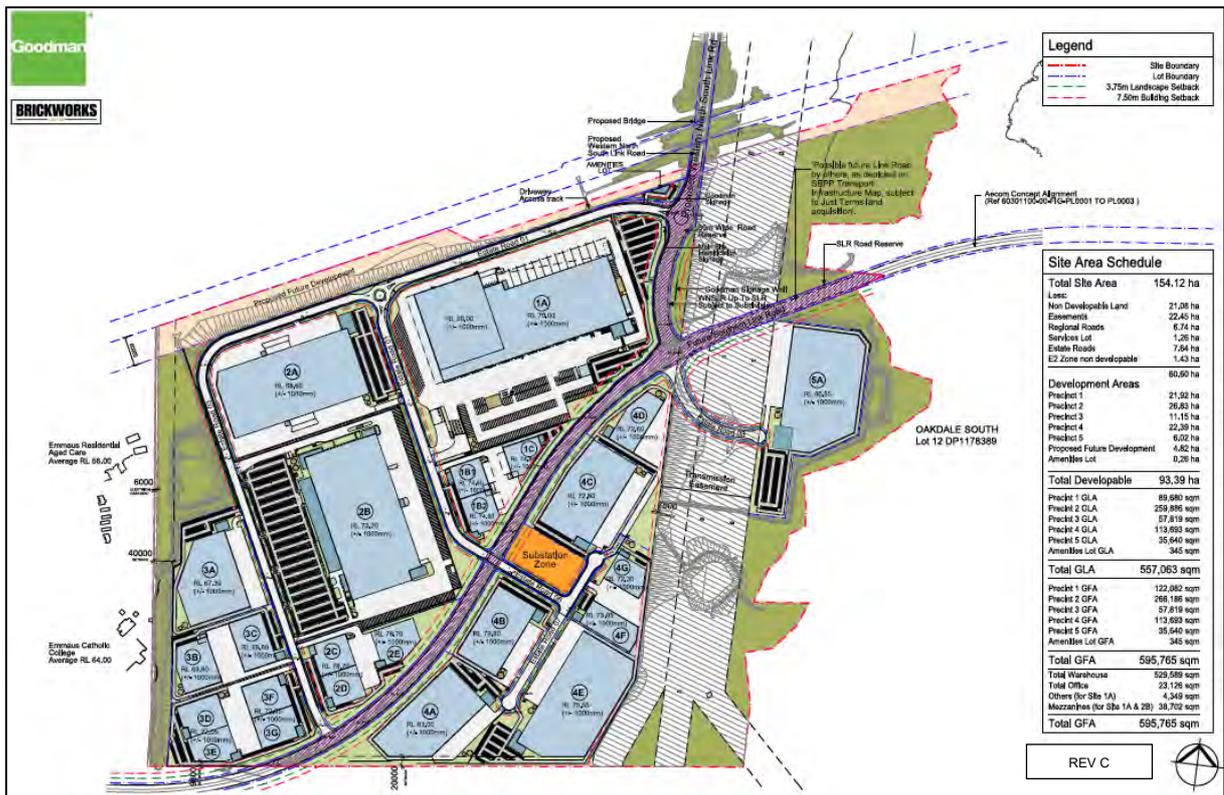


Figure 6: Modification 3 Master Plan

As stated before, MOD 3 will primarily affect some internal roads and Precincts 2 and 3 built forms, including:

- Realignment of the estate roads through Precinct 2 & 3 as a modification to the Stage 1 consent.
- Provision of a roundabout controlled intersection at the new Estate Road 01 and 03 intersection as a modification to the Stage 1 consent, and
- An increase to the overall built-form Gross Floor Area as a modification to the Stage 1 consent.

For clarity, extent of the MOD 3 when compared to the approved development plans is demonstrated in **Figure 7**.

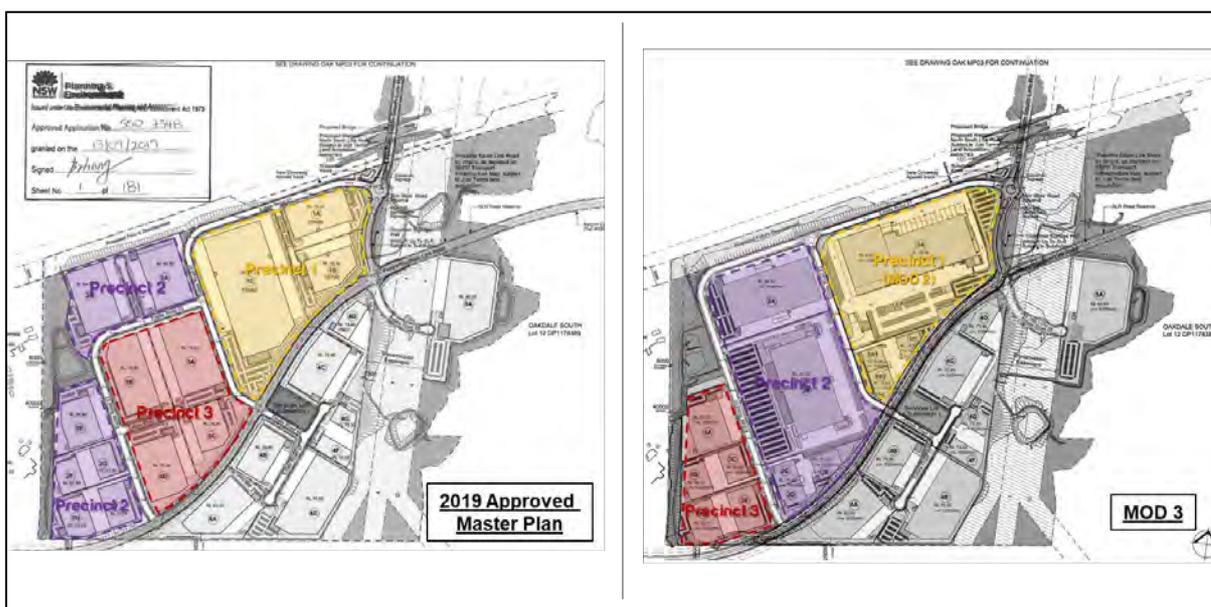


Figure 7: 2019 Approved Masterplan vs MOD 3

3.2 Proposed Building Characteristics

The following table outlines a comparison between areas schedule between the proposed Concept Plan Modification 3 and the approved Concept Plan.

Table 4: Area Comparison

Precinct No.	Original Approval GFA m ²	MOD 2 GFA m ²	MOD 3 GFA m ²	Difference (MOD 3 and approval) GFA m ²
Precinct 1	116,359	122,082	122,082	5,723 ¹
Precinct 2	105,425	107,111	266,186	160,761
Precinct 3	99,967	102,466	57,820	(-) 42,147
Precinct 4	120,988	113,693	113,693	(-) 7,294 ²
Precinct 5	32,530	35,640	35,640	3,110 ²
Amenities Lot	-	-	345	345
Total	475,269	480,992	595,765	120,496

Notes: 1) As a result of MOD 2.
2) Minor changes to Precincts 4 & 5 are due to MOD 3.

It is acknowledged that upon completion of MODs 2 and 3, OWE would provide some **595,765 m²** of building which is 120,496 m² above that envisaged by the SSD 7348 Approval (2019). Notably, this is attributed to the increase in number of warehouse levels, as opposed to increase in building footprints.

The traffic implications for the surrounding road network as a result of this increased GFA is discussed in section 5.

3.3 Internal Intersection Layouts

MOD 3 seeks approval for the following internal road changes to the Master Plan, and their construction as a modification to the Stage 1 consent:

- Re-configuration of Estate Road 03
- Removal of Estate Road 04 and Estate Road 05
- A new roundabout at intersection of Estate Roads 1 & 3

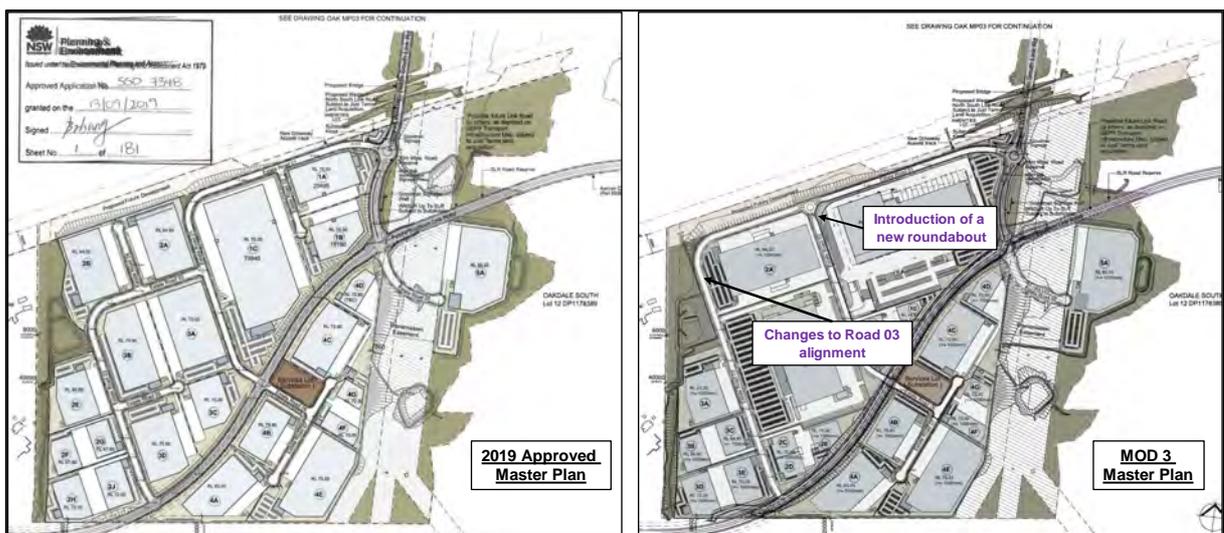


Figure 8: Internal Road Changes

Additionally, the *Southern Link Road / WSEA RNS Key Stakeholder Briefing (RMS, July 2019)* indicates that the intersections of SLR / Estate Road 01 and Estate Road 03 may be signalised intersections. Final resolution of these intersections and their timing are not yet determined and therefore, in the absence of detailed civil plans of these intersections, the following layouts have been adopted for the modelling assessment.

It should be noted that the internal roundabout SIDRA modelling is based on the resolved civil design of this intersection subject of SSD 10397 being Stage 2 DA and associated works.

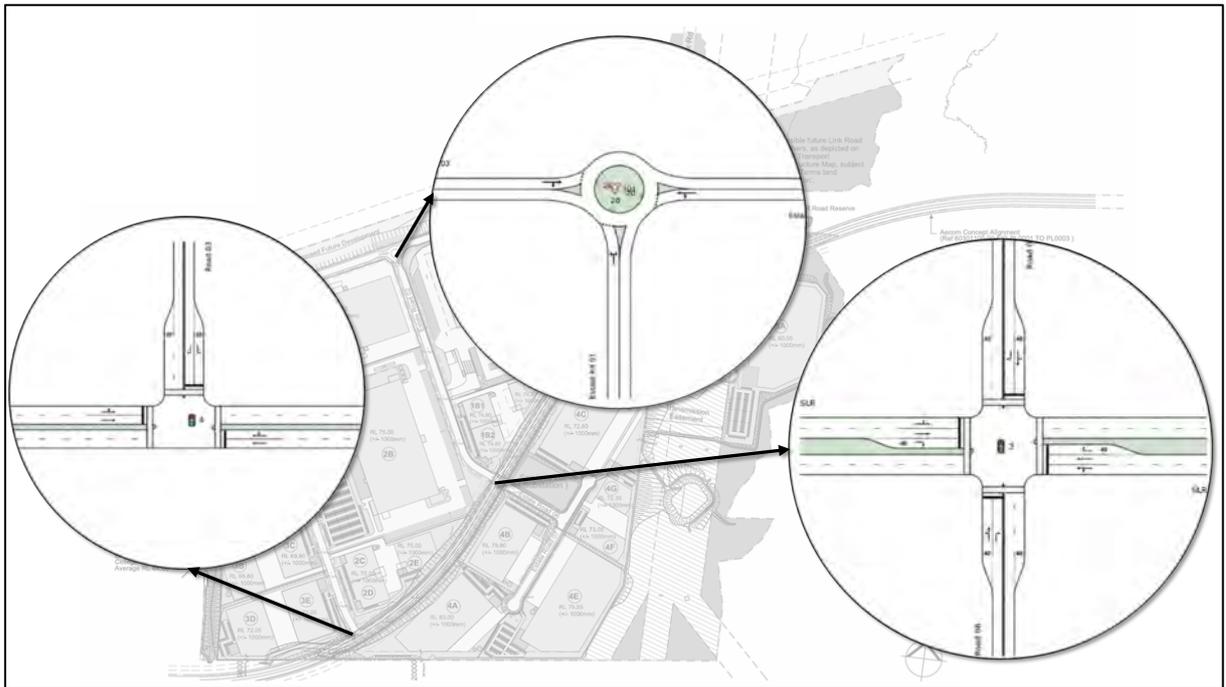


Figure 9: Internal Intersection Layouts – For the Purpose of Modelling

4 Parking Provisions

4.1 Car Parking

No change to the car parking requirements approved as part of the original Concept Plan are proposed under MOD 3. It is considered that detailed parking assessment for each individual building should be deferred to their respective DA assessment.

4.1.1 Approved Parking Rates

For clarity, the approved car parking rates — in accordance with Condition B13 — are outlined below.

Table 5: Approved Parking Rates

Land Use	Parking Rate
Warehouse	1 space per 300 m ²
Office	1 space per 40 m ²

Detailed car parking demand vs. supply assessment shall be undertaken as part of the DA stage assessments.

4.1.2 Accessible Parking

Condition B13 of the approval requires 2 accessible parking bays for every 100 car parking spaces of which should be considered for future DAs.

4.2 Bicycle Parking

Condition B14 of the approval suggest that the applicant shall provide bicycle racks in accordance with the *Planning Guidelines for Walking and Cycling* (December 2004, NSW Department of Infrastructure, Planning and Natural Resources and Roads and Traffic Authority). Accordingly, the following bicycle rates should be considered for future DAs:

- Staff Bicycle Parking Requirement 3-5% of staff number (for each building)
- Visitor Bicycle Parking Requirement 5-10% of staff number (for each building)

5 Traffic Assessment

5.1 Traffic Generation Estimation

This TIA reviews the proposed traffic generation of the MOD 3 Precinct and building layout in accordance with two different approaches, defined below:

- **Theoretical approach** – using the approved generation rates outlined in section 2.4 for all precincts,
- **Combined approach** – combination of first principles and generic assessments having regard for the operational information provided for specific building tenants. Specifically, a first-principles assessment for Building 1A (as part of MOD 2) and Building 2B (as part of SSD 10397) and adoption of the approved trip rates for all other buildings and precincts for which tenants are not yet known.

5.1.1 Theoretical Approach (Generic Rates)

Traffic generation adopted for MOD 3 assessments are identical to the approved rates which were outlined in section 2.4, and are utilised to inform the original traffic assessment in the Concept application. Application of these generic trip rates to proposed MOD 3 built form results in the following peak hour and daily traffic generation for each Precinct.

Table 6: MOD 3 Precinct Traffic Generation – Generic Trip Rates

Precinct No.	GFA m ²	AM / PM (vehicular traffic/hr)	Daily (vehicular traffic/day)
Precinct 1	122,082	199	2,310
Precinct 2	266,186	434	5,036
Precinct 3	57,820	94	1,094
Precinct 4	113,693	185	2,151
Precinct 5	35,640	58	674
Total	595,420	971	11,265

Note: 1) Figure includes both Light Vehicle (staff) and Heavy Vehicle movements

As the amenities lot is ancillary to the primary developments, it does not generate traffic and is not listed above.

When considering the generic trip approach above, Precinct 2 and 3 are expected to generate the following combined peak hourly and daily traffic movements:

- **Peak hour:** 528 vehicular trips/hr

- Daily: 6,130 vehicular trips/day

5.1.2 Combined Approach (First principles Assessment)

Ason Group has been advised that the Building 2B tenancy agreement (within Precinct 2 and subject to SSD 10397) has already been discussed and as such the immediate tenant for this building has provided detailed, hourly traffic movements (separated for light and heavy vehicles for staff and commercial movements) in accordance with their operational needs. These volumes are outlined in the Building 2B DA transport assessment report, which is included in **Appendix A**.

Precinct 2 traffic generation has been estimated having regard for the abovementioned schedules for Building 2B, and a generalised trip rate assessment based on nominal GFA's for the other future buildings within the Precinct.

It is noted that a 'seasonal peak' demand scenario figures have also been provided. However, it is emphasised that these higher volumes would occur only for a short period of time in advance of busy consumer periods (Christmas and other special days). Accordingly, the following table outlines the peak hour and daily traffic generation based on first principles assessment for both 'seasonal peak' and 'non seasonal peak' periods.

In preparation of **Table 7**, consideration has also been given to the MOD 2 traffic volumes for Precinct 1, and it should be noted that, for **CONSERVATIVE** assessment, it is assumed that the 'seasonal peak' for building 1A tenant (refer to MOD 2 TIA) and building 2B tenant will occur at the same time. Accordingly, this translates into the 'worst case scenario' for traffic impact review which may not even occur as part of the operation of these two buildings.

Table 7: MOD 3 Precinct Traffic Generation – Combined Approach

Precinct No.	GFA m ²	AM Peak	PM Peak	Daily
Precinct 1 ¹	122,082	94 (103) ²	74 (78)	2,059 (2,503)
Precinct 2	264,107	677 (920) ²	468 (629)	3,797 (4,901)
Precinct 3	57,819	94	94	1,094
Precinct 4	113,693	185	185	2,151
Precinct 5	35,640	58	58	674
Total	595,420	1,108 (1,360)	879 (1,044)	9,776 (11,324)

Note: 1) Detailed first principles traffic generation assessment of Building 1A is included in MOD 2 TIA.

- 2) Figures in bracket shows peak seasonal changes. These traffic figures demonstrate the maximum possible traffic generation for Buildings 1A and 2B during their peak seasonal periods.

5.1.3 Traffic Generation Summary

The first-principles assessment results in a higher traffic generation than the generic traffic generation based purely on the ‘approved rates’ to all building areas. This is typical, noting that the approved rates reflect average rates and individual buildings / lots may vary slightly above and below that rate. Therefore, for conservative assessment, this traffic generation has been adopted for traffic impact review and modelling purposes. Accordingly, the following peak hour and daily traffic volumes have been estimated for Precincts 2 and 3:

- AM Peak: 771 (1,014) vehicular trips/hr
- PM Peak: 562 (723) vehicular trips/hr
- Daily: 4,891 (5,995) vehicular trips/day

Following **Table 8** outlines a comparison between SSD 7348 approved generation with the MOD 3 traffic generation estimation. As mentioned above, for **conservativeness**, the results from the combined assessment has been adopted for the impact review.

Table 8: Traffic Generation Comparison

Precinct No.	SSD 7348 Approval			MOD 3			Difference		
	AM	PM	Daily	AM	PM	Daily	AM	PM	Daily
Precinct 1	190	190	2,202	94 (103)	74 (78)	2,059 (2,503)	-96 (-87)	-116 (-112)	-143 (301)
Precinct 2	172	172	1,995	677 (920)	468 (629)	3,797 (4,901)	505 (748)	296 (457)	1,802 (2,906)
Precinct 3	163	163	1,891	94	94	1,094	-69	-69	-797
Precinct 4	197	197	2,289	185	185	2,151	-12	-12	-138
Precinct 5	53	53	615	58	58	674	5	5	59

Total	775	775	8,992	1,108 (1,360)	879 (1,044)	9,776 (11,324)	333 (585)	104 (269)	784 (2,332)
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Note: 1) Figures in bracket shows peak seasonal changes.

Accordingly, upon full completion of MODs 2 and 3 the surrounding road network would see an increased traffic generation of 333 (585 during peak season) and 104 (269 during peak season) vehicular trips/hr during AM and PM peak period and additional of 784 (2,322 during peak season) vehicular trips/day during the weekday.

It is important to note that the peak seasonal is expected to only occur for a short period of time, and the above assessment has assumed that the seasonal peak for building 1A tenant (refer to MOD 2 TIA) and building 2B tenant will occur at the same time. Accordingly, the quantum of anticipated vehicle movement for this MOD, used in the traffic assessment in **Section 5** is considered robust and conservative.

5.2 Trip Distribution

5.2.1 Inbound / Outbound Trip Distribution

As discussed above, Ason Group has been provided with detailed operational information (hourly traffic generation for light and heavy vehicles, with separated inbound / outbound movements) for Building 2B.

Additionally, a review of the *Trip Generation Surveys - Business Parks and Industrial Estate Data Report* (RMS 2012) demonstrated the following inbound / outbound trip distribution:

- Light Vehicle:
 - AM Peak: 80% inbound movement, 20% outbound movement
 - PM Peak: 20% inbound movement, 80% outbound movement
- Heavy Vehicle:
 - AM Peak: 50% inbound movement, 50% outbound movement
 - PM Peak: 50% inbound movement, 50% outbound movement

5.2.2 Directional Trip Distribution

A review of the RMS EMME data for the relevant selected zone in the area (Z3479) for year 2036 demonstrated the following regional trip distribution:

- Arrival:
 - 30% of vehicles arriving from Lenore Drive West,
 - 20% of vehicles arriving from Lenore Drive East,
 - 35% of vehicles arriving from future Southern Link Road (SLR) West, and
 - 15% of vehicles arriving from future SLR East
- Departure:
 - 25% of vehicles departing to Lenore Drive West,
 - 20% of vehicles departing to Lenore Drive East,
 - 30% of vehicles departing to future Southern Link Road (SLR) West, and
 - 25% of vehicles departing to future SLR East

Having regard for these directional splits, the resulting traffic flow network diagrams are included in **Appendix B**, and the impact on the operation of the critical intersections in the locality is discussed below.

5.3 Traffic Impacts

The impact of the proposed MOD 3 traffic generation on the critical intersections in the locality has been assessed by comparing to the SIDRA results reported in the OWE TIA RTS (SSD 7348 Approval) for the following forecast year scenarios:

- 2026 (Interim), and
- 2036 (Ultimate)

It is noted that the 2036 results for the intersection of Lenore Drive & WNSLR references the upgraded intersection (as shown in **Figure 4**).

As the MOD 3 to the Stage 1 consent includes re-configuration of Estate Road 03 and introduction of a new roundabout at Estate Road 01 and 03, SIDRA modelling has also been undertaken at this new roundabout and the other two intersections with the SLR as discussed in Section 3.3 which were not previously reported on as part of earlier studies. Accordingly, SIDRA results are summarised in **Table 9**.

Table 9: Intersection Performance Comparison – Forecast Year 2026 (Interim)

Intersection	Time Period	SSD 7348 Approval		MOD 3 (Non-Peak Seasonal)		MOD 3 (Peak Seasonal)	
		Average Delay (AVD)	Level of Service (LoS)	Average Delay (AVD)	Level of Service (LoS)	Average Delay (AVD)	Level of Service (LoS)
WNSLR / Lenore Drive	AM	40.3	C	45.8	D	52.7	D
	PM	31.7	C	34.9	C	36.2	C
WNSLR / Lockwood Road	AM	13.1	A	13.4	A	13.6	A
	PM	14.8	B	14.9	B	15.1	B
WNSLR / Estate Road 01	AM	12	A	11.8 ¹	A	11.9	A
	PM	15.1	B	13.4 ¹	A	14.0	A
WNSLR / SLR	AM	28.4	B	29.1	C	29.5	C
	PM	31.5	C	31.6	C	32.4	C
SLR / Estate Rd 02	AM	Na	Na	17.2	B	17.3	B
	PM	Na	Na	18.4	B	18.5	B
SLR / Estate Rd 03	AM	Na	Na	13.4	A	16.0	B
	PM	Na	Na	16.8	B	20.1	B
Estate Rd 01 / Estate Rd 03	AM	Na	Na	9.3	A	9.3	A
	PM	Na	Na	8.5	A	9.8	A

Note: 1) the reduced average delay at the intersection of WNSLR / Estate Road 01 is because of the re-calculation / re-distribution of the overall Oakdale West Estate traffic having regard for the changes at the internal roads.

Intersection performance under the forecast year 2036 (ultimate) scenario is presented in **Table 10**.

Table 10: Intersection Performance Comparison – Forecast Year 2036 (Ultimate)

Intersection	Time Period	SSD 7348 Approval		MOD 3 (Non-Peak Seasonal)		MOD 3 (Peak Seasonal)	
		Average Delay (AVD)	Level of Service (LoS)	Average Delay (AVD)	Level of Service (LoS)	Average Delay (AVD)	Level of Service (LoS)
WNSLR / Lenore Drive	AM	37.9	C	37.9	C	38.2	C
	PM	26.9	C	29.6	C	29.6	C
WNSLR / Lockwood Road	AM	17.9	B	18.1	B	18.7	B
	PM	15.1	B	14.9 ¹	B	15.1	B
WNSLR / Estate Road 1	AM	12.5	A	12.0 ¹	A	12.5	A
	PM	17.7	B	13.7 ¹	A	14.3	A
WNSLR / SLR	AM	40.3	C	51.1	D	53.8	D
	PM	40.8	C	40.4	C	52.3	D
SLR / Estate Rd 02	Na	Na	Na	17.8	B	19.7	B
	Na	Na	Na	19.4	B	30.3	C
SLR / Estate Rd 03	Na	Na	Na	23.2	B	49.4	D
	Na	Na	Na	26.1	B	38.4	C
Estate Rd 01 / Estate Rd 03	Na	Na	Na	9.3	A	9.7	A
	Na	Na	Na	8.5	A	8.8	A

Note: 1) the reduced average delay at the intersection of WNSLR / Lockwood Road and Estate Road 01 is because of the re-calculation / re-distribution of the overall Oakdale West Estate traffic having regard for the changes at the internal roads.

The SIDRA analysis indicates that MOD 3 will result in moderate increases in AVD and LoS at all intersections generally. Despite these minor increases, these intersections will operate with acceptable Level of Service (LoS D or better) in both forecast years (2026 and 2036) during peak seasonal and non-peak seasonal periods.

In summary, the traffic impact analysis concludes that MOD 3 traffic generation volumes will have no material additional impact at the surrounding key intersections and that the infrastructure proposed (and

approved) as part of the original Concept Plan will be sufficient to accommodate the impacts of the development.

Detailed SIDRA results outlining LoS, queue and delays for each intersection “approach” are included in **Appendix C**. A copy of SIDRA modelling files can be provided to RMS and/or Council, upon request.

6 Construction Traffic Management

6.1 Background

A detailed Construction Environmental Management Plan (CEMP), including a Construction Traffic Management Plan (CTMP), has been developed in response to the condition of consent following the original approval.

Separate reference should be made that CEMP in relation to the management measures associated with the broader works. That CEMP includes protocols for regular updates should they be required in response to changing conditions generally, such as could occur as a result of a new modification.

Changes required as a result of this specific MOD are discussed below.

6.2 Implications of MOD 3

The quantum of cut to fill anticipated to deliver the site plan and anticipated pad levels contemplated in this current proposed Master Plan is approximately 70,000m³ less than that anticipated and approved in the original Concept and Stage 1 consent. Accordingly, the number of trucks required for fill importation is less than that contemplated in the Concept and Stage 1 consent, resulting in there being a reduction in traffic impacts on the wider network as a result of the revised earthworks plan.

Accordingly, there will be no additional traffic impacts to the wider road network as a result of the MOD 3.

7 Design Commentary

7.1 Relevant Design Standards

Detailed design of each individual building is deferred to their respective DA assessment. However, the site access, car park and loading areas for all buildings are expected to comply with the following relevant Australian Standards:

- AS 2890.1 for car parking areas,
- AS 2890.2 for commercial vehicle loading areas,
- AS 2890.3 for bicycle parking, and
- AS 2890.6 for accessible (disabled) parking.

7.2 Estate Roads

Modifications to Estate Road 01 and Estate Road 03 and the proposed new roundabout at the junction thereof have been designed to accommodate trucks up to 26m B-doubles. Reference should be made to the turn paths drawings prepared by AT&L, provided separately.

NO PARKING and NO STOPPING restrictions are proposed on all future public roads within OWE.

8 Summary & Conclusions

Ason Group has been engaged by Goodman Property Services (Aust) Pty Ltd (Goodman) to prepare a Traffic Impact Assessment (TIA) to assess the traffic and parking implications of:

- proposed modifications (MOD 3) to the recently approved (13 September 2019) SSD 7348 at Oakdale West Industrial Estate (OWE), and
- a stage 2 Development Application (DA SSD 10397) in relation Building 2B.

8.1 Key Findings

The key findings of this Traffic Impact Assessment are as follows:

- MOD 3 broadly includes:
 - Estate road network re-configuration,
 - Major rationalisation and re-sizing of warehouse buildings included in Precincts 2 and 3,
 - Moderate changes to Precincts 4 and 5 GFAs, and
 - Changes to the overall Estate-wide levels due for cut and fill process related to the additional road network changes.
- Key changes to Gross Floor Areas (GFA) are summarised in the below table.

Precinct No.	Original Approval GFA m ²	MOD 2 GFA m ²	MOD 3 GFA m ²	Difference (MOD 3 and approval) GFA m ²
Precinct 1	116,359	122,082	122,082	5,723
Precinct 2	105,425	107,111	266,186	160,761
Precinct 3	99,967	102,466	57,810	(-) 42,147
Precinct 4	120,988	113,693	113,693	(-) 7,294 ²
Precinct 5	32,530	35,640	35,640	3,110 ²
Amenities Lot	-	-	345	345
Total	475,269	480,992	595,765	120,496

- No change to the previously approved car parking rates is proposed. For clarify, the following rates are proposed to be retained:
 - Warehouse: 1 space per 300 m²
 - Office: 1 space per 40 m²

- The traffic generation assessment has had regard for 2 scenarios:
 - Generic assessment based on ‘approved rates’ which referenced standard RMS data for large format industrial warehouses.
 - First-principles assessment, based on known operational requirements of specific tenants, including ‘seasonal peak factors. NOTE: for those buildings where a tenant is unknown, this scenario adopts the generic assessment above.

- Resultant worst-case forecast traffic generation — being the first-principles assessment — is then as follows.
 - AM peak non-peak seasonal (1,108 vehicular trips/hr)
 peak-seasonal (1,360 vehicular trips/hr),
 - PM peak non-peak seasonal (879 vehicular trips/hr)
 peak-seasonal (1,044 vehicular trips/hr), and
 - Daily non-peak seasonal (9,776 vehicular trips/hr)
 peak-seasonal (1,1324 vehicular trips/hr),

- Traffic modelling of the worst-case scenario has been undertaken to confirm the suitability of the road infrastructure improvements previously approved. A comparison of future intersection performance is provided in the below table.

Intersection Performance Comparison – Forecast Year 2026 (Interim)

Intersection	Time Period	SSD 7348 Approval		MOD 3 (Non-Peak Seasonal)		MOD 3 (Peak Seasonal)	
		Average Delay (AVD)	Level of Service (LoS)	Average Delay (AVD)	Level of Service (LoS)	Average Delay (AVD)	Level of Service (LoS)
WNSLR / Lenore Drive	AM	40.3	C	45.8	D	52.7	D
	PM	31.7	C	34.9	C	36.2	C
WNSLR / Lockwood Road	AM	13.1	A	13.4	A	13.6	A
	PM	14.8	B	14.9	B	15.1	B
WNSLR / Estate Road 01	AM	12	A	11.8 ¹	A	11.9	A
	PM	15.1	B	13.4 ¹	A	14.0	A
WNSLR / SLR	AM	28.4	B	29.1	C	29.5	C
	PM	31.5	C	31.6	C	32.4	C
SLR / Estate Rd 02	AM	Na	Na	17.2	B	17.3	B
	PM	Na	Na	18.4	B	18.5	B
SLR / Estate Rd 03	AM	Na	Na	13.4	A	16.0	B
	PM	Na	Na	16.8	B	20.1	B
Estate Rd 01 / Estate Rd 03	AM	Na	Na	9.3	A	9.3	A
	PM	Na	Na	8.5	A	9.8	A

Note: 1) the reduced average delay at the intersection of WNSLR / Estate Road 01 is because of the re-calculation / re-distribution of the overall Oakdale West Estate traffic having regard for the changes at the internal roads.

Intersection Performance Comparison – Forecast Year 2036 (Ultimate)

Intersection	Time Period	SSD 7348 Approval		MOD 3 (Non-Peak Seasonal)		MOD 3 (Peak Seasonal)	
		Average Delay (AVD)	Level of Service (LoS)	Average Delay (AVD)	Level of Service (LoS)	Average Delay (AVD)	Level of Service (LoS)
WNSLR / Lenore Drive	AM	37.9	C	37.9	C	38.2	C
	PM	26.9	C	29.6	C	29.6	C
WNSLR / Lockwood Road	AM	17.9	B	18.1	B	18.7	B
	PM	15.1	B	14.9 ¹	B	15.1	B
WNSLR / Estate Road 1	AM	12.5	A	12.0 ¹	A	12.5	A
	PM	17.7	B	13.7 ¹	A	14.3	A
WNSLR / SLR	AM	40.3	C	51.1	D	53.8	D
	PM	40.8	C	40.4	C	52.3	D
SLR / Estate Rd 02	Na	Na	Na	17.8	B	19.7	B
	Na	Na	Na	19.4	B	30.3	C
SLR / Estate Rd 03	Na	Na	Na	23.2	B	49.4	D
	Na	Na	Na	26.1	B	38.4	C
Estate Rd 01 / Estate Rd 03	Na	Na	Na	9.3	A	9.7	A
	Na	Na	Na	8.5	A	8.8	A

Note: 1) the reduced average delay at the intersection of WNSLR / Lockwood Road and Estate Road 01 is because of the re-calculation / re-distribution of the overall Oakdale West Estate traffic having regard for the changes at the internal roads.

- SIDRA results indicate that MOD 3 will:
 - Result in only moderate increases in AVD and LoS at all intersections generally. According to the SIDRA results the intersections will operate with acceptable Level of Service (LoS D or better) in both forecast years (2026 and 2036).
- MOD 3 will not have any material implications for the construction of the Estate, as it affects external parties. Changes are largely internal reconfigurations and thus, the construction impacts – and

management thereof outlined in the CEMP – shall be unaffected. In the event that minor changes were to occur, as a result of unforeseen matters, then this can occur as part of ongoing review and updates to the CEMP.

8.2 Recommendations

- No additional road upgrades are required.
- Assessment of individual buildings / lots — which shall be subject to separate Development Applications — shall consider:
 - Compliance with AS2890 series Australian Standards.
 - Parking provisions, in accordance with the approved rates or to satisfy known tenant requirements.
 - Ensure that cumulative traffic generation is not greater than assessed, or further modelling and assessment may be required. NOTE: it should be acknowledged that minor variations to generation rates can occur from lot-to-lot so that the emphasis should be on the cumulative / estate-wide generation.

8.3 Conclusion(s)

In summary, MOD 3 is supportable on traffic planning grounds and will not result in any adverse impacts on the surrounding road network or the availability of on-street parking.

Appendix A

Traffic Impact Assessment for Building 2B DA

Traffic Impact Assessment

Oakdale West Industrial Estate
Stage 2 Development Application – SSD 10397

Ref: P1086r02
15/01/2020

Document Control

Project No: 1068r02

Project: Lot 2B SSD 10397, Oakdale West Industrial Estate

Client: Goodman Property Services (Aust) Pty. Limited

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Appendices

Appendix A1: Swept Path Analysis

Appendix A2: Transport Access Guide (TAG)

Appendix A3: Sample Travel Mod Questionnaire

Executive Summary

The Stage 2 Development Application (DA) specifically applies to Building 2B (the Site) of the Modification 3 Master Plan, located within revised Precinct 2 post application of MOD 3. The Proposal for Building 2B consists of 206,968 m² GFA (200,668 m² GLA) combined warehouse and office floorspace. A breakdown of the key development details is provided below:

Building	<ul style="list-style-type: none"> • 195,176 m² of warehouse GLA • 5,492 m² of office GLA
Parking Yield	<ul style="list-style-type: none"> • 1,127 parking spaces (incl. 36 accessible bays) • 128 bicycle parking spaces • 54 motorcycle spaces
Docks	<ul style="list-style-type: none"> • 61 Loading Bays

The proposed parking provision of Building 2B as outlined above readily satisfies the minimum parking requirements (788 spaces) outlined in Condition B13 of the approval.

Traffic generation for the warehouse has been assessed on the basis of both Generic GFA-based analysis tenant-specific operational information and are provided below.

Time Period	RMS Guide	Tenant-Specific Operational Information	
	GFA-Based	Non-Peak	Peak
AM Network Peak	337	580	823
PM Network Peak	337	371	532
Daily Total	3,916	2,677	3,784

The outcomes of the modelling undertaken as part of MOD 3 indicate that the operational traffic (during peak and non-peak seasonal periods) provided by the future tenant will not result in any substantial change or significant worsening of the road network performance from what has been approved as part of SSD 7348.

Similarly, a construction traffic assessment has been conducted for works associated with Stage 2 DA 10397. The modelling results demonstrate moderate impact to the two critical intersections impacted by construction routes as a result of relatively low traffic volumes. Nonetheless, suggestion is provided to the Mamre Road / Abbotts Road intersection to improve overall performance.

The layout and design of Building 2B, the hardstand area and parking facilities have generally been designed in accordance with standards and guidelines outlined in Australian Standards AS2890.1, AS2890.2, AS2890.3 and AS2890.6.

In summary, traffic and transport elements of the Stage 2 DA specifically relating to Lot 2B and their respective impacts have been accordingly assessed and is deemed to be satisfactory on traffic and transport planning grounds.

1 Stage 2 Development Application

1.1 Response to Secretary’s Environmental Assessment Report

Relevant responses to the Secretary’s Environmental Assessment Report (SEAR) SSD 10397 and SSD 7348 MOD 3 – dated 15 November 2019 – to Stage 2 DA, has been provided in the following table.

Table 1: Response to SEARs

No.	Comment	Ason Response
Traffic and Transport – including		
1	a Traffic Impact Assessment detailing all daily and peak traffic and transport movements likely to be generated (vehicle, public transport, pedestrian and cycle trips) during construction and operation of the development, including a description of vehicle access routes (construction and operation) and the impact on nearby intersections;	<p>This TIA has been prepared to respond to this comment. The Proposal is not anticipated to generate significant pedestrian and/or public transport trips during the construction or operation of Building 2B. However, details of daily and peak hour traffic generation of the Building 2B has been reviewed (at operational phase) and outlined in section 4.1.</p> <p>Furthermore, impact of the proposed Building 2B on the surrounding road network during the non-peak seasonal and peak seasonal periods have also been assessed and discussed in the MOD 3 transport assessment with a brief provided at section 4.3.</p> <p>A Construction Traffic Assessment has been included and referred to in Section 5 of this report.</p> <p>As part of the assessment, trafficable impacts have been modelled to demonstrate that the construction traffic induced by Stage 2 works will have moderate impacts to the critical intersections outlined in the truck routes.</p>
2	details of access to the site from the road network including intersection location, design and sight distance;	Details of the Building 2B access for light and heavy vehicles have been provided in section 2. Sight distances at the Building 2B access points have been reviewed and discussed in section 5.2.
3	an assessment of the predicted impacts on road safety and capacity of the road network to accommodate the development;	With reference to section 4.3 of this report and the SIDRA modelling undertaken as part of the MOD 3, the traffic generation of the proposed Building 2B can be accommodated through the surrounding road network as approved by 2019 concept plan.
4	detailed plans of the proposed site access and parking provision on site in accordance with the relevant Australian Standards and with reference to the approved concept plan (SSD 7348).;	Parking provision of the proposed Building 2B have been reviewed against the approved SSD 7348 in section 3. Design of the access and car parking area have also been reviewed and discussed in section 5.
5	details of impact mitigation, management and monitoring measures.	<p>As outlined in section 4.3 and the traffic modelling undertaken as part of the MOD 3, the proposal for Building 2B will not require any additional road network upgrade works.</p> <p>Furthermore, a comprehensive Sustainable Travel Plan (STP) has been prepared for this DA which details the traffic management measures and ways to minimise reliance on motorised vehicles. Monitoring program has also been included in our STP referenced in section 6.</p>

1.2 Relevant SSDA Conditions

This assessment of Stage 2 addresses the traffic impacts of the included works, as part of Modification 3 applied to Building 2B. It is subject to the conditions outlined in Schedule C of the SSDA 7348 Conditions. The conditions, as well as responses to effect are provided in **Table 2**.

Table 2: Relevant Schedule C Conditions to Building 2B (SSD 10397)

C9. Transport, Access and Parking	
Condition	Response
(a) assess the impacts on the safety and capacity of the surrounding road network and access points during construction and operation of the relevant Stage;	Assessment of the impacts on the surrounding road network have been assessed as part of the MOD 3 precinct-wide traffic modelling. Safety of the relevant access point associated with Lot 2B have been reviewed assessed in Section 5 .
(b) (i) demonstrate internal roads and car parking complies with relevant Australian Standards (ii) and the car parking rates in Condition B13;	(i) This traffic report details a design assessment in accordance with Australian Standards – specifically AS2890.1 and AS2890.2. Refer Section 5 . (ii) This traffic report details the requirements of parking as outlined in Condition B13. Refer Section 3 . However, a general condition of consent requiring car parking design in accordance with relevant Australian Standards (AS) is expected to be included as part of the DA approval.
(c) detail the scope and timing of any required road upgrades to service the relevant Stage; and	It should be noted that road construction and delivery of the internal road network and the proposed internal roundabout between Estate Roads 01 & 03 has been planned as part of Modification 3 works to the Stage 1 consent and will be delivered as part of that construction phase. Timing for these changes will be prior to Building 2B construction.
(d) detail measures to promote non-car travel modes, including a Sustainable Travel Plan identifying pedestrian and cyclist facilities to service the relevant Stage of the Development.	Noted. This traffic report details a Sustainable Travel Plan for Building 2B. Refer Section 6 .

2 Stage 2 DA Description

2.1 Built Form

The Stage 2 SSD 10397 applies to Building 2B of the Modification plan 3. The Proposal for Building 2B, an industrial warehouse development with ancillary office, provides the following key characteristics:

- 206,968 m² GFA (200,668 m² GLA), consisting of:
 - 195,176 m² of Warehouse space;
 - 5,492 m² of Office space; and
 - 6,300 m² of Mezzanine space.
- 4 private vehicle crossovers on Estate Road 03 providing access to:
 - 1,127 car parking bays (incl. 37 accessible parking bays);
 - 128 bicycle parking spaces; and
 - 54 motorcycle parking bays.
- A primary entry and exit access crossover for commercial vehicles at the northern boundary of the Site, facilitating B-Double access and egress movements; and
- A secondary exit only crossover at the Site's southern boundary, facilitating seasonal movements for 4 weeks of the year only as an exit for vans and small trucks.

Building 2B and the Estate Roads associated with Stage 2 is identified within the contexts of the OWE in **Figure 1** below.

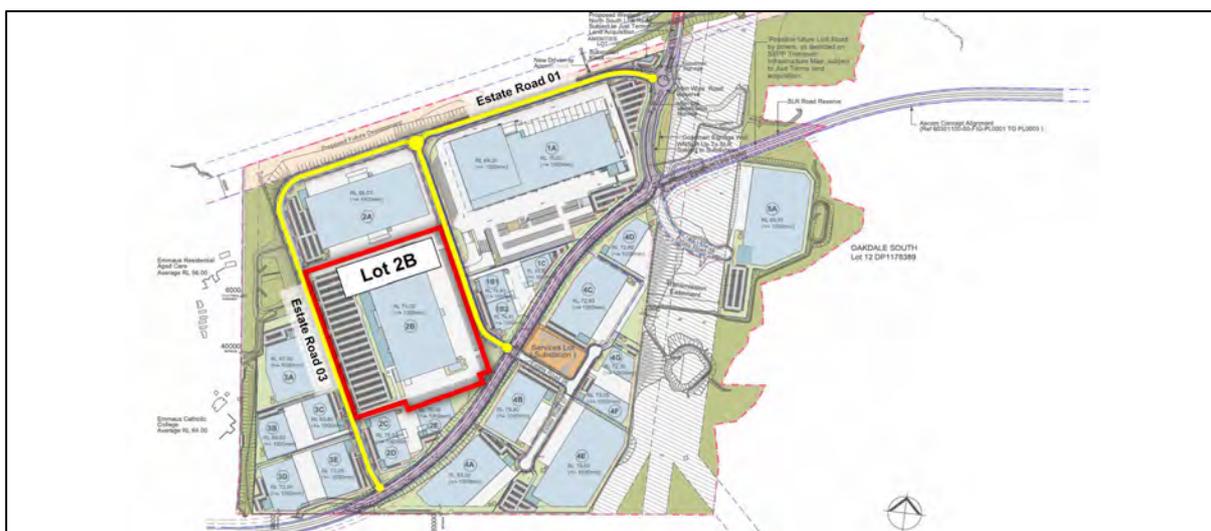


Figure 1: Modification 3 Master Plan and Building 2B Location

A copy of the detailed Warehouse Plans and access crossovers is provided in **Figure 2**.

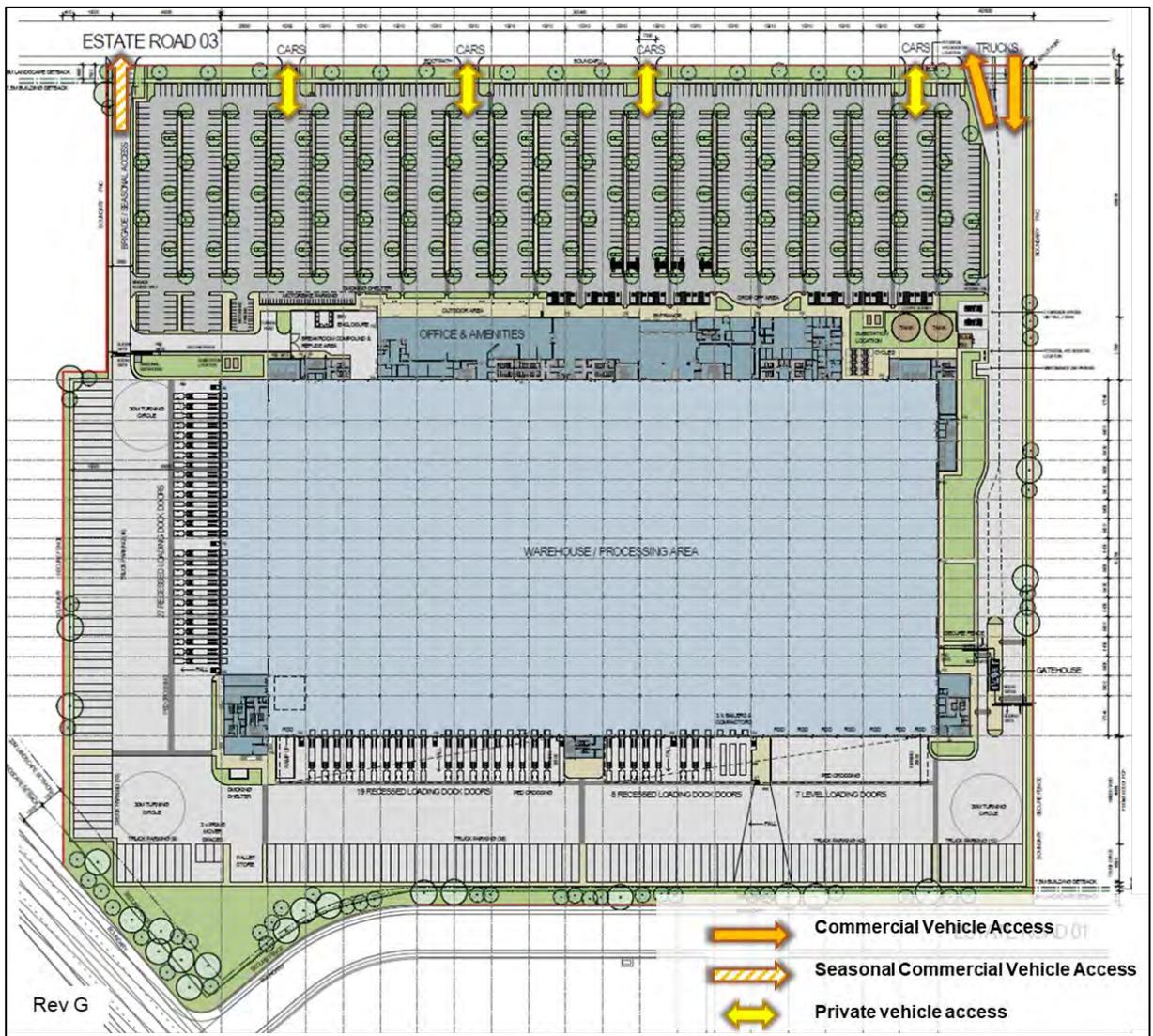


Figure 2: Detailed Warehouse Plans & Access

2.2 Warehouse Operational Details

2.2.1 Staffing Schedule

Future Tenancy has indicated that an expected 1,500 staff will be employed at the warehouse facility when fully operational.

The shift structure involves an AM and PM shift for operation of the main warehouse floor, with an anticipated 587 staff per shift during the non-peak period, and 838 staff per shift during the peak seasonal periods. It is noteworthy that the peak seasonal period will only be related to a short period of time.

2.2.2 Hours of Operation

The Building 2B Warehouse is intended to operate 24 hours a day, 7 days a week. The AM and PM shifts periods are indicated to occur as follows:

Table 3: Shift Timing

Shift / Type		Start	End
Day (AM) Shift	Inbound Deliveries	07:00 AM	05:30 PM
	Outbound Deliveries	07:30 AM	06:00 PM
Night (PM) Shift	Inbound Deliveries	06:00 PM	06:30 AM
	Outbound Deliveries	06:30 PM	07:00 AM

2.2.3 Proposed Amenities

The warehouse facility accommodates up to 135 truck parking spaces around the perimeter of the hardstand area and facilitates 61 loading bays on the warehouses' eastern and southern side, as indicated below.

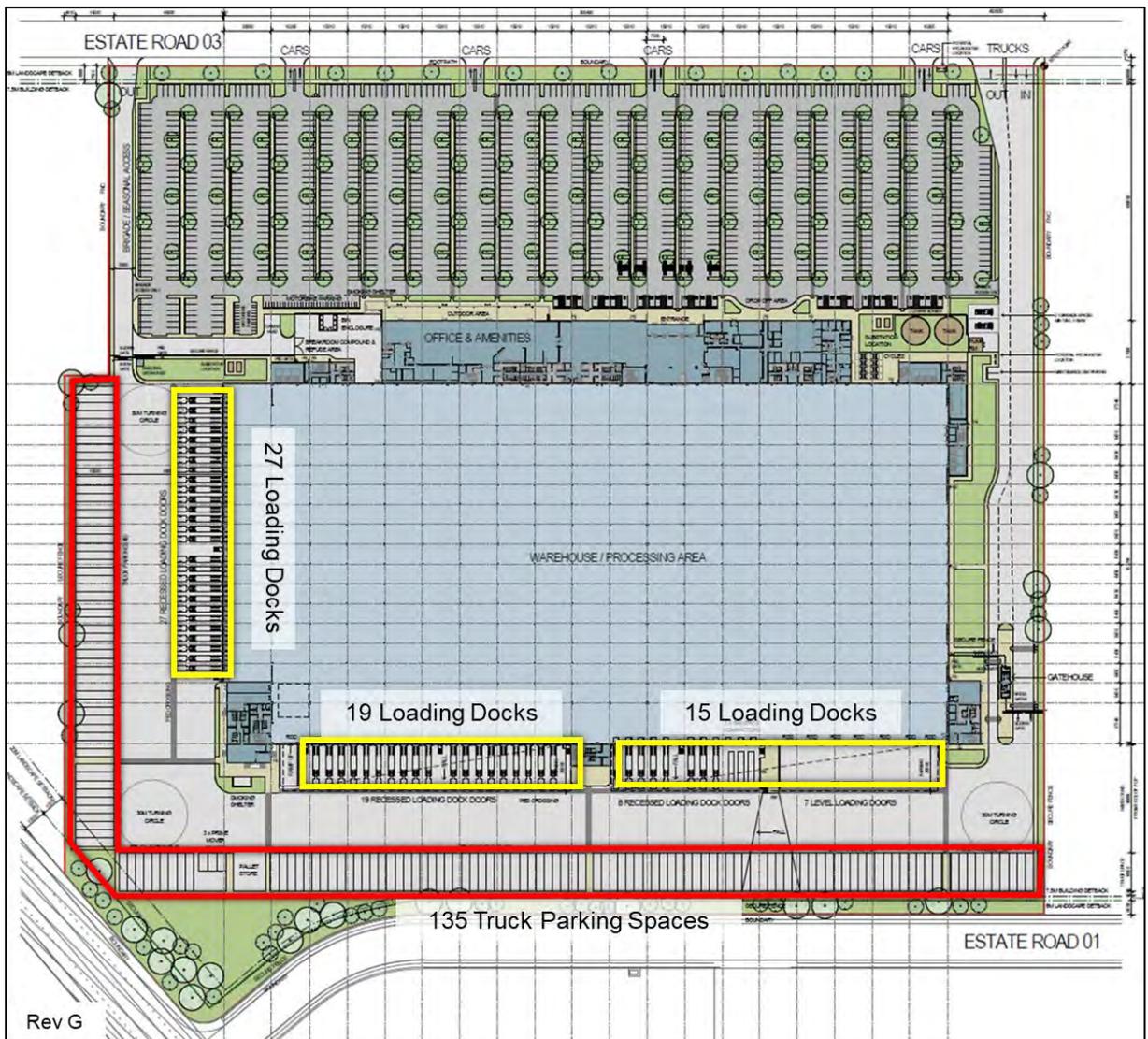


Figure 3: Loading Dock Locations and Truck Parking

3 Parking Provisions

3.1 Car Parking

Parking rates for the wider Estate have been provided in accordance with Condition B13 of the 2019 SSD approval. The rates are as follows:

- 1 space per 300 m² for Warehouse; and
- 1 space per 40 m² for Office.

Application of these approved SSDA rates to the floor areas now proposed is summarised below.

Table 4: Approved Parking Rates

Land Use	Lot 2B Yield	Car Parking Required	Lot 2B Provision
Warehouse	195,176	651	1,127
Office	5,492	137	
Total	200,668	788	1,127

As indicated above, the parking provided for Lot 2B exceeds the nominal parking requirement, thereby complying with the approved car parking rates, which are a minimum.

It is acknowledged that the parking provision is significantly more than strictly required by Condition B13. However, the increased provision proposed is in response to the demands of the future tenant for this Lot, with an anticipated total of 1,500 staff (maximum 838 staff on-site during peak seasonal) to be employed when fully operational.

It should be noted that the occupancy of the car park will vary throughout the day, based on the traffic information provided by the tenant. During warehouse shift periods, an estimated 587 staff will be rostered for non-peak seasonal periods, with an increase to 838 staff during the 'seasonal peak' period which is anticipated to only occur for 4-6 weeks of the year. The shifts are staggered to provide sufficient timing for staff changeover to occur between shifts. Accordingly, the parking provision proposed readily provides for this number of staff, with sufficient additional space to cater for unexpected surges.

3.1.1 Accessible Parking

Condition B13(e) of the SSD specifies the following requirements for accessible parking spaces:

- 2 spaces for disability parking for every 100 car parking spaces.

This equates to a requirement for 23 accessible spaces to be included within the above provisions.

In response, Building 2B provides for 37 accessible bays, exceeding the SSDA requirements.

3.2 Bicycle Parking

Condition B14 of the approval suggests the provision of bicycle racks in accordance with Planning Guidelines for Walking and Cycling (December 2004, NSW Department of Infrastructure, Planning and Natural Resources and Roads and Traffic Authority). Accordingly, the following bicycle rates apply:

- Staff Bicycle Parking Requirement 3-5% of staff number (for each building)
- Visitor Bicycle Parking Requirement 5-10% of staff number (for each building)

Application of the above rates to the total provision of staff (1,500) equates to a minimum requirement of 120 bicycle parking spaces. In response, Building 2B provides for a total of 128 bicycle parking exceeding the minimum requirements of the SSDA. The bicycle racks are located on the northern side of the office block.

Furthermore, the Proposal for Building 2B will provide a sum of 54 motorcycle parking spaces. In this regard, a parking diagram has been provided in **Figure 4** to show the details of parking proposed for the Site.

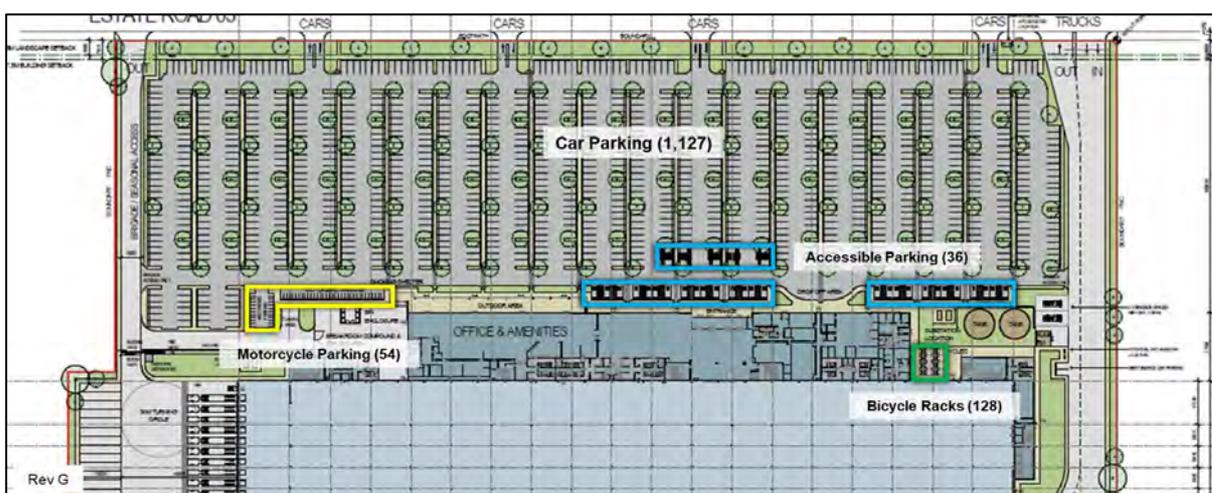


Figure 4: Proposed On-site Parking Diagram

4 Traffic Assessment

Traffic assessment of the proposed Building 2B has readily been discussed in detailed as part of the MOD 3 TIA (above). However, further details of the proposed traffic generation in accordance with the immediate tenant operational information is provided in this section.

4.1 Traffic Generation

Similar to the MOD 3 assessment, 2 methodologies have been assessed to identify Building 2B traffic generation.

4.1.1 Generic (GFA based) Approach

Application of the approved trip rates to the proposed lot 2B total building area (206,968 m² of warehouse plus ancillary office GFA) results in the following traffic generation estimation:

- Peak Period 337 veh/hr (@ 0.163 vehicle trips per 100 m² of GFA)
- Daily 3,916 veh/day (@ 1.892 vehicle trips per 100 m² of GFA)

4.1.2 First Principal Assessment (Operational Vehicle Movements)

Operational vehicle movements have been provided by the Tenant to account for two time periods, defined as ‘non-peak and peak seasonal’ operations. Seasonal peak is anticipated to occur for a short period of time and up to 4-6 weeks per year. A summary of the vehicle movements is provided below.

Table 5: Non-Peak Vehicle Movements

Period	Cars			Trucks			Cars + Truck (inbound+outbound)
	Inbound	Outbound	Total	Inbound	Outbound	Total	
AM Network Peak (07:00-0:800)	267	297	564	8	8	16	580
PM Network Peak (17:00-18:00)	206	157	363	4	4	8	371
Daily Total	1,174	1,174	2,347	165	165	330	2,677

Table 6: Seasonal Peak Vehicle Movements

Period	Cars			Trucks			Cars + Truck (inbound+outbound)
	Inbound	Outbound	Total	Inbound	Outbound	Total	
AM Network Peak (07:00-08:00)	381	424	805	9	9	18	823
PM Network Peak (17:00-18:00)	294	224	518	7	7	14	532
Daily Total	1,676	1,676	3,352	216	216	432	3,784

Accordingly, comparison of the above tables suggests as follows:

- Building 2B indicatively generates less daily traffic based on operational information than when assessed through application of the approved rates; and
- Operational traffic suggests higher traffic movements during the morning and afternoon road network peak hours.

4.2 Traffic Distribution & Assignment

Precinct-wide modelling has been conducted for the wider Oakdale West Network as part of the MOD 3 Assessment. Accordingly, traffic Distribution and assignment for the seasonal and non-seasonal volumes generated by Building 2B have appropriately been captured in the wider modelling studies.

Thus, the modelling conducted as part of MOD 3 has readily included the traffic of this proposal onto the surrounding road network.

4.3 Traffic Impacts

The Precinct-wide modelling has demonstrated that the cumulative traffic generation of MOD 2 and MOD 3 will not present worsening impacts to the road network, inclusive of the wider estate's internal roads and connections to the Link Roads. This demonstrates that the road network has sufficient capacity to cater for Building 2B traffic whilst maintaining operation at a satisfactory level.

Accordingly, this DA will not result in any unacceptable traffic impacts — being included within the MOD 3 modelling — and no additional upgrades at surrounding road network would be required as part of this DA.

5 Construction Traffic Assessment

The construction and delivery of the involved works associated with Stage 2 SSD 10397 has been assessed from a traffic and transport perspective to quantify the impact of construction vehicle movements on the surrounding road network. In this instance, reference should be made to Section 6 of the parent report (*ref:P1086r01*) as this overview provides context for and aligns with the site-specific works of Stage 2.

5.1 Existing Conditions

Tube count surveys undertaken along Bakers Lane have been reviewed to gain an appreciation for existing traffic flows. **Figure 5** below provides a summary of the results, with defined peaks in the AM and afternoon school peak noteworthy.

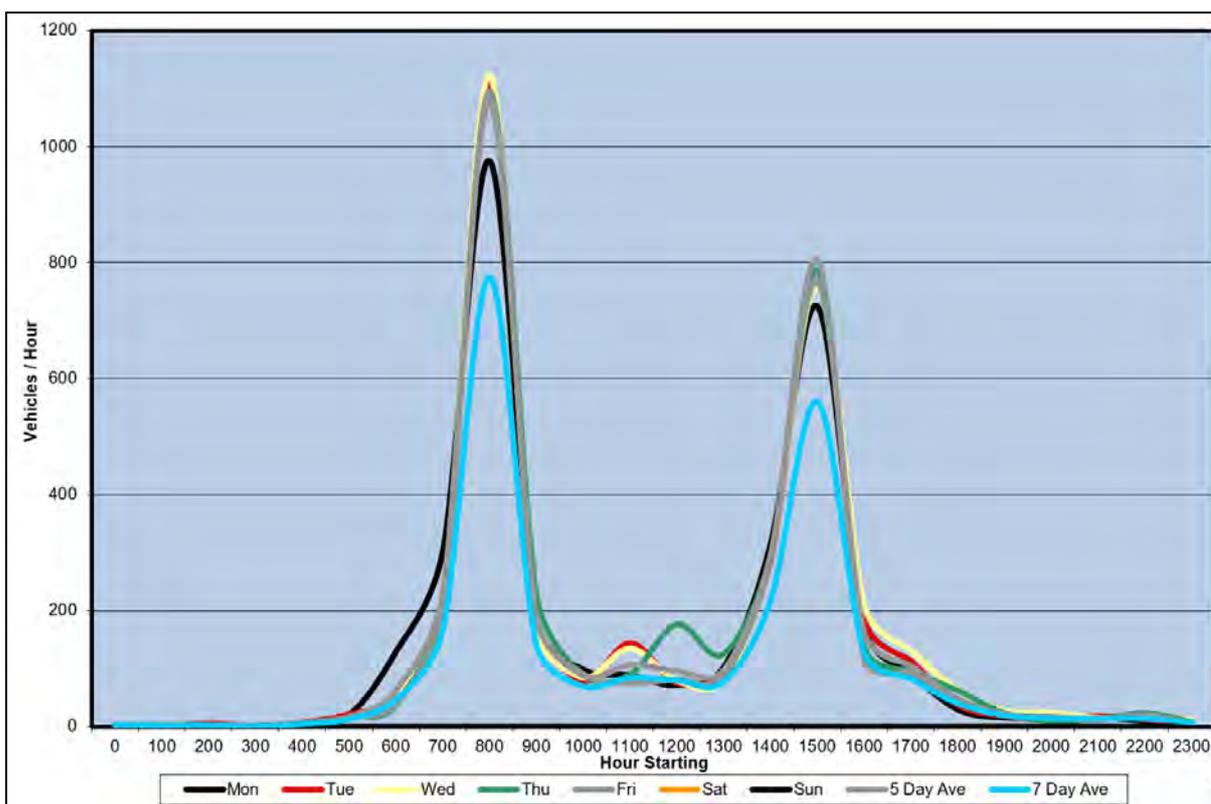


Figure 5: Bakers Lane –Volume Graph

The graph indicates that the peak periods align with the school zone speed limit restrictions placed along Bakers Lane. This similarity can result in the designation of the following peak periods:

- 8:00 am – 9:30 am for the AM Peak; and
- 2:30 pm – 4:00 pm for the PM Peak.

5.2 Hours of Construction

Construction of the encapsulated Stage 2 works shall occur between the hours of 3:00am and 11:00pm (20 hours). This bandwidth is effective 7-days of the week.

In order to mitigate the potential impacts of construction traffic during the network peak hours, it is anticipated that vehicle routes will involve two configurations for operations both within and outside of these peaks. For clarity, the time periods are defined as follows (from 3.00am to 11.00pm):

- Pre-School Period: (3:00am – 8:00am)
- AM Network Peak Period: (8:00am – 9:30am)
- Between School Periods: (9:30am – 2:30pm)
- PM Network Peak Period: (2:30pm – 4:00pm)
- Post-School Period: (4:00pm – 11:00pm)

5.3 Truck Routing

It should be noted that the abovementioned routes shall ONLY be used in relation to the Stage 2 DA construction works. These routes will not have any bearing in association with additional construction works outside of the Stage 2 DA.

For truck routes associated with estate wide infrastructure works covered by the Stage 1 DA, reference should be made to site-specific CTMP's prepared separately.

5.3.1 Network Non-Peak Operations

Construction traffic **OUTSIDE** of the network peak hours shall utilise **Bakers Lane**, via Mamre Road from the north and south as shown in **Figure 6**. The Mamre Road / Bakers Lane intersection currently exists as a signalised intersection.

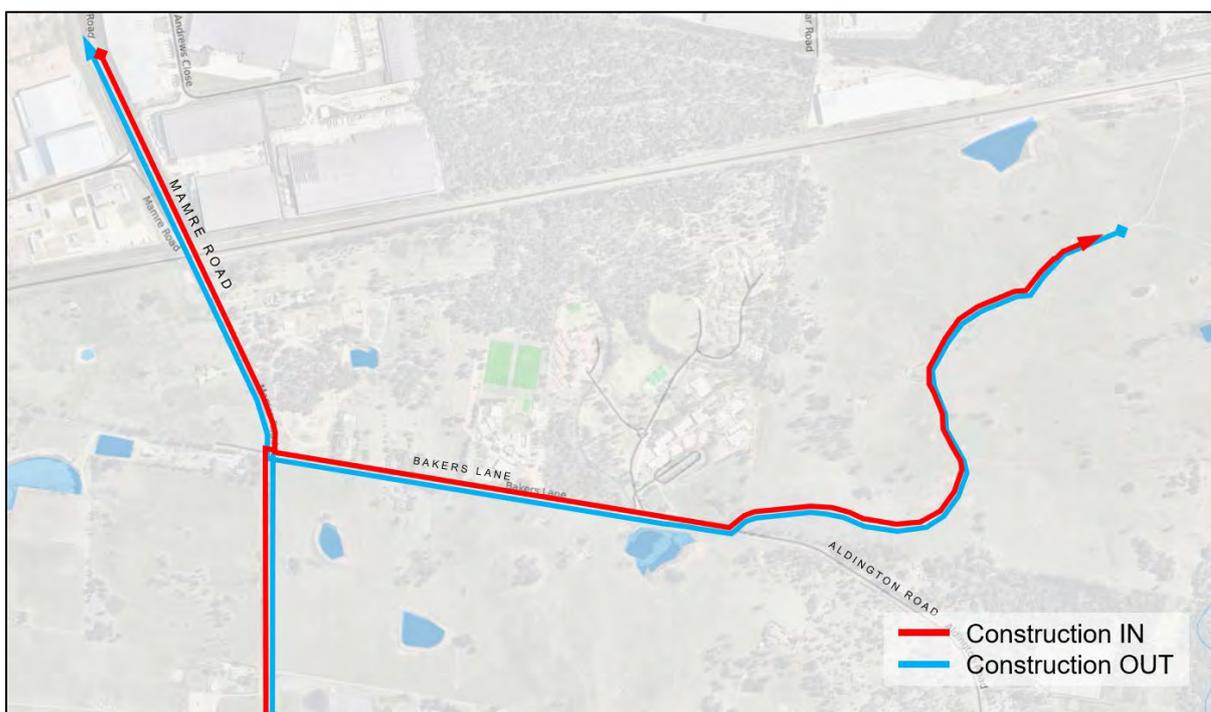


Figure 6: Network Non-Peak Route via Bakers Lane

5.3.2 Network Peak Operations

In consideration of the existing vehicular traffic and the resultant safety concerns associated with Bakers Lane during the network peaks (school pick up and drop off periods), construction traffic accessing and egressing the site **DURING network Peak periods** will be rerouted to utilise **Aldington Road** and the **Abbotts Road** connection to Mamre Road, as referred in **Figure 7**. The main reason for this is due to safety because this will provide for a safer route than trucks constantly delivering building materials on Bakers Lane via the school in pick up and drop off periods.

It should be noted that this is a temporary arrangement and will only be applicable for 3 hours of the day during the construction of the WNSLR, between 1st June 2020 through to 1st October 2020.

The existing Mamre Road / Abbotts Road intersection is a T-junction, with a flared through lane along Mamre Road to assist northbound traffic flow.

It has been considered that Aldington Road is a sealed rural road, and generally provides a minimum 6 metre carriageway from Abbotts Road to the subject Site location; deemed acceptable for two-way traffic flow. In the event that any sections of the road do not provide for 6 metres, then appropriate traffic management measures can be provided during the construction to assist with two way flow. It is noted that Abbotts Road would only be utilised during road network peak (school peak period) with a low level of traffic, and as such no material traffic impact is anticipated in this regard. It is again important to note

that this arrangement is temporary, and that construction traffic will be rerouted to the WNSLR when it has been completed.

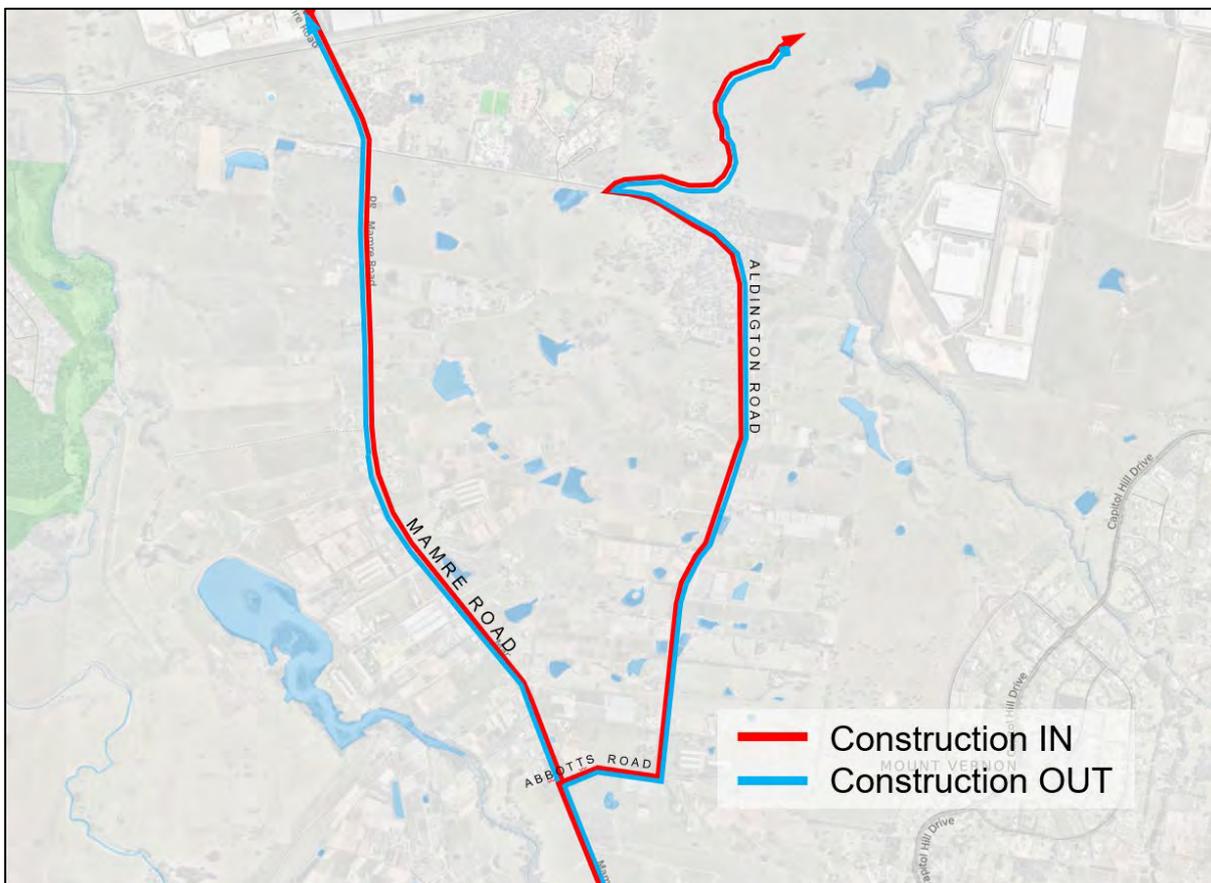


Figure 7: Network Peak Route via Aldington Road

5.4 Truck Volumes

The monthly schedule of anticipated construction traffic movements has been provided by Qanstruct, as the appointed builder. This information has been extrapolated to establish hourly and daily traffic volumes for assessment of traffic impacts on the following basis:

- Construction will occur 7-days a week,
- Construction will occur between 3:00am – 10:00pm (19-hour bandwidth); and
- Temporal distribution has been adopted from previously approved CTMP for OWE (*ref: 0605r01*).

For conservative estimation, the highest observed traffic volumes from the monthly schedule (occurring in November 2020) have been used for modelling purposes. This equates to a total of **217** daily vehicle trips (consisting of **68** Light Vehicle trips and **150** Heavy Vehicle trips). Additionally, the highest hourly

movement shall be applied regardless of occurrence in or outside of network peaks, to ensure conservativeness.

The traffic distribution for traffic movements adopts the method as referred in previous CTMP's which proportions construction traffic within the previously defined periods. The application of this methodology results in **Table 7**.

Table 7: 24-Hour Construction Traffic Movements

	Pre-School Period	AM School Period (Network Peak)	Between School Periods	PM School Period (Network Peak)	Post-School Period	Total (Daily)
Light Vehicles	38	0	7	0	23	68
Heavy Vehicles	26	22	54	21	27	150
TOTAL	46	27	68	26	50	217

Accordingly, uniform distribution within the periods has been applied to provide the total hourly breakdown demonstrated in **Figure 8**.

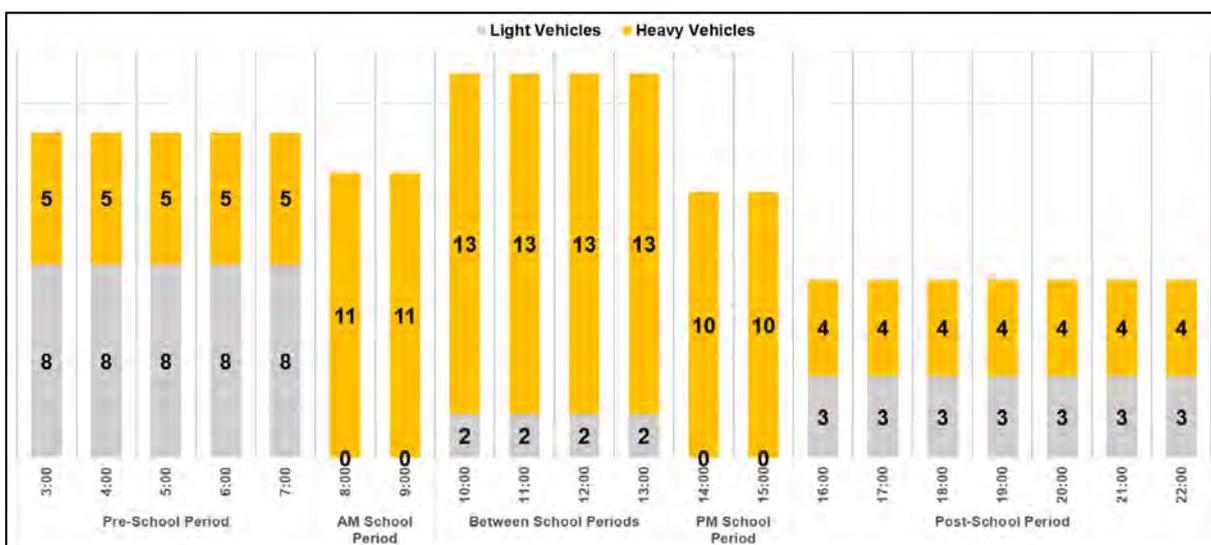


Figure 8: Hourly Construction Traffic Movements

5.5 Impact Assessment

5.5.1 Traffic Distribution

For conservative estimation, the highest estimated traffic hourly volume of 15 vehicles, in accordance with Figure 8 above, was used for indicative traffic generation within the peak hour periods.

Traffic Distribution for construction has been simplified to provide a 50/50 split between IN and OUT movements. Directional distribution to and from Mamre West has been determined proportionate to northbound and southbound traffic.

Traffic distribution for the Mamre Road x Bakers Lane intersection outside of the peaks, as well as Mamre Road / Abbotts Road (connecting to Aldington Road) during the peaks, is provided in **Figure 9** and **Figure 10**.

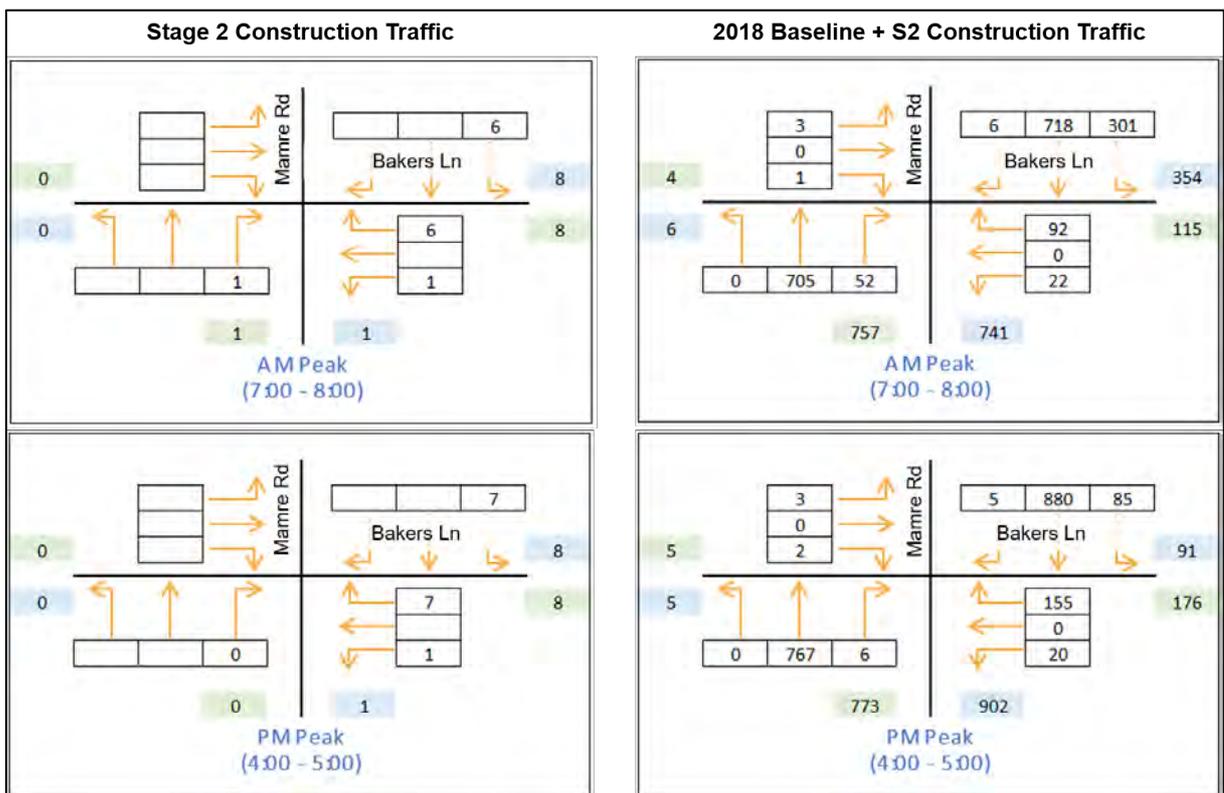


Figure 9: Mamre Road / Bakers Lane - Traffic Distribution and Project Traffic

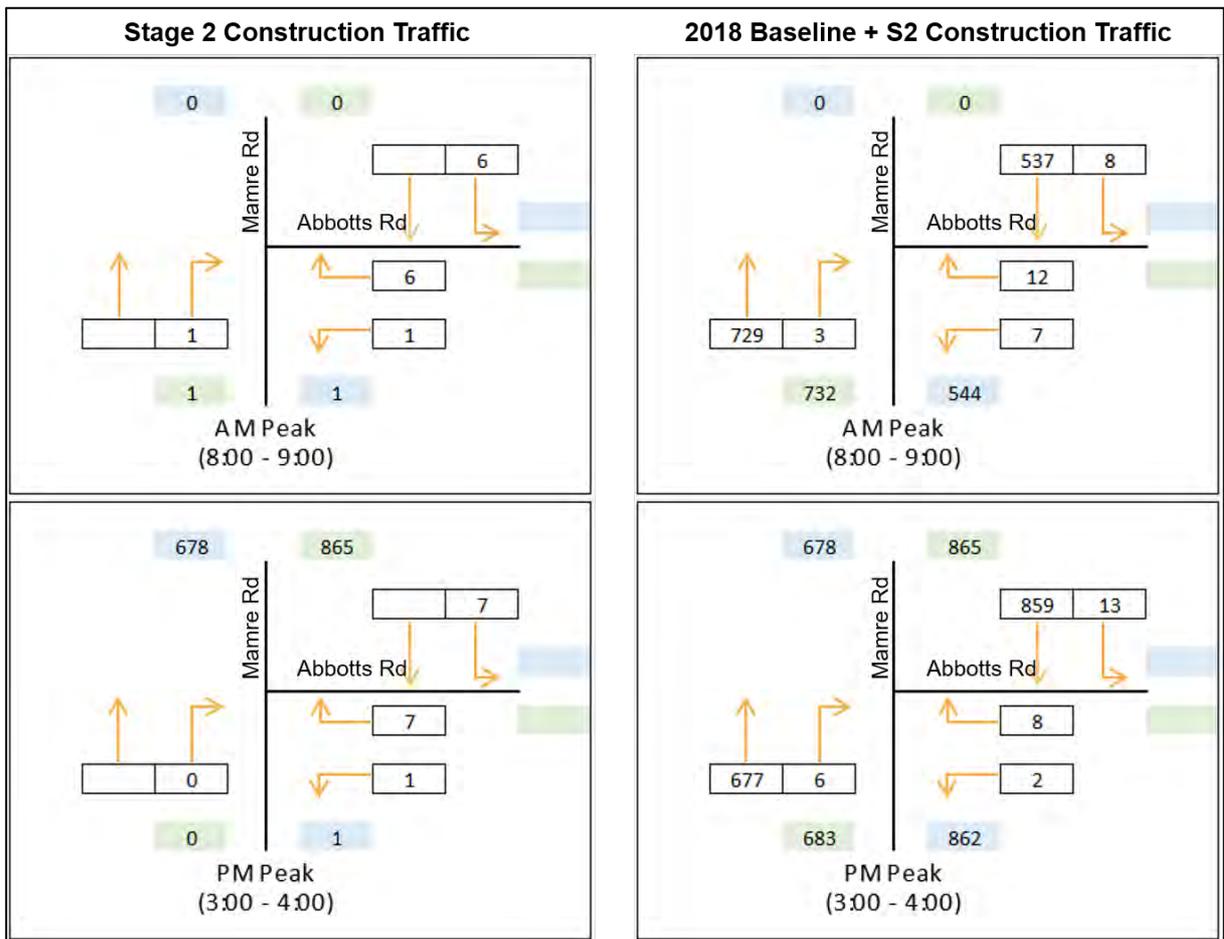


Figure 10: Mamre Road / Abbotts Road - Traffic Distribution and Project Traffic

5.5.2 Modelling

Baseline traffic has been established having regard for surveyed traffic flows as well as the inclusion of construction vehicles with the wider Oakdale West Estate earthworks. The Project scenario includes the Stage 2 construction traffic as outlined above. The results of the modelling are presented in **Table 8** and **Table 9**.

Table 8: SIDRA Modelling Results - Baseline

	Time Period	Delay (sec)	LoS
Mamre Road x Bakers Lane	AM (outside network peak)	11.8	A
	PM (outside network peak)	13.9	A
Mamre Road x Abbots Road	AM (network peak)	38.9	C
	PM (network peak)	71.9	F
Mamre Road x Abbots Road (No right turn out)	AM (network peak)	10.6	A
	PM (network peak)	17.1	B

Table 9: SIDRA Modelling Results - Project Case

	Time Period	Delay (sec)	LoS
Mamre Road x Bakers Lane	AM (outside network peak)	12.5	A
	PM (outside network peak)	14.4	A
Mamre Road x Abbots Road (No right turn out)	AM (network peak)	13.6	A
	PM (network peak)	28.8	C

The intersection modelling demonstrates:

- Mamre Road / Bakers Lane operates at LoS A outside of the peak periods in both Base and Project case, indicating that the existing intersection has sufficient capacity to provide for associated traffic.
- The Mamre Road / Abbots Road intersection generally performs at a satisfactory LoS, with the exception of the right-out movement from Abbots Road. This movement is impacted by long average delay times accredited to the function of the priority intersection.
- Options testing to ban the Right-Out movement from Abbots Road and restrict the approach to Left-Out only rectifies the delay issue, improving the overall intersection performance.

- The right turn out movement from Abbots Road into Mamre Road northbound can be prohibited by means of “No Right Turn” signs at this intersection.

In accordance with the advice provided to Ason Group, Goodman has engaged DPIE regarding this DA and the temporary construction route arrangement to be provided from Abbots Road.

5.6 Traffic Impacts

Overall, the modelling results indicate that construction traffic generates minimal impact to the road network, both inside and outside of the network peaks, as a result of the moderate level of traffic volumes generated during these time frames.

Nevertheless, it is recommended that during the operational use of the Mamre Road / Abbots Road priority intersection, right-out movements from Abbots Road should be prohibited to mitigate potential impacts to intersection delay primarily during network peak periods. This may be enforced with signage on the Abbots Road approach, or via a solution such as usage of barriers or islands to prevent undesirable movements. It should be emphasised again that this is a temporary arrangement and will only be applicable for a short period of a day and, between 1st June 2020 through to 1st October 2020.

It is noted that the existing Mamre Road intersection has already includes a Basic Turn Treatment (BAR) as denoted in Austroads Guidelines 4A and includes a 110-metre flared lane for northbound traffic to mitigate the impacts on trafficable flow by right-turning vehicles, as demonstrated in **Figure 11**.

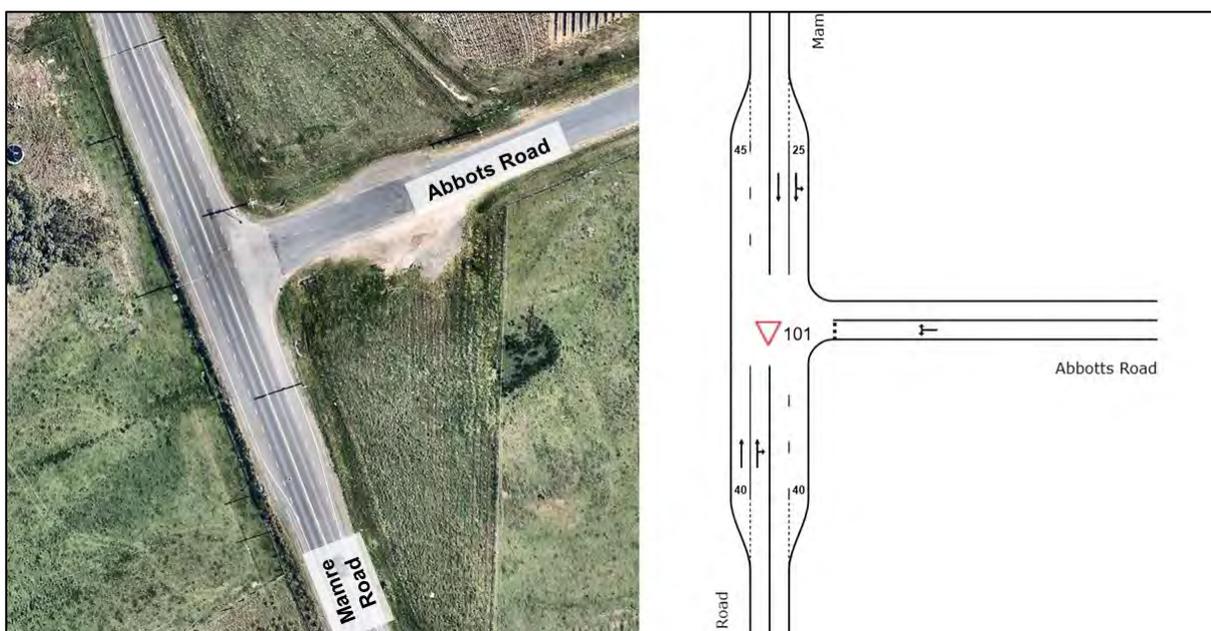


Figure 11: Basic Turn Treatment (BAR) Mamre Road / Abbots Road

6 Design Commentary

6.1 Relevant Design Standards

The site access, car park and loading has generally been designed to comply with the following relevant Australian Standards:

- AS2890.1 for car parking areas;
- AS2890.2 for commercial vehicle loading areas;
- AS2890.3: Bicycle Parking; and
- AS2890.6 for accessible (disabled) parking.

6.2 Access Design

6.2.1 Car Park Access Design

A total of 4 access crossovers servicing a total of 1,127 car parking spaces are proposed. In this regard, the car parking area can be divided into 4 sections with approximately 200-300 spaces each serviced by one of the access points. On this basis, a Category 2 access driveway is nominally required (in accordance with Table 3.1 of AS2890.1).

In response, the proposed access crossovers are all separate entry and exit with a total width of 7.5 metres which is considered superior to the minimum 6.0m combined width required for a Category 2 driveway.

Furthermore, all 4-access point have been reviewed for sight line assessments and found to be satisfactory. However, to improve the sight lines at these accesses any landscaping proposed at the access points shall be limited to 0.5 metres in height for the first 83 metres along the kerb line to provide for a desirable Stopping Sight Distance (SSD) in accordance with figure 3.2 of AS2890.1 and with respect to the 60 km/hr speed limit on Estate Road 03.

Furthermore, it is noteworthy that all Estate Roads within OWE will be 'No Stopping' (or No Parking as appropriate) and hence readily improving the sight lines at access points in general.

6.2.2 Access to Commercial Area

Primary access to the hardstand area will be provided via the northern access point — a separated access with 12m entry and 12m exit with 1.5m median separation — which meets the requirements of AS2890.2 as outlined in Figure 3.2 of this standard.

A secondary 'Exit Only' crossover at the southern end of the Site is also provided which is expected to be in operation during the peak seasonal demand and provides a contingency in the event of unplanned issues (e.g. a breakdown or maintenance works) at the primary access.

The suitability of both access crossovers has been tested by 26.0 metres B-Double in AutoTrack software and is included in **Appendix A1** of this report.

6.3 Design Commentary

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

- The crossover locations provide sufficient sight distance to any potential obstructions or conflicts.
- Internal circulation of the hardstand area is designed to facilitate the maximum vehicle size (design vehicle) of a 26m B-Double. The more common vehicle used in operation is expected to be an 19m Articulated Vehicle (AV), and to a lesser extent, a 12.5m Heavy Rigid Vehicles (HRVs).
- Car park facilities have been designed in accordance with User Class 1/1A for employee parking.
- 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.
- Motorcycle parking is located in an appropriate area to mitigate the potential impacts of vehicular parking and manoeuvring.

In this regard, consideration should be given to the swept path analysis conducted for the proposal and provided in **Appendix A1**.

Furthermore, compliance with the above Standards would be expected to form a standard condition of consent to any development approval.

7 Preliminary Sustainable Travel Plan

7.1 Purpose

This plan sets out objectives and strategies to assist both the DPIE and Penrith City Council in achieving their goals to improve sustainability of work trips for the proposal. This STP includes a review of the existing transport choices and sets targets so that the effective implementation of the STP can be assessed. These targets are intended to be realistic but ambitious enough to initiate substantive behavioural change to achieve the desired outcomes, given existing and future multi-modal transport networks.

This STP is expected to be coordinated with the site tenants or their representatives. It shall be reviewed and updated regularly as part of an ongoing review to ensure it remains relevant and reflective of current conditions.

7.2 Travel Mode Share Analysis

It is noteworthy that the Site is still in development, as such existing travel patterns cannot be ascertained at this time. Therefore, for the purposes of the STP, a neighbouring travel zone with existing development, DZN114695449, has been identified and assessed.

Existing travel patterns of employees within the surrounding area have been surveyed in the 2016 Census and presented in the Journey to Work (JTW) dataset provided by TfNSW. The JTW information for the Site and surrounding locality is presented in **Figure 6** below.

It is evident that the area experiences a high proportion of private vehicle trips (inclusive of vehicle driver and vehicle passenger modes) and similarly a low proportion of public and active transport modes. Accordingly, the mode share analysis indicates a high likelihood for staff associated with the development to use private vehicles as the primary mode of transport.

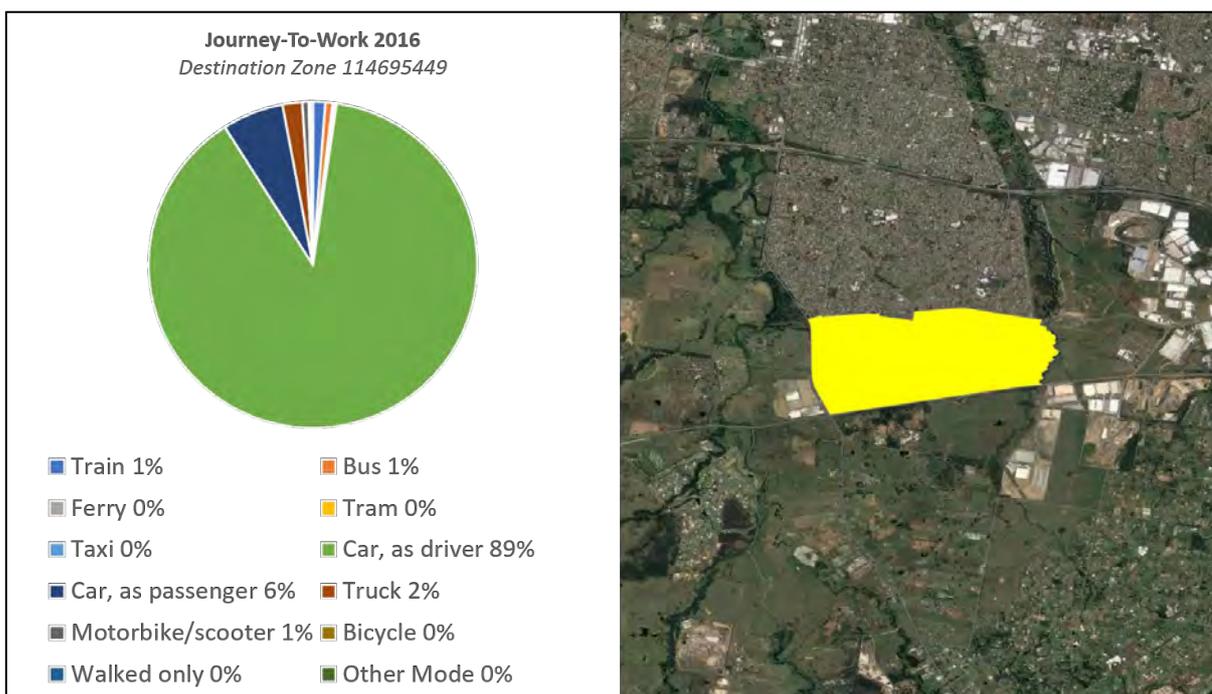


Figure 12: Journey-To-Work 2016 Profile

7.3 Strategic Context

7.3.1 Western Sydney Employment Area

The Oakdale Precinct is located within the Western Sydney Employment Area (WSEA), part of the Western Sydney Priority Growth Area – planning for which being driven by the DPIE. A key outcome of the project involves providing land opportunity for industry and employment, including improvements in connectivity to benefit transport, logistics, warehousing and office space of the area. The project aims to support the urban growth of the Badgerys Creek Aerotropolis and Western Sydney Airport.

7.3.2 North South Rail Link

The North South Rail Link is a proposed rail access corridor supporting the urban growth and employment through the Western Sydney Priority Growth Area, providing connection between the northern growth centres, through the Badgerys Creek and southwards. The corridor study identifies St Marys Station and Schofields Road as junction points for the corridor, passing through the WSEA site and towards the Western Sydney airport. This rail link will provide additional connectivity to Erskine Park and Orchard Hills from the north and south, widening the potential catchment area of employment and improving workplace accessibility for public transport modes.

7.4 Surrounding Public Transport Services

7.4.1 Railway Services

The *Integrated Public Transport Service Planning Guidelines, Sydney Metropolitan Area* (Transport for NSW, December 2013) states that rail services influence the travel mode choices of areas within 800 metres (approximately 10 minutes' walk) of a railway station. The closest railway station to the Oakdale West Precinct is Mt Druitt Station, is approximately 7km north of the site. This would imply that commuting by rail would have minimal influence on workplace travel.

It should be noted that several studies conducted for the Broader Western Sydney Employment Area (BWSEA) reference the potential development of connecting freight or passenger corridor to the Site's west, connecting the T1, T2 and T5 lines to Badgerys Creek Airport^{1 2}.

7.4.2 Bus Services

Having regard to the standard bus travel, the *Integrated Public Transport Service Planning Guidelines* state that bus services influence the travel mode choices of sites within 400 metres (approximately 5 minutes) of a bus stop. As there are no existing bus services in the proximity of the Site, this implies that bus commuting would have minimal influence on workplace travel.

As outlined in the WSEA, a new regional road network is being developed interlinking the industrial precincts within the region to support the growth and continued development of the area. This presents the potential for an accompanying expansion in the bus service network to connects places of employment within the region.

Currently, Goodman is investigating opportunities to facilitate bus service routes for the Oakdale West Precinct.

¹ Western Sydney Rail Needs Scoping Study https://www.westernsydneyairport.gov.au/files/WSRNSS_Outcomes_Report.pdf

² Broader Western Sydney Employment Area – Structure Plan
<https://www.planning.nsw.gov.au//media/Files/DPE/Reports/broader-western-sydney-employment-area-structure-plan-transport-planning-preliminary-analysis-report-exhib-draft-2013-06.pdf?la=en>

7.5 Objective and Targets

7.5.1 Objectives

The primary objectives of this STP are to:

- Reduce the environmental footprint of the development,
- Promote the use of ‘active transport’ modes such walking and cycling, particularly for short-medium distance journeys,
- Reduce reliance on the use of private vehicles for all journeys,
- Encourage a healthier, happier and more active social culture.

Having regard for the above, this Plan adopts the following movement hierarchy with priority given to ‘active transport’ followed by mass public transport and lastly the use of cars and other private vehicles.



Figure 13 : Movement Hierarchy

In a broad sense, this STP is intended to encourage the use of active transport thereby reducing the overall distance travelled by private vehicles.

It is noted that the above hierarchy applies to staff and visitor (i.e. car) movements. Given the nature of the development for warehouse and industrial purposes, it is acknowledged that there is limited ability to reduce the number of commercial vehicle movements without compromising site operations.

7.5.2 Mode Share Targets

With the above objectives in mind, the mode share targets outlined in **Table 7** are proposed, based on the JTW Profile for Travel Zone 5002 in Section 6.2.

Table 10: Mode Share Targets (Primary Mode of Travel)

Travel Mode.	Existing – DZN 114695449	Proposed	Relative Change
Walking	0%	0%	0%
Cycling	0%	5%	+ 5%
Train ¹	1%	5% ²	+ 4%
Bus ¹	1%	10%	+ 9%
Vehicle Passenger	6%	10%	+ 4%
Vehicle Driver	90%	68%	- 22%
Other/Mode Not Stated	2%	2%	0%

Note: 1) Key opportunity in future with provision of further regional infrastructure

2) The JTW classifies multi-modal journeys by indicating the 'primary' mode only, and is considered in this proposition.

Given the limited options for modal availability in the area, it is difficult to quantify the degree of modal shift from private vehicular usage to public and active transport modes. However, in the context of development outlined in the above sections, it is evident that there is clear direction in a strategic context for the expansion of public and active transport networks to serve the western Sydney area.

In this context, the mode share targets identified in **Table 7** can be considered with a focus on 20% for public and active transport, and 80% on private car usage. This ratio is reflective of travel zones observed to have higher degrees of road network connectivity and limited access to rail facilities. It shall be necessary to adjust these mode share targets as future developments and planned transport infrastructure are realized, allowing for more ambitious targets to be set.

The changes made to cycling, train and bus travel modes are specifically reliant on the improvement of connectivity and additional infrastructure to facilitate them, which is anticipated to occur through several developments and initiatives associated with the broader WSEA. Similarly, the 'Vehicle Passenger' travel mode increase will primarily be met through Precinct specific initiatives, including Shuttle Services

during the peak seasonal demand for Building 2B providing connectivity to nearby stations or interchange nodes, a strategy discussed further in **Section 6.6**.

7.6 Action Plan

7.6.1 Action Plan Measures

The following specific actions have been identified to aid achievement of the targets outlined in Section 6.5.2. It is anticipated that relevant actions in **Table 8** should be conveyed to the tenants at the time of tenancy agreement.

Identified strategies include promotion of some event or day-specific activities. In isolation, these may not dramatically alter the day-to-day travel of staff. However, there are benefits of such activities whereby participation can increase awareness of alternative modes of travel that can then form the basis of future travel choices.

Table 11: Action Plan Measures

Item No.	Action / Description	Responsibility
1. General		
1.1	Establish a centralised Travel Plan Coordinator (TPC) which is to take responsibility for the ongoing review and monitoring of this Plan. This person(s) shall also provide direction to tenants in relation to tenant-specific requirements arising from the STP.	Landowner / Strata Manager
1.2	Establish and maintain a transport coordinator to engage with the overall transport coordinator above.	Tenant
1.3	Provide 'Travel Welcome Pack' for newly employed staff, highlighting alternate modes of transport other than use of a private vehicle.	TPC / Tenant
1.4	Review of STP as a regular item on the agenda for the Tenant / Landowner meetings.	TPC
1.5	Encourage flexible work hours, where practicable. Whilst not reducing mode share, this can permit travel outside of peak periods which has other positive benefits.	Tenant
1.6	Preparation of a Transport Access Guide (TAG) – refer Appendix B.	TPC
2. Walking and Cycling		
2.1	Lobby Council / DPIE for improved cycle connections in the broader area.	TPC
2.2	Promote participation in the National Ride2Work Day activity.	Tenant
2.3	Promote participation in Walk to Work Day (and other) events.	Tenant
2.4	Provide and maintain clearly signposted bicycle parking within the Site.	Developer / Landowner
2.5	In accordance with the 5% cycling mode share target, sufficient secure parking spaces and 'EoT' facilities shall be provided and maintained. (NOTE: this can be staged to reflect realised demand)	Developer / Landowner

Item No.	Action / Description	Responsibility
3. Public Transport		
3.1	Advocate for TfNSW to improve public transport services in response to increased development within the surrounding area.	Landowner / TPC
3.2	Update the STP to reflect changes to any bus routes and service times.	TPC
3.3	Undertake a review to promote initiatives for staff using public transport.	TPC / Tenant
4. Shared Vehicles		
4.1	Review initiatives for staff to promote car-pooling. This may include (but not limited to) the provision of online services or forums to facilitate ease of finding carpooling scheme participants.	TPC / Tenant
4.2	Undertake research in the feasibility of providing shuttle services during the Building 2B peak seasonal demand to and from the Site to train stations or other interchange nodes. This may require additional coordination with surrounding precincts to facilitate additional capacity potential.	TPC
4.3	In longer term, engage with Car Share operators to encourage provision of Car Share pods in proximity to the site. This transport option – for miscellaneous travel throughout the day – can then alleviate pressure for staff to drive as part of the primary mode of travel to work.	TPC

Bicycle parking spaces and End of Journey facilities are expected to be provided on-site to support the above Action Plan. Additional bicycle parking spaces (over and above the currently provided 128 spaces) may be recommended in the future; however, this would be subject to further review as part of the ongoing STP maintenance which is discussed further below.

7.6.2 Communications Strategy

Welcome Packs

New staff shall be provided with a 'welcome pack' as part of the on-site induction process which includes the STP and other information in relation to sustainable transport choices. This pack shall include a copy of the Travel Access Guide (TAG) as well as general information regarding the health and social benefits of active transport. Advice on where to find further information should also be included such as links to Sydney Cycleways website (<http://www.sydneycycleways.net>).

7.7 Governance & Support

7.7.1 Travel Plan Coordinator

A person(s) shall be nominated as the Travel Plan Coordinator (TPC) and be responsible for:

- Engagement with the future tenants on-site,
- Implementation and promotion of the STP actions,
- Monitoring the effectiveness of the STP (refer to monitoring requirements outlined in **Section 6.7.3**) and ongoing maintenance of the Plan,
- Provide advice in relation to transport-related subjects to staff, tenancy management and visitors, as required, and
- Liaise with external parties (i.e. Council, public transport and car share operators) in relation to Travel Plan matters.

This role does not necessarily require full-time position; however, it should be clearly designated among the key responsibilities of the building management group.

This may include financial incentives for staff to use active transport and public transport to travel to work. However, this is not a mandatory requirement and would be subject to the management discretion.

7.7.2 Resourcing

It is not anticipated that the maintenance of this STP will have significant ongoing cost implications and shall be reviewed on an annual basis by the TPC in order for the best outcome.

7.7.3 Plan Maintenance

This Plan shall be subject to ongoing review and will be updated accordingly. Regular reviews – ideally on annual basis – will be undertaken by the TPC, as required. Key considerations regarding the review of the STP shall be:

- Updating baseline conditions to reflect any changes to the transport environment in the vicinity of the Site such as changes to bus services, new cycle routes etc. In this regard, review of the STP may be undertaken on a more frequent basis,
- Tracking progress against proposed travel mode targets,
- To identify any shortfalls and develop an updated action plan to address issues, and

- To ensure travel mode targets are updated (if necessary) and to ensure they remain realistic but also ambitious.
- To revise mode share targets and develop strategies that encourage the use of public and active transport and that discourage single occupant car travel to the site, as future public and active transport improvements around the development site occur.

7.7.4 Travel Mode Audit Requirements

Travel mode surveys will be undertaken to determine the proportion of persons travelling to/from the site by each transport mode. This will be in the form of annual travel mode questionnaire surveys to be completed by all persons attending the Site, as far as practicable. This survey may be undertaken online or in-person at the discretion of the TPC. A sample of a typical travel mode questionnaire form is included in **Appendix A3**.

8 Summary & Conclusion

8.1 Key Findings

Key findings of this Development Application (DA) Traffic Impact Assessment (TIA) are as follows:

- This Stage 2 DA 10397 relates to Building 2B, and the development and construction of an industrial warehouse facility within Precinct 2 (of the Concept Plan envisaged by MOD 3).
- The development comprises:
 - 206,968 m² GFA (200,668 m² GLA), consisting of 195,176 m² of Warehouse space; and 5,492 m² of Office space,
 - 1,127 car parking bays (incl. 36 accessible parking bays),
 - 54 motorcycle parking bays,
 - 135 truck parking bays; and
 - 61 rear loading bays catering for AVs and HRVs.
- Proposed car parking, bicycle parking and accessible parking are in line with the requirements of clause B13 and B14 of the Conditions of Consent accompanying the SSD 7348 Approval.
- Operational traffic projections have been provided by the future tenant in order to gain a more detailed appreciation for vehicle movements. Accordingly, Building 2B is anticipated to generate:
 - 580 vehicles in the AM road network Peak, and
 - 371 vehicles in the PM road network Peak of a non-peak seasonal period.
 - During the seasonal peak, this generation increases by 240 and 161 in the respective network peaks.
- The wider precinct modelling conducted for MOD 3 reflects these traffic volumes to ensure that the development traffic generation of Building 2B is suitably factored into consideration of the Estate as a whole.
- That precinct-wide modelling has demonstrated that the traffic generation provided by the future tenant will not present any unacceptable impacts to the road network, inclusive of the wider estate's internal roads and connections to the external road network.
- Construction traffic projections have been provided by the construction firm to provide a detailed appreciation for the potential impact of traffic during the construction phase of Stage 2 Works. This traffic is anticipated to peak at a total of 217 daily vehicle trips during November 2020.
- Accordingly, these numbers have been assessed and modelled. According to the SIDRA results:

- These demonstrate no significant impacts to the two critical intersections identified in the Construction Routes.
- Nonetheless, recommendation is made to ban Right-Out movements from the Abbots Road approach of the Mamre Road / Abbots Road intersection, improving intersection performance and driver safety.
- It is expected that a condition of consent requiring compliance with the AS series would be imposed to ensure full compliance at Construction Certificate stage of the project. In this regard, the proposed design of Lot 2B has been assessed in accordance of Australian Standards and is generally supportable. The design has adopted a 26m B-double as the 'design vehicle' which is suitable for a development of this size and nature.

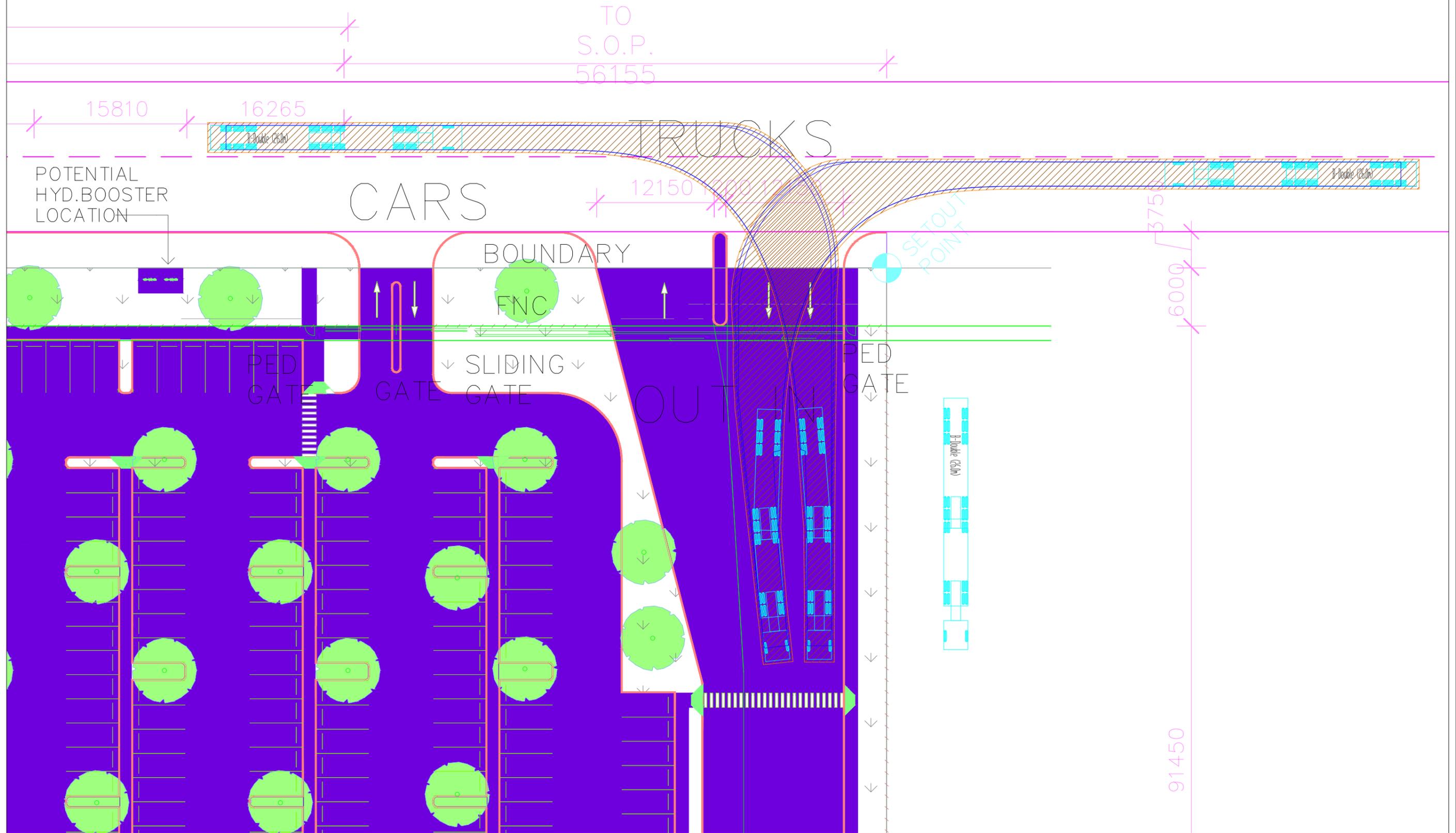
8.2 Conclusion

In summary, the Proposal is supportable on traffic planning grounds and will not result in any adverse impacts on the surrounding road network or the availability of on-street parking.

Appendix A1

Swept Paths

Northern Driveway - IN



Revision notes:

Rev:	Date:	Notes:

For information purposes only - not for construction

Drawn By:

M TANGONAN

Client:

Goodman Property Services

Project:

P1086
OWE - Project Waratah

Drawing Title:

Driveway Access
B-Double (26m)

Date:

4-Dec-19

Scale @ A3:

NTS

Drawing Number:

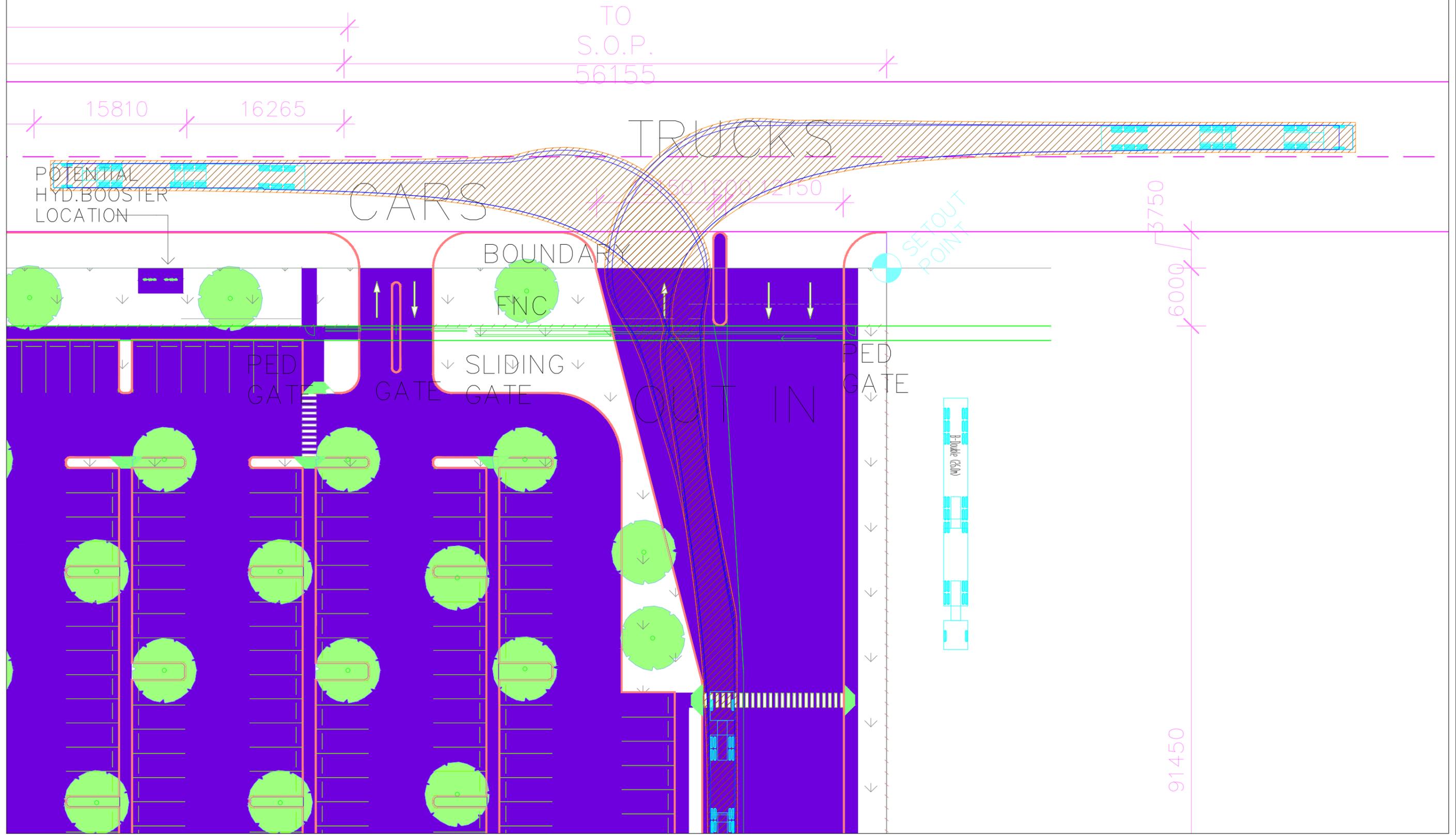
AG01



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

info@asongroup.com.au

Northern Driveway - OUT



Revision notes:

Rev:	Date:	Notes:

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Drawn By:
M TANGONAN

Client:
Goodman Property Services

Project:
P1086
OWE - Project Waratah

Drawing Title:
Driveway Egress
B-Double (26m)

Date:
4-Dec-19

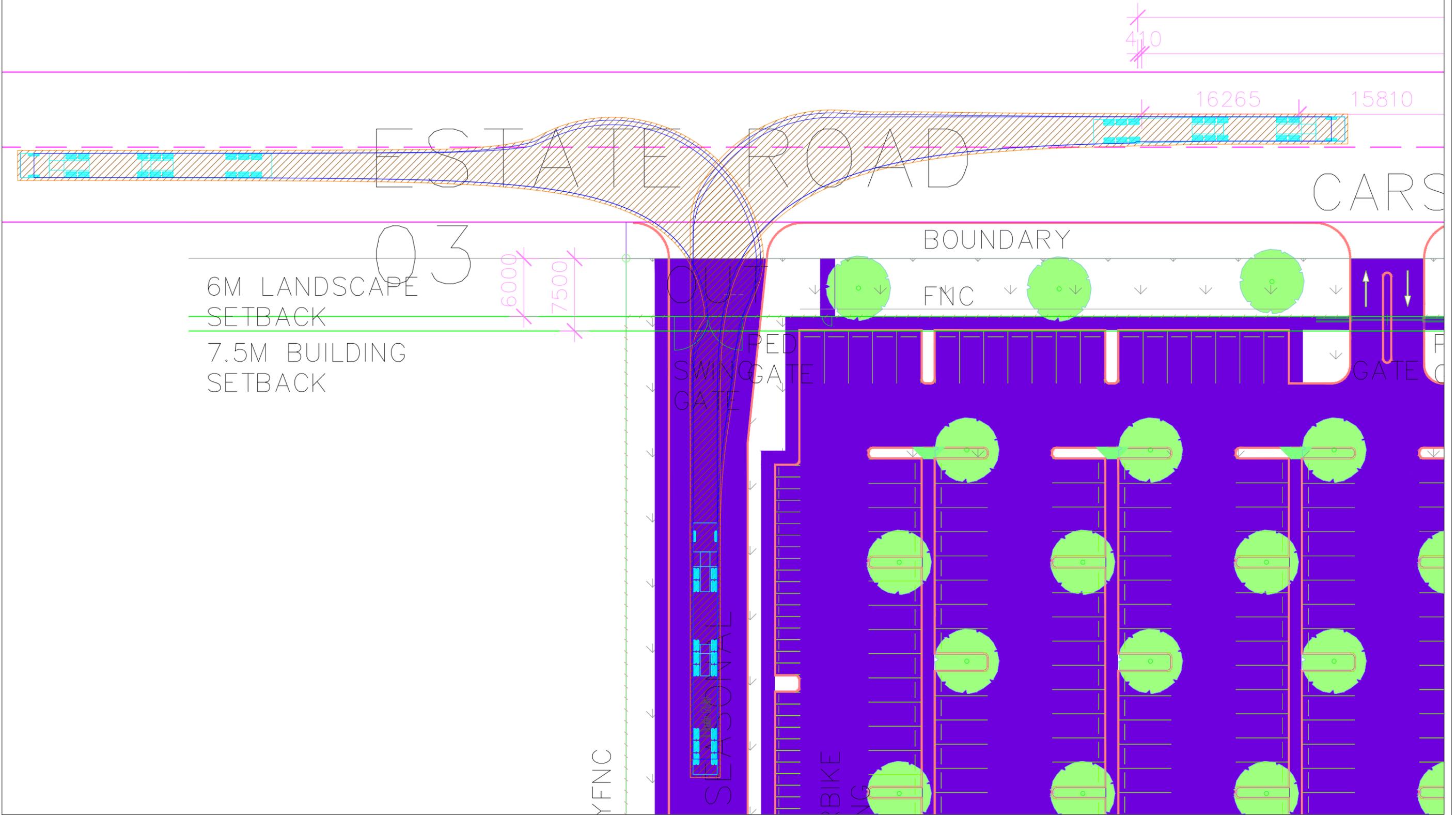
Scale @ A3:
NTS

Drawing Number:
AG02

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Sydney NSW 2000
info@asongroup.com.au

Southern Driveway - OUT



Revision notes:

Rev:	Date:	Notes:

For information purposes only - not for construction

Drawn By:
M TANGONAN

Client:
Goodman Property Services

Project:
P1086
OWE - Project Waratah

Drawing Title:
Driveway Egress
B-Double (26m)

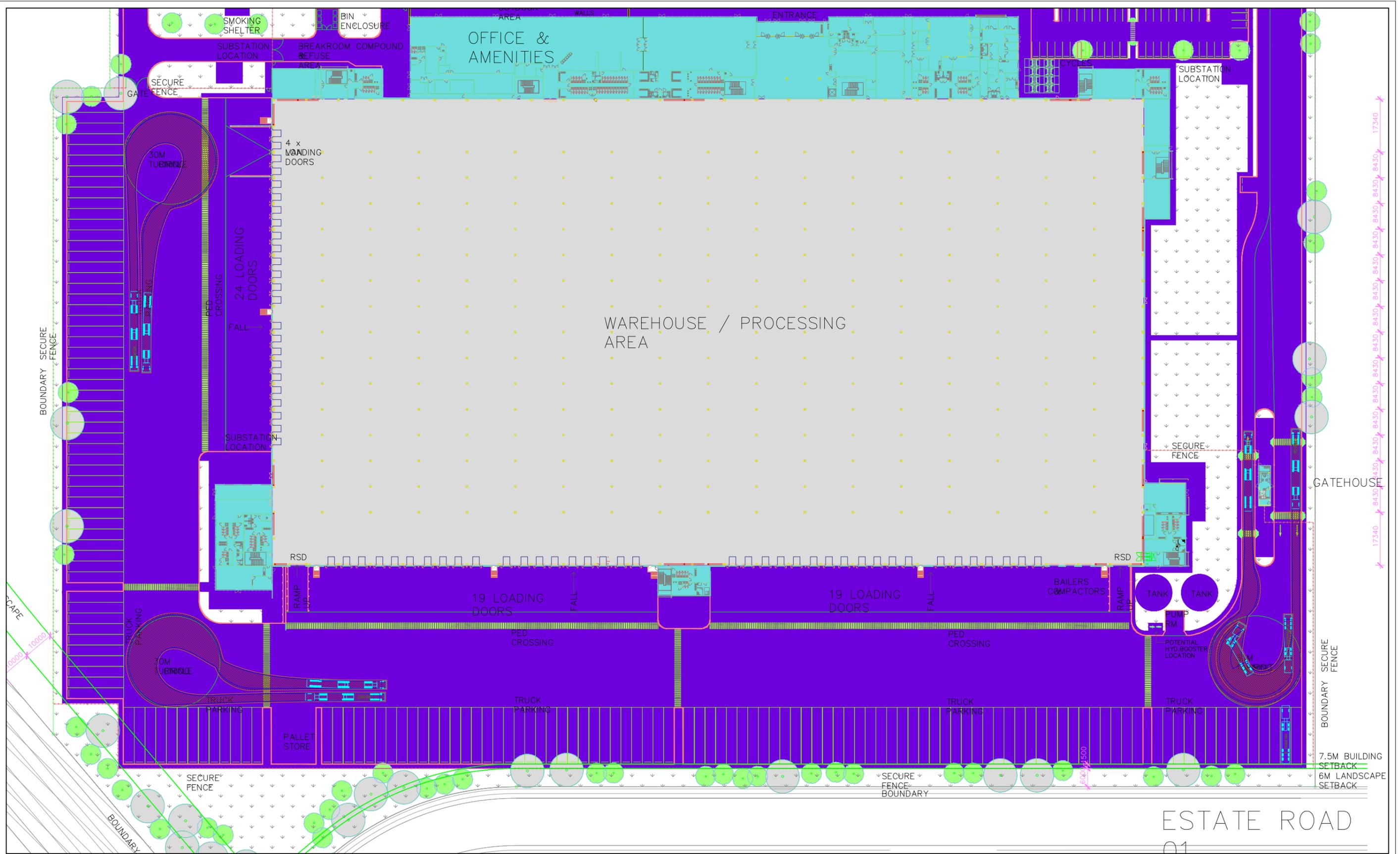
Date:
4-Dec-19

Scale @ A3:
NTS

Drawing Number:
AG03

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Revision notes:

Rev:	Date:	Notes:

For information purposes only - not for construction

Drawn By: M TANGONAN
Client: Goodman Property Services

Project: P1086 OWE - Project Waratah
Drawing Title: Hardstand Turning Circles B-Double (26m), AV (19m)

Date: 4-Dec-19
Scale @ A3: NTS
Drawing Number: AG04

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Appendix A2

Transport Access Guide (TAG)

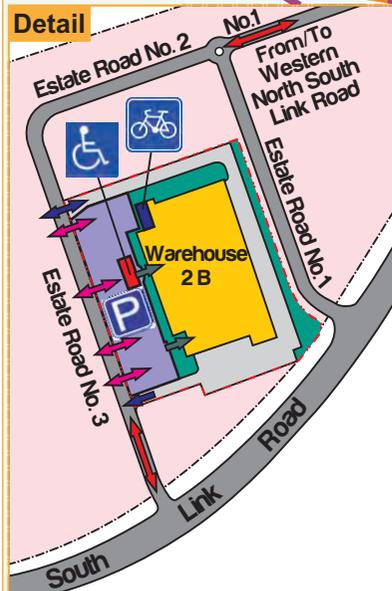
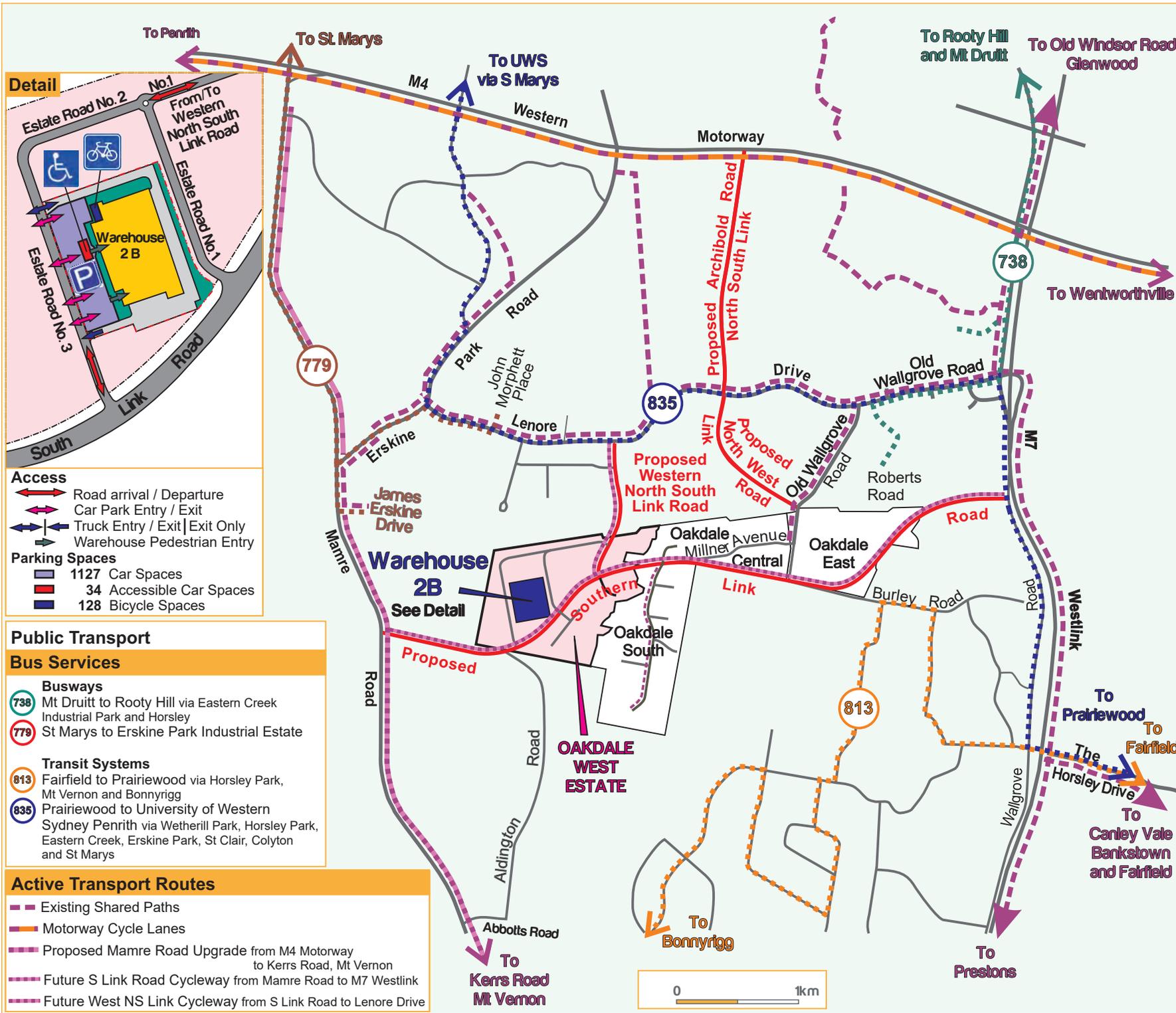
Travel Access Guide



Lot 2B "Waratah" Warehouse Facility
Oakdale West Estate

Kemps Creek Erskine Park 2759

November 2019



- Access**
- ↔ Road arrival / Departure
 - ↔ Car Park Entry / Exit
 - ↔ Truck Entry / Exit | Exit Only
 - ↔ Warehouse Pedestrian Entry
- Parking Spaces**
- 1127 Car Spaces
 - 34 Accessible Car Spaces
 - 128 Bicycle Spaces

- Public Transport**
- Bus Services**
- 738** Busways: Mt Druitt to Rooty Hill via Eastern Creek Industrial Park and Horsley
 - 779** Busways: St Marys to Erskine Park Industrial Estate
- Transit Systems**
- 813** Busways: Fairfield to Prairiewood via Horsley Park, Mt Vernon and Bonnyrigg
 - 835** Busways: Prairiewood to University of Western Sydney Penrith via Wetherill Park, Horsley Park, Eastern Creek, Erskine Park, St Clair, Colyton and St Marys

- Active Transport Routes**
- Existing Shared Paths
 - Motorway Cycle Lanes
 - Proposed Mamre Road Upgrade from M4 Motorway to Kerrs Road, Mt Vernon
 - Future S Link Road Cycleway from Mamre Road to M7 Westlink
 - Future West NS Link Cycleway from S Link Road to Lenore Drive

Appendix A3

Sample Travel Mode Questionnaire

Instructions for Surveyor(s)

1. The Survey Form (over page) should be completed by EVERY PERSON attending the site on a particular day.
2. This survey should be completed SEPARATELY for EACH TRIP undertaken

Travel Mode Questionnaire Survey Form

Date:

Approximate Time:

Q1. Are you one of the following?

- | | |
|--|--|
| <input type="checkbox"/> Office staff | <input type="checkbox"/> Company driver / sub-contractor |
| <input type="checkbox"/> Courier / office delivery | <input type="checkbox"/> Warehouse ground staff |
| <input type="checkbox"/> Casual contractor | <input type="checkbox"/> Other (Please specify) . |

Q2. How did you travel to / from the site today?

- | | |
|---------------------------------------|---|
| <input type="checkbox"/> Walked only | <input type="checkbox"/> Car share vehicle |
| <input type="checkbox"/> Bicycle only | <input type="checkbox"/> Motorcycle / scooter |
| <input type="checkbox"/> Train | <input type="checkbox"/> Car (as passenger) |
| <input type="checkbox"/> Bus | <input type="checkbox"/> Car (as driver) |
| <input type="checkbox"/> Taxi | <input type="checkbox"/> Other (Please specify) |

Q3. If you drove to the site, where did you park?

- | | |
|---|--|
| <input type="checkbox"/> Not applicable – did not drive | <input type="checkbox"/> On-street |
| <input type="checkbox"/> On-site car park | <input type="checkbox"/> In other nearby off-street car park |
| <input type="checkbox"/> On-site within truck hardstand | <input type="checkbox"/> Other (Please specify) |

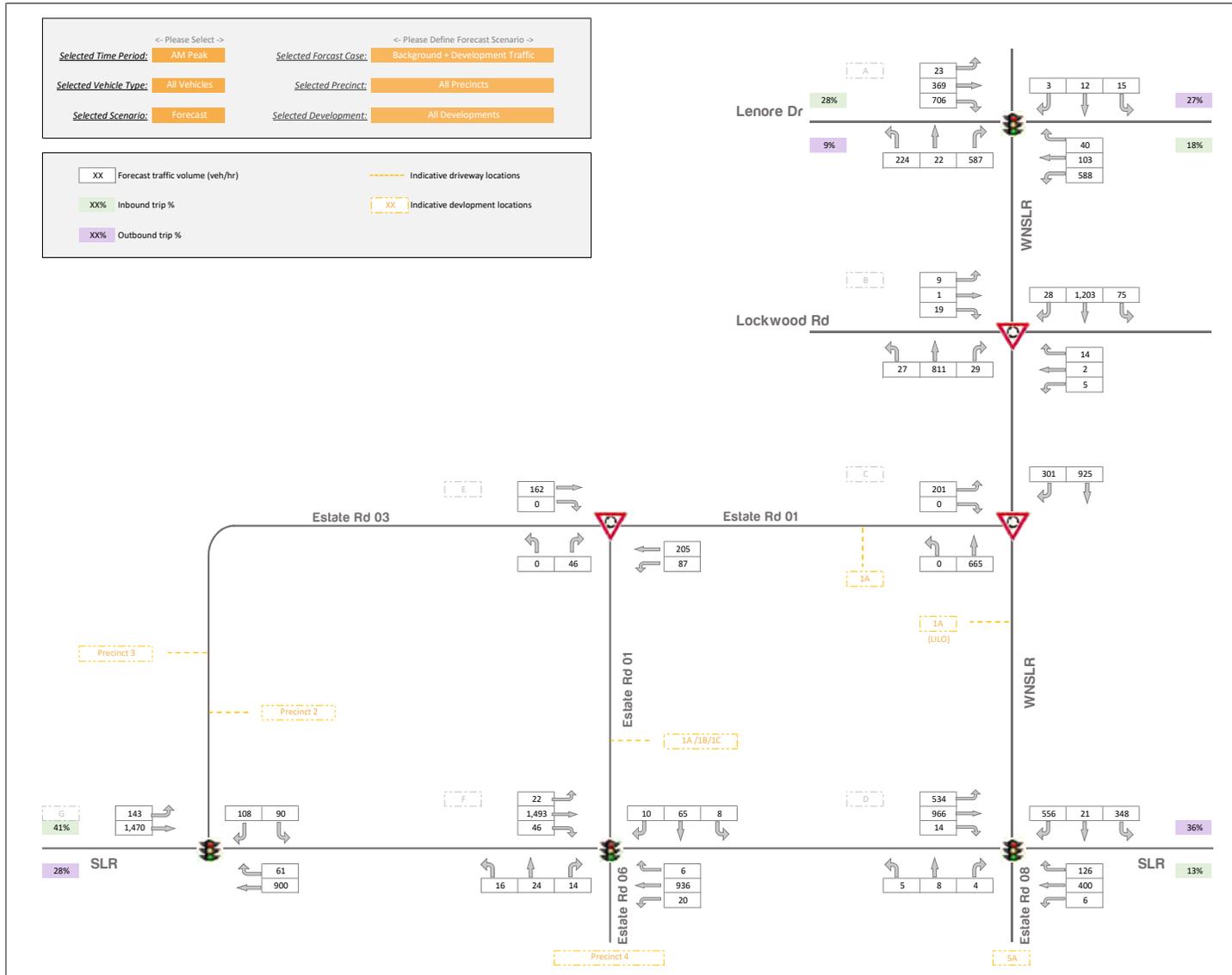
Q4. What is your Residential Postcode?

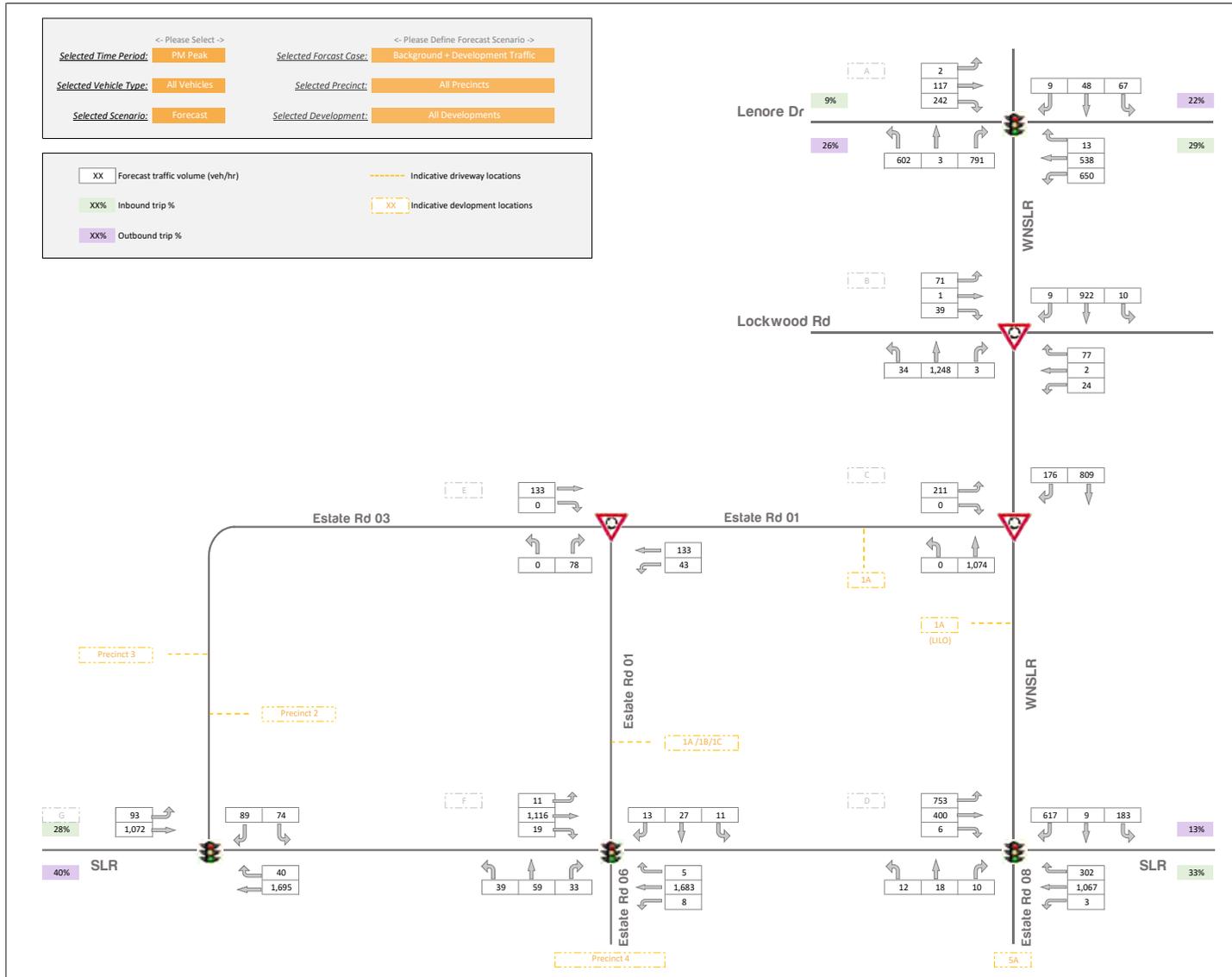
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Appendix B

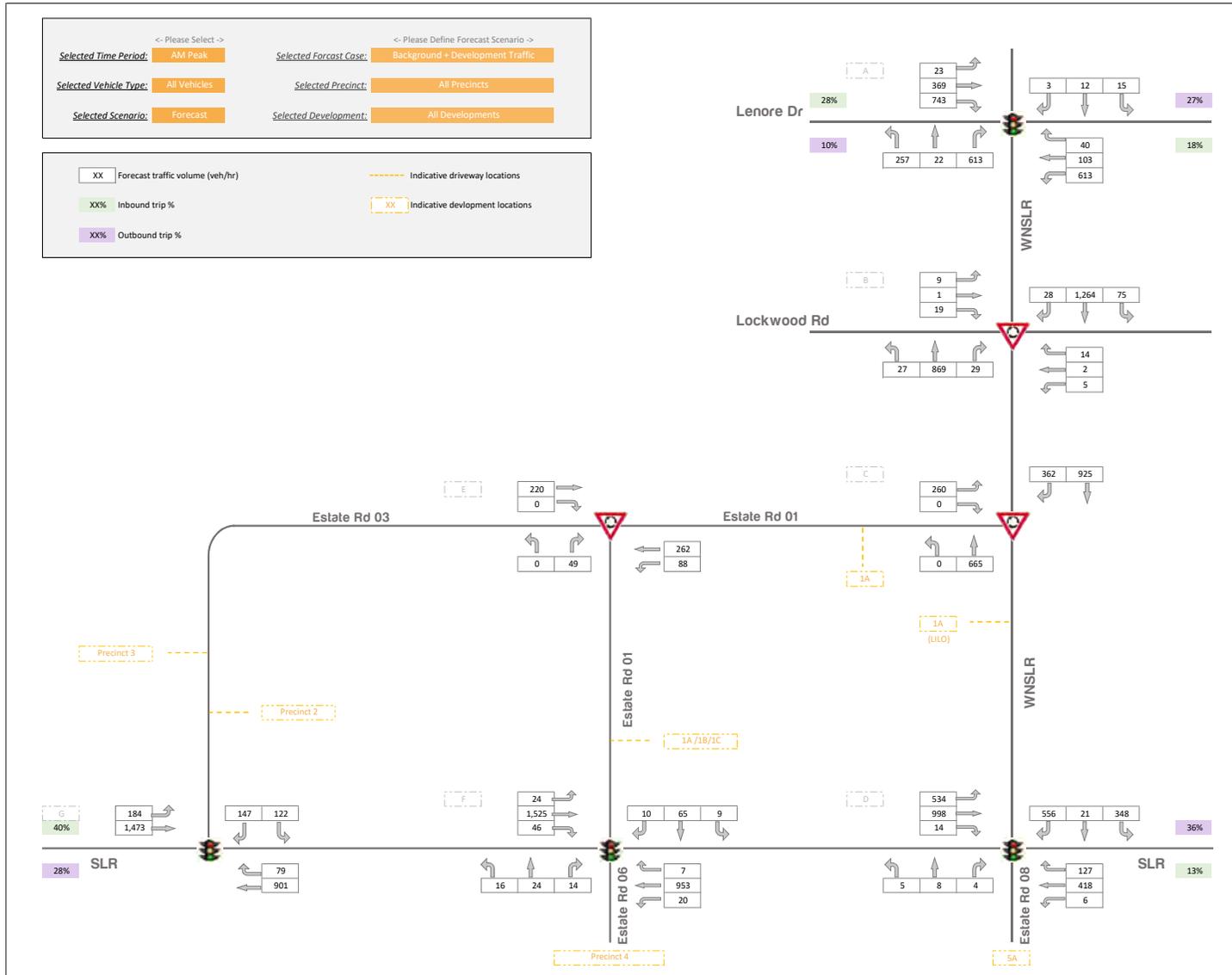
Traffic Flow Network Diagrams

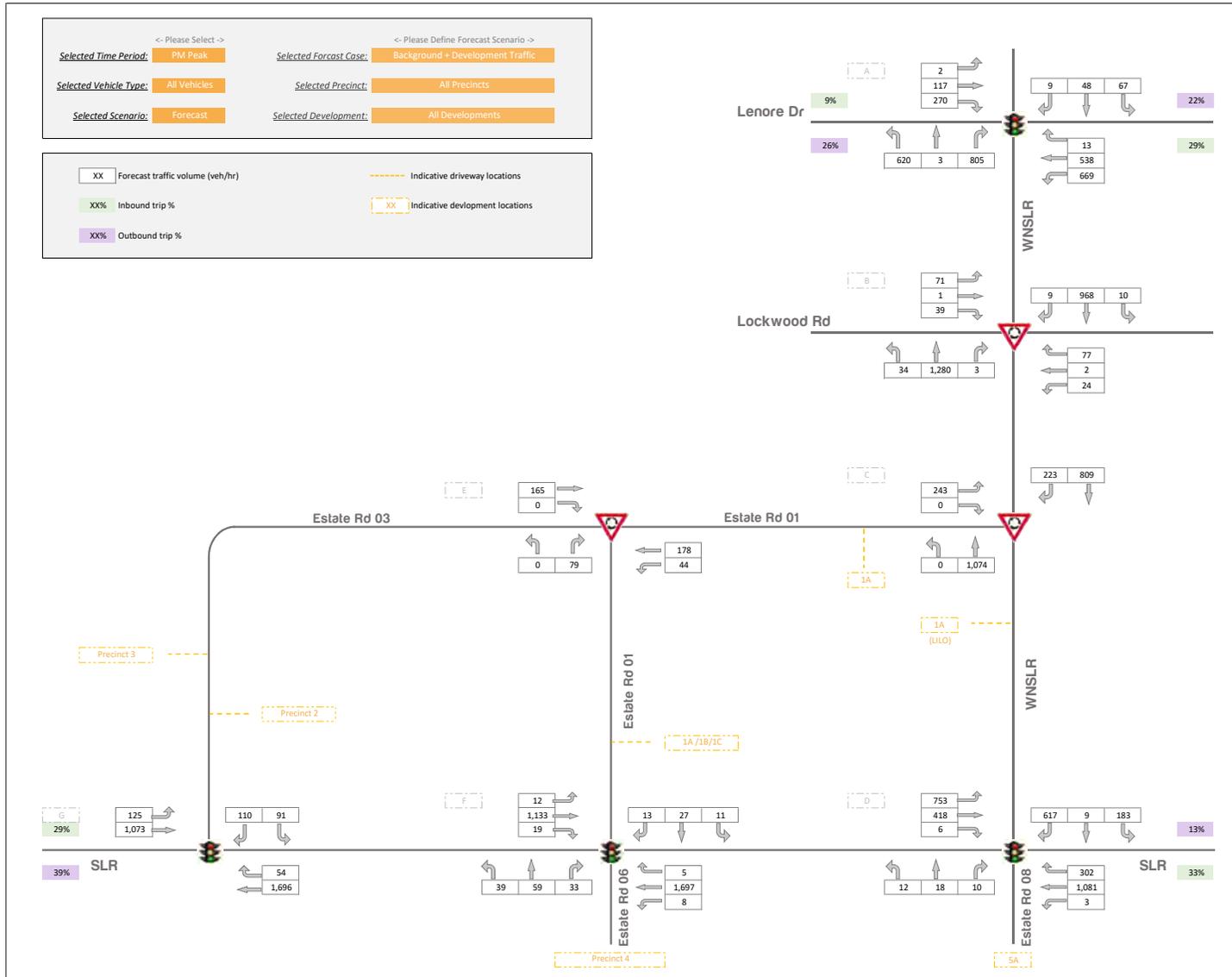
Modelling Year 2026 – Non-seasonal Peak



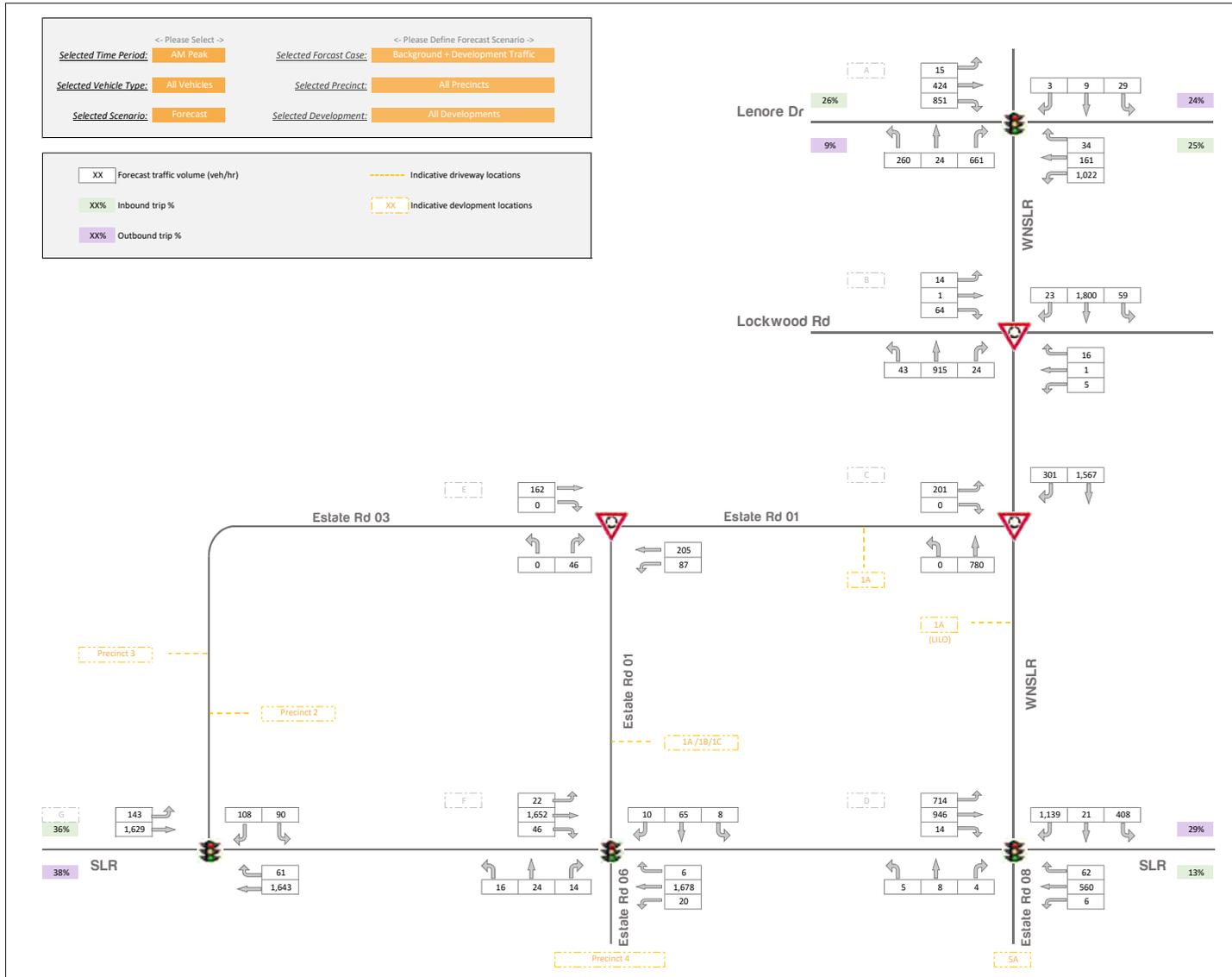


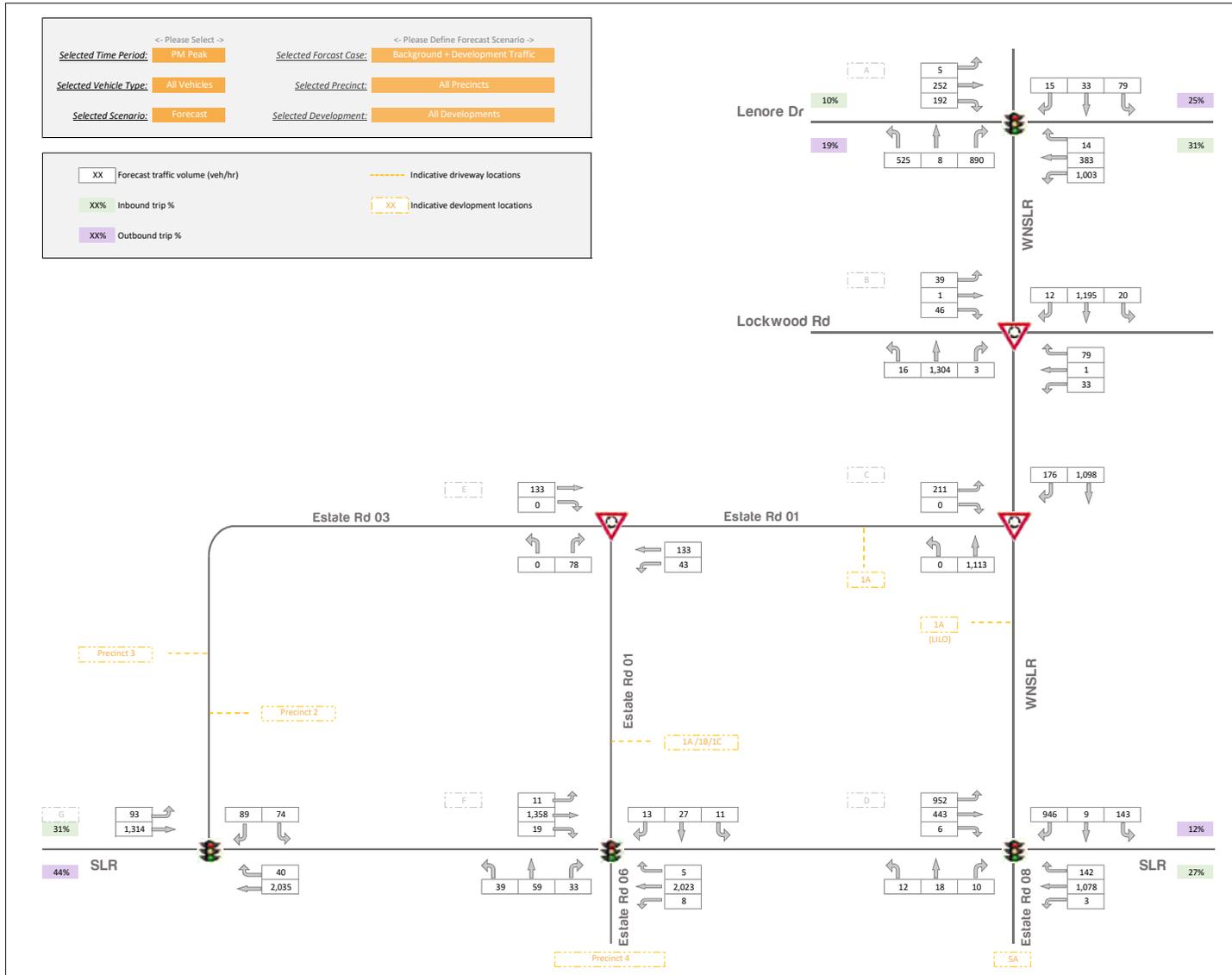
Modelling Year 2026 – Seasonal Peak



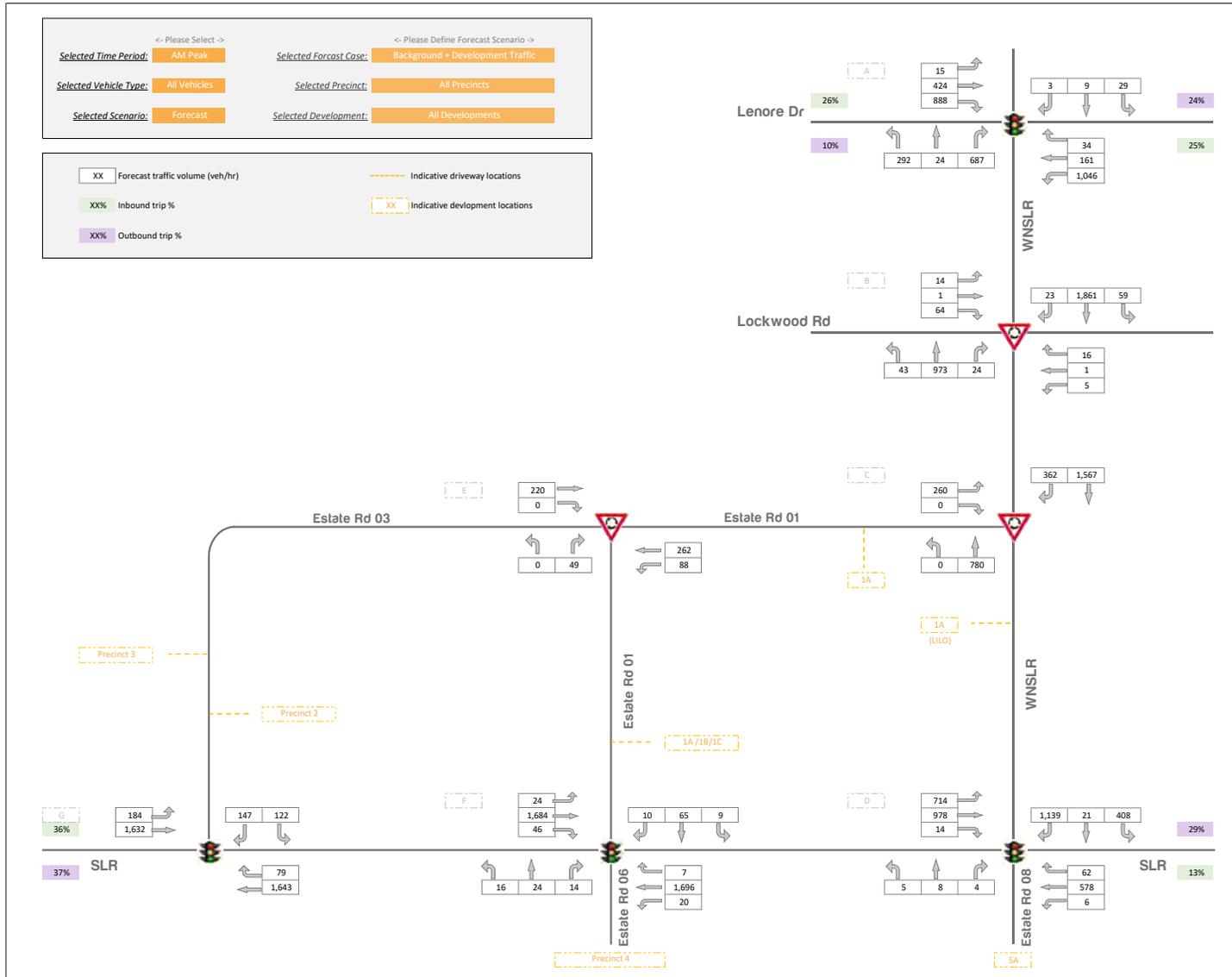


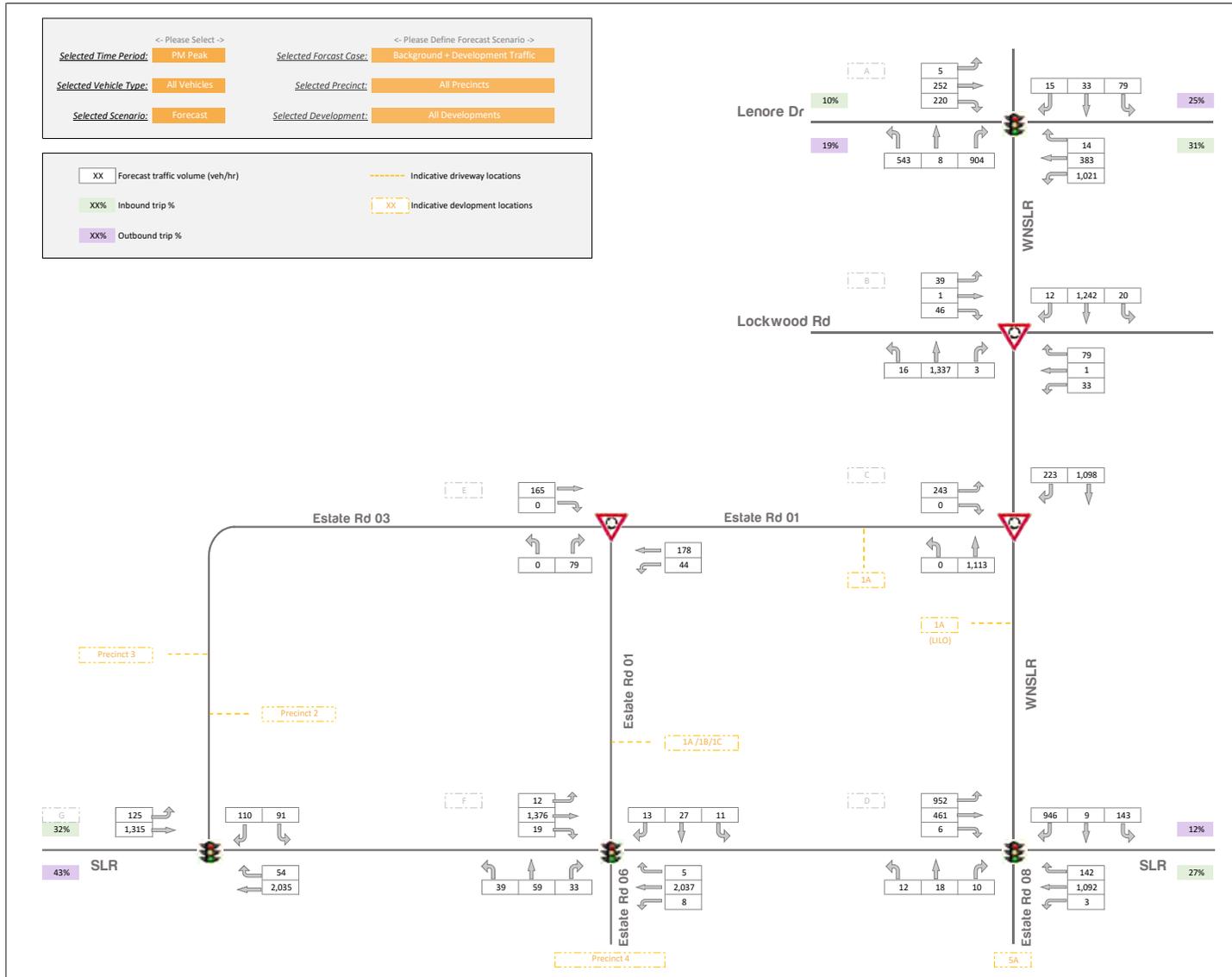
Modelling Year 2036 – Non-seasonal Peak





Modelling Year 2036 – Seasonal Peak





Appendix C

Detailed SIDRA Results

2026 Intersection Performance

Intersection	Control	Period	SSDA 7348 Approval				Modification 3 (Non-peak Seasonal)				Modification 3 (Peak Seasonal)					
			Overall Intersection Delay - LoS	Approach	Average Queue (m)	Average Delay (sec)	Overall Intersection Delay - LoS	Approach	Average Queue (m)	Average Delay (sec)	Overall Intersection Delay - LoS	Approach	Average Queue (m)	Average Delay (sec)		
WNSLR / Lenore Drive	Signal	AM	40.3 - C	S	88	54.6	45.8 - D	S	100	54.2	52.7 - D	S	110	57.7		
				E	116	38.0		E	129	45.0		E	152	53.6		
				N	9	62.8		N	8	62.6		N	8	62.6		
		PM	31.7 - C	W	169	31.5	34.9 - C	W	225	39.4	36.2 - C	W	269	47.8		
				S	105	28.2		S	109	31.0		S	116	32.6		
				E	76	28.2		E	79	31.4		E	82	32.8		
				N	36	62.5		N	37	66.7		N	37	66.7		
				W	42	50.5		W	77	50.5		W	85	50.6		
WNSLR / Lockwood Road	Roundabout	AM	13.1 - A	S	6	10.7	13.4 - A	S	7	10.7	13.6 - A	S	8	10.7		
				E	1	13.1		E	1	13.4		E	1	13.6		
				N	11	10.9		N	12	10.9		N	13	10.9		
		PM	14.8 - B	W	1	11.7	14.9 - B	W	1	12.2	15.1 - B	W	1	12.4		
				S	16	11.3		S	16	10.9		S	16	11.0		
				E	2	12.1		E	2	12.7		E	2	12.8		
				N	6	10.7		N	8	10.7		N	9	10.7		
				W	3	14.8		W	4	14.9		W	4	15.1		
WNSLR / Estate Road 1	Roundabout	AM	12.0 - A	S	6	7.8	11.8 - A	S	5	8.2	11.9 - A	S	6	8.7		
				N	11	12.0		N	11	11.8		N	12	11.7		
				W	2	11.8		W	5	11.6		W	6	11.9		
		PM	15.1 - B	S	9	6.4	13.4 - A	S	9	7.6	14.0 - A	S	10	8.0		
				N	8	12.4		N	8	11.9		N	9	11.9		
				W	9	15.1		W	6	13.4		W	8	14.0		
				S	1	35.8		S	2	35.6		S	2	35.6		
				E	37	32.0		E	34	30.5		E	34	29.8		
				N	70	35.1		N	69	36.4		N	72	38.2		
WNSLR / SLR	Signal	AM	28.4 - B	W	97	22.8	29.1 - C	W	112	24.0	29.5 - C	W	117	24.2		
				S	5	31.0		S	6	37.8		S	6	37.8		
				E	107	30.8		E	131	34.7		E	139	36.0		
		PM	31.5 - C	N	95	45.1	31.6 - C	N	80	42.0	32.4 - C	N	80	42.0		
				W	98	21.1		W	49	20.6		W	52	21.2		
SLR x Estate Rd 01	Signal	AM		S			17.2 - B	S	17	69.4	17.3 - B	S	17	69.4		
				E				E	71	11.3		E	73	11.4		
				N				N	28	71.9		N	29	72.3		
		PM				W			18.4 - B	W	154	16.1	18.5 - B	W	160	16.3
						S				S	41	80.7		S	41	80.7
						E				E	193	15.5		E	197	15.7
				N				N	19	80.0		N	19	80.1		
				W				W	99	12.8		W	101	12.9		
SLR x Estate Rd 03	Signal	AM		S			13.4 - A	S	86	8.9	16.0 - B	S	112	10.7		
				E				E	25	44.3		E	38	49.5		
				N				N	120	12.2		N	142	13.6		
		PM				W			16.8 - B	W	122	9.6	20.1 - B	W	135	13.1
						E				E	22	41.2		E	25	39.6
						N				N	115	24.0		N	120	27.0
				S			9.3 - A	S	1	9.3	9.3 - A	S	1	9.3		
				E				E	4	3.0		E	4	3.0		
				W				W	2	7.6		W	2	7.6		
Estate Rd 01 x Estate Rd 03	Signal	AM		S			8.5 - A	S	1	8.5	9.8 - A	S	1	9.8		
				E				E	2	3.3		E	5	3.0		
				W				W	2	7.7		W	3	7.6		

2036 Intersection Performance

Intersection	Control	Period	SSDA 7348 Approval				Modification 3 (Non-peak Seasonal)				Modification 3 (Peak Seasonal)			
			Overall Intersection Delay - LoS	Approach	Average Queue (m)	Average Delay (sec)	Overall Intersection Delay - LoS	Approach	Average Queue (m)	Average Delay (sec)	Overall Intersection Delay - LoS	Approach	Average Queue (m)	Average Delay (sec)
WNSLR / Lenore Drive	Signal	AM	37.9 - C	S	79	34.3	37.9 - C	S	87	33.5	38.2 - C	S	91	33.1
				E	125	39.9		E	126	42.3		E	130	42.4
				N	5	29.3		N	5	28.4		N	5	28.4
	Signal	PM	26.9 - C	W	100	38.7	29.6 - C	W	110	37.4	29.6 - C	W	117	38.3
				S	107	22.7		S	104	24.5		S	106	24.6
				E	57	24.8		E	70	26.6		E	74	27.3
WNSLR / Lockwood Road	Roundabout	AM	17.9 - B	N	19	28.2	18.1 - B	N	20	29.0	18.7 - B	N	18	28.1
				W	34	52.9		W	34	55.1		W	34	52.3
				S	7	10.7		S	9	10.8		S	10	10.8
	Roundabout	PM	15.1 - B	E	1	17.9	14.9 - B	E	1	18.1	15.1 - B	E	1	18.7
				N	32	12.1		N	35	12.0		N	38	12.1
				W	2	12.3		W	2	12.8		W	2	13.0
WNSLR / Estate Road 1	Roundabout	AM	12.5 - A	S	18	11.4	12.0 - A	S	17	11.0	12.5 - A	S	18	11.0
				E	3	13.3		E	3	14.0		E	3	14.2
				N	10	10.8		N	13	10.9		N	14	10.9
	Roundabout	PM	17.7 - B	W	3	15.1	13.7 - A	W	3	14.9	14.3 - A	W	3	15.1
				S	8	8.0		S	7	8.3		S	7	8.8
				N	38	12.5		N	45	11.8		N	51	11.7
WNSLR / SLR	Signal	AM	40.3 - C	W	3	12.2	51.1 - D	W	5	12.0	53.8 - D	W	7	12.5
				S	9	6.5		S	10	7.6		S	10	8.0
				N	15	12.7		N	13	11.9		N	15	11.9
	Signal	PM	40.8 - C	W	14	17.7	40.4 - C	W	7	13.7	52.3 - D	W	8	14.3
				S	2	44.0		S	4	51.9		S	4	51.9
				E	59	42.7		E	74	41.7		E	76	41.7
SLR x Estate Rd 01	Signal	AM	40.3 - C	N	191	44.3	51.1 - D	N	243	63.8	53.8 - D	N	243	64.1
				W	146	35.4		W	233	42.6		W	257	48.9
				S	12	47.0		S	10	60.6		S	11	64.5
	Signal	PM	40.8 - C	E	183	52.7	40.4 - C	E	196	48.4	52.3 - D	E	250	66.1
				N	170	54.2		N	171	55.5		N	222	76.5
				W	63	18.2		W	66	20.9		W	68	21.0
SLR x Estate Rd 03	Signal	AM	40.3 - C	S	2	44.0	23.2 - B	S	4	51.9	49.4 - D	S	4	51.9
				E	59	42.7		E	74	41.7		E	76	41.7
				N	191	44.3		N	243	63.8		N	243	64.1
	Signal	PM	40.8 - C	W	146	35.4	26.1 - B	W	233	42.6	38.4 - C	W	257	48.9
				S	12	47.0		S	10	60.6		S	11	64.5
				E	183	52.7		E	196	48.4		E	250	66.1
Estate Rd 01 x Estate Rd 03	Signal	AM	40.3 - C	N	170	54.2	9.3 - A	N	171	55.5	9.7 - A	N	222	76.5
				W	63	18.2		W	66	20.9		W	68	21.0
				S	2	44.0		S	4	51.9		S	4	51.9
	Signal	PM	40.8 - C	E	59	42.7	8.5 - A	E	74	41.7	8.8 - A	E	76	41.7
				N	191	44.3		N	243	63.8		N	243	64.1
				W	146	35.4		W	233	42.6		W	257	48.9
SLR x Estate Rd 01	Signal	AM	40.3 - C	S	12	47.0	17.8 - B	S	10	60.6	19.7 - B	S	11	64.5
				E	183	52.7		E	196	48.4		E	250	66.1
				N	170	54.2		N	171	55.5		N	222	76.5
	Signal	PM	40.8 - C	W	63	18.2	19.4 - B	W	66	20.9	30.3 - C	W	68	21.0
				S	2	44.0		S	4	51.9		S	4	51.9
				E	59	42.7		E	74	41.7		E	76	41.7
Estate Rd 01 x Estate Rd 03	Signal	AM	40.3 - C	N	191	44.3	23.2 - B	N	243	63.8	49.4 - D	N	243	64.1
				W	146	35.4		W	233	42.6		W	257	48.9
				S	12	47.0		S	10	60.6		S	11	64.5
	Signal	PM	40.8 - C	E	183	52.7	26.1 - B	E	196	48.4	38.4 - C	E	250	66.1
				N	170	54.2		N	171	55.5		N	222	76.5
				W	63	18.2		W	66	20.9		W	68	21.0