Traffic Impact Assessment

NEXTDC S4 Data Centre

Prepared for NEXTDC Ltd / 14 June 2024

211085

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Executive Summary

This Traffic Impact Assessment has been prepared by TTW on behalf of NEXTDC Limited to accompany a detailed State Significant Development Application (SSDA) for the S4 data centre development at 16 Johnston Crescent, Horsley Park. The site is legally described as Lot 305 in Deposited Plan 1275011.

This report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued for the project (SSD-63741210). This report concludes that the proposed data centre development is suitable and warrants approval subject to the implementation of the following mitigation measures:

- **Site Access Management:** Recommended installation of 'Give Way' sign and TB line across both passenger and heavy vehicle egress lanes to prioritise potential vehicles exiting that were not permitted access to the site. Additional details with respect to the site signage and linemarking can be provided via a formal plan, subject to council's Condition of Consent.
- **Internal Circulation:** Swept path plan analysis suggests implementing additional one-way aisle circulation to prevent conflicting vehicle movements, especially between passenger and heavy vehicles. Where two-way circulation is provided, convex mirrors on blind corners are recommended to enhance visibility.
- **Traffic Modelling and TfNSW Consultation:** The absence of STFM data from TfNSW necessitates additional information for future volume predictions within the provided modelling scenarios. It is acknowledged that projections of the planned Southern Link Road (SLR) and associated signalised intersections indication an operation at a Level of Service F in 2036 peak periods, pending detailed intersection layout design and signal timing and phasing parameters. Further consultation with TfNSW is required with respect to the SLR planning and future volume projections. However, based on the undertaken 2026 modelling scenario (prior to the construction of the SLR), the road network is expected to function satisfactorily, with no intersection upgrades required due to development traffic. Anticipated impact on local and regional road network is therefore deemed reasonable.

Following the implementation of the above mitigation measures, the remaining impacts are appropriate.

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Revision Register

Rev	Date	Prepared By	Reviewed By	Approved By	Remarks
0	21/12/2023	SS	GC		Draft for Comment
1	20/2/2024	SS	GC		Draft for Comment
2	19/4/2024	SS	GC	PY	Final
3	14/06/2024	SS	GC	PY	Final

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1.0 Introduction

1.1 Project Description

This report has been prepared to accompany a detailed SSDA for the proposed S4 data centre development at 16 Johnston Crescent, Horsley Park (SSD-63741210).

The application seeks consent for construction and operation of a data centre development and includes site preparation works, bulk earthworks and infrastructure, and construction of the buildings, ancillary facilities, and associated site works.

The key features of the Proposal are summarised as follows:

- Site preparation works including bulk earthworks.
- Staged construction and operation of five data centre buildings comprising a total gross floor area (**GFA**) of 63,654m^2 including 52,916m^2 of technical data hall floor space and 10,738m^2 of ancillary office and innovation floor space, including 'front of house' meeting and function spaces, and a café.
- Associated and ancillary on-site facilities on-site parking for 200 cars, business identification signage (pylon and elevation signage), civil and stormwater works and 9,900m^2 of deep soil landscaping.
- Delivery of 232 megawatts of power, including a 330kV substation and a 33kV switching station, plus above ground diesel storage tanks and above ground water tanks for industrial water and fire water.

The Project will be delivered in three construction stages as follows:

- Stage 1 = Buildings A, B, C, and substation
- Stage 2 = Building D
- Stage 3 = Building E

Taylor Thomson Whitting (TTW) has been engaged by NEXTDC to provide traffic engineering consultancy services for the development of the S4 Data Centre. This Transport Impact Assessment (TIA) has been prepared to support the proposal.

1.2 Scope

This TIA has been developed to assess and address the traffic and transport impacts of the proposed development. The report covers the following areas:

- Site access
- Car parking
- Service and loading
- Active transport
- Public transport
- Traffic modelling
- Road network performance

1.3 Guidelines and References

The traffic and transport strategy for the project has been prepared in the context of a variety of relevant codes, standards, and references listed below.

- AS2890 – Parking Facilities
- RTA Guide to Traffic Generating Developments
- NSW Planning Guidelines for Walking and Cycling

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- Fairfield Local Environmental Plan, 2013
- Fairfield Citywide Development Control Plan, 2013
- State Environmental Planning Policy (Western Sydney Employment Area), 2009
- 327 – 335 Burley Road, Horsley Park Development Control Plan, 2016

This report makes reference to architectural plans prepared by HDR, copies of which are included as Appendix 1 of this report.

1.4 Authority Consultation

Pre-application advice was sought from TfNSW with regard to the proposal. The items raised by TfNSW upon initial discussions are noted in Table 1, as well as reference to where these items have been addressed within the design or this report. A copy of the correspondence between TTW and TfNSW is provided as Appendix 2.

Table 1 – TfNSW Pre-DA Advice

Discussions	Design Response
For Modelling purposes, it needs to be a staged approach: *Model Year 2026 –* *1. Telopea Place / Lenore Dr / Old Wallgrove Rd (signalised)* *2. Old Wallgrove Rd / Millner Ave (signalised)* *3. Old Wallgrove Rd / Johnston Cres / Burley Rd* *Model Year 2036 –* *1. Telopea Place / Lenore Dr / Old Wallgrove Rd (signalised)* *2. Old Wallgrove Rd / Millner Ave (signalised)* *3. Old Wallgrove Rd / Johnston Cres (future SLR) / Burley Rd (future SLR) - (4 lane signalised)* 4. *Burley Rd (future SLR) / Wallgrove Rd - (4 lane signalised)*	Refer to Sections 5.1., 5.1.2 and 5.1.3

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Discussions	Design Response
If the DA involves the creation of a TCS then we will require an AIP. *To initiate an Agreement in Principle process, the following supporting documents will need to be provided by the applicant:* *Traffic Signal Warrant Assessment* *SIDRA intersection modelling* *Turning paths for design and check vehicles* *Concept TCS Plan* *Also note the general stipulations included in an Agreement-in-Principle as shown below:* *Please note that following the commencement of the detailed design review unforeseen constraints may be identified which significantly affect the delivery of the project agreed to in principle by this form. This includes, but is not limited to, utility works, land ownership, property acquisition, and drainage.* *Under normal circumstances this Agreement in Principle expires after the latter of:* *5 years after the date of the signatures provided above;* *5 years after the Notice of the Determination for a Development Application from a Consent Authority.*	A TCS is understood to be a Traffic Control System plan for a proposed signalised intersection. The SSDA does involve the creation of a TCS.

1.5 Response to SEARS

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 27 October 2023 issued for the SSDA (SSD-63741210). Specifically, this report has been prepared to respond to the issued SEARS requirement Item 6 as presented below in Table 2.

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Table 2 – Response to SEARs

Assessment Requirements	Section Reference
6. Traffic, Transport and Accessibility Provide a transport and accessibility impact assessment, which includes:	
○ Details of all traffic types and volumes likely to be generated during construction and operation, including a description of key access and haul routes.	Refer to Section 4.8 of this report. Refer to Preliminary CTMP prepared by TTW, under separate cover.
○ An assessment of the predicted impacts of this traffic on road safety and the capacity of the road network, including consideration of cumulative traffic impacts on existing performance levels of nearby intersections (using industry standard modelling).	Refer to Section 5.0 (and all subsections) of this report.
○ Plans demonstrating how all vehicles likely to be generated during construction and operation and awaiting loading, unloading or servicing can be accommodated on the site to avoid queuing in the street network.	Refer to Appendix 6 – Swept path plans of this report. Refer to Preliminary CTMP prepared by TTW, under separate cover.
○ Details and plans of any proposed internal road network, loading dock provision and servicing, on-site parking provision and sufficient pedestrian and cyclist facilities, in accordance with the relevant Australian Standards.	Refer to Section 4.0 (and all subsections) and Appendix 1 – Architectural plans prepared by HDR of this report.
○ Swept path analysis for the largest vehicle requiring access to the development.	Refer to Appendix 6 – Swept path plans of this report.
○ Details of road upgrades, infrastructure works, or new roads or access points required for the development if necessary.	Refer to Section 4.0 of this report.
Provide a Construction Traffic Management Plan detailing predicted construction vehicle routes, access and parking arrangements, coordination with other construction occurring gin the area, and how impacts on existing traffic, pedestrian and bicycle networks would be managed and mitigated.	Refer to Preliminary CTMP prepared by TTW, under separate cover.

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1.5.1 Agency Advice on SEARS

Fairfield City Council provided a SEARs advisory letter, which requested the items listed in Table 3. The issues in Table 3 have been addressed in various sections of this report as referenced in the table.

Table 3 – Response to Agency Advice on SEARs

Issue and Assessment Requirements	Section Reference
D. Traffic, Access and Parking A Traffic and Parking Impact Assessment is required to be submitted as part of the EIS and must address the following matters, but is not limited:	
○ The anticipated traffic generation and parking impacts of the proposed development on the adjoining road network / nearby signalised intersections.	Refer to Section 4.10 and 5.0 (and all subsections) of this report.
○ The intersection shall carry out technical assessment to determine whether any upgrade works need to be carried out at the intersection of Burley Road and Johnston Crescent to minimise the traffic impacts on the SSDA on the surrounding road network.	Refer to Section 5.0 of this report.
○ Details of the maximum size vehicle to access and service the site to be confirmed. PBS and A-Double vehicles are common vehicle types being requested to access the development sites. The applicant needs to consider whether any upgrades are needed at the intersection of Burley Road and Johnston Crescent to accommodate these types of vehicle movements. The applicant shall submit swept path diagrams to demonstrate that the largest vehicle travelling to and from the site can satisfactorily negotiate the chosen vehicle routes.	Refer to Appendix 6 – Swept path plans of this report.
○ Swept path diagrams to demonstrate that the largest vehicle can manoeuvre into, within and out of the site without being impacted by vehicles parking within the site or at/near the site.	Refer to Appendix 6 – Swept path plans of this report.
○ Off-street parking within the site complies with the requirements of relevant DCP car parking rate.	Refer to Section 4.5 of this report.
○ Internal site layout shall comply with the requirements of Australian Standards (AS/NZS 2890.1:2004 and AS2890.2:2018).	Refer to Section 4.4 and Appendix 1 – Architectural plans prepared by HDR of this report.
○ A Construction Traffic Management Plan detailing the stages of works being carried out and the construction traffic impacts of the development proposal on the adjoining road network (state road and local road network) shall be assessed for each stage in more detail.	Refer to Preliminary CTMP prepared by TTW, under separate cover.
○ Consult with Transport for NSW due to the potential impact on the adjoining state road network and the Southern Link Road project.	Refer to Section 1.4 of this report.
○ Unless otherwise agreed, Road Safety Audit should be an integral part of the design development process for all public roads.	No public roads are proposed as part of the SSDA.

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1.6 Response to Test of Adequacy

This report was presented to the Department of Planning, Housing and Infrastructure for a test of adequacy assessment. The relevant traffic, parking and access items that are an outcome of the test of adequacy are provided below in Table 4. This report has been updated accordingly to respond to the resultant items from the test of adequacy.

Table 4 – Response to Test of Adequacy

Issue and Assessment Requirements		Section Reference
Traffic and access	*1 – The Department expresses its concerns regarding the total provision of car parking on the site noting a total of 200 parking spaces to supply 411 operational staff and minimal public transport accessibility. The Department requests an indicative staff roster to identify the total amount of staff at the site at any one time and justify the proposed parking provision.*	Section 4.7 (and all subsections) and Appendix 5

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2.0 Existing Conditions

2.1 The Site

The site is located at 16 Johnston Crescent, Horsley Park within the Fairfield Local Government Area (LGA). The site is legally described as Lot 305 in Deposited Plan 1275011.

An aerial photograph of the site is provided at Figure 1. The site comprises vacant land which has been cleared of vegetation and does not contain any existing built form structures. Bulk earthworks approved under DA-893-201 are currently underway on the site.

The site will be well serviced by infrastructure. The signalised intersection of Lenore Drive and Old Wallgrove Road at Eastern Creek is approximately 2 kilometres to the north, providing access to Wallgrove Road and the Westlink M7 Motorway to the east and Erskine Park Road and Mamre Road to the west. Each of these roads provides access to the M4 Motorway to the north and M5 Motorway to the south. A utilities and site services report will accompany the EIS.

The site is located approximately 35 kilometres west of the Sydney Central Business District (CBD), 17 kilometres west of the Parramatta CBD and 10 kilometres north-east of the future Western Sydney International (WSI) airport.

The site is within a developing employment precinct, including the ESR Horsley Logistics Park, Oakdale Central, Oakdale South and Horsley Park Employment Precinct. It is also close to other established and emerging employment-generating precincts, including Eastern Creek to the north, Huntingwood to the north-east, Wetherill Park and Mamre Road West to the north-west and Wetherill Park to the east.

Figure 1 – Site Aerial Photograph

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2.1.1 Greater Site Location

Figure 2 shows the location of the site within the broader context of its surroundings. The site is located on the north-western border of the City of Fairfield LGA, with Blacktown City Council to the north and Penrith City Council to the west. The site is approximately 4.5 kilometres by road to the M7 motorway.

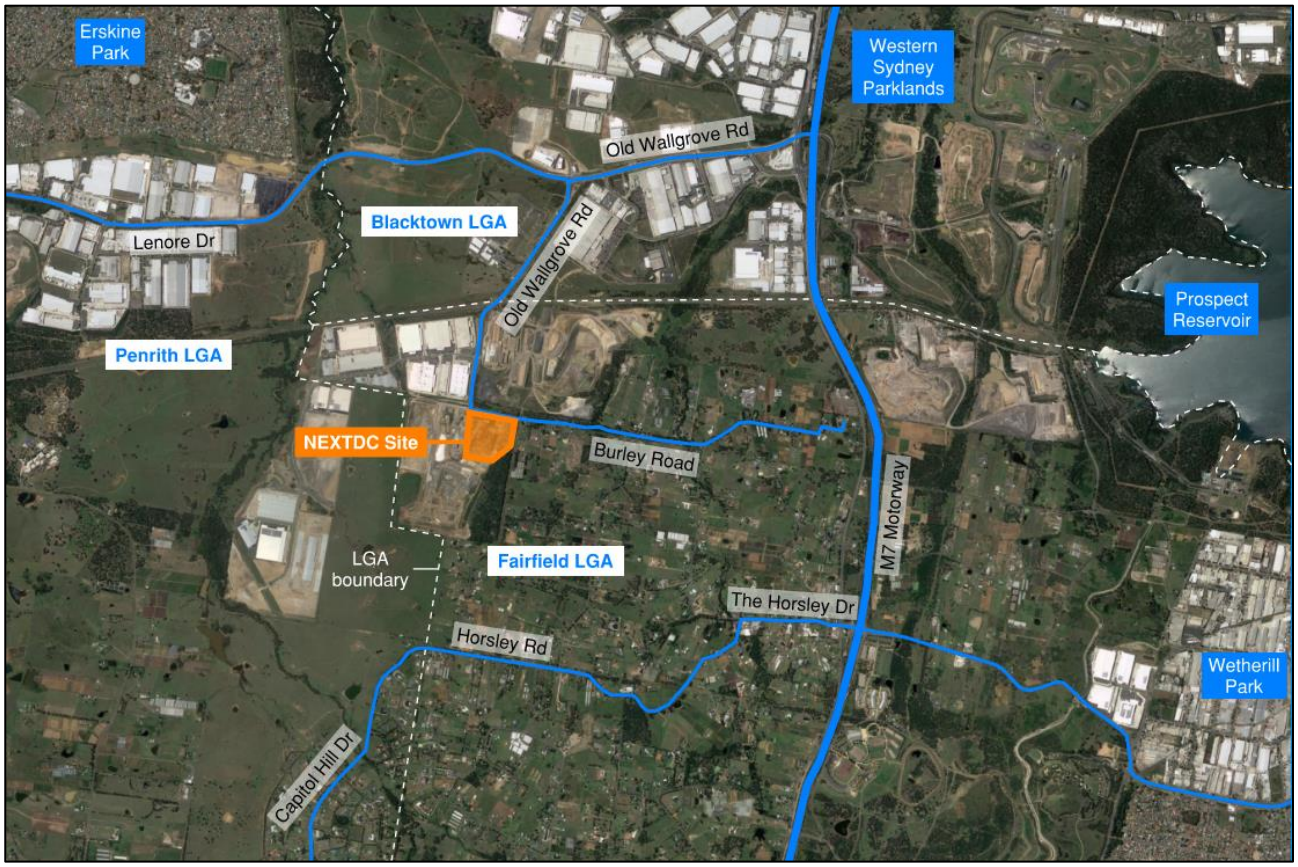

Figure 2 – Site Location Context

2.2 Road Network

2.2.1 State Road Network

The state roads in the vicinity of the site are shown in Figure 3. To the north of the site, Old Wallgrove Road becomes a state road at its intersection with Lenore Drive, which is also a state road. The M7 and M4 motorways are also classified as state roads, as is Erskine Park Road. Ferrers Road to the east of the site is a regional road in the area.

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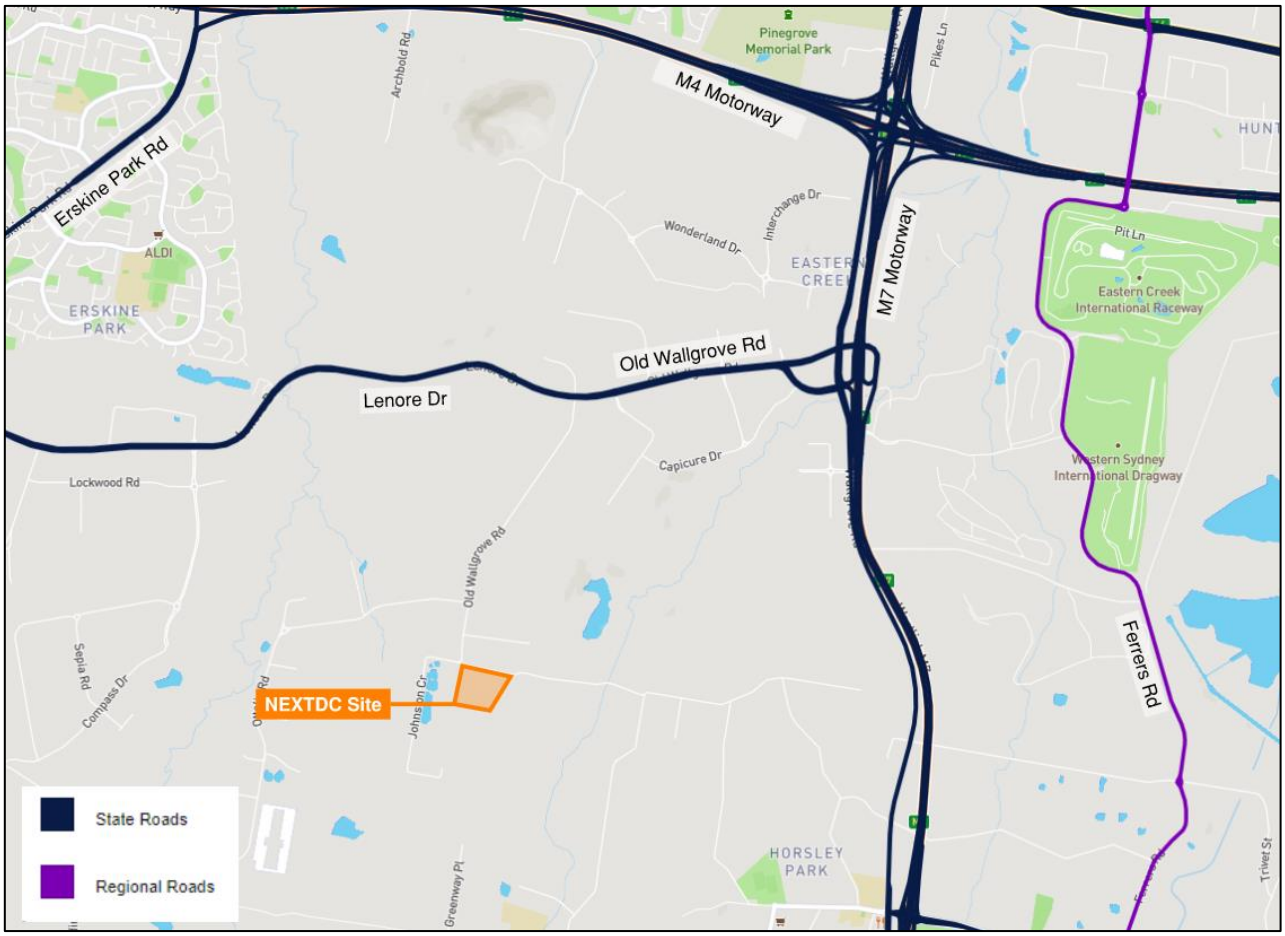

Figure 3 – State Road Network

Source: TfNSW Road Network Classifications, 2023

The M7 motorway is an arterial route providing a primarily north-south alignment, connecting Prestons in the south and Baulkham Hills in the north. The M4 motorway is an arterial route providing a primarily east-west alignment, connecting the City in the Western Sydney suburbs in the west. The M4, M7 and Wallgrove Road intersect at the Lighthorse Interchange to the north-east of the site.

Lenore Drive / Old Wallgrove Road (between M7 and Erskine Park Road)

Old Wallgrove Road intersects with Lenore Drive and Telopea Place under traffic signal operation. Old Wallgrove Road / Lenore Drive extends in an east-west alignment connecting the M7 motorway in the east and Erskine Park Road in the west. The road comprising a dual carriageway and providing two to three through lanes of traffic in each direction with additional dedicated turning lanes on approach to major intersections. The carriageways are separated by a central vegetated / concrete median. It is signposted with an 80 km/h speed limit. Old Wallgrove Road / Lenore Drive is an RMS approved 25/26m B-double Route.

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2.2.2 Local Road Network

Burley Road

The site is located at the south-western corner of the existing informal termination of Burley Road. Burley Road is partially unsealed to the east of the development site for approximately 350 metres. The rest of the roadway has two traffic lanes, one in each direction. The road does not contain or kerb and gutter provisions and has sections with line marking and delineation. It is signposted with a 60 km/h speed limit.

Johnston Crescent

The site is situated at the south-eastern corner of the T-junction of Johnston Crescent and Old Wallgrove Road. It then extends to the west and south, placing it along the western boundary of the development site. The road provides a total pavement width of approximately 13m and contains one lane in each direction. 'No Stopping' restrictions apply along both kerb alignments. Johnston Crescent is governed by a speed limit of 60 km/h.

Old Wallgrove Road (between Lenore Drive and Johnston Crescent)

Old Wallgrove Road intersects Johnston Crescent at the north-western corner of the site and runs in a north-south alignment. At this point, the road contains two traffic lanes, one in each direction. The road widens to the north of the site at its intersection with Millner Avenue to become a four-lane roadway, with two lanes in each direction and a speed limit of 80 km/h.

2.2.3 Planned Road Network

Southern Link Road

The site is located at 16 Johnston Crescent, on the southern side of the planned future Southern Link Road (SLR) roadway. The future SLR is being planned as an east-west arterial route, as part of the WSEA Strategic Transport Assessment. It is considered that the SLR would run parallel to the Erskine Park Link Road and would ultimately run adjacent to the northern boundary of the subject site. The road is to form a dual carriageway comprising 2 of 4 lanes of traffic divided by a central median. It is assumed that in the vicinity of the site the SLR would be signposted with a 60 km/h speed limit.

Northwest Link Road

The Northwest Link Road is a planned future road providing a connection between Old Wallgrove Road in the south-east and the M4 in the north-west. This road will create three future intersections with Old Wallgrove Road, Lenore Drive and the M4 motorway, the details for which are unknown at the time of writing this report. The Northwest Link Road is to provide 2 lanes of traffic in each direction. The Northwest Link Road is assumed to be signposted with a 60 km/h speed limit.

2.3 Public Transport

2.3.1 Buses

There are limited public transport services available to travel to and from the site. There are however bus stops located approximately 2 kilometres north of the site on Lenore Drive / Old Wallgrove Road and would take approximately 24 minutes to walk to. Other bus stops are available on Burley Road and Delaware Road to the east of the site. However, these bus stops are accessible via the unsealed segment of Burley Road, meaning that pedestrians cannot easily access these bus stops. The locations of all nearby bus stops are shown in Figure 4.

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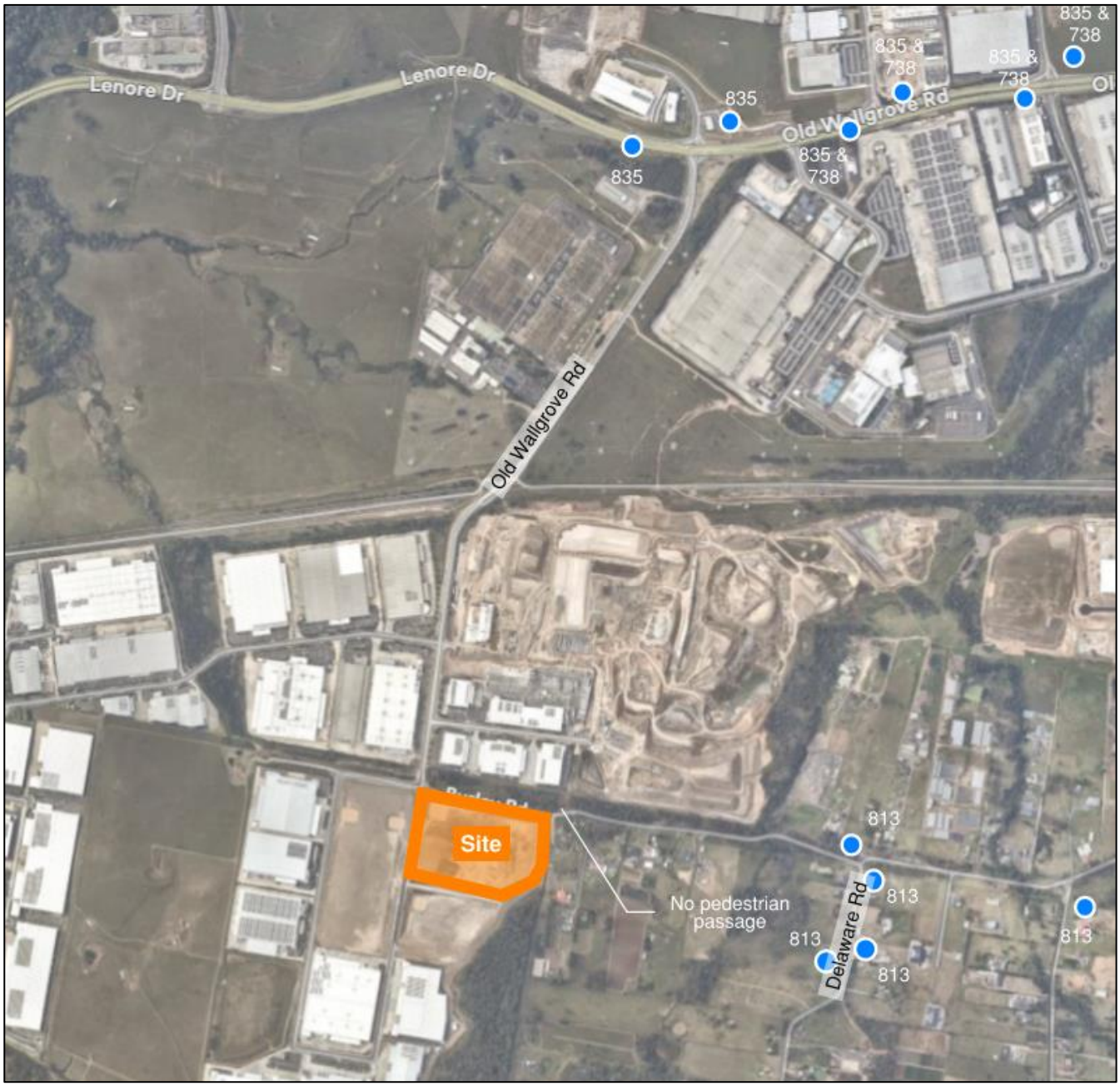

Figure 4 – Nearby Bus Stop Facilities

The bus routes available at these bus stops are summarised in Table 5 and the relevant bus network maps are included in Figure 5.

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Table 5 – Summary of Available Bus Services

Operator	Route Number	Route	Frequency during AM and PM peak hours
Busways Western Sydney	738	Mount Druitt to Eastern Creek via Rooty Hill (Loop Service)	**AM:** 30 minutes **PM:** 20 – 40 minutes
Transit Systems	813	Bonnyrigg and Western Sydney Parklands to Fairfield	**AM:** 105 minutes **PM:** 1 service offered
		Fairfield to Western Sydney Parklands and Bonnyrigg	**AM:** 1 service offered **PM:** 30 minutes
	835	WSU Penrith to Prairiewood	**AM:** 30 minutes **PM:** 30 minutes
		Prairiewood to WSU Penrith	**AM:** 30 minutes **PM:** 30 minutes

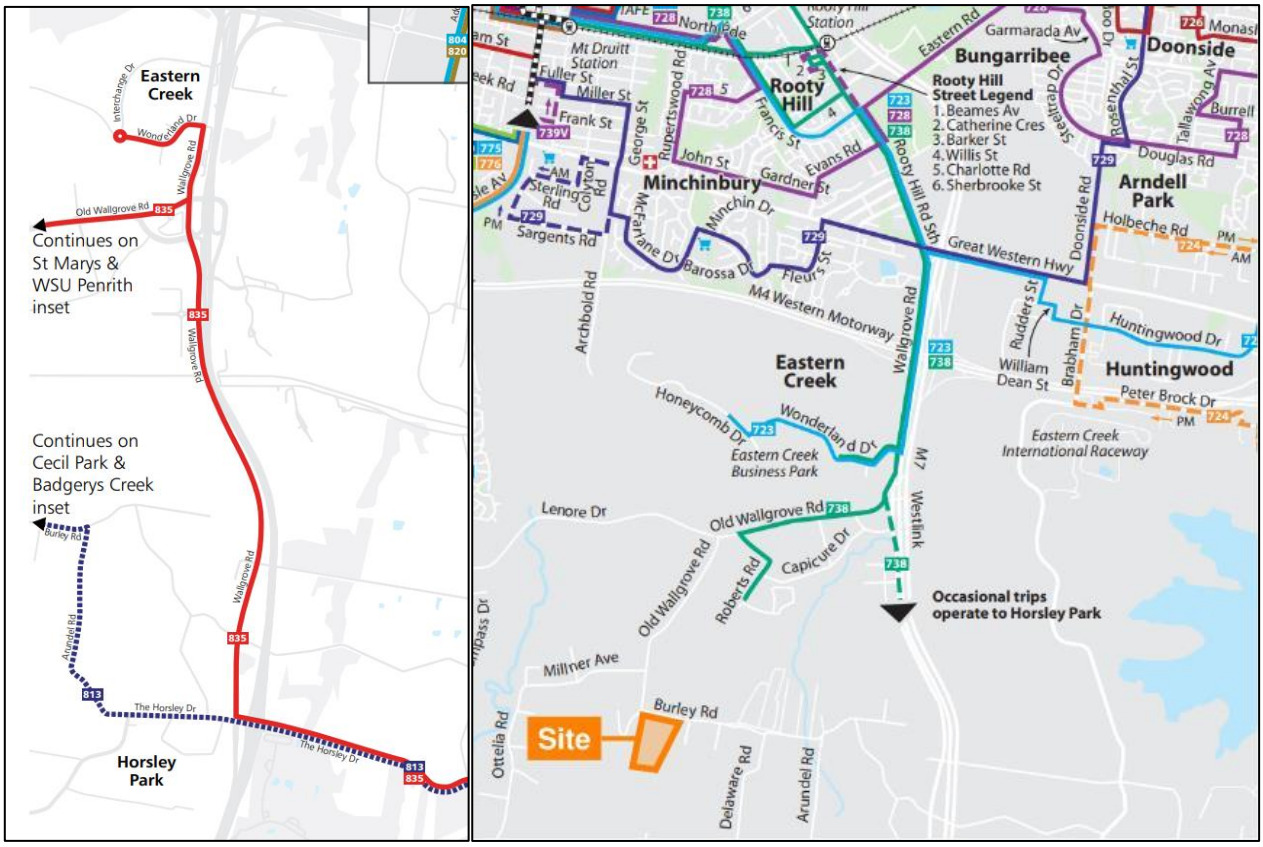

Figure 5 – Transit Systems and Busways Bus Network Maps

Source: Transit Systems, 2021

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2.4 Active Transport

2.4.1 Pedestrians

There is limited pedestrian infrastructure available in the road network local to the site. There are no pedestrian footpaths or safe road crossing points within 350 metres of the site. 350 metres north of the site is the signalised intersection between Old Wallgrove Road and Millner Avenue, providing a safe crossing opportunity for pedestrians. Old Wallgrove Road to the north of this intersection includes a shared path adjacent to the northbound lane, and footpaths are provided along both sides of Millner Avenue to the west.

The available pedestrian facilities near to the site are shown in Figure 6.

Figure 6 – Existing Pedestrian Facilities

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2.4.2 Cyclists

The closest designated cycleway to the site is 350 metres north on Old Wallgrove Road, as indicated in Figure 7. From here, the local cycle network provides good connection to the west along Lenore Drive and east along Old Wallgrove Road, with access to the local roads such as Roberts Road and Capicure Drive.

The Westlink M7 Shared Path is approximately 3.5 kilometres from the site, or a 12-minute cycle. The shared path runs alongside the motorway for approximately 40 kilometres between Baulkham Hills and Prestons and is separated from the roadway.

However, cycling infrastructure is still limited around the site, with no cyclist facilities to the south of the site.

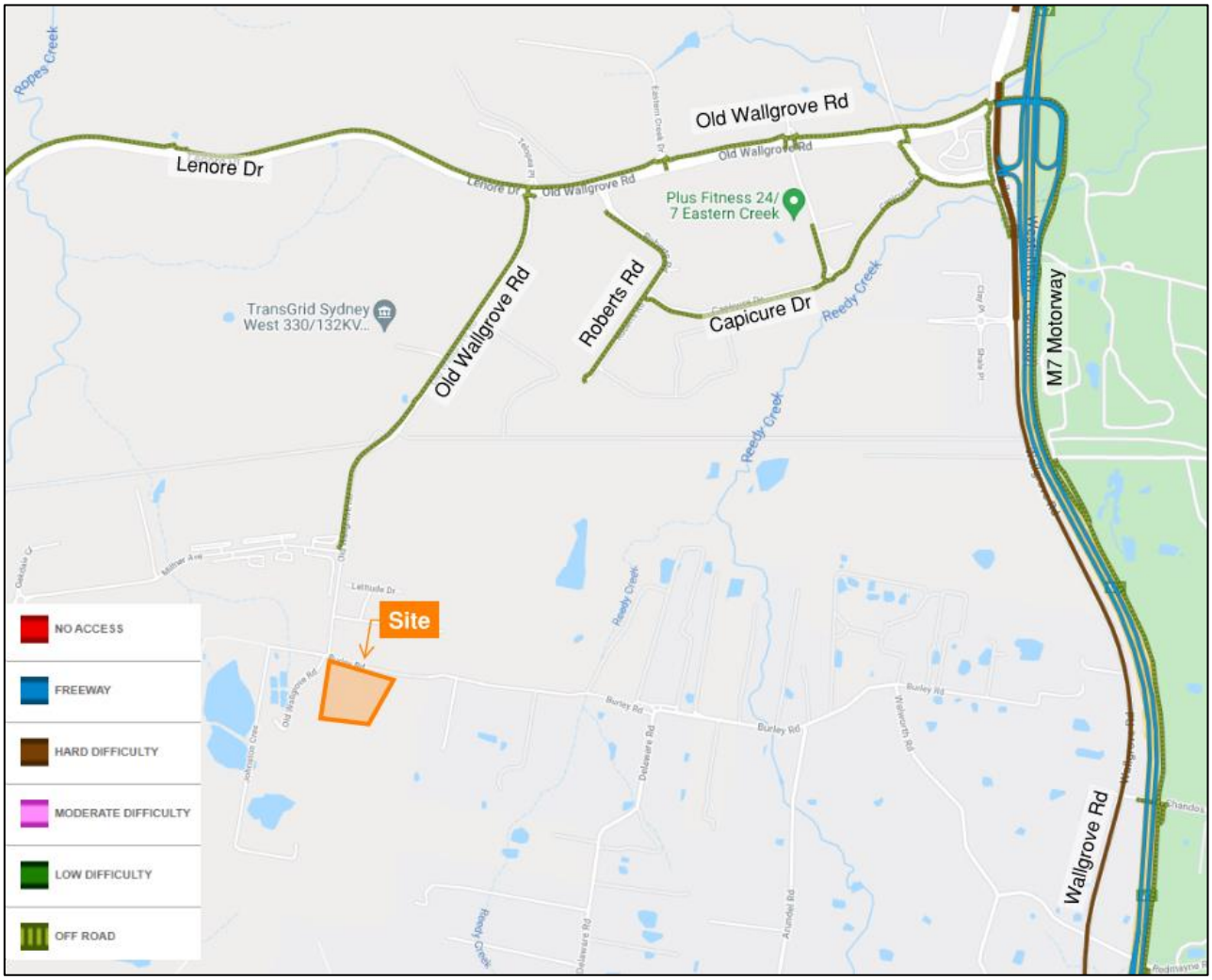

Figure 7 – Existing Cyclist Facilities

Source: TfNSW Cycleway Finder

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2.5 Journey to Work Data

The 2016 Journey to Work (JTW) data displayed in Table 6 – 2016 JTW Data for Horsley Park – Kemps Creek is sourced from the Australian Bureau of Statistics Census of Population and Housing, 2016. This dataset provides an estimate of employee travel modes into and out of the local areas defined by the Statistical Area Level 2 (SA2) region. The site is located within the 'Horsley Park – Kemps Creek' SA2.

Method of Travel (MTW15P) categorisation of travel modes (as listed in the left column of Table 6) is used for a clearer and simpler assessment of key travel modes through the allocation of a primary mode when multiple modes have been used in one trip.

Table 6 – 2016 JTW Data for Horsley Park – Kemps Creek

Travel Mode (MTW15P)	Mode Share (%)
Train	0.5%
Bus	0.1%
Tram / Light Rail	0.0%
Taxi	0.3%
Car, as driver	88.5%
Car, as passenger	5.3%
Truck	2.4%
Motorbike/scooter	0.4%
Bicycle	0.1%
Walked only	1.1%
Other Mode	1.2%
Total	**100.0%**

The JTW data can be summarised into three main categories as shown in Table 7.

Table 7 – Summarised JTW Data

Mode Summary	Mode Share (%)
Private vehicle (taxi, car, truck, motorcycle)	96.9%
Public transport (train, bus, tram)	0.6%
Active transport (bicycle, walk)	1.2%
Other	1.2%
Total	**100.0%**

It is clear from the data that the dominant mode of travel into and out of the Horsley Park – Kemps Creek area is by private vehicle, with only approximately 1% of employees travelling via public transport, and < 2% using active transport.

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2.6 Traffic Conditions

2.6.1 Traffic Data Collection

The following intersections, shown in Figure 8, have been surveyed in the vicinity of the site during the morning and afternoon peak hours in order to determine the existing traffic volumes within the surrounding road network:

- Telopea Place / Lenore Dr / Old Wallgrove Rd (signalised)
- Old Wallgrove Rd / Millner Ave (signalised)
- Old Wallgrove Rd / Johnston Cres / Burley Rd

Figure 8 – Surveyed Intersections

Source: Nearmap (2023)

Traffic volume surveys were undertaken on Tuesday 5 December 2023 between 7:00 – 9:00am and 4:00 – 6:00pm. The traffic counts included light vehicles, heavy vehicles, cyclists and pedestrians. The date of data collection is considered representative of a typical day, as it fell within normal (non-school holiday) term period.

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2.6.2 Traffic Volumes

The traffic volume surveys determined the following morning and afternoon network peak hours:

- AM Peak hour: 7:00am – 8:00am
- PM Peak hour: 4:15pm – 5:15pm

The peak hour traffic volumes collected at the surveyed intersections is summarised in Figure 9 and Figure 10, for the morning and afternoon survey periods, respectively. Full traffic volume survey results have been presented in Appendix 3 for reference.

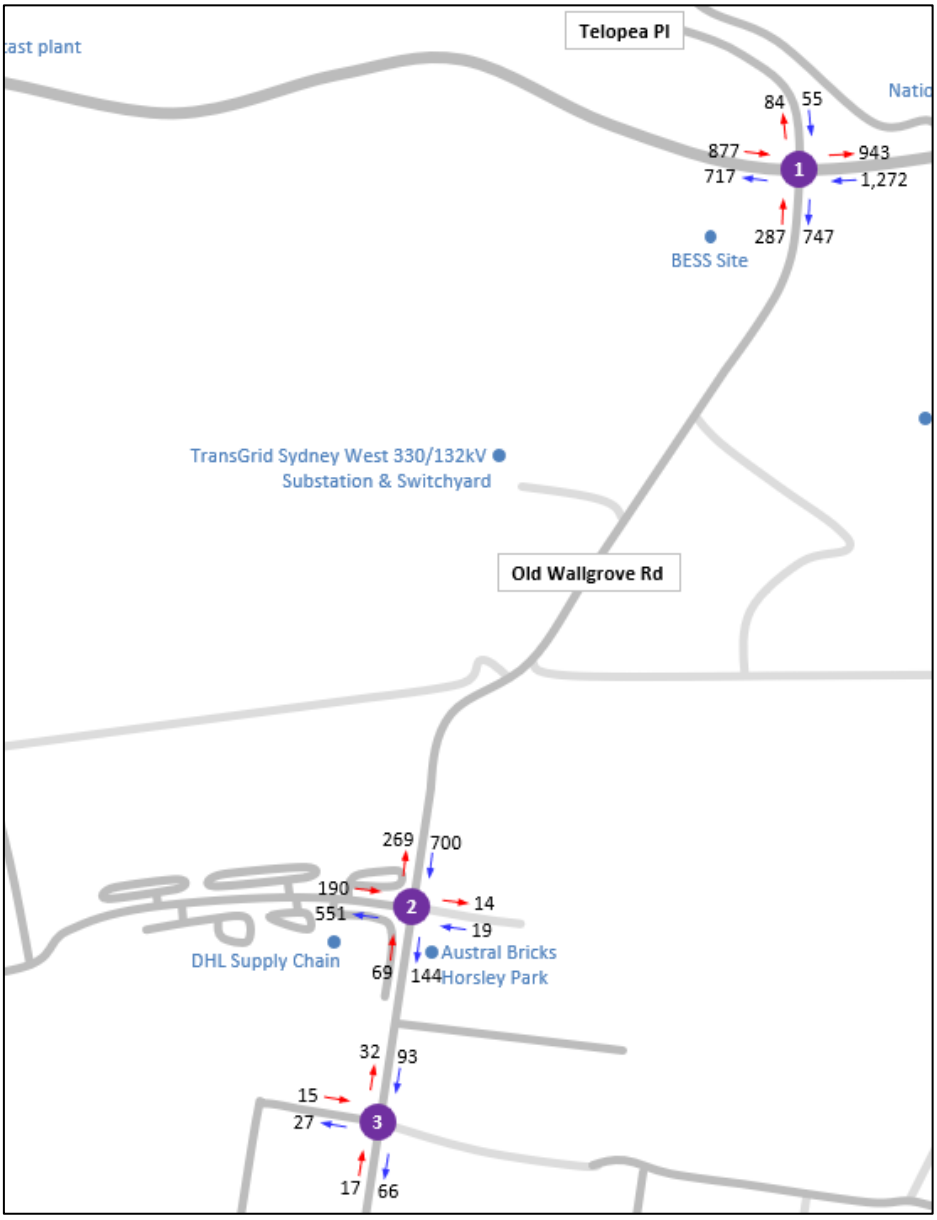

Figure 9 – AM Peak Hour Traffic Volumes (7:00am – 8:00am)

Source: Matrix (2023)

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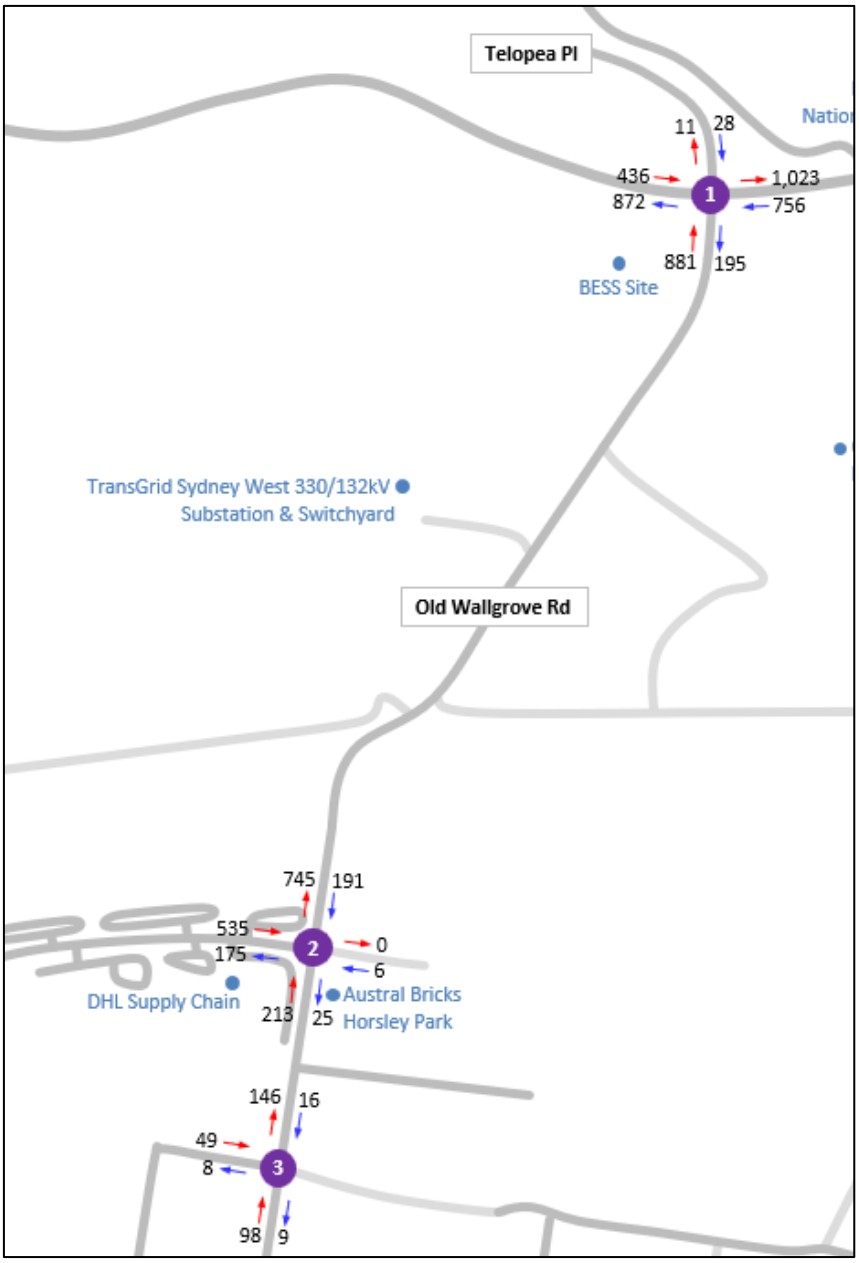

Figure 10 – PM Peak Hour Traffic Volumes (4:15pm – 5:15pm)

Source: Matrix (2023)

2.7 Existing Traffic Model

SIDRA intersection modelling has been undertaken to assess the existing traffic conditions and performance of the nearby surveyed intersections. Figure 11, Figure 12 and Figure 13 contains the layout of the three intersections, as modelled in SIDRA.

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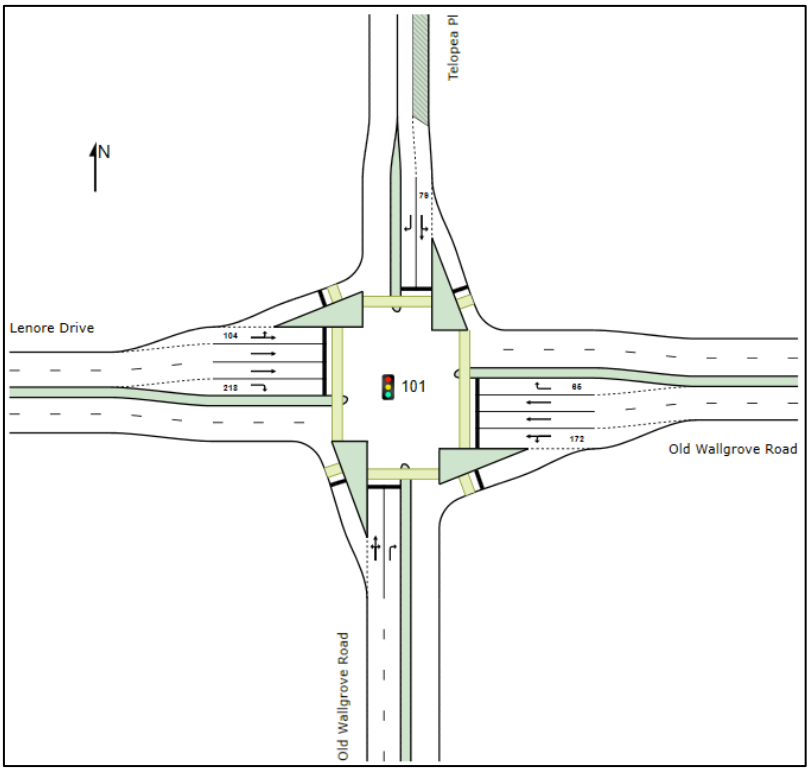

Figure 11 – SIDRA Existing Intersection Layout – Old Wallgrove Rd / Lenore Dr / Telopea Pl

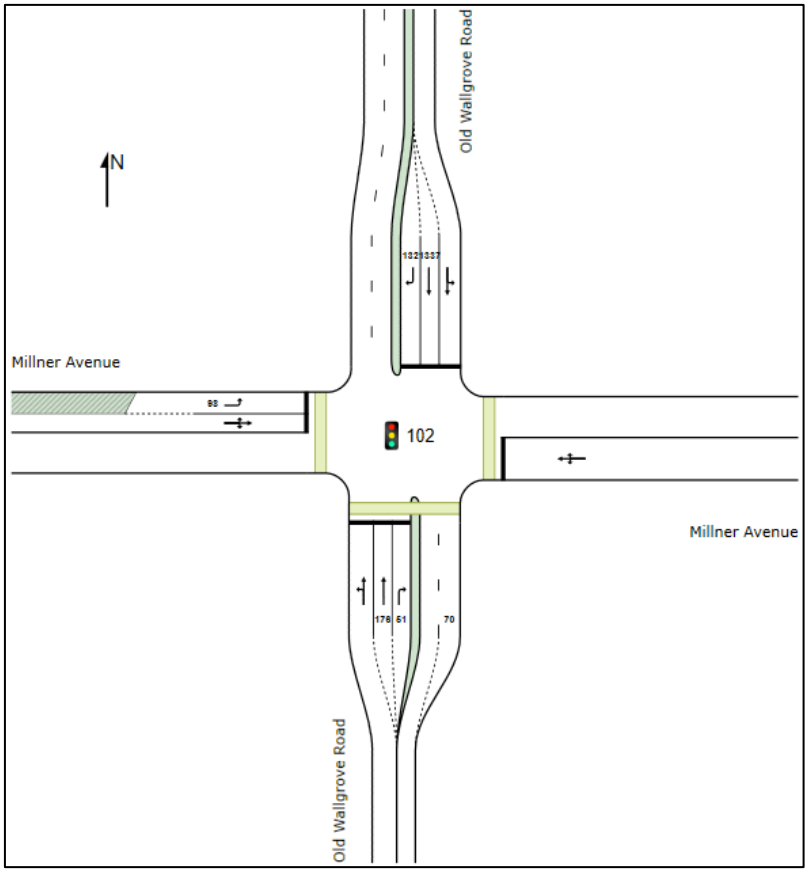

Figure 12 – SIDRA Existing Intersection Layout – Millner Ave / Old Wallgrove Rd

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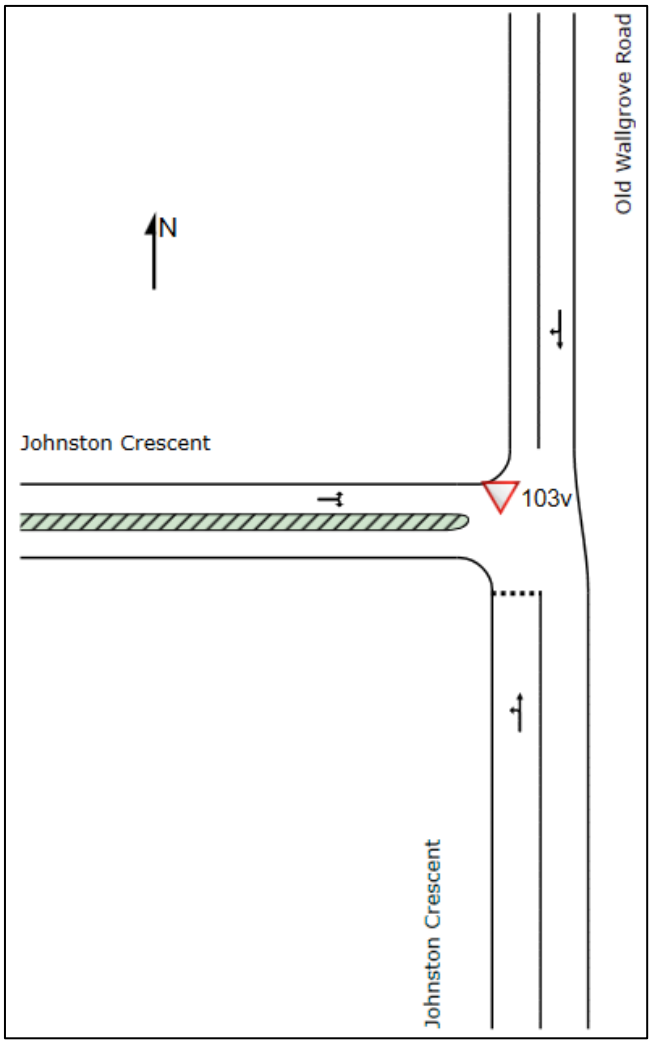

Figure 13 – SIDRA Existing Intersection Layout – Old Wallgrove Rd / Johnston Cres

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2.7.1 Performance Criteria

SIDRA modelling outputs provide a range of performance measures, in particular the following parameters are given:

- Degree of saturation (DOS) – The DOS is used to measure the performance of intersections, where a value of 1.0 represents an intersection at theoretical capacity. As the performance of an intersection approaches DOS of 1.0, queue lengths and delays increase rapidly. It is usual to attempt to keep DOS to less than 0.9, with satisfactory intersection operation generally achieved with a DOS below 0.8.

- Average Vehicle Delay (AVD) – The AVD (or average delay per vehicle in seconds) for intersections also provides a measure of the operational performance of an intersection and is used to determine an intersection's Level of Service (see below). For signalised intersections, the AVD reported relates to the average of all vehicle movements through the intersection. For priority intersections, the AVD reported relates to the worst performing vehicle movement at the intersection.

- Level of Service (LOS) – This is a comparative measure that provides an indication of the operating performance, based on AVD.

Table 8 below further describes what each level of service represents.

Table 8 – Intersection Performance Criteria

LOS	AVD (Seconds)	Traffic Signals	Give Way and Roundabouts
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals, incidents will cause delays	At capacity, requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity	Unsatisfactory and requires other control mode

2.7.2 Existing Intersection Performance

Table 9 summarises the existing operation and performance of the surveyed intersections. Detailed Existing Model SIDRA results are included in Appendix 4.

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Table 9 – Existing Intersection Performance

Note: Data for unsignalised intersections is taken from the movement with the worst delay

Peak	Degree of Saturation	Average Delay (sec)	95% Queue Length (m)	Level of Service
Telopea Place / Lenore Dr / Old Wallgrove Rd (signalised)				
AM Peak	0.622	33.4	151.4	C
PM Peak	0.741	34.9	144.7	C
Old Wallgrove Rd / Millner Ave (signalised)				
AM Peak	0.629	17.3	111.8	B
PM Peak	0.451	21.1	62.2	B
Old Wallgrove Rd / Johnston Cres / Burley Rd (unsignalised)				
AM Peak	0.012	6.2	0.1	A
PM Peak	0.087	6.8	2.5	A

The results in Table 9 indicate that all surveyed intersections are currently performing at a satisfactory level of service during the morning and afternoon peak periods.

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3.0 Planning Context

3.1 Western Sydney Employment Area Planned Works

The location of the subject site within the context of the Western Sydney Employment Area (WSEA) is shown below in Figure 14.

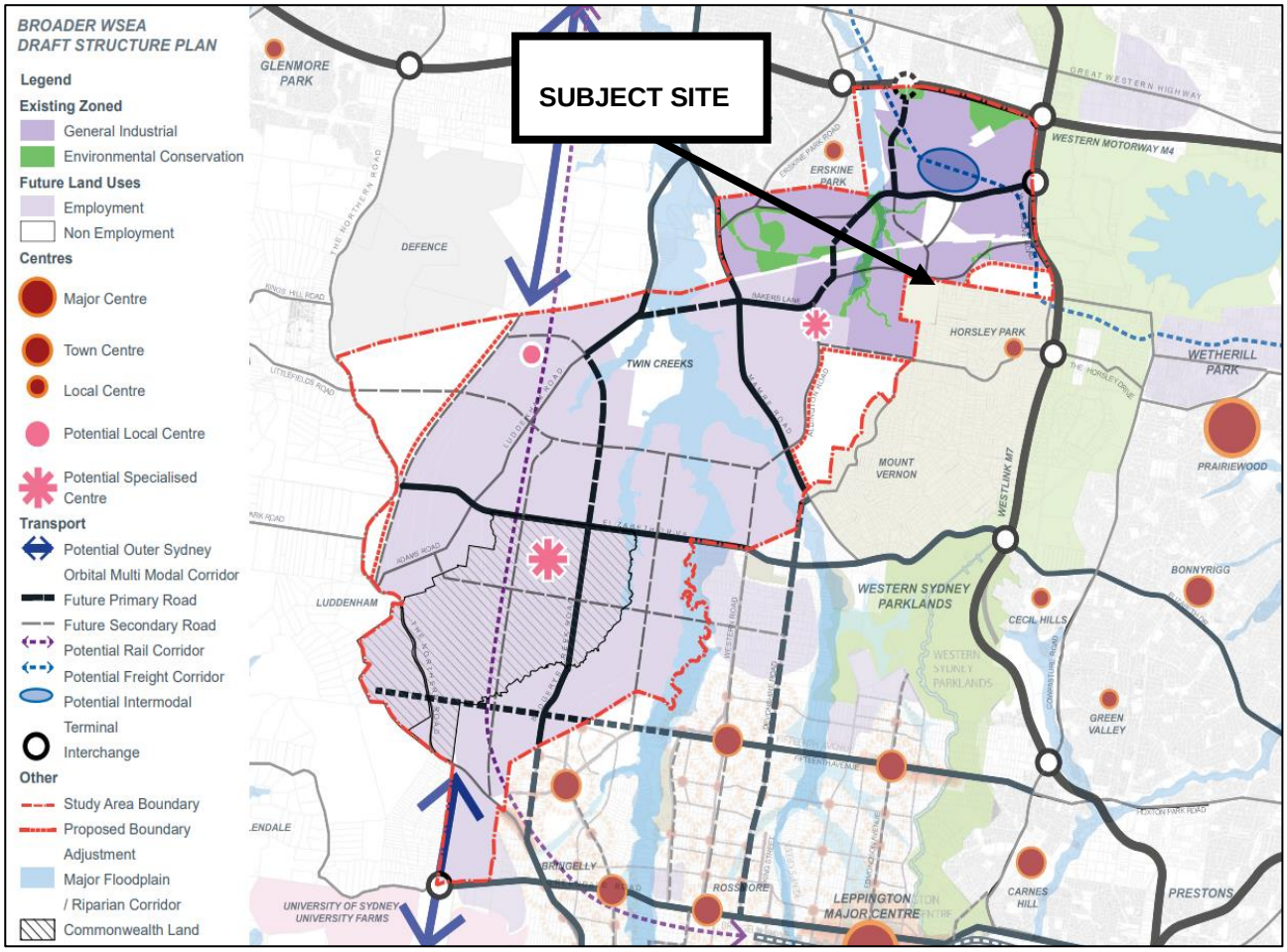

Figure 14 – Western Sydney Employment Area Structure Plan

Source: Department of Planning and Infrastructure (accessed February 2024)

As shown in Figure 14, the site is actually situated just to the south of the existing / proposed study area boundary and adjacent to the existing general industrial land-use zone, and in close proximity to secondary roads within the WSEA and the potential freight transport corridor. A future secondary road is planned along the northern boundary of the site, being the future Southern Link Road. Two planned interchanges are situated to the north-east and south-east of the site, with the Westlink M7.

The Western Sydney Employment Area – Fairfield Development Control Plan 2016 (WSEA Fairfield DCP) specifies that is applies to the land known as Lot 1 DP 106143, 327-335 Burley Road Horsley Park, which contains the proposed data centre site as shown overleaf in Figure 15.

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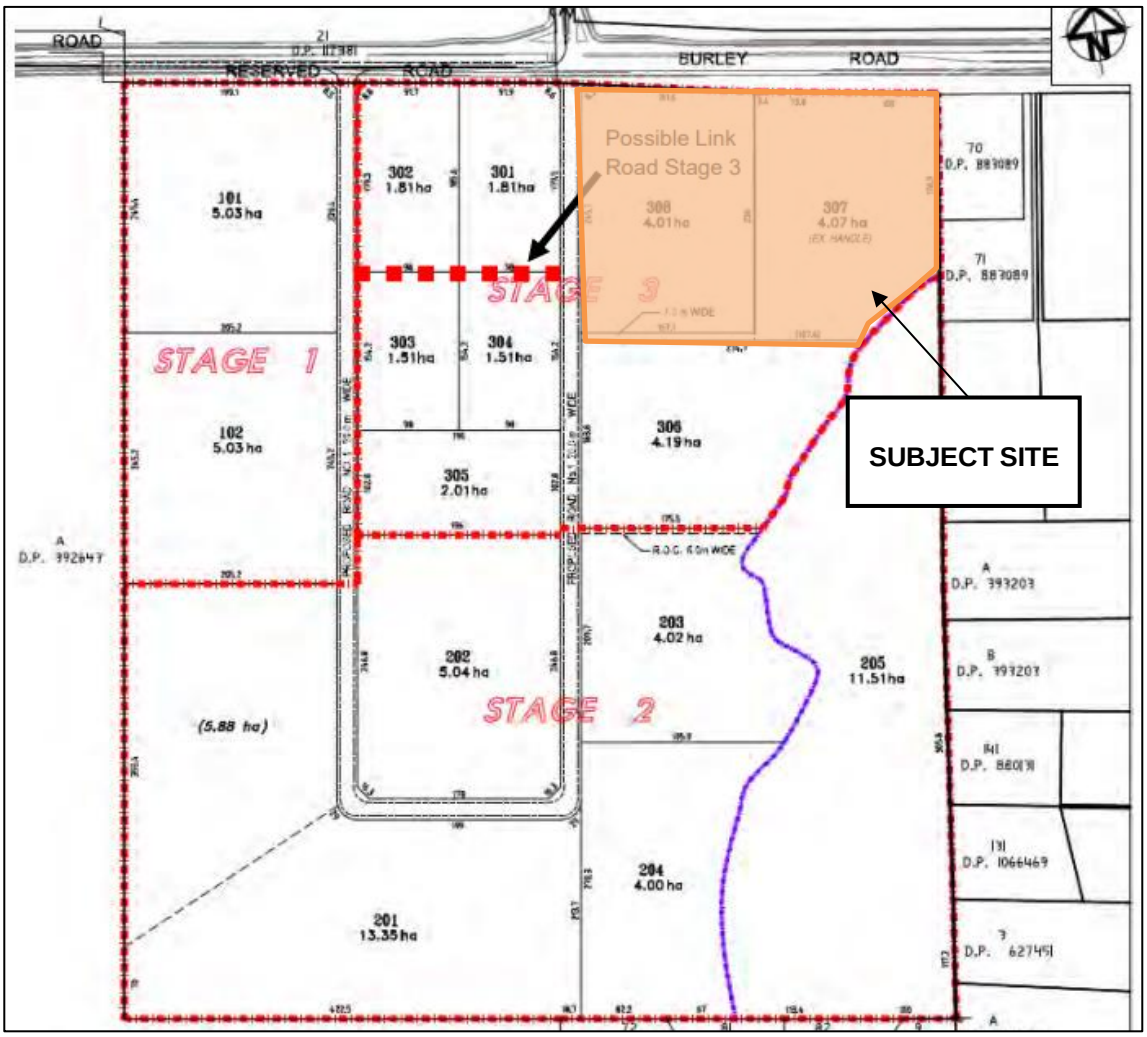

Figure 15 – Western Sydney Employment Area Subdivision Plan

Source: 327 – 335 Burley Road, Horsley Park Development Control Plan (2016)

Figure 15 above specifies that the two lots comprising the subject site provide a total land area of approximately 8.1 ha.

3.2 WSEA Road Network Strategy

The WSEA Road Network Strategy involves the introduction of additional road connections and road widenings in order to accommodate the future growth in the area. A summary of the planned road network upgrades in context of the proximity to the subject site is shown overleaf in Figure 16.

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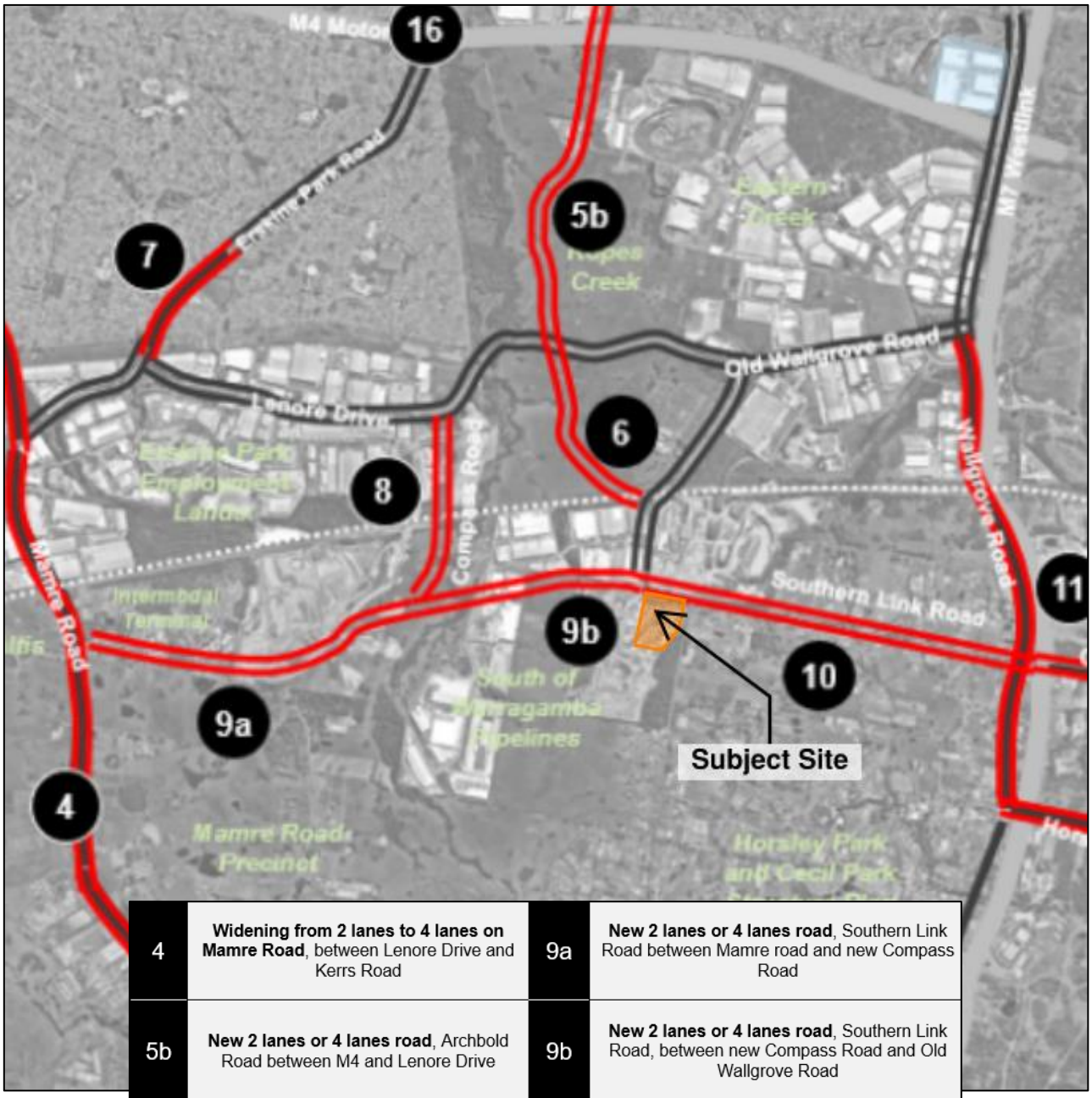

4	**Widening from 2 lanes to 4 lanes on Mamre Road**, between Lenore Drive and Kerrs Road	9a	**New 2 lanes or 4 lanes road**, Southern Link Road between Mamre road and new Compass Road
5b	**New 2 lanes or 4 lanes road**, Archbold Road between M4 and Lenore Drive	9b	**New 2 lanes or 4 lanes road**, Southern Link Road, between new Compass Road and Old Wallgrove Road
6	**New 2 lanes or 4 lanes road**, Archbold Road between Lenore Drive and Old Wallgrove Road	10	**New 2 lanes or 4 lanes road**, Southern Link Road, between Old Wallgrove and Wallgrove Road
7	**Widening to 4 lanes,** Erskine Park Road	11	**Widening to 4 lanes**, Wallgrove Road, between south of Old Wallgrove Road and Horsley Drive
8	**New 4 lanes road**, Compass Road	16	New on ramp Erskine Park Road and Roper Road to M4 (westbound)

Figure 16 – Western Sydney Employment Area Structure Plan

Source: TfNSW adapted by TTW

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3.2.1 Southern Link Road

Items 9a, 9b and 10 shown in Figure 16 above indicates the future Southern Link Road (SLR) being a planned east-west arterial route, as part of the WSEA Strategic Transport Assessment. It is considered that the SLR would run parallel to the Erskine Park Link Road and would ultimately run adjacent to the northern boundary of the subject site.

According to the *Southern Link Road Traffic Modelling and Assessment,* prepared by GHD in 2021, the preliminary configuration of the SLR at the time was as follows:

- The road is to form a dual carriageway comprising of 2 of 4 lanes of traffic divided by a central median
- Stage 1 of the SLR is to construct a connection between Mamre Road and Old Wallgrove Road, in alignment with Bakers Lane
- Stage 2 of the SLR is to construct the connection between Old Wallgrove Road and Wallgrove Road, with two different alignments being investigated:
    - 2a) an upgraded intersection connecting to Wallgrove Road (south of Warragamba Pipeline)
    - 2b) a new intersection with Chandos Road

Figure 17 below indicates the proposed alignment of the SLR in the context of the local road network surrounding the subject site.

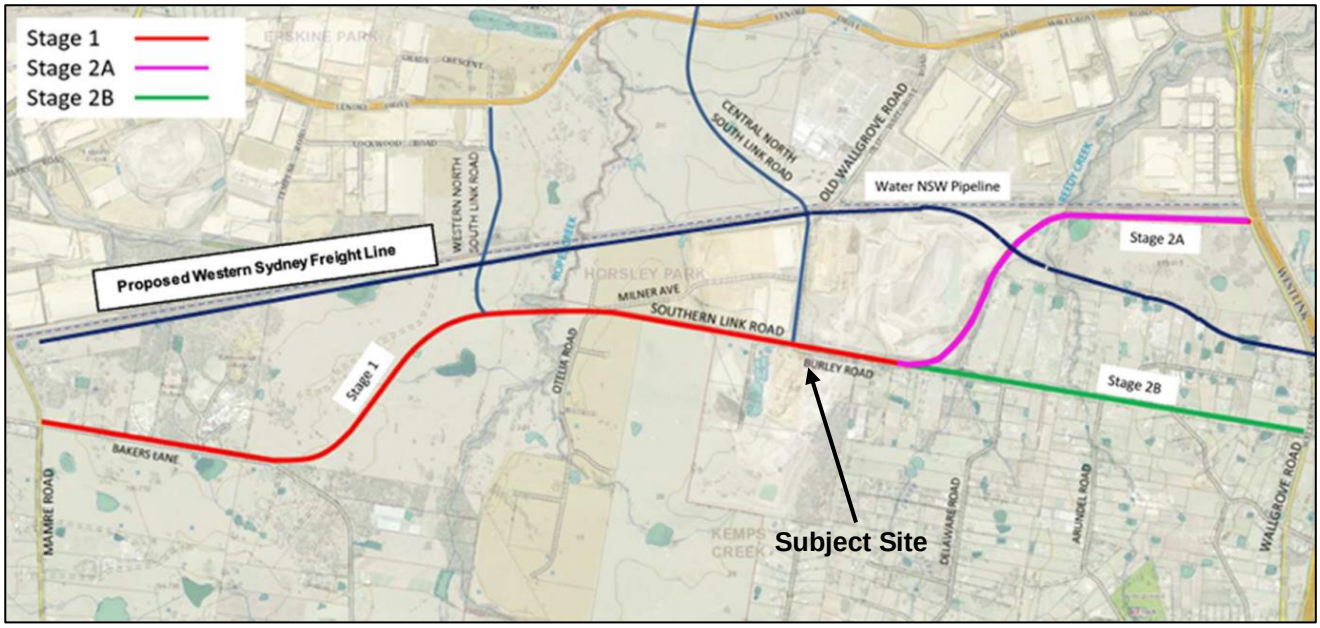

Figure 17 – Southern Link Road Alignment

Source: TfNSW

TfNSW's *Southern Link Road Corridor – Options Report*, prepared in September 2022, indicates that the Stage 2B is the preferred option for the alignment of the SLR. Therefore, the strategic design of Stage 2B is indicated in Figure 18 overleaf in the context of the proximity of the SLR road configuration and the subject site.

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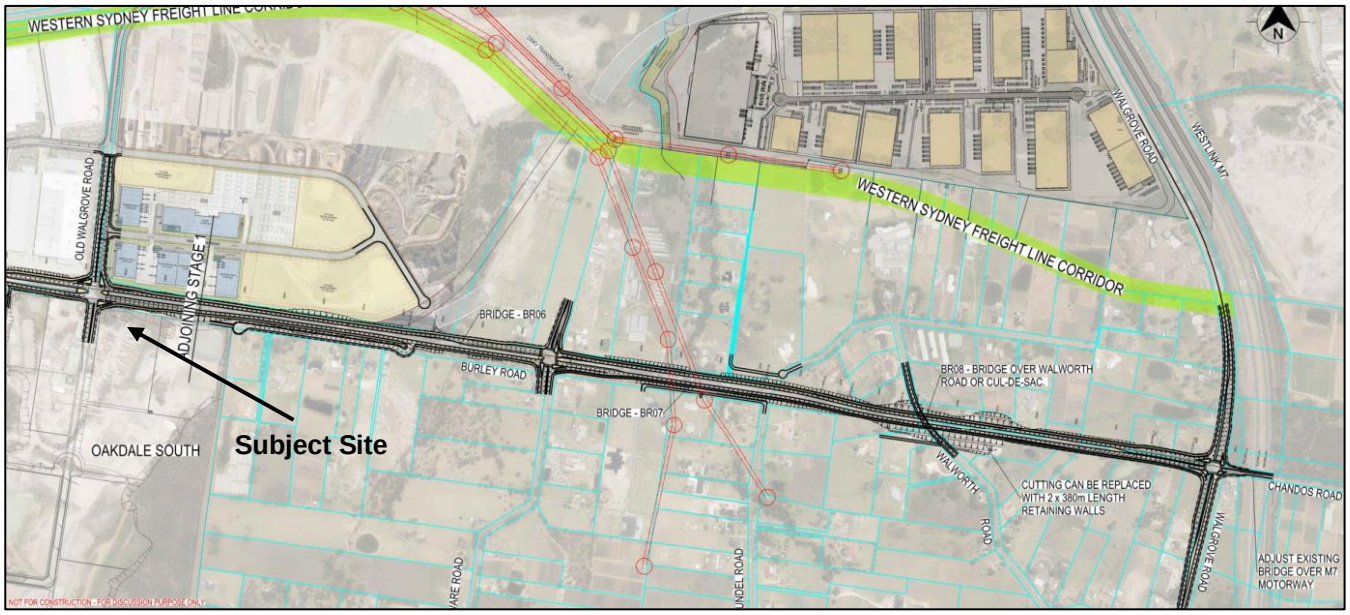

Figure 18 – Southern Link Road Strategic Design Stage 2B

Source: TfNSW

As shown above, the upgraded intersection of the future SLR, Old Wallgrove Road and Johnston Crescent is to be situated adjacent to the north-western corner of the subject site. An additional upgraded signalised intersection is planned at the future SLR, Wallgrove Road and Chandos Road. The details of these two upgraded future intersections are described in detail in Section 5.1.4 of this report.

3.3 Broader Western Sydney Employment Area Planned Works

The following precincts have recently been or are currently being developed in proximity of the subject site:

- Oakdale Central
- Oakdale South
- Oakdale West
- Oakdale East
- CSR (the precinct in which the subject site resides, a portion of this site is also now known as ESR Hosley Logistics Park)
- Jacfin

Works at the Oakdale estates above have commenced and in many instances are completed and the developments are operational.

Figure 19 overleaf indicates the proposed future and current development that is situated within the surrounding area.

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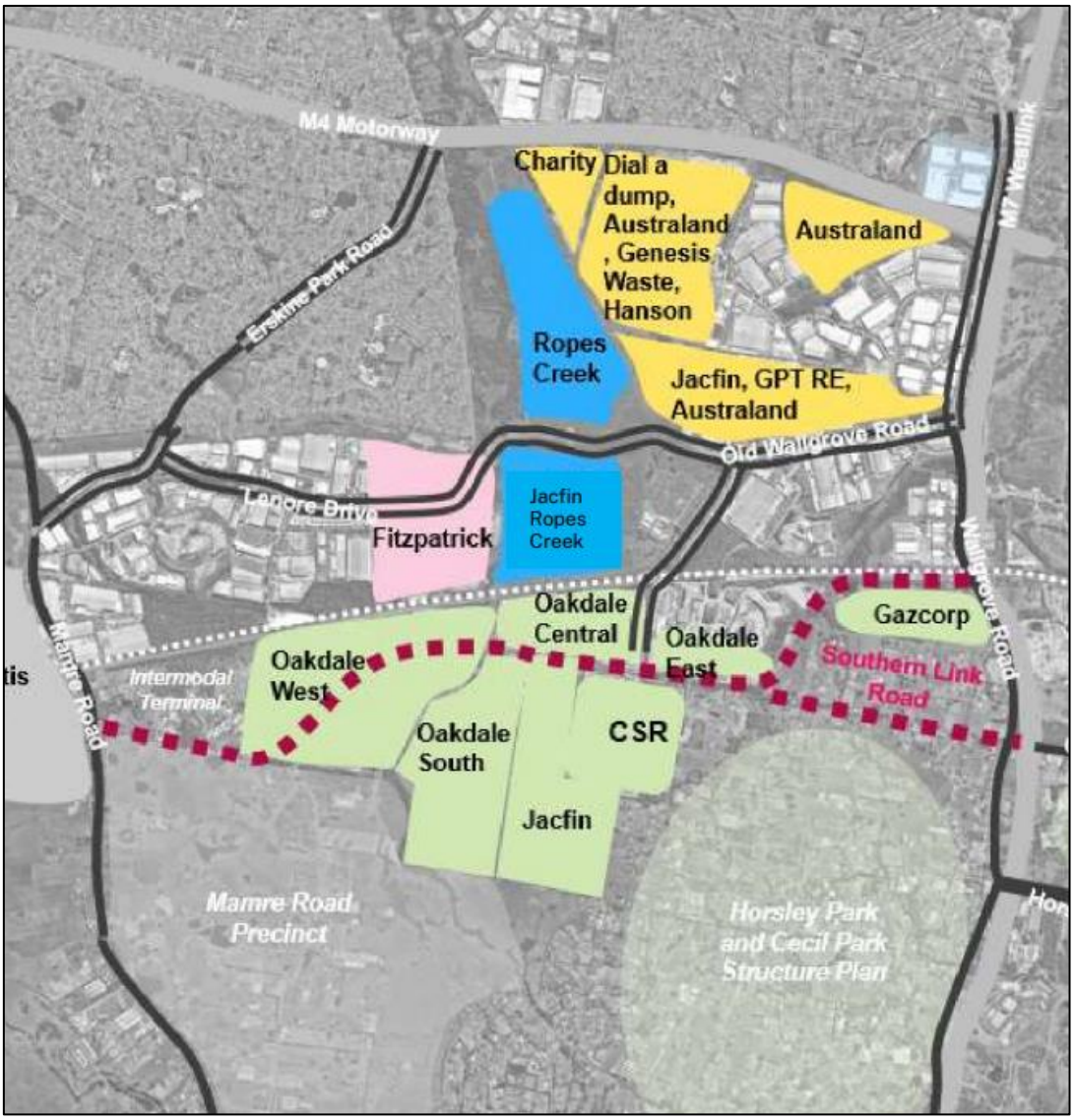

Figure 19 – Proposed Future Development and Precincts

Source: TfNSW

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4.0 Proposed Development

4.1 Detailed Project Description

The key features of the Proposal are summarised as follows:

- Site preparation works including bulk earthworks.
- Staged construction and operation of five data centre buildings comprising a total gross floor area (**GFA**) of 63,654m^2 including 52,916m^2 of technical data hall floor space and 10,738m^2 of ancillary office and innovation floor space, including 'front of house' meeting and function spaces, and a café.
- Associated and ancillary on-site facilities on-site parking for 200 cars, business identification signage (pylon and elevation signage), civil and stormwater works and 9,900m^2 of deep soil landscaping.
- Delivery of 232 megawatts of power, including a 330kV substation plus a 33kV switching station and above ground diesel storage tanks and above ground water tanks for industrial water and fire water.

The Project will be delivered in three construction stages as follows:

- Stage 1 = Buildings A to C and Substation
- Stage 2 = Building D
- Stage 3 = Building E

The key components of the proposed data centre development are listed in Table 10.

Table 10 – Project Details

Descriptor	Project Details
Project Area	The site has a total area of 8.206 hectares. The entire site will be disturbed by the Project.
Use and Activities	Data centre with ancillary office and innovation floor space and café
Project Summary	▪ Site preparation works including bulk earthworks. ▪ Staged construction and operation of five data centre buildings comprising a total gross floor area **(GFA)** of 63,654m^2 including 52,916m^2 of technical data hall floor space and 10,738m^2 of ancillary office and innovation floor space, including 'front of house' meeting and function spaces, and a café. ▪ Ancillary development including on-site parking for 200 cars, business identification signage (pylon and elevation signage), civil and stormwater works. ▪ Delivery of 232 megawatts of power, including a 330kV substation and a 33kV switching station, plus above ground diesel storage tanks and above ground water tanks for industrial water and fire water.

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Descriptor	Project Details
Gross Floor Area (GFA)	Total GFA of 63,654m², broken down as follows: ▪ Data halls/technical: 52,916m². ▪ Mission critical **(MCX)** office, innovation and admin floor space: 10,738m². ▪ Total number of data houses: 34 data houses
Maximum Height	▪ Building A – 32 metres over three storeys ▪ Buildings B, C, D and E – 39 metres over four storeys
Floor Space Ratio	0.78:1
Deep Soil Area	9,900m² (12.1% of site area)
Car Parking	200 car spaces including 6 DDA spaces and 10 EV spaces
Motorbike Parking	5 spaces
Bicycle Parking	24 spaces
Utilities	Provision of required utilities: ▪ Building A Utilities including: – Above ground diesel storage tanks (10 x 25kL each) – Above ground water tanks for industrial water (4 x 170kL each) ▪ Building B Utilities including: – Above ground diesel storage tanks (10 x 65kL each) – Above ground water tanks for industrial water (4 x 580kL each) ▪ Building C Utilities including: – Above ground diesel storage tanks (10 x 65kL each) – Above ground water tanks for industrial water (4 x 580kL each) ▪ Building D Utilities including: – Above ground diesel storage tanks (10 x 65kL each) – Above ground water tanks for industrial water (4 x 580kL each) ▪ Building E Utilities including: – Above ground diesel storage tanks (14 x 65kL each) – Above ground water tanks for industrial water (6 x 580kL each) Fire Water Storage Tanks: ▪ Above ground water tanks for fire water (6 x 340kL each) Substation: ▪ On site 330kV substation plus 33kV switching station
Power Consumption	232 megawatts
Operations and Management	The facility would be constructed and operated by NEXTDC. The site would be operated on a 24-hour, 7 day a week basis.

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Descriptor	Project Details
Existing Services and Infrastructure	Existing services and infrastructures will be extended, adapted and augmented to meet the demands of the Project.
Staging/Phasing	The Project will be constructed in three stages: ▪ Stage 1 = Buildings A to C and Substation ▪ Stage 2 = Building D ▪ Stage 3 = Building E

4.2 Site Layout

Figure 20 below indicates the proposed general arrangement plan illustrating the data centre development site layout. A full set of copies of the architectural plans prepared by HDR have been provided as Appendix 1 of this report.

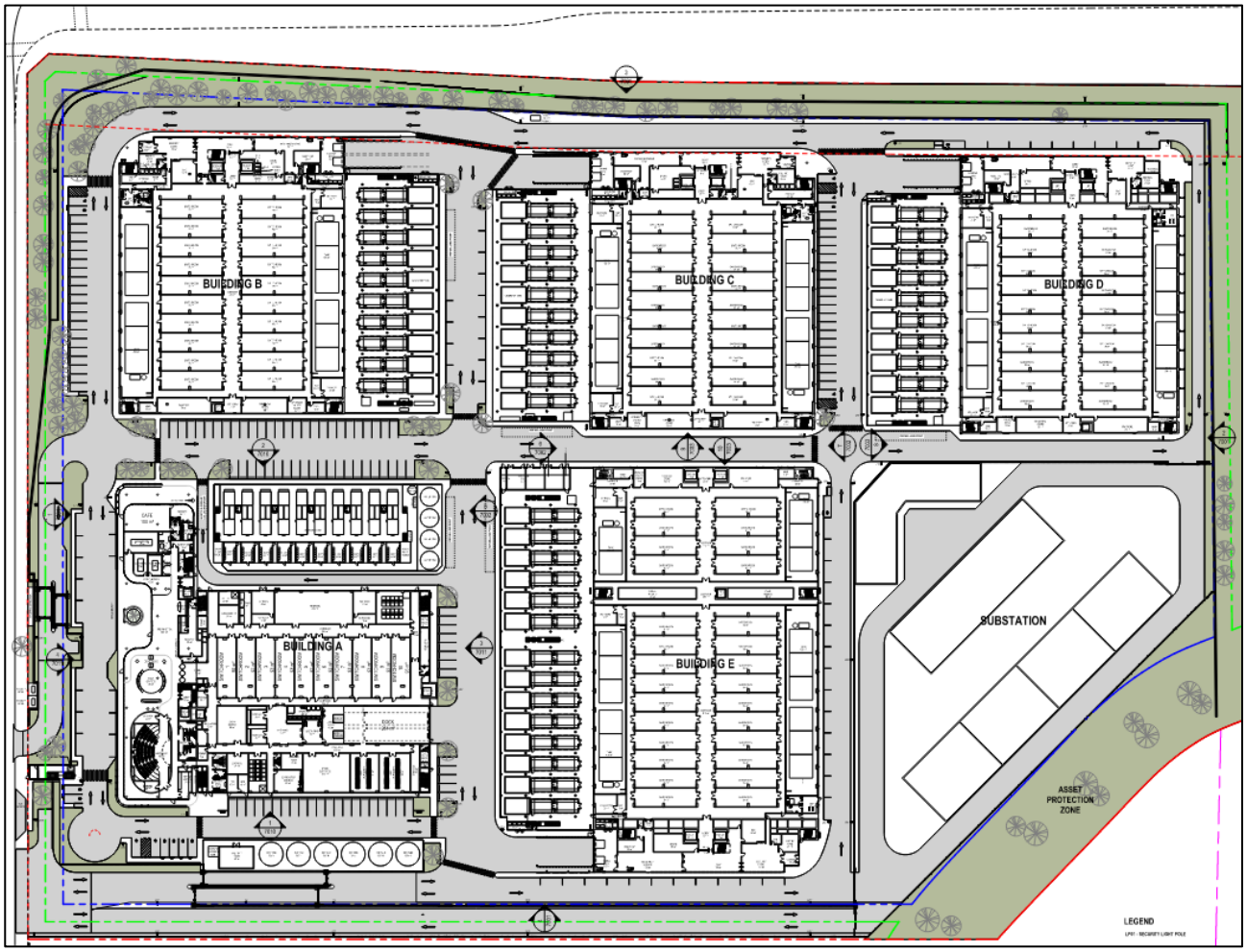

Figure 20 – General Arrangement Plan

Source: HDR (2024)

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Each of the proposed buildings and associated GFA is provided in detail in Table 11 below, being split into technical and administration / commercial space for each building. The parking space allocation for each building is also provided.

Table 11 – Building GFA and Proposed Parking Provision

Proposed Building	Proposed Commercial Space GFA (m^2)	Proposed Technical Space GFA (m^2)	Parking Provision
A	4,345	6,465	77
B	1,448	10,055	53
C	1,449	10,053	34
D	1,489	10,209	10
E	2,007	16,134	26
Total	10,738	52,916	200

4.3 Staffing Details

The anticipated staffing levels for the site is a total of 411 specialists and related full-time roles during operation. These staff will comprise the following roles:

- Executive / sales
- Security / CSR / Concierge
- Operational
- Mission critical office
- External and intermittent maintenance contractors
- Café

Many of the above roles work on an 8hr shift basis, as the development will operate 24/7. Therefore, it is anticipated that the maximum total staff on-site at any given time will be 196 (inclusive of all roles specified above). A staffing occupancy schedule prepared by NEXTDC has been provided as Appendix 5 of this report for reference.

4.4 Project Staging

The proposed site is to be developed in three stages. The staging program is shown in Table 12, and a proposed staging plan is provided as Figure 21.

Table 12 – Proposed Staging Program

Stage / Phase	Proposed Works
Stage 1	Construction of data centre Buildings A – C, vehicular driveways, required internal roads, adjacent parking areas and the substation
Stage 2	Construction of data centre Building D, adjacent internal roads and adjacent parking areas
Stage 3	Construction of data centre Building E, adjacent internal roads and adjacent parking areas

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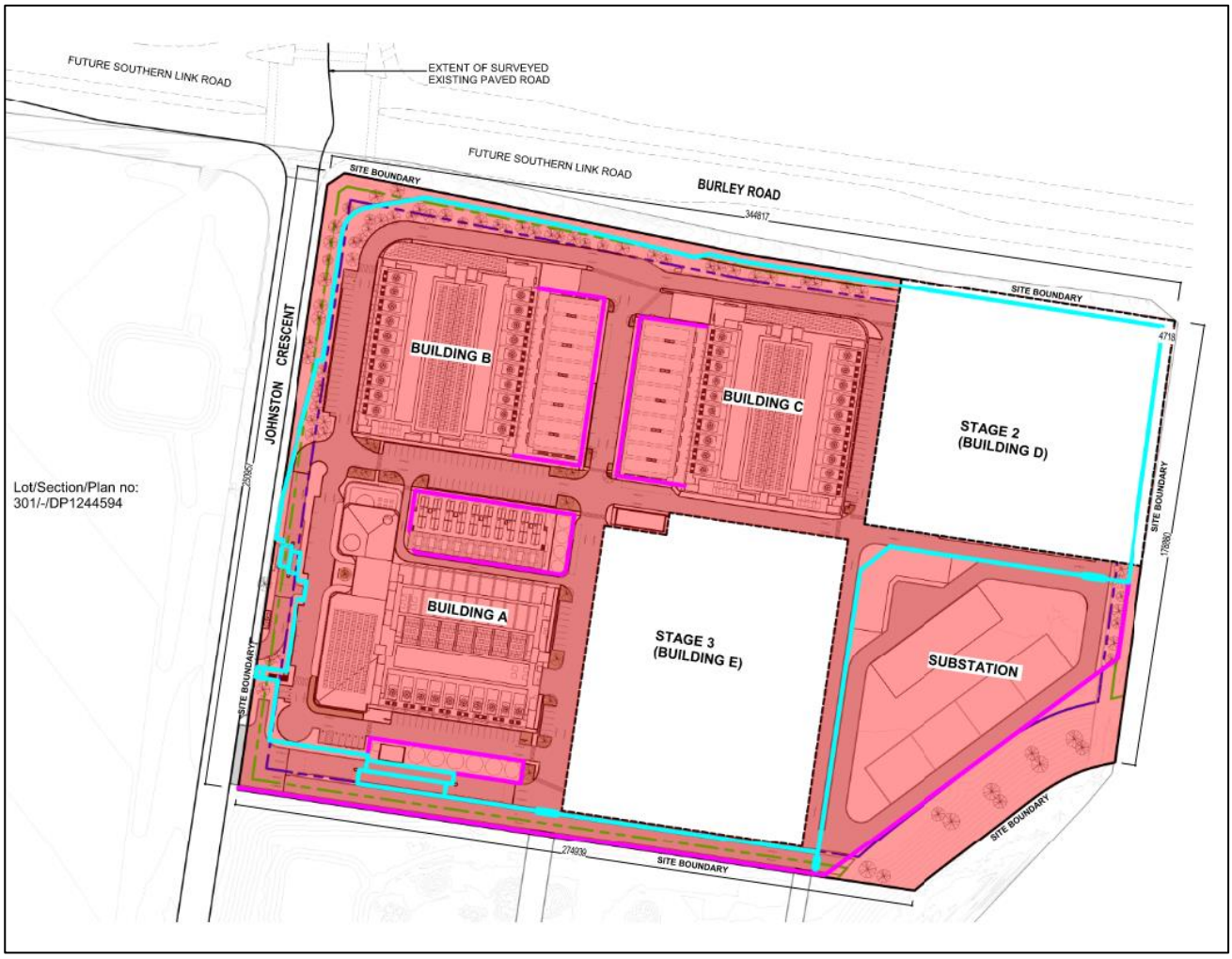

Figure 21 – Staging Plan

Source: HDR (2024)

4.5 Site Access

4.5.1 Passenger Vehicle Access

Passenger vehicle access to the site is proposed via an approximately 7m wide combined ingress / egress driveway connecting with Johnston Crescent, approximately central on the western boundary of the site.

This driveway is to connect to an internal roadway that provides access to the proposed passenger drop off / pick up adjacent to Building A, on-site parking areas and the rest of the internal private road network.

4.5.2 Heavy Vehicle Access

A separate 17m wide heavy vehicle access driveway is proposed to the south of the above mentioned passenger vehicle driveway, connecting to Johnston Crescent in the south-western corner of the site. This driveway has been designed to accommodate the largest vehicle to access the site, being 20m long Articulated Vehicles, and provides access to a secure internal roadway, where heavy vehicles can access the loading areas associated with each proposed building.

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4.5.3 Construction Vehicle Access

A separate Construction Vehicle access driveway is proposed to be situated to the south of the heavy vehicle driveway, also connecting to Johnston Crescent in the south-western corner of the site.

This driveway is to accommodate construction vehicle access to the site during the construction of each stage, as well as access for substation transformer delivery and substation maintenance as required.

4.5.4 Pedestrian Access

Pedestrian access to the site is facilitated by a proposed pedestrian staircase and adjacent accessible ramp connecting with the eastern Johnston Crescent footpath. This staircase and ramp provide access to the entrance of Building A in the western portion of the site. Marked pedestrian crossings have been provided throughout the site where pedestrians are required to crossing internal roadways.

This development application does not include any proposed upgrades to nearby external pedestrian facilities or public domain.

4.6 Internal Circulation and Site Layout

4.6.1 Site Layout

The site is to provide five data hall buildings in a grid alignment, comprising two rows. Building A is to be situated in the south-western corner of the site and form the “Mission Critical” building, which will be the building where visitors to the site will access.

The site is to be serviced by internal private roadways that provide access throughout the site, running adjacent to each building. The internal roads are proposed to comprise primarily of two-way aisles with the following one-way aisles provided:

- Northbound aisle provided along the eastern sides of Building D and E
- Westbound aisle along the northern side of Building D
- Eastbound aisle along the southern side of Building D.

Internal passenger vehicle turnaround is facilitated by an internal minor roundabout in the south-western corner of Building A.

Figure 22 indicates the internal roadway network and emphasises the proposed internal circulation.

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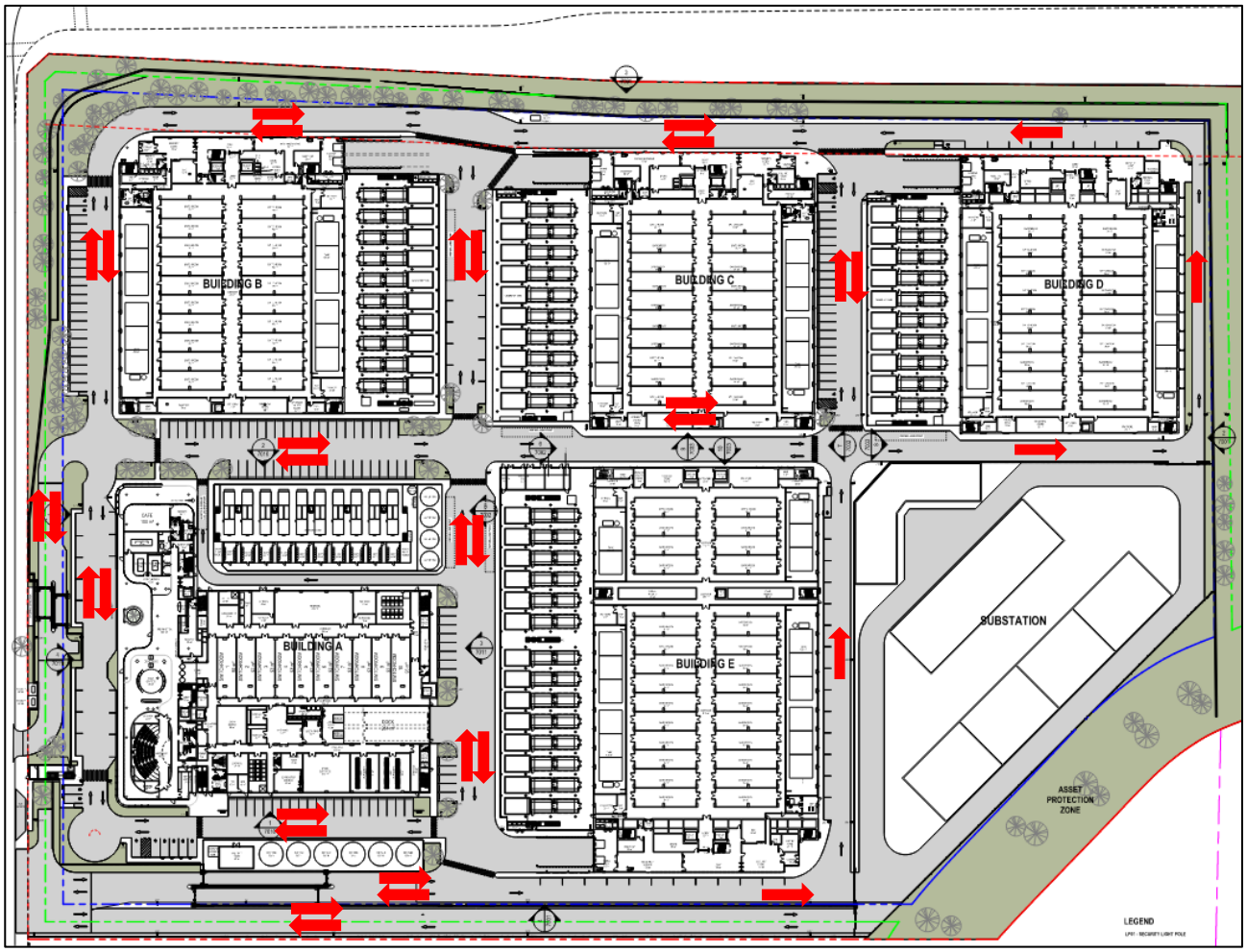

Figure 22 – General Arrangement Plan – Internal Circulation

Source: HDR (2024)

Passenger vehicle parking is to be provided along the internal roadways and adjacent to the proposed buildings in the form of parallel and 90-degree angled parking. Accessible parking spaces are proposed in proximity to the entrance to each building. A number of electric vehicle parking spaces equipped with electric charging points are also proposed throughout the site.

The substation is to be located in the south-eastern portion of the site, being secured by fencing around its perimeter. Access to the substation is to be provided via a security gate in the southern-most section of the substation fencing. The detailed substation and surrounding yard design is to be undertaken and finalised by others.

4.6.2 Passenger Vehicle Circulation

All passenger vehicles are to enter and exit the site in a forward direction via the passenger vehicle access driveway connecting with Johnston Crescent.

Access control to passenger vehicles upon approach to the site is to be restricted via two sets of gates set-back approximately 30m within the site in order to allow queuing for up to five vehicles within the property boundary and on approach to the boom gates.

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An intercom system is to grant access to the site. Additional access control to various parts of the site is provided as required via boom gates situated at internal intersections in order to appropriately restrict access as required.

An internal passenger vehicle turning head is provided immediately within the site for passenger vehicles to exit the site in a forward direction if access is not granted.

It is recommended that a 'Give Way' sign and TB line is provided across the egress lane of the passenger vehicle roadway in order to assign priority to vehicles utilising the turning head to exit the site in a forward direction in the instance that access is not granted. Further details of the signage and line marking can be provided via a signage and linemarking plan, the requirement for which can be imposed by council as a Condition of Consent.

It is proposed that private internal roads will be provided along each proposed building within the site providing access to adjacent 90-degree and parallel parking spaces. The internal roadway / parking aisle and parking space design is to be compliant with AS2890.1:2004, providing the following dimensions:

- 90 degree angled staff parking spaces are to be 2.4m wide by 5.4m long
- 90 degree angled visitor parking spaces are to be 2.5m wide by 5.4m long
- Parallel parking spaces are to be minimum 2.1m wide
- Unobstructed end parallel parking spaces are to be 5.4m long
- Obstructed end parallel parking spaces are to be minimum 6.2m
- Parallel parking spaces between two spaces are to be minimum 5.9m long
- A minimum head clearance of 2.2m is to be maintained where all passenger vehicles are to travel
- A two-way internal roadway is to be a minimum of 5.8m wide

The internal private roadways intersect at right angles, forming standard cross intersections. Intersection control is recommended to be governed by 'Stop' sign control where required in order to appropriately manage traffic flow within the internal intersections and junctions. Additional access control to various parts of the site is provided through the provision of boom gates situated at internal intersections in order to appropriately restrict access.

Passenger vehicles swept path plans have been prepared in order to demonstrate the ability of passenger vehicles to enter and exit in a forward direction manoeuvre within the site, copies of which are included as Appendix 5.

4.6.3 Heavy Vehicle Circulation

All heavy vehicles are to enter and exit the site in a forward direction via the heavy vehicle access driveway connecting with Johnston Crescent.

Upon access to the site via the heavy vehicle driveway in the south-western portion of the site, heavy vehicles will directly access an internal roadway running along the southern boundary of the site. Access to the site is to be restricted via two sets of gates within the heavy vehicle roadway being set-back from the property boundary approximately 50m in order to provide space for queuing, with an intercom system to grant access.

An internal heavy vehicle turning head is provided immediately within the site for heavy vehicles to exit the site in a forward direction if access is not granted.

It is recommended that a 'Give Way' sign and TB line is provided across the egress lane of the heavy vehicle roadway in order to assign priority to vehicles utilising the turning head to exit the site in a forward direction in the instance that access is not granted. Further details of the signage and line marking can be provided via a signage and linemarking plan, the requirement for which can be imposed by council as a condition of consent.

Heavy vehicles will then circulate within the site via the internal private road network and access the loading docks within each building as required.

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The internal loading dock design is to be compliant with AS2890.2:2018, providing the following minimum dimensions for 20m long AVs:

- Internal loading bay dimensions of 3.5m wide by 20m long
- A minimum headroom clearance of 4.5m
- A maximum gradient within serviced area of 12.5% measured in any direction (as reverse movements are required)

Heavy vehicles swept path plans of the largest vehicle to access the site, being 20m long Articulated Vehicles, have been prepared in order to demonstrate the ability of vehicles to enter and exit in a forward direction manoeuvre within the site, copies of which are included as Appendix 5.

Based on the prepared swept path plan analysis, it is recommended that additional one-way aisle circulation should be implemented to avoid conflicting vehicle movements, particularly between passenger vehicles and heavy vehicles. Where an aisle is two-way convex mirrors should be provided on blind corners in order to facilitate visibility between approaching vehicles.

4.6.4 Internal Site Refuelling Points

Each proposed building includes an adjacent pavement marked refuelling point for 20m long Articulated Vehicles to delivery fuel and service the proposed generators on site.

Ingress and egress to each proposed refuelling point has been demonstrated via swept path analysis, copies of which are included as Appendix 5. These swept paths indicate that all refuelling points are capable of being accessed via a forward direction and exited in a forward direction with the exception of the refuelling point adjacent to Building D in the north-eastern portion of the site. The swept paths indicate, due to the one-way aisle along the eastern side of Building D, that vehicles are to reverse out of the refuelling point and then travel northbound between Buildings C and D to circulate through the site and ultimately exit the heavy vehicle driveway in a forward direction. It is considered that refuelling is anticipated to be an infrequent occurrence, with approximately three vehicles servicing each refuelling point per 24-hour period. This reverse movement is to be appropriately managed through a heavy vehicle site management plan.

Further detail regarding the management of the refuelling process is to be developed and documented prior to the occupation of the site.

4.7 Parking

4.7.1 Proposed Provision

The development includes the provision of the following with respect to parking:

- 200 passenger vehicle parking spaces including:
  - 6 accessible parking spaces
  - 10 electric vehicle charging-equipped spaces
- 5 motorcycle parking spaces
- 24 bicycle parking spaces

4.7.2 Council Parking Requirements

The 327 – 335 Burley Road, Horsley Park DCP requires car parking to comply with the provided rates as well as those contained in the Fairfield Citywide DCP. The controls within these DCPs are provided in Table 13.

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Table 13 – Parking Rates and Requirements from Relevant DCPs

DCP	Land Use	Parking Rate	Measure	Parking Required
Fairfield Citywide DCP	**Commercial Space**	1 space per 40m^2 gross leasable area	5,072m^2 GLA	126.8 (adopt 127)
	General Industry	1 space per 70m^2 gross leasable area	52,916m^2 GLA	755.94 (adopt 756)
	Total			883
327 – 335 Burley Road DCP	**IN1 (General Industrial)**	1 space per 70m^2 gross leasable area including ancillary plus 1 space per unit for factory units.	57,988 m^2 GLA	828.4 (adopt 829)

Based on the above, the proposed development is required to provide between 829 – 883 parking spaces on-site. However, as the development is anticipated to generate a maximum of 196 staff on-site and limited visitors on-site at any given time, it is considered that this parking provision would result in a significant oversupply to meet the requirements of the data centre development. It is therefore considered that strict application of the DCP parking rates do not necessarily provide a reasonable indication of the parking needs of the development.

4.7.3 First Principles Parking Approach

As the development is to generate a total of 196 site-wide staff, it is clear that the above parking rate for 'General Industry' is inappropriate to apply to the data centre technical space, and the parking demand is more appropriately assessed based upon a first-principles approach.

Therefore, if a rate of one parking space per maximum staff on-site at any given time were applied, a parking requirement of 196 spaces would apply. Refer to Appendix 5 for the Staffing Occupancy Schedule prepared by NEXTDC.

As the proposed development includes a parking provision of 200 spaces, the parking provision is considered to be satisfactory to accommodate staff and allow at least 4 parking spaces available for visitor use at any given time. It should however be noted that the staff provision includes maintenance contractors, which will only be on-site intermittently as required.

4.7.4 Visitor Parking Management

Further, in order to manage the parking space amenity on-site, any visitors wishing to travel to the site will be required to do so under an online booking system governed by the management of the site and will require approval to attend site at a scheduled date and time. It is therefore considered that this booking system will effectively manage the parking demand of visitors and can ensure that the parking demand generated can be accommodated on-site at any given time. It is also considered that the visitors travelling to site will only be on-site for a short pre-determined amount of time, resulting in a high turnover of visitor parking spaces.

4.7.5 Precedence

To further substantiate the parking provision proposed, an investigation of similar recently approved data centre type developments and other surrounding areas relevant DCP rates has been reviewed and provided.

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Kemps Creek data centre development (SSD-9522)

The recently approved Kemps Creek data centre development (SSD-9522) is situated approximately 4.5km from the site at the street address 769 Mamre Road, Kemps Creek, which also situated within the Western Sydney Employment Area.

The Kemps Creek data centre development provides the following parking provision and other relevant development characteristics:

- 120 on-site parking spaces
- Total GFA In the order or 65,000m^2
- 79 on-site staff members

The parking provision of the Kemps Creek data centre site results in an approved parking rate of approximately one parking space per 542m^2 GFA.

If the approved parking rate above were to be applied to the **proposed** data centre development, a parking provision of 117 parking spaces would be required (63,654m^2 total GFA / 542m^2). As the proposed parking provision exceeds the approved parking rate, it is considered to be satisfactory.

4.7.6 Green Travel Plan

Further, to manage the parking space amenity and traffic generation of the site, a Green Travel Plan has been prepared by this practice to provide travel initiatives in line with state government policy and efforts to achieve established travel mode targets. It is considered that the Green Travel Plan is an evolving document that should be adjusted as required to remain in line with the surrounding transportation conditions and the development user needs. This Green Travel Plan has been prepared by this practice and has been submitted under separate cover.

The GTP highlights possible initiatives in order to reduce the site's dependency on private vehicle travel. These initiatives include the provision of adequate End of Trip facilities, bicycle and motorcycle parking and potential ways to promote staff carpooling.

4.7.7 Accessible Parking

The development is proposed to provide 6 accessible spaces for the users of the development in close proximity to the entrance of each building, with access unimpeded by stairs, gutters or other obstacles.

The 327 – 335 Burley Road, Horsley Park DCP, provides the following requirements with respect to accessible parking:

> *"Sufficient spaces should be provided for disabled parking. All developments providing 50 parking spaces or more must provide at least 2% or part thereof of those spaces for disabled drivers, clearly marked and signposted for this purpose and located as close as possible to the building's entrance."*

The Fairfield Citywide DCP also specifies the following controls with respect to accessible parking:

- Spaces should be located close to the entry of the building to minimise travel distances and maximise accessibility. Spaces should be located on level ground.
- Parking areas should recognise the needs of the disabled by ensuring gutters/stairs or other obstacles do not impede access into the building.
- Spaces for the disabled should be clearly identified by both signage and stencilled disabled symbol on the surface. The space should be painted blue.

Therefore, as the proposed development is to provide 200 parking spaces, at least 4 accessible parking spaces are required. Therefore, the provision of 6 spaces exceeds this requirement and is deemed satisfactory.

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4.7.8 Electric Vehicle Charging

The Fairfield City Wide DCP and the 327 – 335 Burley Road, Horsley Park DCP do not provide requirements with respect to the provision of parking spaces with electric vehicle charging capabilities.

Notwithstanding, 5% of all proposed parking spaces, or 10 spaces, have been equipped with electric vehicle charging capabilities and have been marked as electric vehicle spaces.

The electric vehicle parking space provision is considered to be satisfactory to meet the needs of the proposed development. Further provision for electric vehicle charging can be monitored based on the evolving needs of the users of the development.

4.7.9 Bicycle Parking and End of Trip Facilities

The development is proposed to provide a total of 24 bicycle parking spaces within enclosed storage rooms within each data centre building. Additionally, end of trip facilities are proposed to be provided within each building in the form of at least one unisex toilet and shower, one accessible toilet and shower and multiple lockers.

The Fairfield Citywide DCP states that new developments should include bicycle storage facilities to encourage the use of active transport.

The bicycle parking provision rates contained in the NSW *Guidelines for Walking and Cycling* indicate that bicycle parking should be provided at a rate of 3-5% of staff parking requirements and 5-10% of staff for all visitor parking requirements. Table 14 below indicates a guide for the bicycle parking provision, based on a total development requirement of 411 staff.

Table 14 – Bicycle Parking Guide

User	Rate	Requirement
Staff Parking	3 – 5%	12 – 21
Visitor Parking	5 – 10%	21 – 41
Total		42 – 62

Whilst the proposed bicycle parking provision of 24 spaces is in alignment with the requirements of Council's DCP, it is considered that further bicycle parking spaces can be provided as required in alignment with the evolving travel needs of the development.

4.7.10 Motorcycle Parking

The development is proposed to provide 5 motorcycle parking spaces.

The Fairfield Citywide DCP does not provide motorcycle parking requirements; therefore, reference is made to the Austroad's *Guide to Traffic Management* which recommends a motorcycle parking rate of 2% of the total number of car spaces should be adopted.

Based on a total parking provision of 200 spaces, this equates to a motorcycle parking requirement of 4 spaces. The motorcycle parking provision of 5 spaces exceeds this requirement and is therefore satisfactory.

4.8 Service and Loading

The proposed development includes five loading docks, one for each building. Each loading dock has been designed capable of accommodating up to two 20m long AVs at a time. These loading docks are accessible via the heavy vehicle access gate specified for deliveries and the internal site roadway.

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4.9 Pick up and Drop Off Activities

Building A provides an area dedicated to passenger pick-up and drop-off along the kerb alignment adjacent to the entrance to the building.

It is also proposed that an approximately 12m long section for 'Taxi Drop Off' zone be signposted along the eastern kerb alignment of Johnston Crescent. It is considered that as the Johnston Crescent kerb-side is currently sign posted as 'No Stopping' restrictions, there would be no resultant loss of on-street parking if this zone were to be established. The approval for which is however subject to Council's Local Traffic Committee.

4.10 Development Traffic Generation

During operation of the data centre, the following users will generate passenger vehicle traffic to and from the centre:

- Technical space staff;
- Commercial / Front of House staff and visitors
- Maintenance / servicing crews

The centre will also generate heavy vehicle movements throughout the day for large deliveries or major maintenance activities that cannot be achieved via vans or utes.

The following subsections will describe the passenger and heavy vehicle traffic generation for the Stage 1 development and the total generation of the site, with reference to the RMS *Guide to Traffic Generating Developments* where possible. It is however noted that the RMS *Guide to Traffic Generating Developments* does not provide traffic generation rates relevant to data centres. Therefore, first principles approaches have been employed as required.

The following total development characteristics are applicable to the traffic generating ability of the site:

- Technical space staff is to be in the order of 73
- Commercial floor space is approximately 10,738m^2 GFA across all buildings
- The total site is to contain 5 loading docks, each dock is considered to generate up to three heavy vehicle movements per day

Table 15 indicates the projected passenger vehicle and heavy vehicle peak hour traffic generation based upon the above total development characteristics.

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Table 15 – Total Development Traffic Generation

Vehicle Type	User Type	Traffic Generation Rate	Inbound / Outbound Split	Measure	AM Peak Generation	PM Peak Generation
Passenger Vehicles	**Technical Space**	No data centre traffic generation rate available	It is assumed that 50% of technical staff will arrive during the AM peak hour and depart during the PM peak hour.	73 staff	37 inbound trips	37 outbound trips
	Commercial Space	RTA's *Guide to Traffic Generating Developments* – Office and Commercial: 2 peak hour trips per 100m^2 GFA.	It is assumed that the trips will be 80% inbound and 20% outbound during the morning peak, and vice versa during the afternoon peak.	10,738m^2 GFA	172 inbound trips 43 outbound trips	43 inbound trips 172 outbound trips
	Maintenance / Servicing	Up to 3 maintenance / servicing vehicles anticipated per day per building	It is assumed that servicing vehicles arrive and depart within the same hour and are spread evenly across main business hours (9-5).	5 buildings	2 inbound 2 outbound	2 inbound 2 outbound
Heavy Vehicles	**Maintenance / Servicing**	Up to 3 heavy vehicles per day per loading dock	It is assumed that heavy vehicles arrive and depart within the same hour and are spread evenly across main business hours (9-5).	5 docks	2 inbound 2 outbound	2 inbound 2 outbound
Inbound Trips					213	47
Outbound Trips					47	213
Total Trips					260	260

Based on Table 14 above, the development is projected to generate up to 260 peak hour vehicle trips in the morning and afternoon peak hours, once operating at full capacity.

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5.0 Operational Impacts

5.1 Future Traffic Models

5.1.1 Modelling Scenarios

The following traffic modelling scenarios detailed below in Table 16 have been prepared in order to assess the traffic impacts of the proposed development on the road network, with existing and future layout of the nearby intersections. The 2026 and 2036 models have been prepared based upon information provided by TfNSW as well as the *Southern Link Road Traffic Modelling* report prepared by GHD in 2021.

Table 16 – Modelling Scenarios

Scenario	Year / Time	Peak Hour Period	Description
Existing Model (refer to Section 2.7)	2023	7:00-8:00am 4:15-5:15pm	Existing configurations and existing traffic volumes
2026 Model	2026		Existing intersection configurations with total development traffic and cumulative traffic applied from neighbouring sites currently undergoing development
2036 Model	2036		Future intersection configurations based on the information provided within the GHD report with the 2036 traffic volumes provided in the GHD report + total development traffic generation + cumulative traffic generation from neighbouring sites planned to be completed by 2036

The following subsections describe the and present the projected intersection performance for each modelling scenario.

5.1.2 2026 Model

Cumulative Traffic Assessment

A significant majority of the surrounding planned industrial estates have been developed and operational within the last 2 years. It is considered that the following two nearby industrial estates have the potential to generate further traffic in the future that would not have been picked up by the traffic volume surveys completed in December of 2023 for the purposes of this report.

Accordingly, the following two estates and their associated components that are yet to be operational have therefore been considered for the 2026 cumulative traffic assessment, refer to Figure 23 overleaf for a diagram of the future relevant development provided over an aerial image in order to demonstrate their proximity to the subject site:

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- Oakdale East Estate (OEE): note that Precinct 1 was operational during the traffic survey period and Precincts 2 – 3 are planned to be operational in 2026 (according to the *Oakdale East Industrial Estate Staging Plan* prepared by Goodman on 9 November 2023)
- ESR Horsley Logistics Park (ESR): note that Lot 202 of the greater ESR site was under construction during the traffic survey period, therefore its traffic generation has been incorporated into the 2026

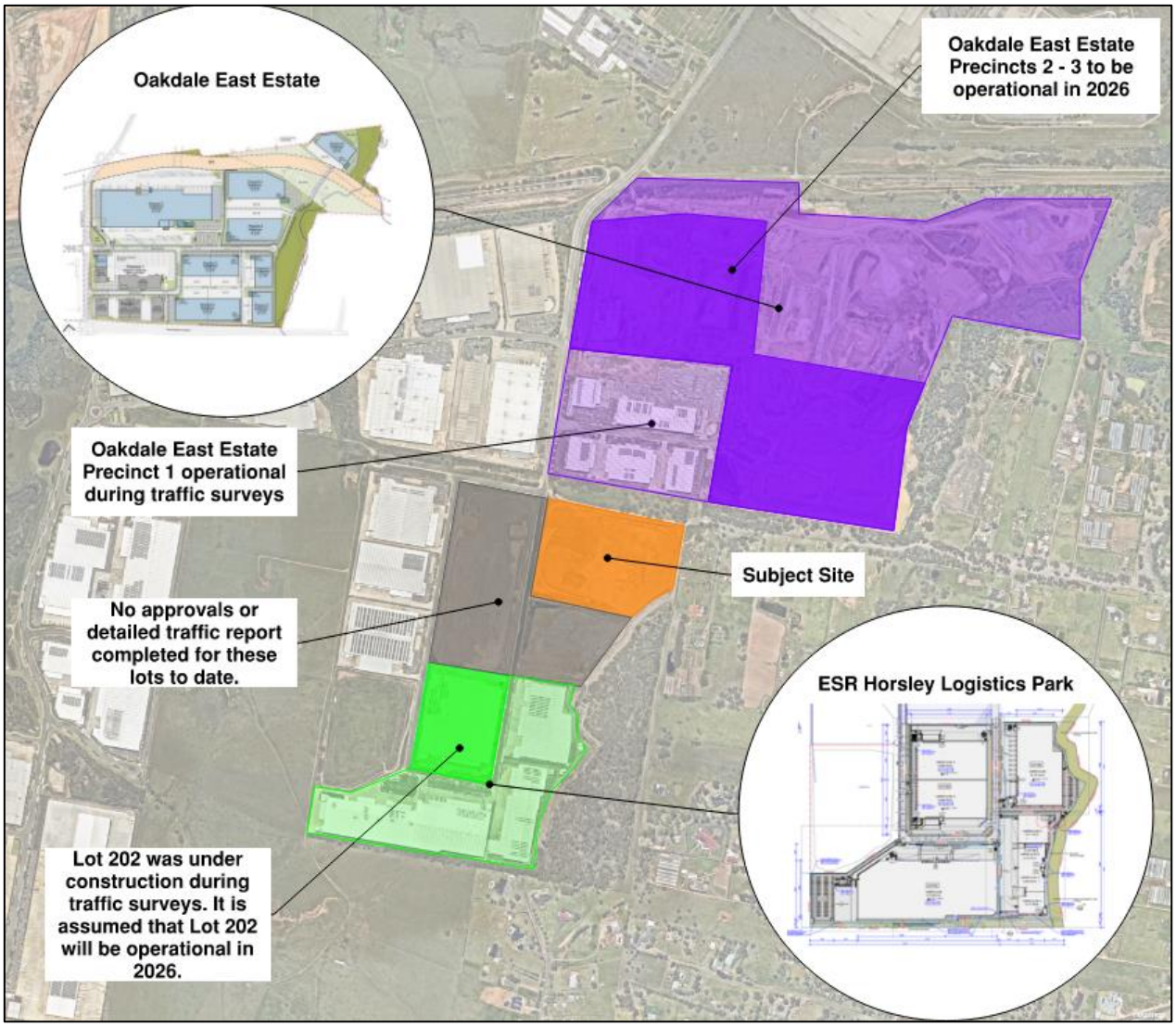

Figure 23 – 2026 Cumulative Traffic Assessment

Insert Sources: Asongroup

The trips provided in Table 17 have been provided based on the information provided within Ason group's *Transport Assessment State Significant Development Application at Oakdale East Industrial Estate (SSD-37486043)* dated 7/06/2022 and the *Transport Assessment for the ESR Horsley Logistics Park – SSD 10436 (Modification 1)* for the OEE precincts and the ESR lots, respectively.

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Table 17 – Forecasted 2026 Trips for Surrounding Developments

Development	GFA	AM Peak Trip Generation	PM Peak Trip Generation
Oakdale East Estate (OEE) – Precinct 2	82,490	148	132
Oakdale East Estate (OEE) – Precinct 3	96,810	174	155
Total		+322	+287
ESR Horsley Logistics Park – Lot 202	33,360	+82	+61

The above volumes have been added to the existing traffic volumes surveyed, in conjunction to the traffic generated by the proposed development in order to determine the 2026 scenario volumes. It is acknowledged that the background volumes have not been altered due to insufficient information provided by TfNSW with respect to STFM data. However, this is considered acceptable as the traffic travelling within Old Wallgrove Road past and adjacent to the subject site is projected to continue to be limited to that traffic generated by abutting industrial development.

Approved Road Network Upgrades

Approval for the OEE included the requirement for road network upgrades at the intersections of Old Wallgrove Road / Millner Avenue and Old Wallgrove Road / Lenore Drive / Telopea Place as a Condition of Consent before Stage 2 construction (Precinct 2 – 3) of the development can occur. Therefore, these network upgrades have been reflected in the 2026 model provided.

Figures 24 and 25 below and overleaf are taken from the issued Development Consent to illustrate the approved road network upgrades that have been incorporated.

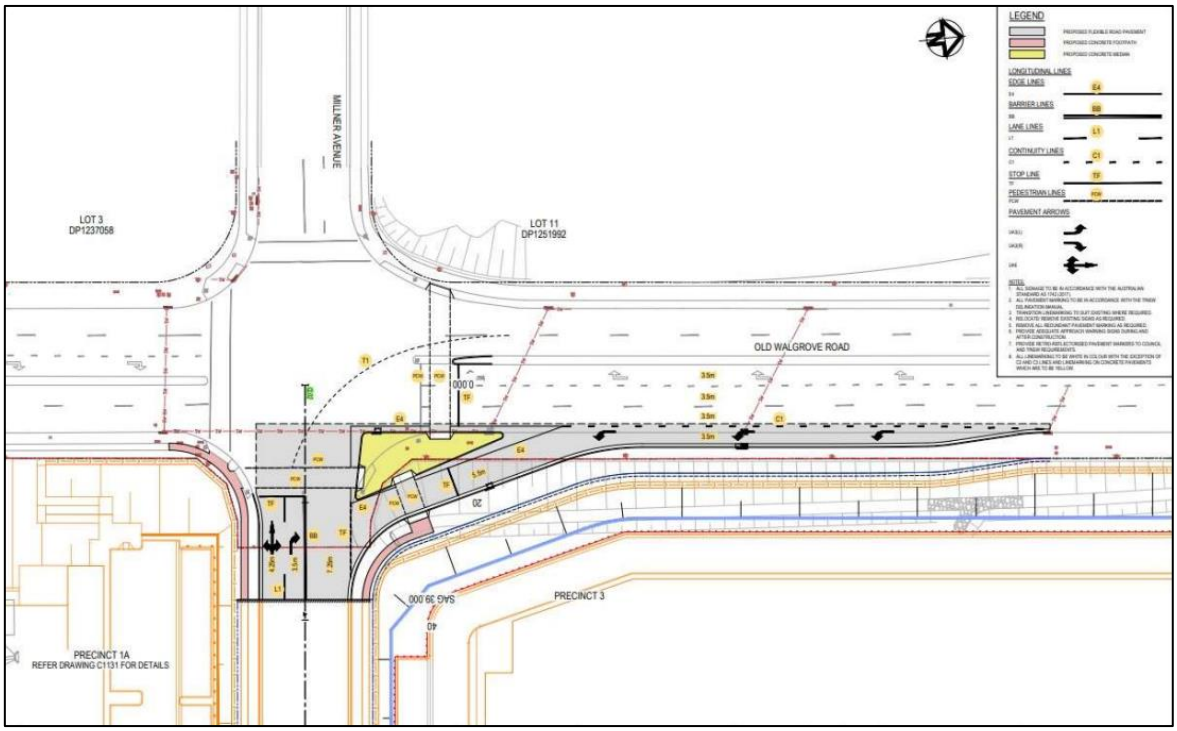

Figure 24 – Approved Intersection Upgrade Works – Old Wallgrove Road / Millner Avenue

Source: DPE SSD 37486043 Condition of Consent

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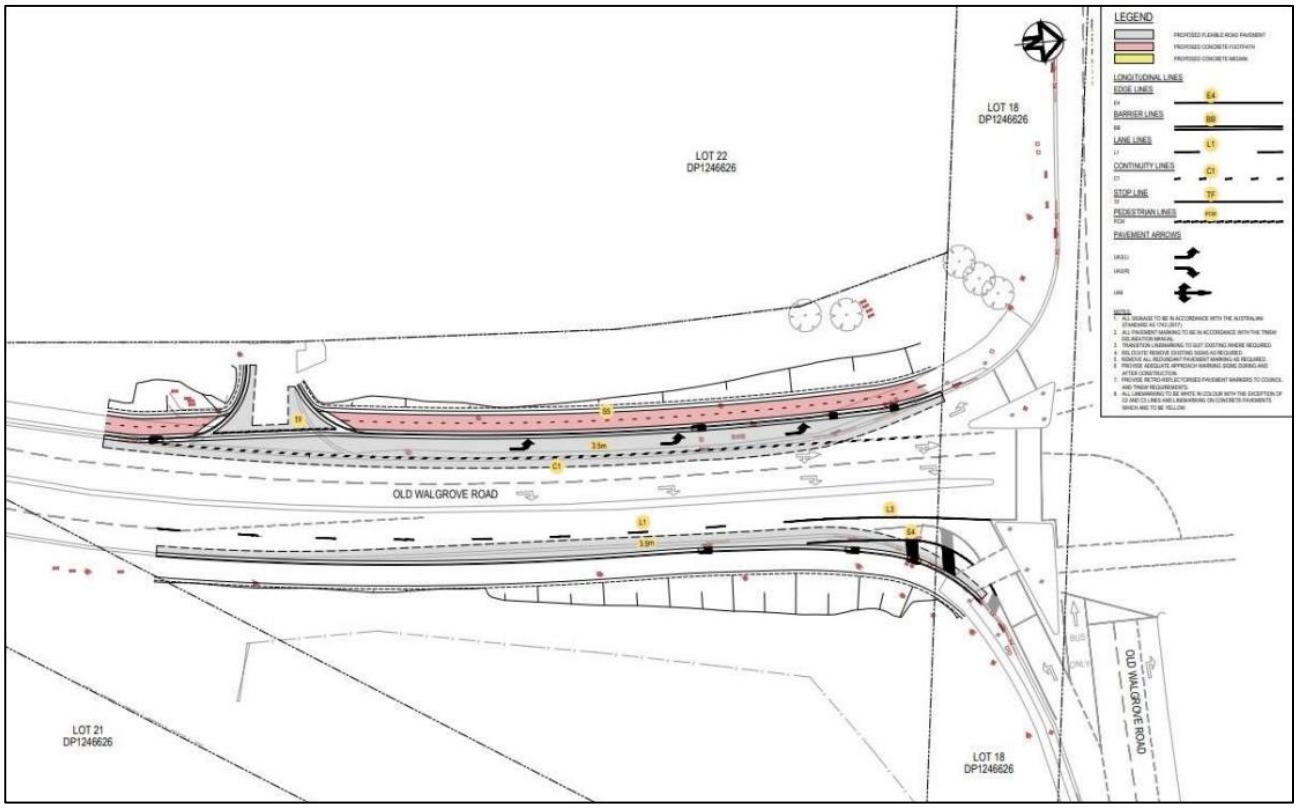

Figure 25 – Approved Intersection Upgrade Works – Old Wallgrove Road / Lenore Drive / Telopea Place

Source: DPE SSD 37486043 Condition of Consent

Trip Distribution

In order to determine the projected 2026 traffic volumes within the road network with the operation of the proposed development and the surrounding sites, a traffic distribution has been developed based upon the existing traffic volume patterns and distributions surveyed and provided in Section 2.6.2.

Additionally, the following assumptions have been made with respect to vehicle routes to each site:

- All traffic accessing and departing the subject site will do so via a through movement onto Johnston Crescent from Old Wallgrove Road and vice versa, respectively
- Traffic accessing and departing the OEE precincts will do so via a 70% / 30% split between the signalised intersection with Millner Avenue, Old Wallgrove Road and the access road and the estate access road to the south, respectively
- Traffic accessing and departing the ESR sites will do so via a 50% / 50% split between a through movement from Old Wallgrove Road onto Johnston Crescent and vice versa and a right turn from Old Wallgrove Road onto Johnston Crescent and vice versa, respectively

The development-generated inbound and outbound trips have been distributed as presented in Table 16 of this report. The OEE and ESR traffic has been assumed to be distributed within an 80% inbound / 20% outbound split for the AM peak and vice versa during the PM peak.

Accordingly, the development and cumulative traffic volumes assessed have been distributed across the network during the morning peak period as illustrated overleaf in Figure 26.

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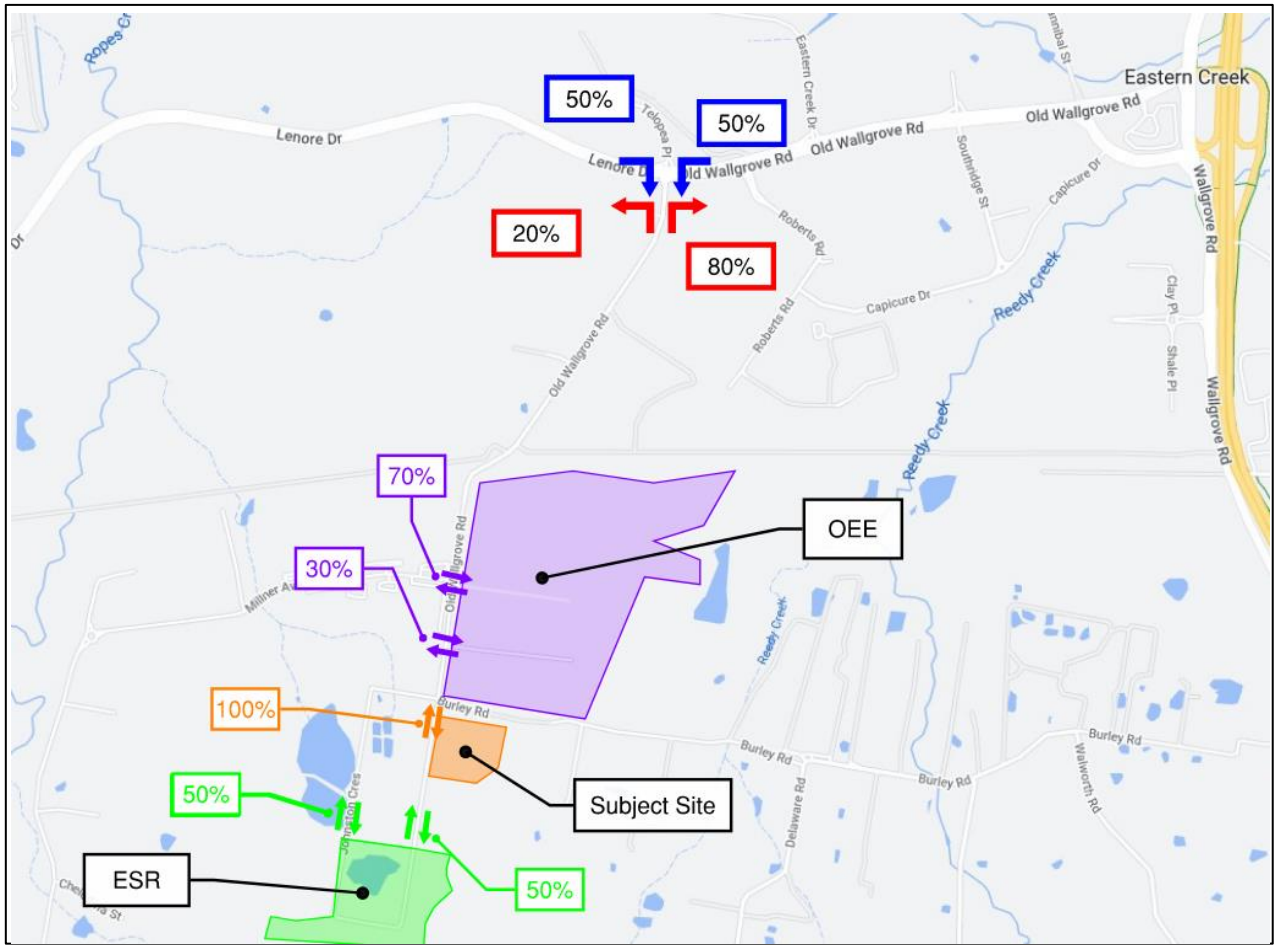

Figure 26 – 2026 AM Trip Distribution

The development-generated traffic volumes have been distributed across the network during the afternoon peak period as illustrated in Figure 27.

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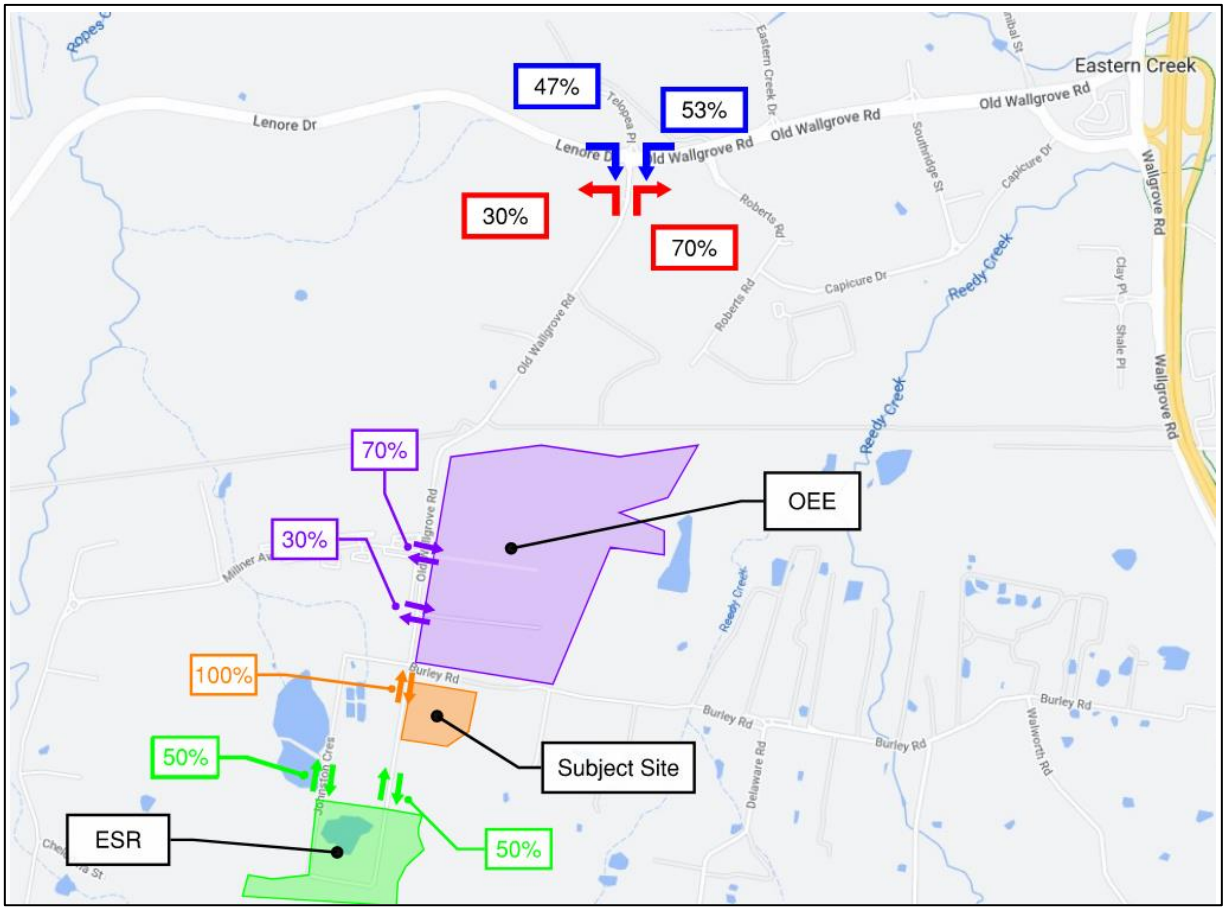

Figure 27 – 2026 PM Trip Distribution

Projected Traffic Volumes

Based on the traffic generation assessment for the total development and the distribution provided above, Figure 28 – Figure 30 indicate the projected traffic volumes at the subject intersections.

Note: STFM data was not provided by TfNSW, therefore additional information may be required in order to substantiate predicted future volumes.

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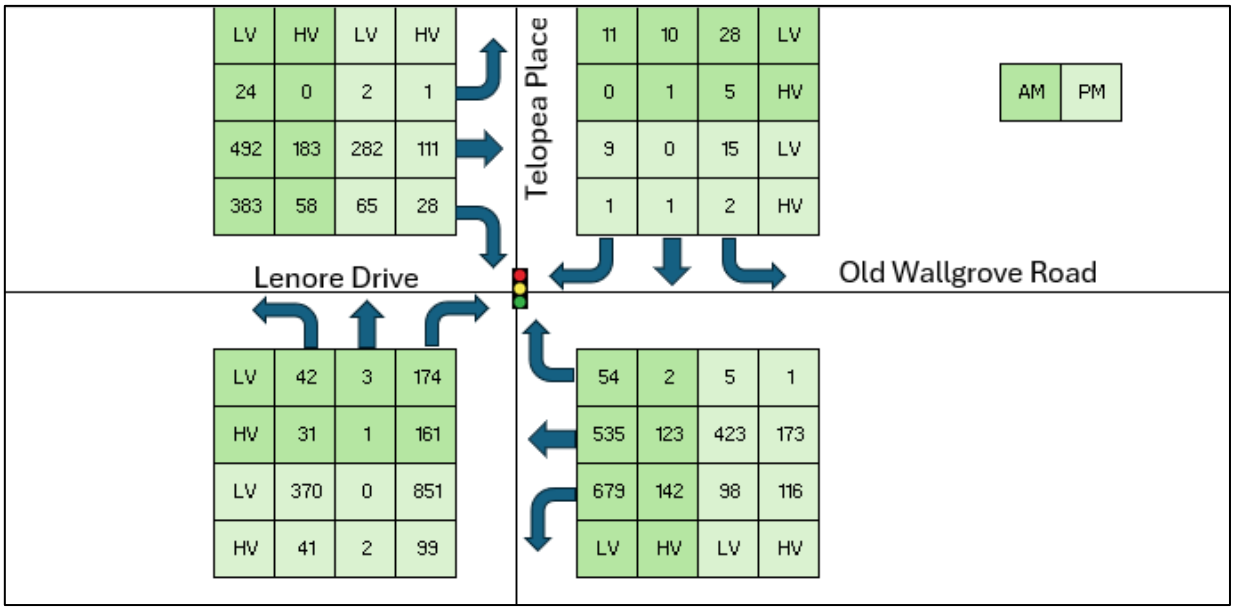

Figure 28 – 2026 Projected Volumes: Intersection of Lenore Drive / Old Wallgrove Road / Telopea Place

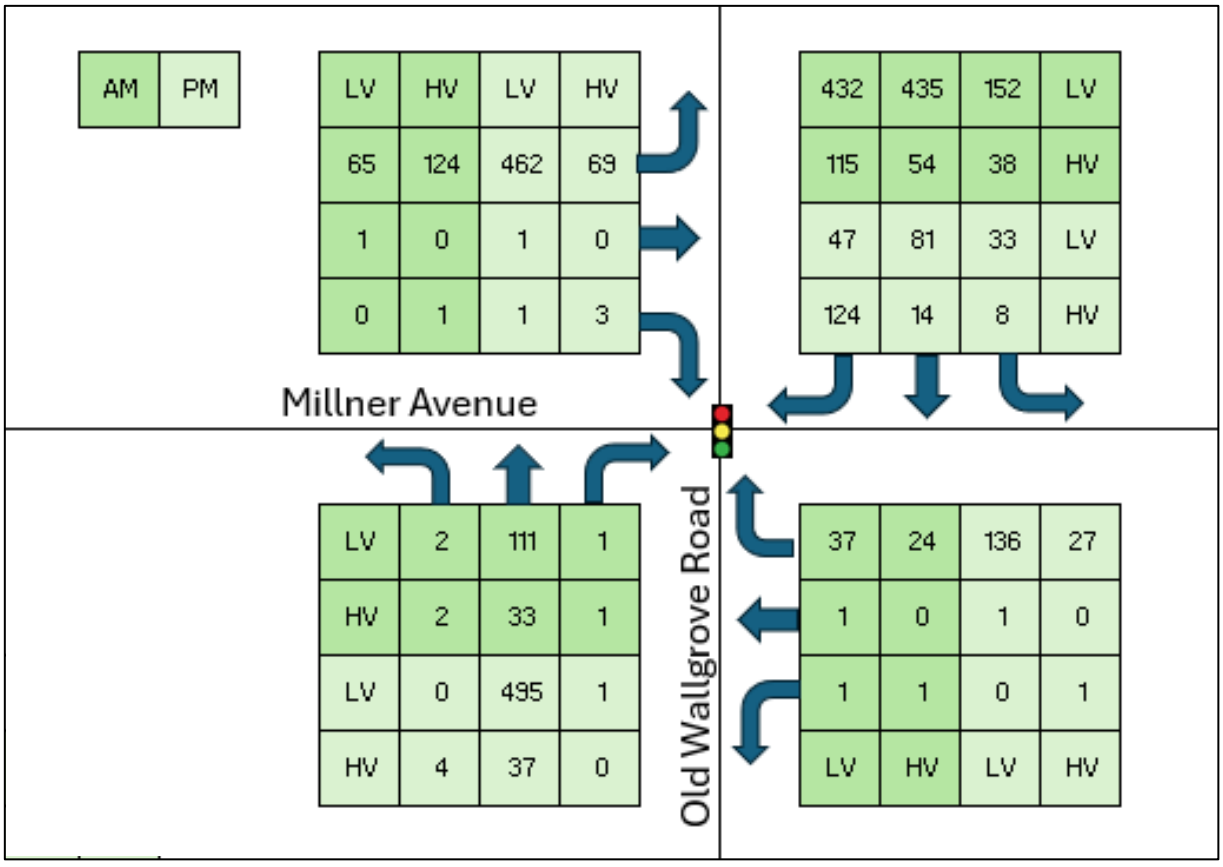

Figure 29 – 2026 Projected Volumes: Intersection of Old Wallgrove Road / Millner Avenue

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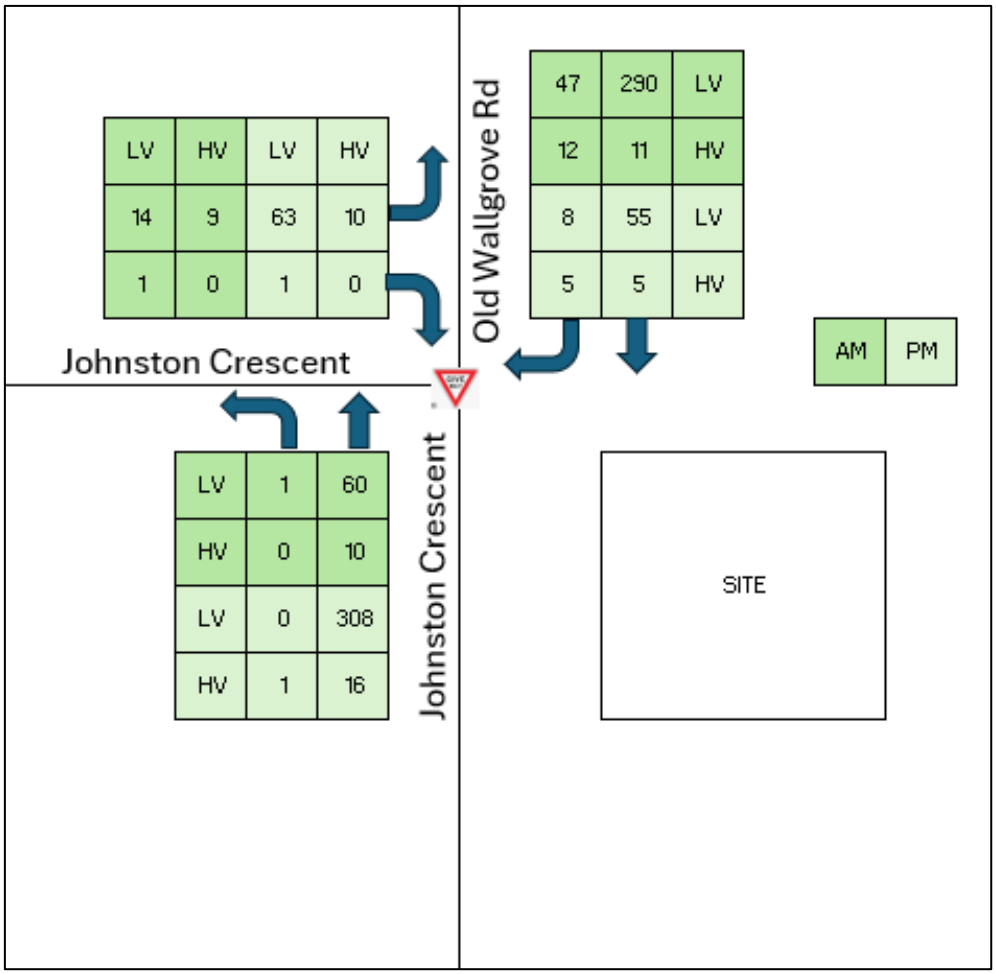

Figure 30 – 2026 Projected Volumes: Intersection of Old Wallgrove Road / Johnston Crescent

Intersection Performance

Table 18 summarises the existing and projected operation and performance of the surveyed intersections following the total operation of the proposed development. Detailed SIDRA results are provided as Appendix 6.

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Table 18 –2026 Model Intersection performance

Note: Data for unsignalised intersections is taken from the movement with the worst delay

Peak Period	Degree of Saturation		Average Delay (sec)		95% Queue Length (m)		Level of Service	
	Existing	2026	Existing	2026	Existing	2026	Existing	2026
Existing: Telopea Place / Lenore Dr / Old Wallgrove Rd (signalised) 2026: Telopea Place / Lenore Dr / Old Wallgrove Rd (signalised) – with approved upgrades								
AM Peak	0.622	0.796	33.4	35.5	151.4	212.1	C	C
PM Peak	0.741	0.782	34.9	34.9	144.7	179.4	C	C
Existing: Old Wallgrove Rd / Millner Ave (signalised) 2026: Old Wallgrove Rd / Millner Ave (signalised) – with approved upgrades								
AM Peak	0.629	0.648	17.3	16.7	111.8	111.8	B	B
PM Peak	0.451	0.638	21.1	25.1	62.2	72.5	B	B
Old Wallgrove Rd / Johnston Cres (unsignalised)								
AM Peak	0.012	0.017	6.2	6.6	0.1	0.1	A	A
PM Peak	0.087	0.298	6.8	6.8	2.5	9.9	A	A

The results in Table 18 indicate that whilst minor increases in degree of saturation, average delay and 95th percentile queue lengths are projected, the overall level of service for each intersection during the morning and afternoon peak hours are not anticipated to change. Therefore, the intersections are expected to continue to operate under satisfactory conditions with the introduction of the subject development-generated traffic and cumulative traffic in the 2026 scenario.

Based on the above 2026 projected conditions at the intersection of Old Wallgrove Road and Johnston Crescent, it is not considered that any intersection upgrades will be required in the immediate future as a result of the subject development.

5.1.3 2036 Model

Cumulative Traffic Assessment

It is considered that the OEE development is planned to be fully completed by 2036, incorporating the following final components that will be constructed following 2026, which have accordingly been accounted for in the 2036 cumulative traffic assessment, refer to Figure 31 overleaf for a diagram of the relevant future development over an aerial image in order to demonstrate their proximity to the subject site:

- Oakdale East Estate (OEE): Precincts 4 – 5 and any remaining works are planned to be completed and operational in 2036 (according to the *Oakdale East Industrial Estate Staging Plan* prepared by Goodman on 9 November 2023)

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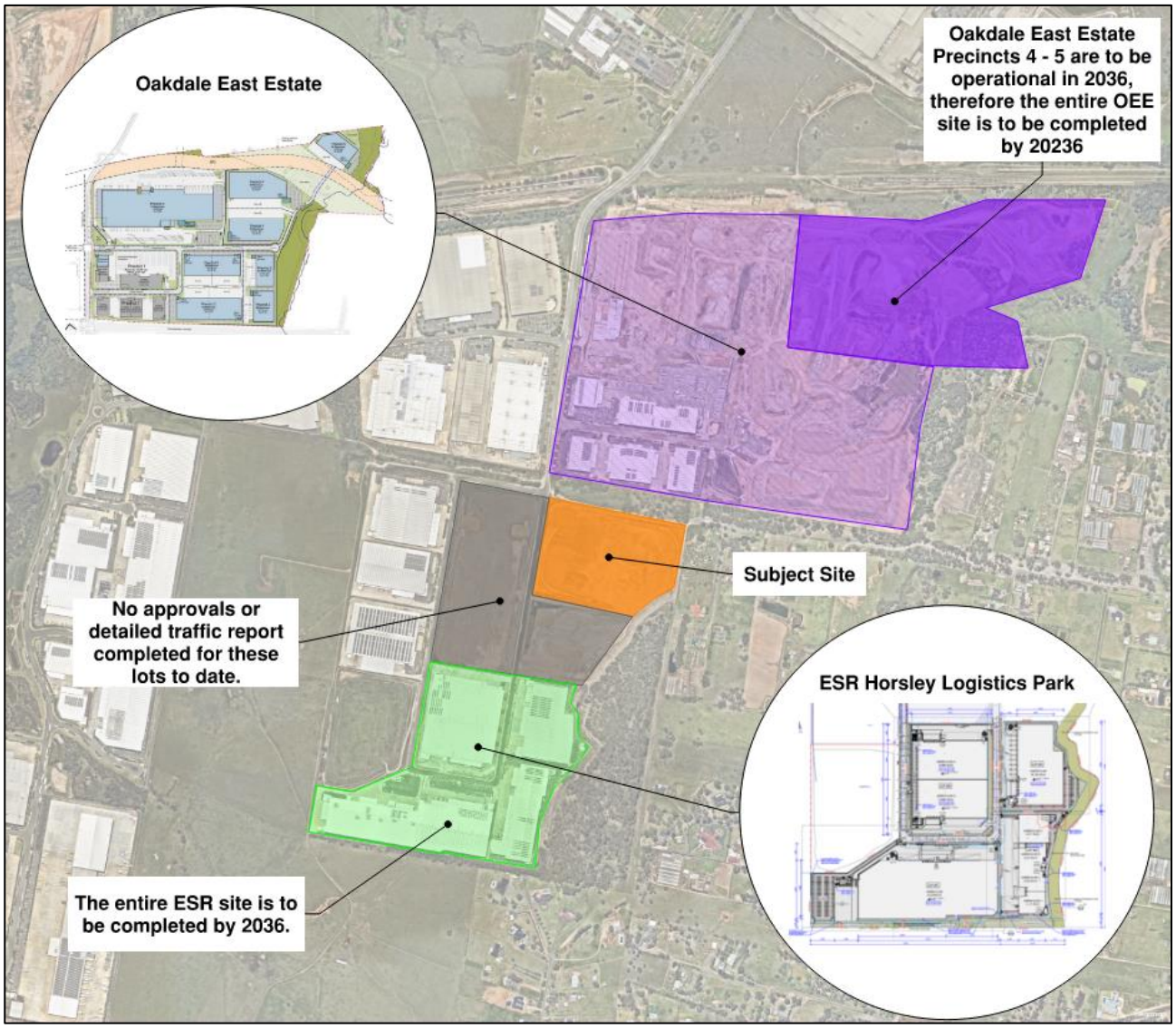

Figure 31 – 2036 Cumulative Traffic Assessment

Insert Sources: Asongroup

The trips in Table 19 overleaf have been provided based on the information provided within Asongroup's *Transport Assessment State Significant Development Application at Oakdale East Industrial Estate (SSD-37486043)* dated 7/06/2022 for the remaining OEE precincts.

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Table 19 – Forecasted 2036 Trips for Surrounding Developments

Development	GFA	AM Peak Trip Generation	PM Peak Trip Generation
Oakdale East Estate (OEE) – Precinct 4	55,800	100	89
Oakdale East Estate (OEE) – Precinct 5	15,400	28	24
Oakdale East Estate (OEE) – Other Traffic	14,058	25	23
Total		+153	+136

Planned Road Network Upgrades (SLR)

Reference has been made to the *Southern Link Road Traffic Modelling and Assessment* prepared by GHD in order to obtain an updated layout for the future planned intersections comprising the SLR. Figure 32 and 33 contains the layout of the planned intersections in the 2036 scenario that have been utilised for the purposes of this report. It is however noted that further updated layouts may be available from TfNSW. Therefore, as the layout of the SLR and its associated intersections evolved, further intersection modelling can be performed as required.

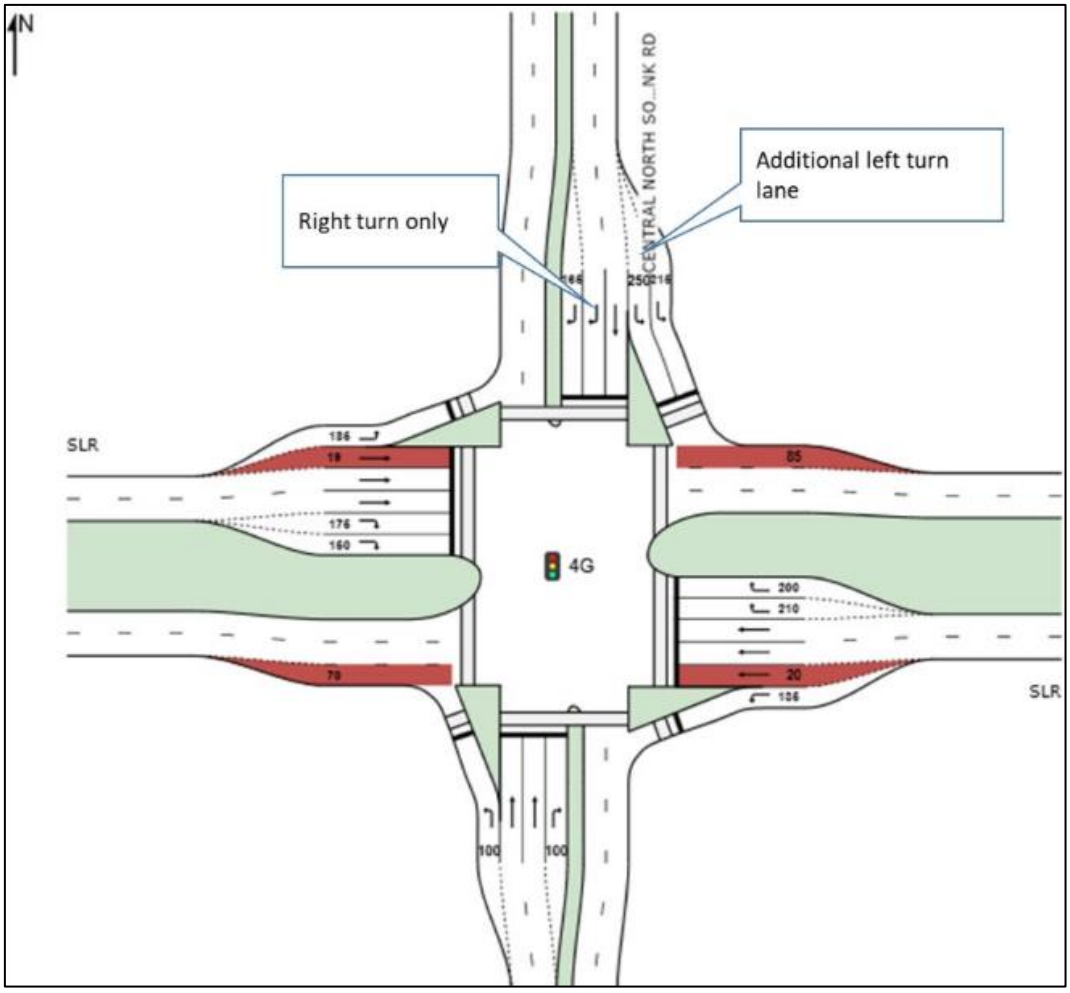

Figure 32 – Planned Intersection Upgrade Works – SLR / Old Wallgrove Road / Johnston Crescent

Source: Southern Link Road Traffic Modelling and Assessment prepared by GHD (Modified Layout)

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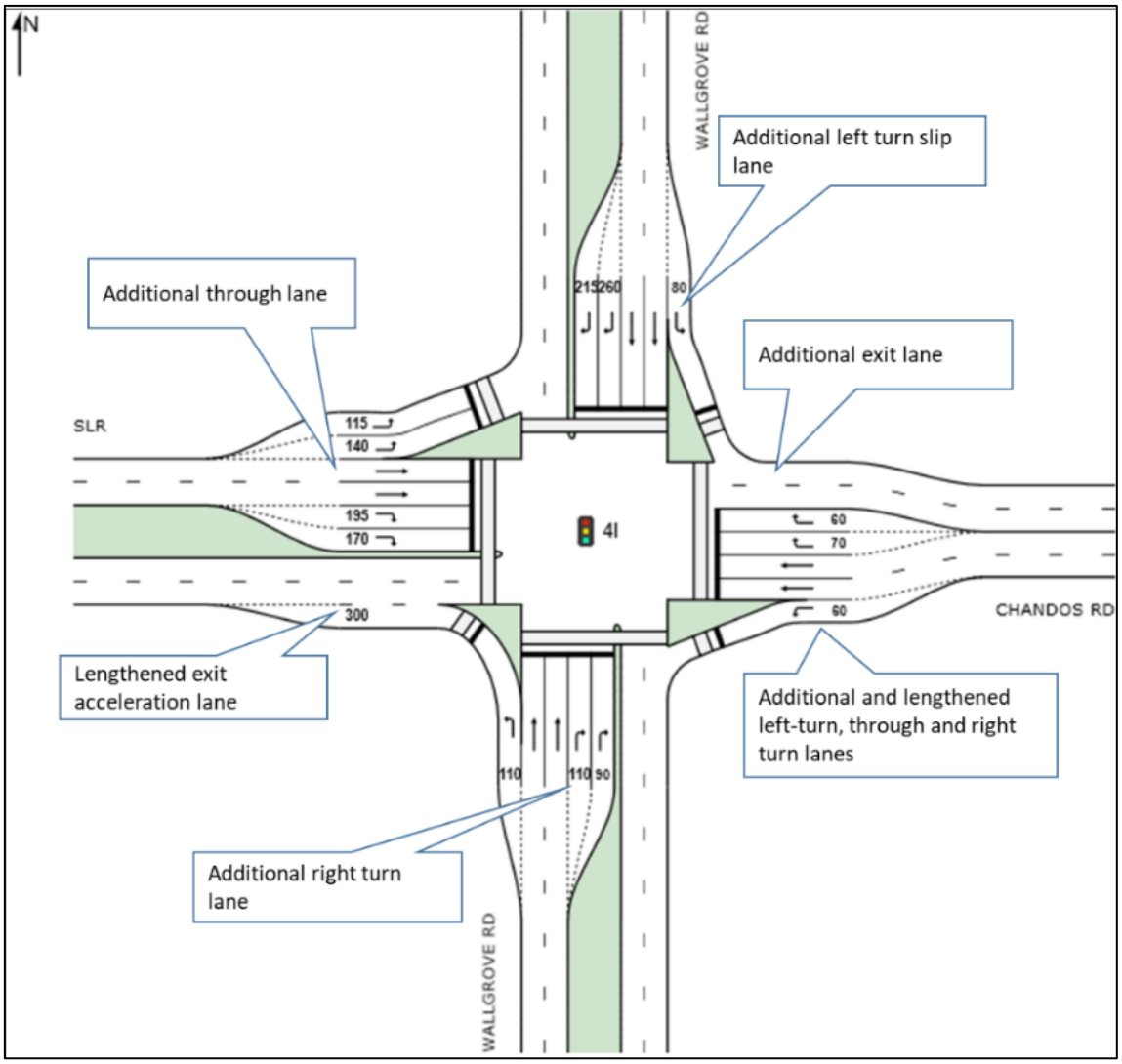

Figure 33 – SIDRA Existing Intersection Layout – Millner Ave / Old Wallgrove Rd

Source: Southern Link Road Traffic Modelling and Assessment prepared by GHD (Modified Layout)

Trip Distribution

In order to determine the projected 2036 traffic volumes within the road network with the operation of the proposed development and the surrounding sites, a traffic distribution has been developed based upon the assumption that traffic will be equally split between the possible approaches to the sites with the introduction of the SLR.

All traffic route assumptions applied in the 2026 model described in Section 5.1.2 of this report have remained for the 2036 model.

Accordingly, the development-generated traffic volumes and the cumulative traffic assessed have been distributed across the network during the morning and afternoon peak periods as illustrated overleaf in Figure 34.

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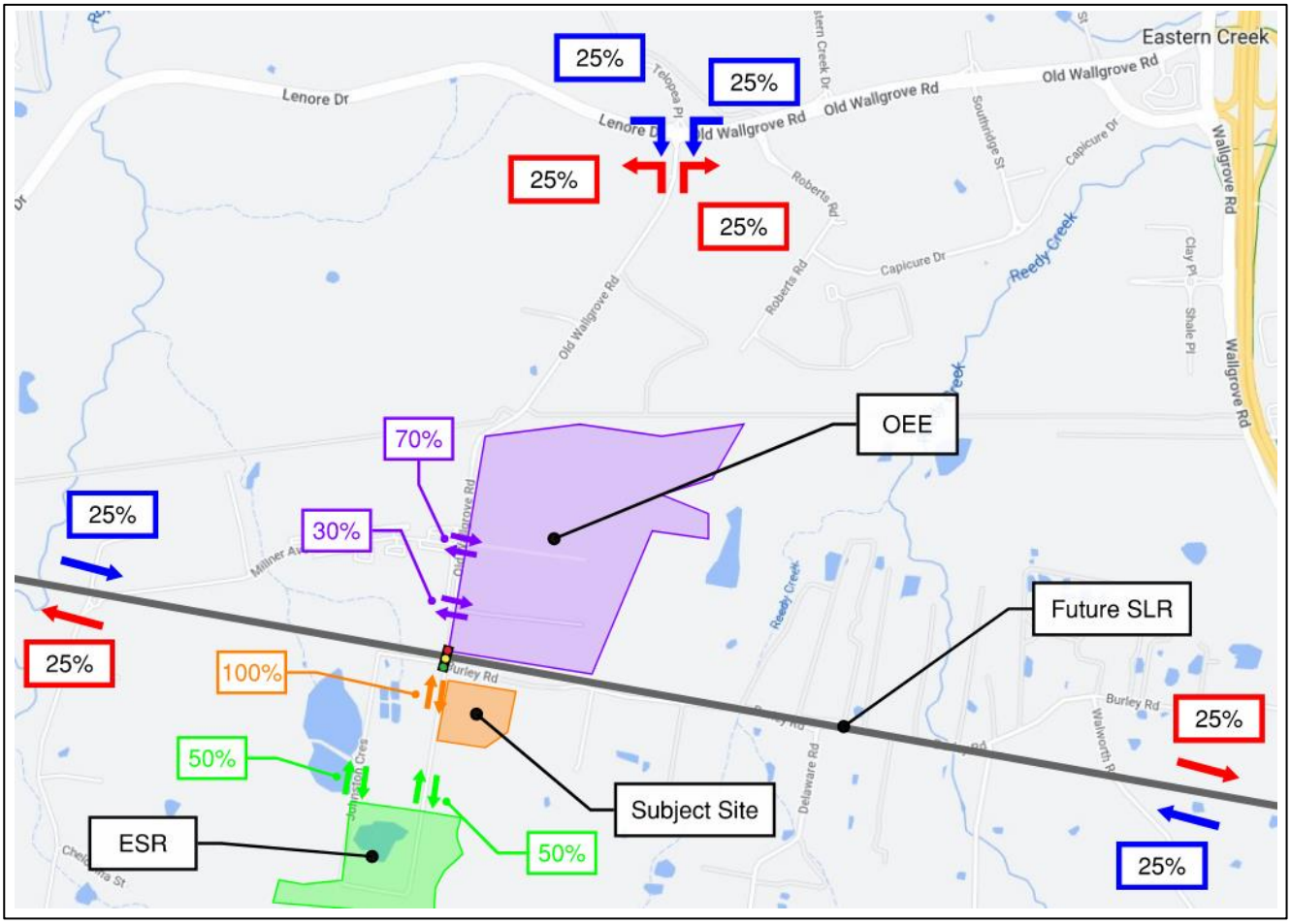

Figure 34 – AM and PM Trip Distribution – 2036 Model

Projected Traffic Volumes

Based on the traffic generation assessment for the total development provided in Table 15 and the distribution provided above, Figure 35 –38 indicate the projected traffic volumes at the subject intersections.

Note: STFM data was not provided by TfNSW, therefore additional information may be required in order to substantiate predicted future volumes.

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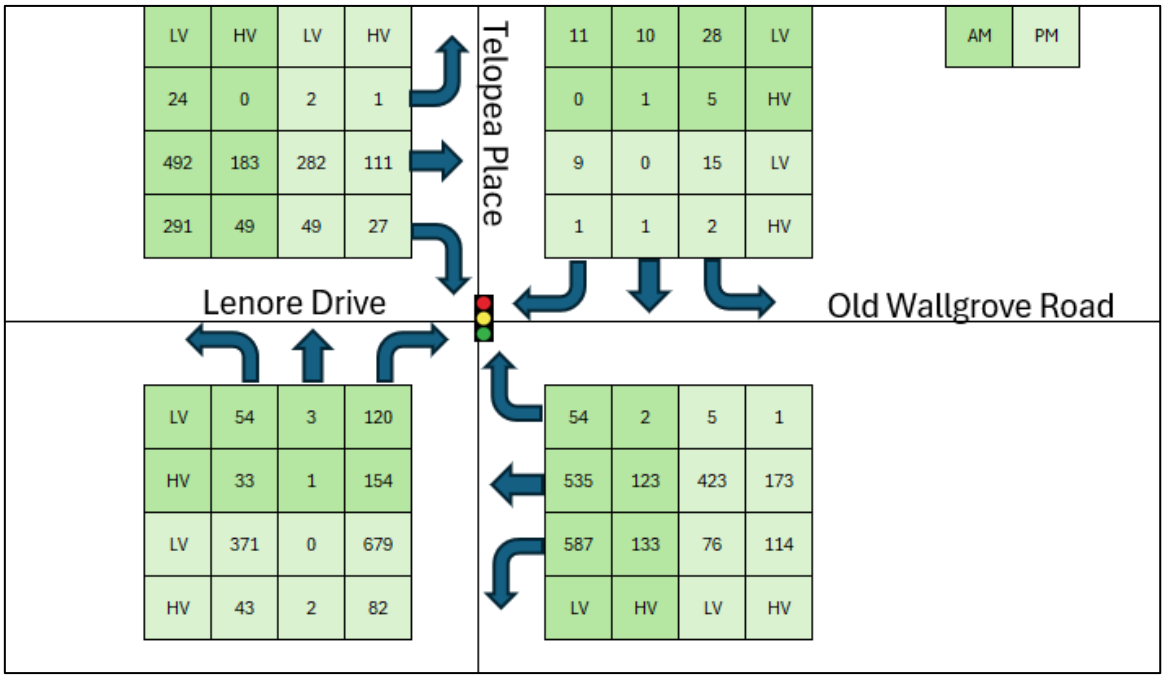

Figure 35 – 2036 Projected Volumes: Intersection of Lenore Drive / Old Wallgrove Road / Telopea Place

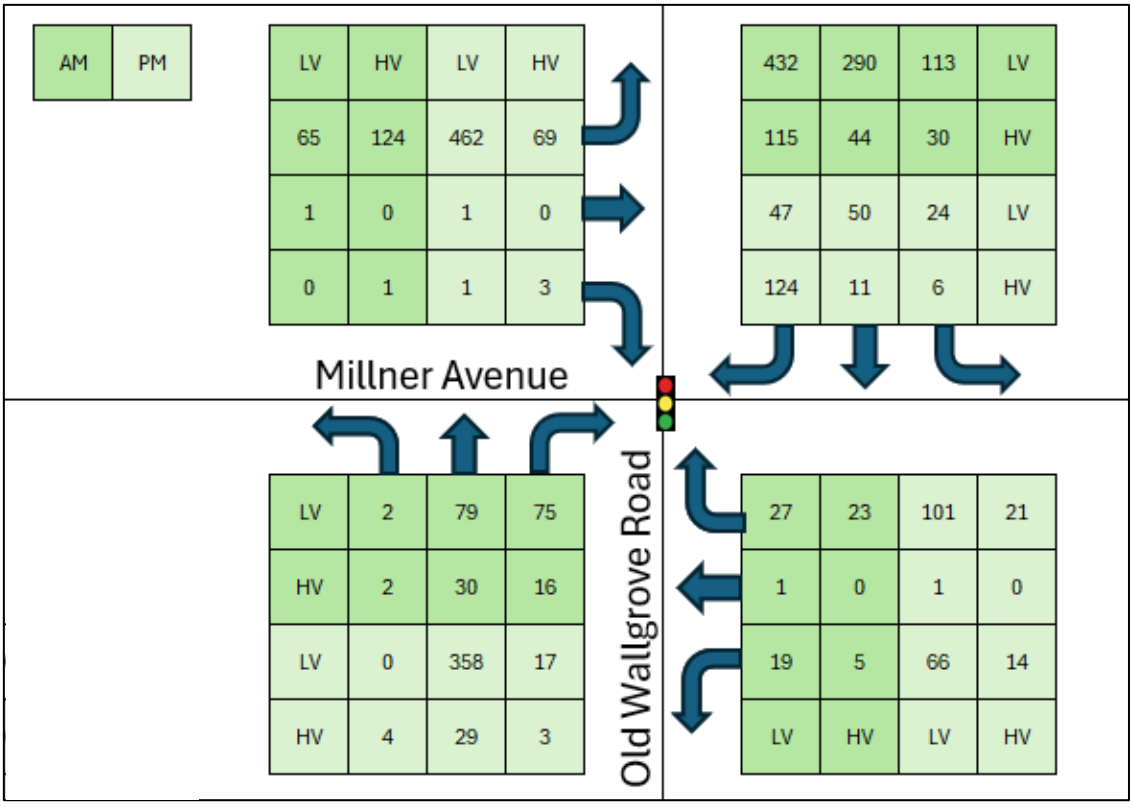

Figure 36 – 2036 Projected Volumes: Intersection of Old Wallgrove Road / Millner Avenue

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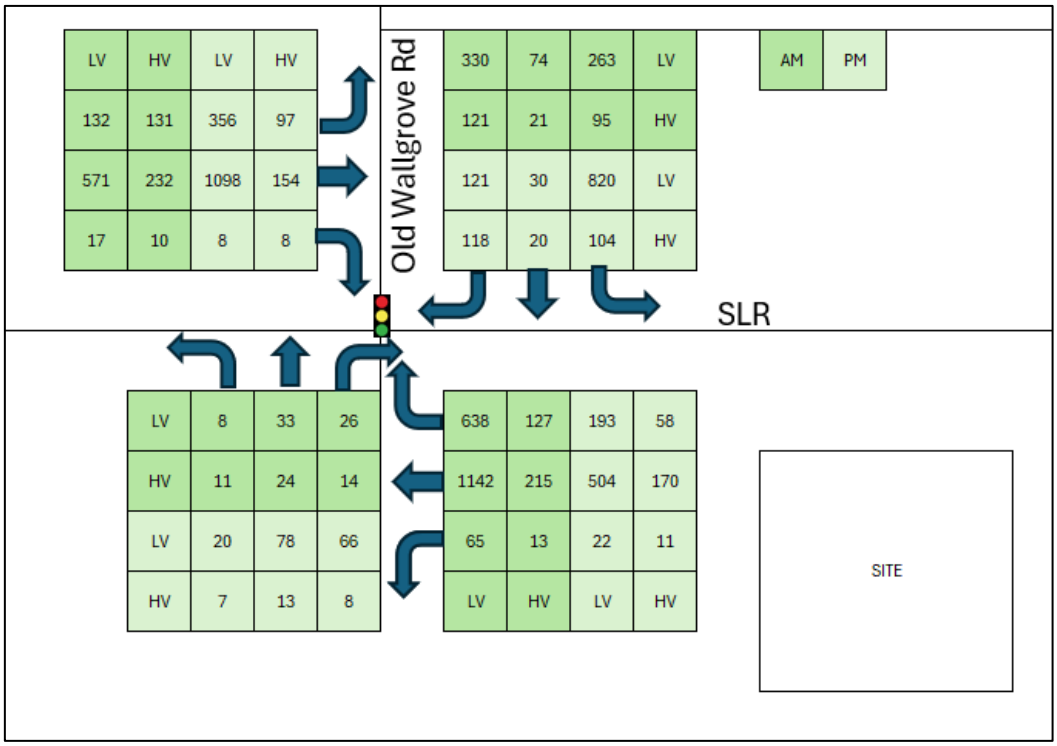

Figure 37– 2036 Projected Volumes: Intersection of SLR / Old Wallgrove Road / Johnston Crescent

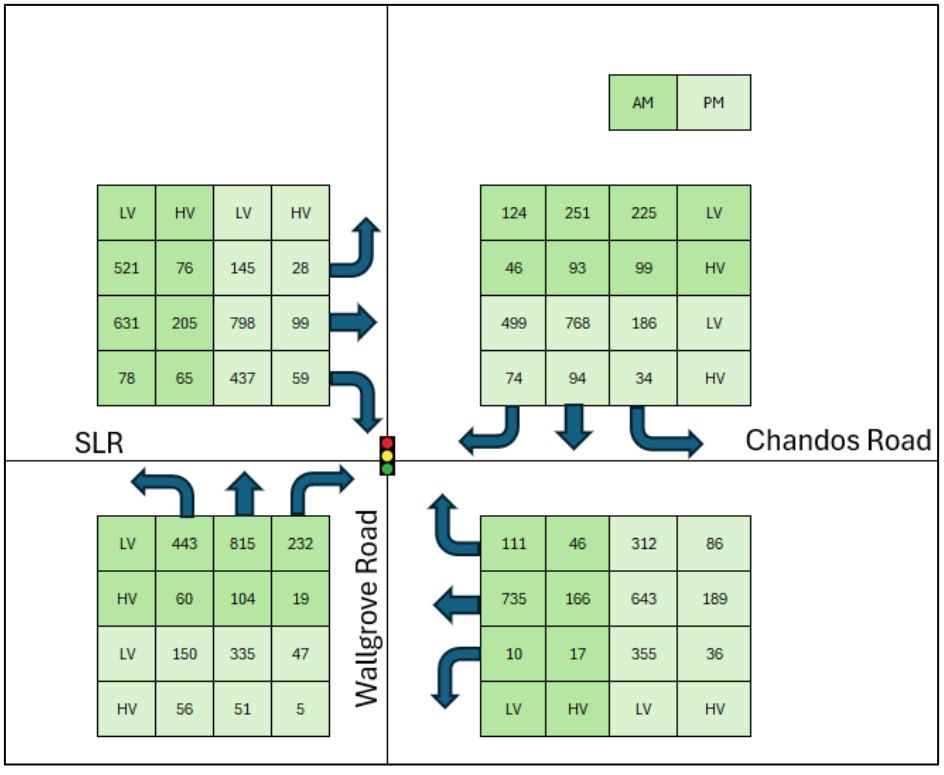

Figure 38 – 2036 Projected Volumes: Intersection of SLR / Wallgrove Road / Chandos Road

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Intersection Performance

Table 18 summarises projected operation and performance of the surveyed intersections in the 2026 and 2036 scenarios following the total operation of the proposed development. Detailed SIDRA results are provided as Appendix 7.

Table 20 – 2036 Model Intersection performance

Note: Data for unsignalised intersections is taken from the movement with the worst delay

Peak Period	Degree of Saturation		Average Delay (sec)		95% Queue Length (m)		Level of Service	
	2026	2036	2026	2036	2026	2036	2026	2036
2026 & 2036: Telopea Place / Lenore Dr / Old Wallgrove Rd (signalised) – Approved Upgrades								
AM Peak	0.796	0.729	35.5	33.3	212.1	165.0	C	C
PM Peak	0.782	0.729	34.9	32.8	179.4	140.2	C	C
2026 & 2036: Old Wallgrove Rd / Millner Ave (signalised) – Approved Upgrades								
AM Peak	0.648	0.716	16.7	19.7	111.8	116.5	B	B
PM Peak	0.638	0.629	25.1	25.2	72.5	55.7	B	B
2026: Old Wallgrove Rd / Johnston Cres (unsignalised) 2036: Old Wallgrove Rd / Johnston Crescent / SLR (Signalised) – Planned Upgrades								
AM Peak	0.017	1.667	6.6	464.9	0.1	1063.5	A	F
PM Peak	0.298	1.729	6.8	309.9	9.9	1030.9	A	F
2026: N/A 2036: SLR / Wallgrove Rd / Chandos Rd (Signalised) – Planned Upgrades								
AM Peak	-	0.920	-	43.5	-	224.9	-	D
PM Peak	-	1.040	-	91.2	-	402.7	-	F

The results in Table 18 indicate that the redistributed traffic as a result of the planned SLR, provides improved or consistent conditions for the intersections of Telopea Place / Lenore Drive / Old Wallgrove Road and Old Wallgrove Road / Millner Avenue. Therefore, these intersections are expected to continue to operate under satisfactory conditions in the 2036 scenario.

It is however acknowledged that the introduction of the SLR and the signalised intersections of the SLR / Old Wallgrove Road / Johnston Crescent and the SLR / Wallgrove Road / Chandos Road are projected to operate at a Level of Service F in the morning and afternoon peak periods in 2036. It is noted that the intersection layout design as well as the specific signal timing and phasing of these intersections are still undergoing development and are subject to change.

5.1.4 Mitigation Measures

5.2 Traffic Impacts

The 2026 modelling scenario results incorporate the total development traffic and the cumulative traffic within the surrounding developing industrial areas and does not include the construction of the SLR. The results of

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this model indicate that the development will result in minimal impacts on the road network as the nearby intersections will continue to operate under satisfactory conditions. No intersection upgrades will be warranted as a direct result of the subject development traffic. It is therefore considered that the development is not anticipated to generate unreasonable impact on the local or regional road network.

It is acknowledged that the 2036 modelling results indicate that the planned intersections will operate at an unsatisfactory level of service. However, it is considered that the unsatisfactory operation is a direct result of the anticipated overall growth in traffic volumes and the higher order nature of the SLR, drawing a significant amount of regional traffic in an important arterial east-west link. The road network to the north of the planned SLR (along Old Wallgrove Road) is projected to continue satisfactory operation in 2036.

5.3 Parking Impacts

Section 4.7 of this report indicates that the proposed passenger vehicle, bicycle and motorcycle parking provision is satisfactory to meet the requirements of the development. It is also considered that as Johnston Crescent currently does not provide on street parking, there will be no resultant loss of parking due to the provision of the site's vehicular driveways and implementation of the proposed 'No Parking' zone.

Based on the above, it is considered that the subject site will not result in any measurable impacts to the parking availability and amenity within the precinct.

5.4 Active Transport

5.4.1 Pedestrians

The travel mode share for employees in the Horsley Park area is significantly low, with only 1.7% of employees walking to and from their workplace. For the estimated 1% of workers travelling via public transport (train, bus and tram), it is expected that some walking is required as part of their trip due to the considerable distance to the closest public transport services. However, given the low mode share for walking and public transport, the proposed development is not anticipated to attract significant additional pedestrian volumes.

The pedestrian infrastructure upgrades included in the Fairfield WSEA subdivision works, providing suitable 3.5-metre-wide footpaths on either side of Johnston Crescent, is considered satisfactory to support the minor anticipated pedestrian traffic associated with the site.

5.4.2 Cyclists

The travel mode share for cycling is anticipated to be significantly low. The JTW data indicated that zero employees travel via bicycle to the Horsley Park area. Therefore, the proposed development is expected to attract minimal cyclists and the provided bicycle parking spaces will be sufficient.

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6.0 Conclusion

This TIA has been prepared to assess the traffic and transport impacts and design elements of the proposed S4 data centre development at 16 Johnston Crescent, Horsley Park. The overall transport strategy and findings for the proposed development is as follows:

- **Pedestrians**
  - The main pedestrian access is proposed at the connection between the existing Johnston Crescent footpath and the proposed Building 1.
  - The project includes satisfactory internal pedestrian connectivity via internal footpaths and pedestrian crossings where required along and across internal roadways, respectively.

- **Cyclists**
  - The proposal includes 24 bicycle parking spaces and includes satisfactory provisions of lockers, showers and change facilities
  - These provisions are expected to adequately support expected demand for future operations.

- **Service and loading**
  - Servicing and loading activities via vans and utes will occur within the visitor parking areas on-site
  - The heavy vehicle servicing will occur within the dedicated loading docks provided within each building, capable of accommodating vehicles up to and including 20m long Articulated Vehicles

- **Car parking**
  - The proposal contains 200 passenger vehicle parking spaces.
  - This provision is an appropriate provision based on a first-principles assessment and a benchmarking study of a similar nearby data centre development.
  - The development also provides 5 motorcycle parking spaces which is considered satisfactory with respect to the requirements within the *Austroad's Guide*

- **Traffic Impacts**
  - The additional vehicle trips generated by the development are expected to have an insignificant impact on the local road network
  - SIDRA intersection modelling indicates a favourable level of service both before and after the development, with the exception of the planned future intersections with the SLR, the design for which is still being developed.

Overall, the proposed development is suitable on consideration of the traffic and transport elements of the site and its surrounds.

Prepared by
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SOPHIE SLADE
Traffic Engineer

Authorised By
TTW (NSW) PTY LTD

GRACE CARPP
Associate

P:\2021\2110\211085\Reports\TTW\Traffic\240419 - Traffic Impact Assessment - Final.docx

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Appendix 1

Architectural Plans (HDR)

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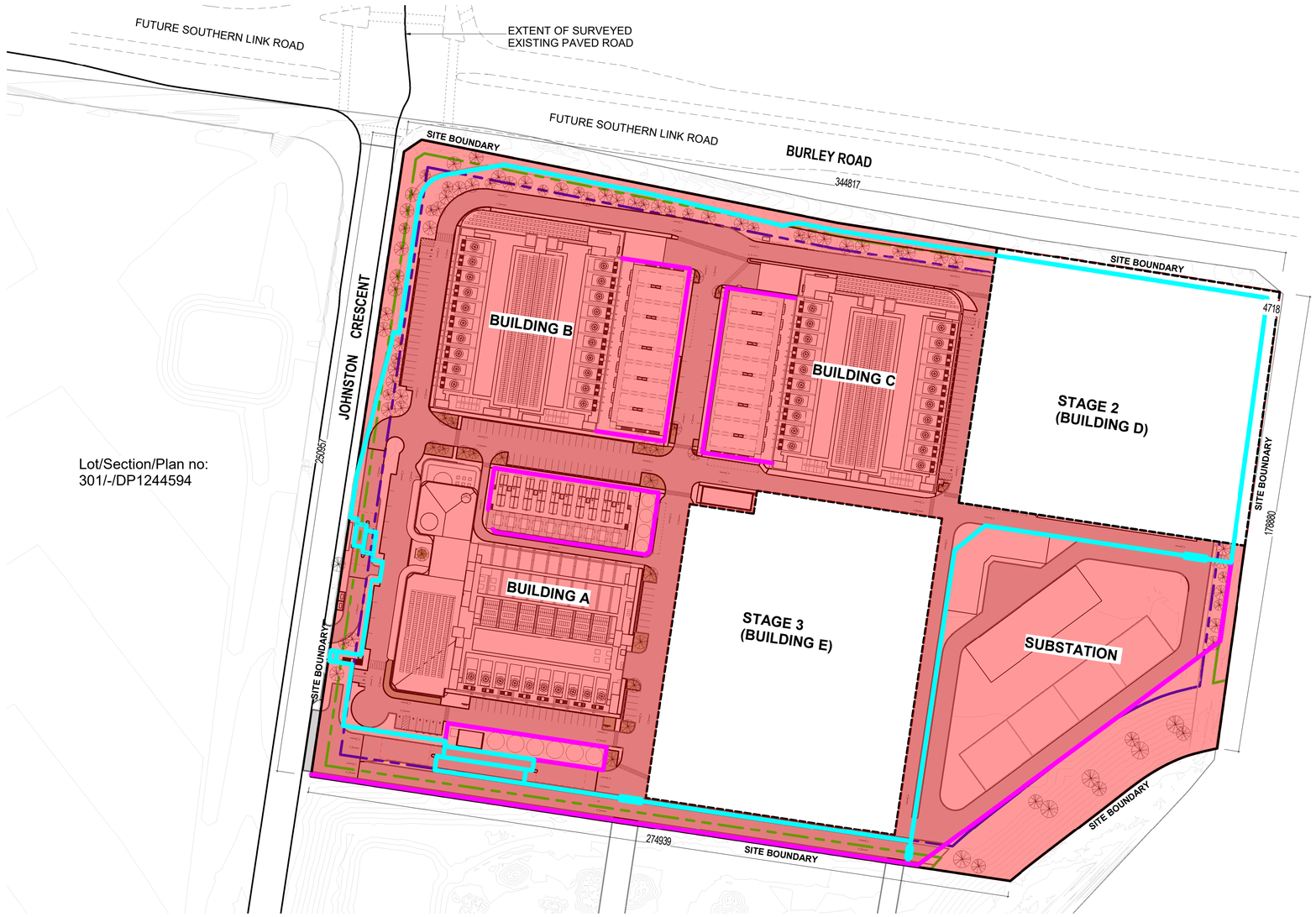

Lot/Section/Plan no:
301/-/DP1244594

1 PHASING DIAGRAM PLAN - STAGE 1
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LEGEND:
- EXTENT OF WORKS FOR CURRENT STAGE
- WORKS COMPLETED

LEGEND:
- 2.4M HIGH PALISADE FENCE
- 2.4M HIGH WELDED MESH FENCE
- 1.8M HIGH TEMPORARY HOARDING

DATE	No.	REVISION HISTORY	DRW	CHK	QA
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Document Author Project Number
10335877

Key Plan

Site:	Stage:	NEXTDC Project Number:

Project Address:
16 JOHNSTON CRESCENT,
HORSLEY PARK, NSW 2175
AUSTRALIA

Project Name:
SHIRAZ 4

Drawing title
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CHK	Date
SF	01/03/2024

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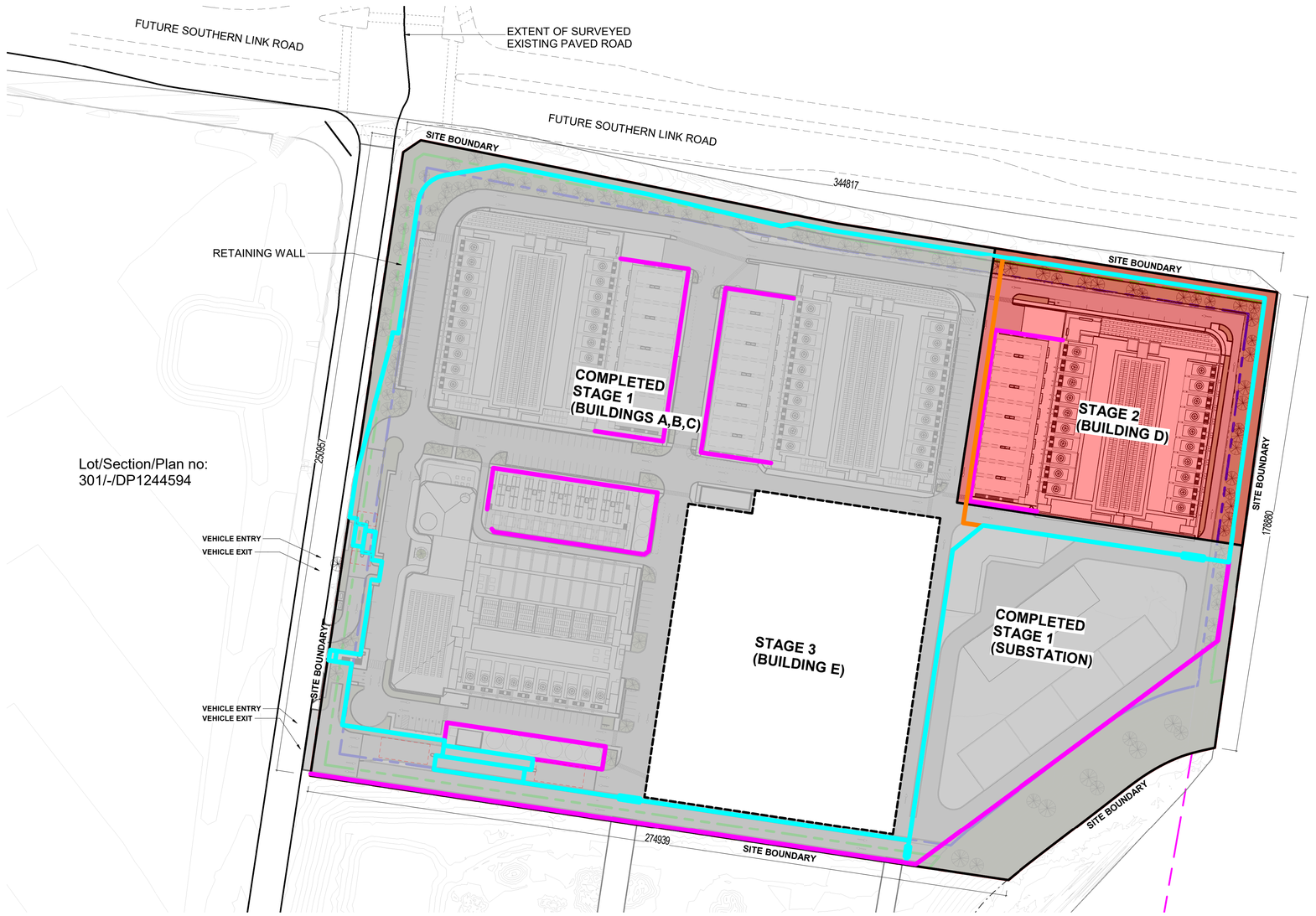

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LEGEND:

- EXTENT OF WORKS FOR CURRENT STAGE
- WORKS COMPLETED

LEGEND:

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- 2.4M HIGH WELDED MESH FENCE
- 1.8M HIGH TEMPORARY HOARDING

DATE	No.	REVISION HISTORY	DRW	CHK	QA
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AUSTRALIA

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SSDA PHASING DIAGRAM - STAGE 2

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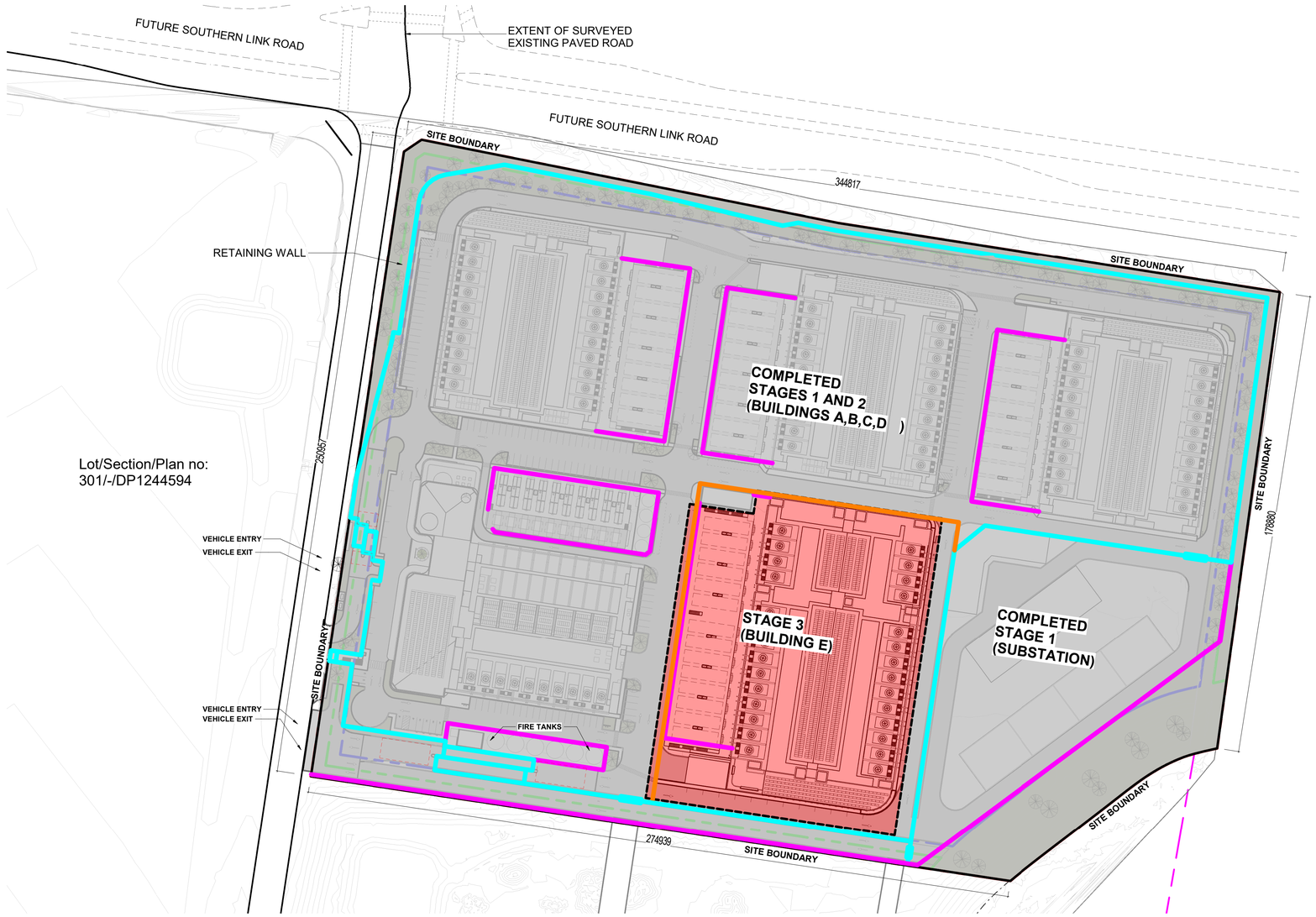

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- WORKS COMPLETED

LEGEND:

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- 2.4M HIGH WELDED MESH FENCE
- 1.8M HIGH TEMPORARY HOARDING

DATE	No.	REVISION HISTORY	DRW	CHK	QA
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Project Name:

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Drawing title

SSDA PHASING DIAGRAM - STAGE 3

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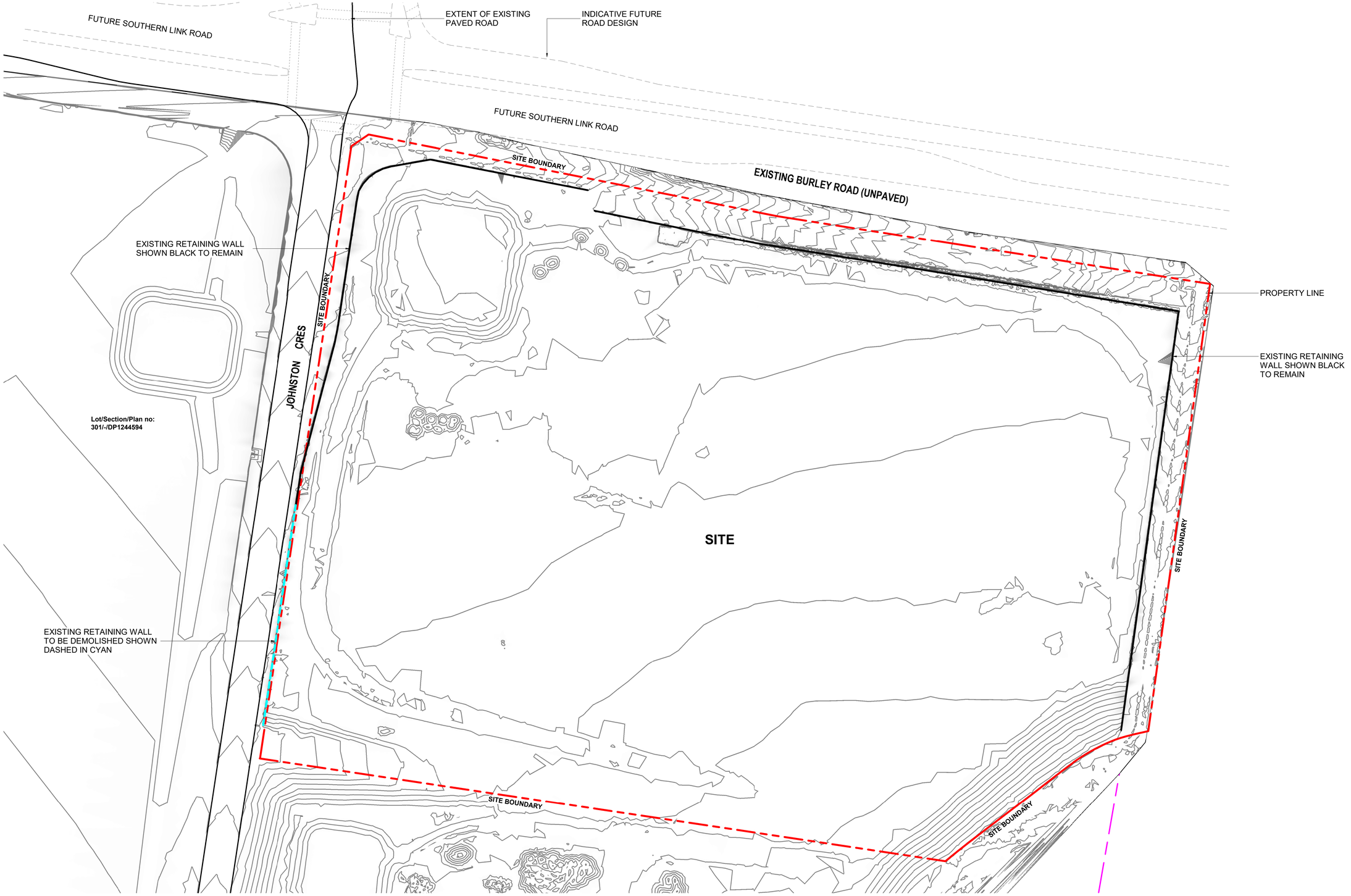

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Document Author Project Number

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Key Plan

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Site:	Stage:	NEXTDC Project Number:

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HORSLEY PARK, NSW 2175
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Project Name:

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Drawing title

SSDA DEMOLITION PLAN

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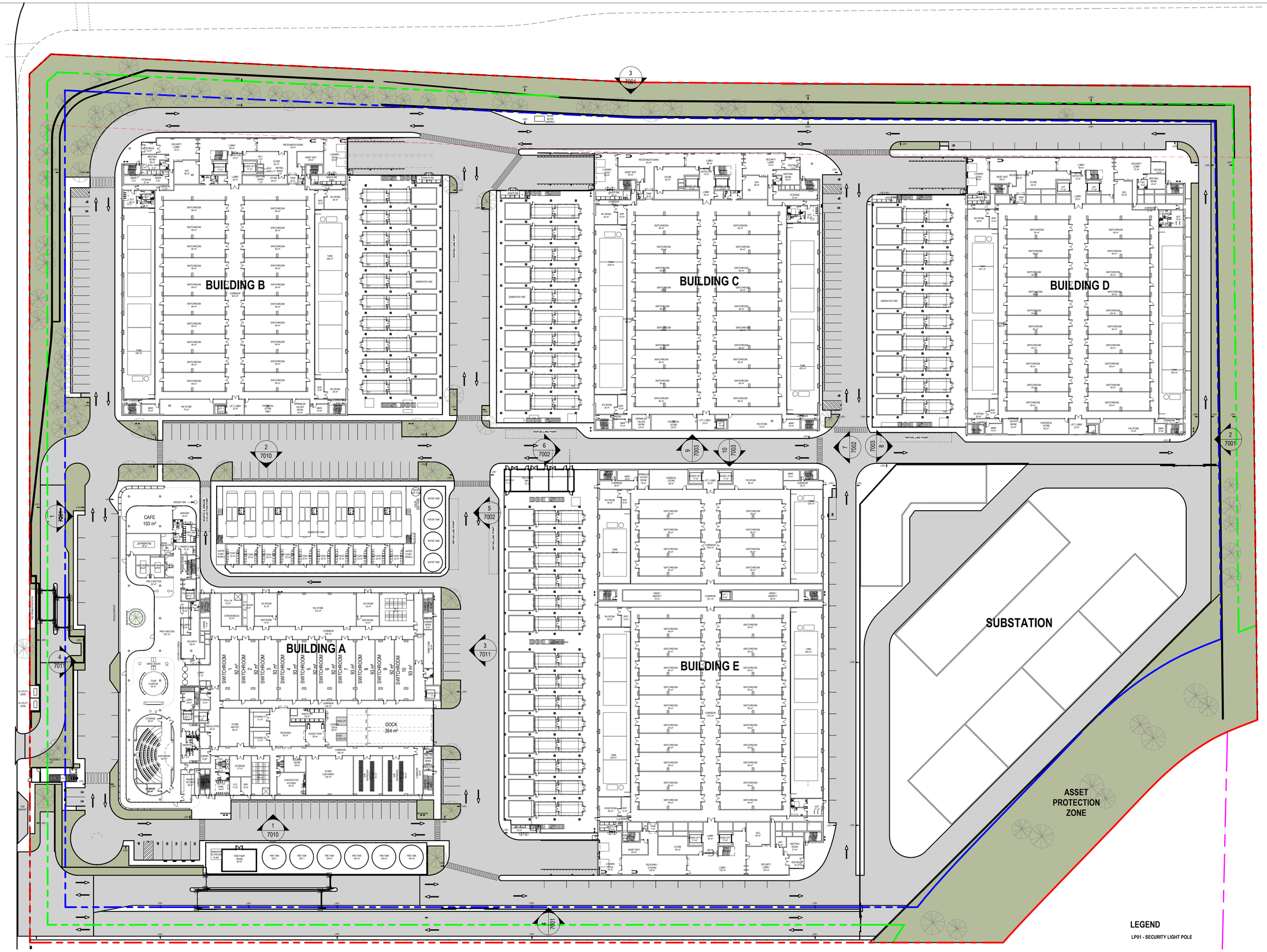

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Document Author Project Number

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Key Plan

Site: | Stage: | NEXTDC Project Number:

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AUSTRALIA

Project Name:

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Drawing title

SSDA GENERAL ARRANGEMENT
OVERALL PLAN - GROUND LEVEL

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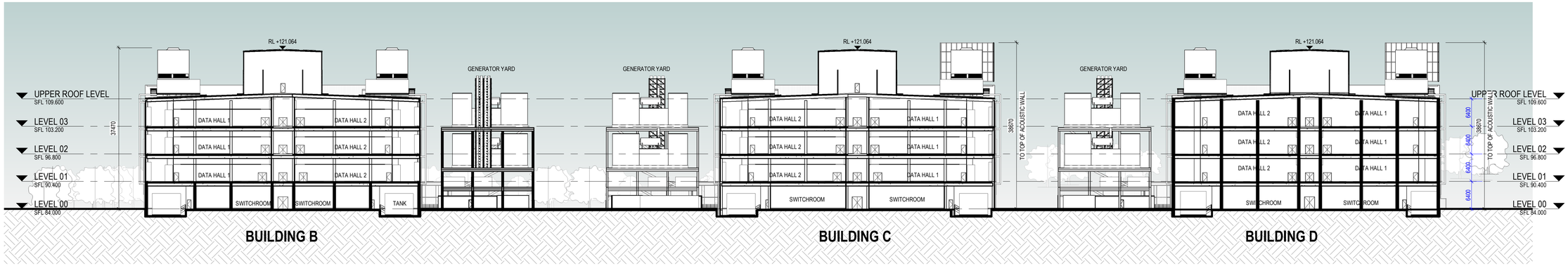

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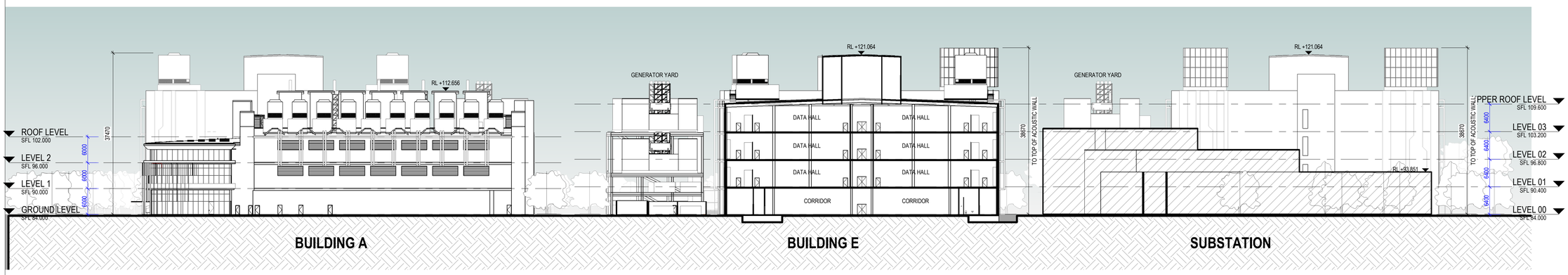

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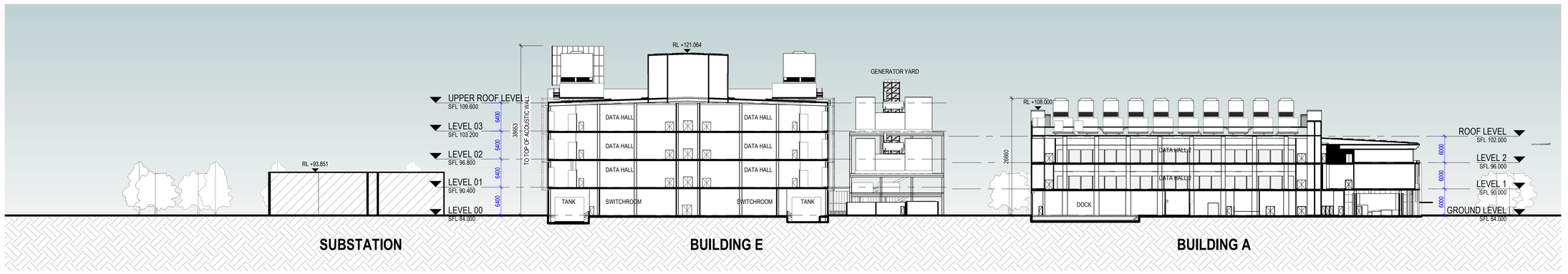

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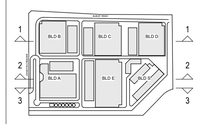

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Project Name:

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Drawing title

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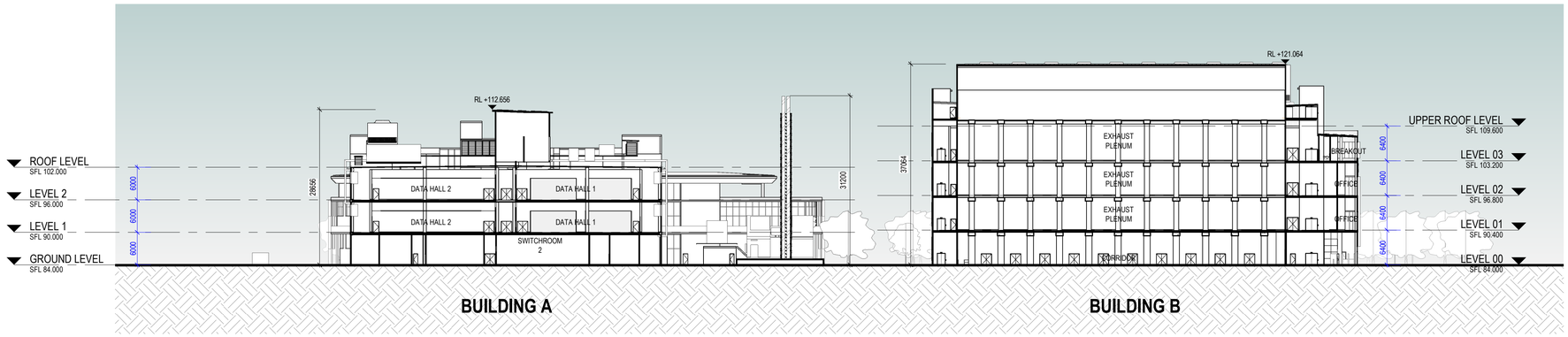

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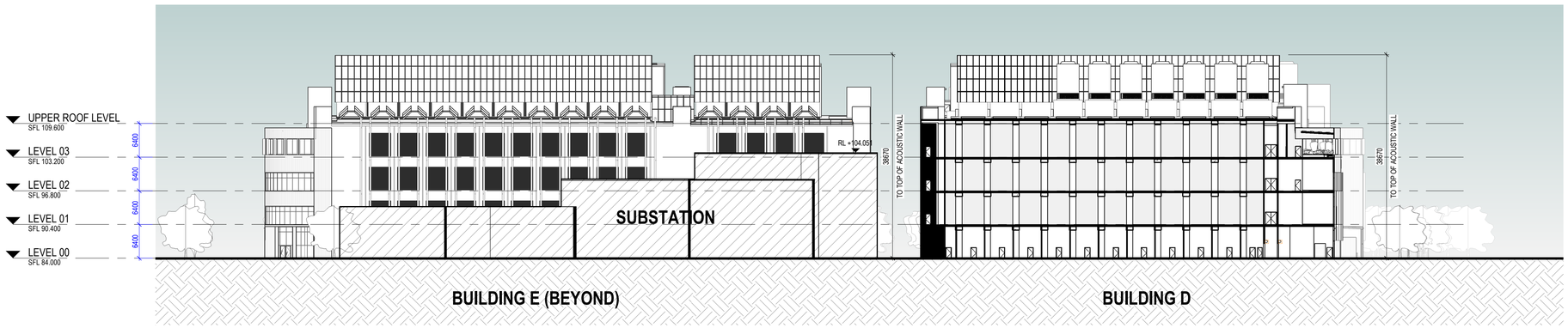

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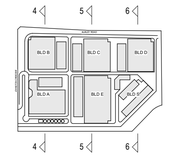

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AUSTRALIA

Project Name:

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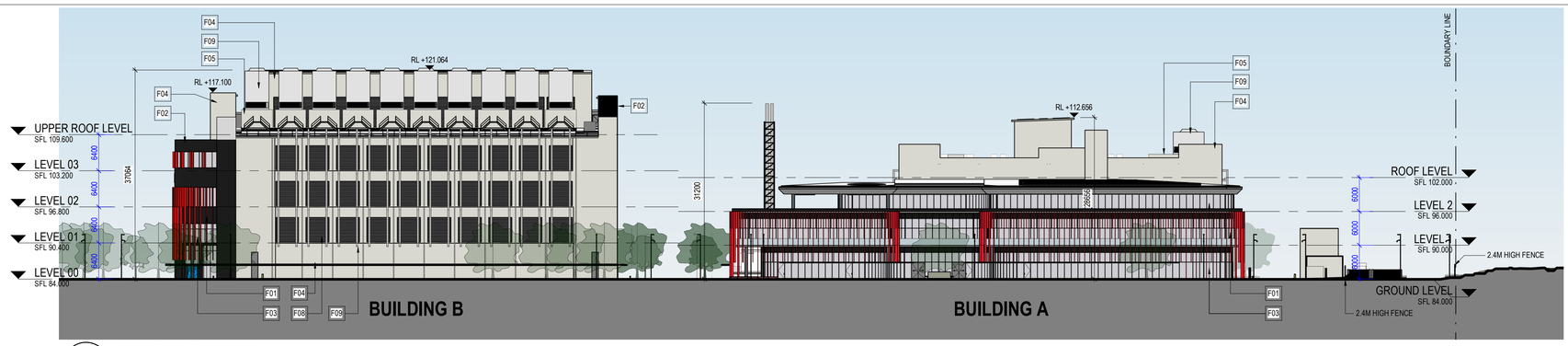

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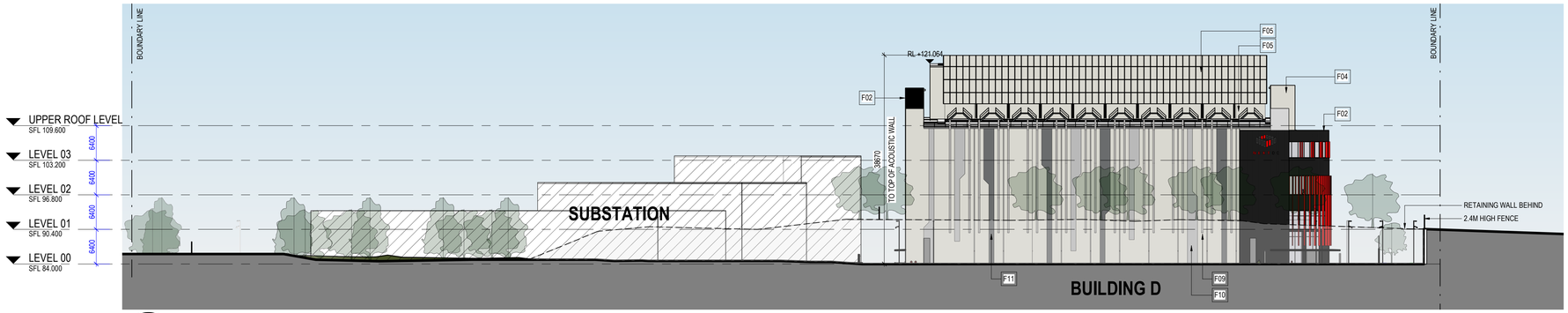

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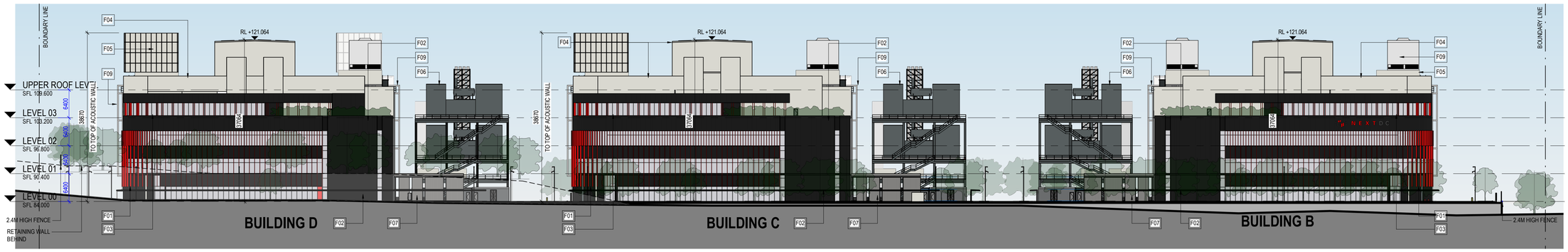

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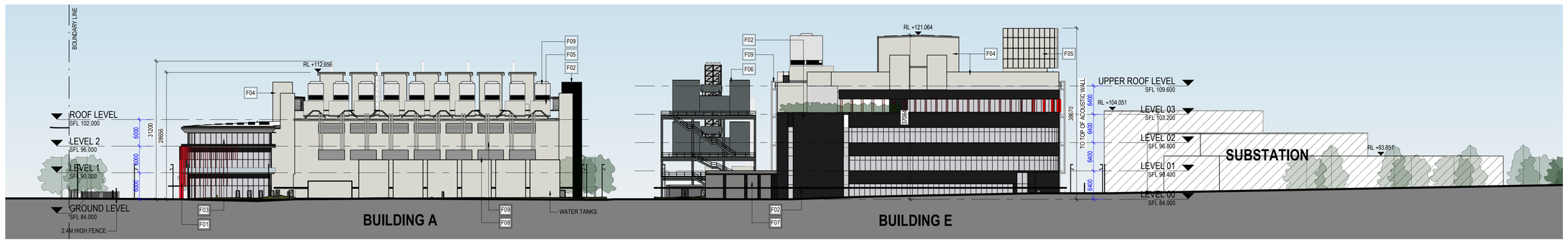

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- F02 - METAL CLADDING - DARK GREY
- F03 - GLAZING - GREY TINTED
- F04 - PAINTED - LIGHT GREY
- F05 - POWDER COAT - LIGHT GREY
- F06 - POWDER COAT - MID GREY
- F07 - METAL SCREEN - MID GREY
- F08 - LOUVRES - MID GREY
- F09 - SERVICES - STAINLESS STEEL
- F10 - PAINTED - GREY
- F11 - PAINTED - MID GREY

DATE	No.	REVISION HISTORY	DRW	CHK	QA
01/03/2024	CP02	SSDA ISSUE	KT	AH	ME
09/02/2024	CP01	SSDA ISSUE	KT	AH	ME

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Document Author Project Number

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Key Plan

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HORSLEY PARK, NSW 2175
AUSTRALIA

Project Name:

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Drawing title

SSDA GENERAL ARRANGEMENT - ELEVATIONS - SHEET 1

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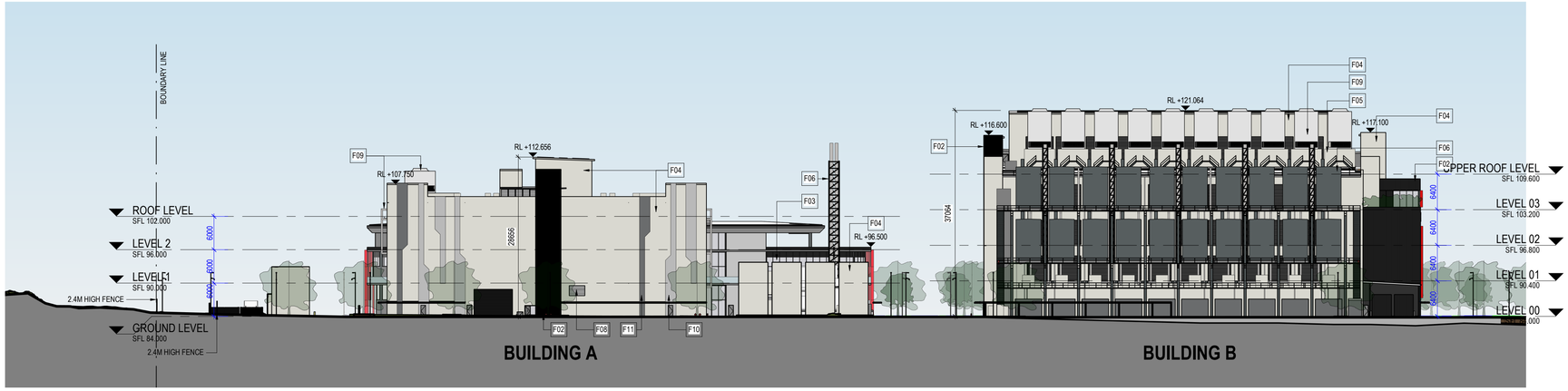

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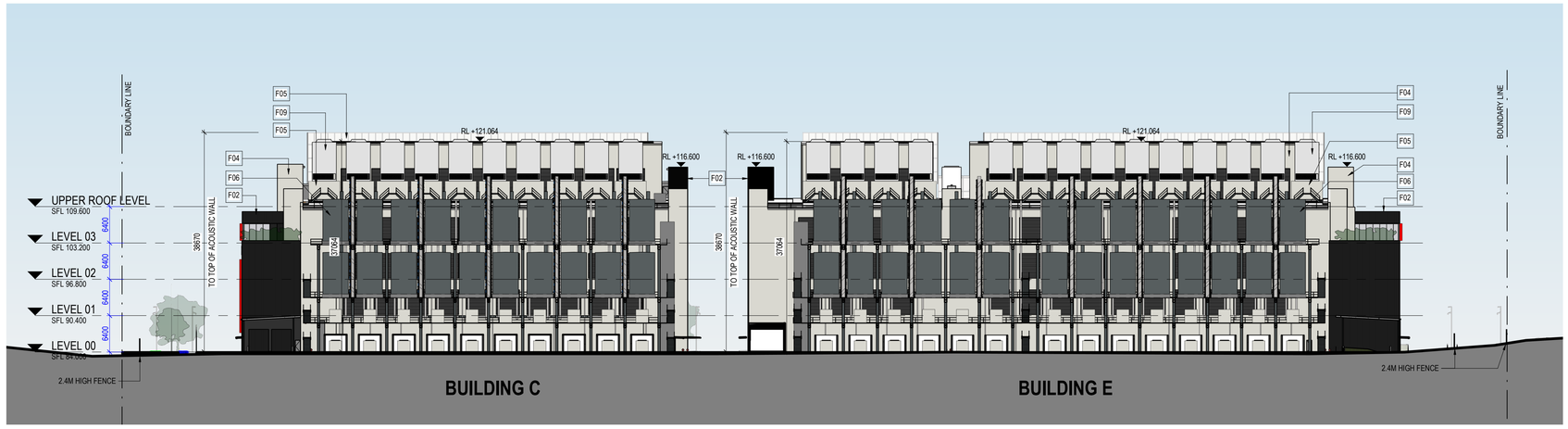

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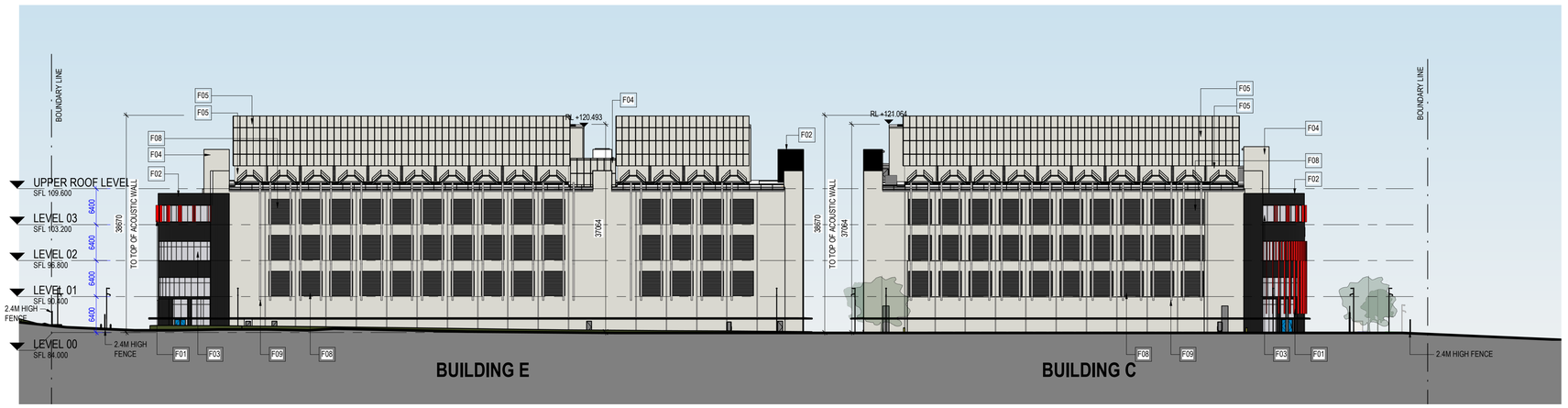


7 ELEVATION 7
1 : 500

LEGEND - MATERIALS AND FINISHES:

- F01 - VERTICAL FACADE FINS
- F02 - METAL CLADDING - DARK GREY
- F03 - GLAZING - GREY TINTED
- F04 - PAINTED - LIGHT GREY
- F05 - POWDER COAT - LIGHT GREY
- F06 - POWDER COAT - MID GREY
- F07 - METAL SCREEN - MID GREY
- F08 - LOUVRES - MID GREY
- F09 - SERVICES - STAINLESS STEEL
- F10 - PAINTED - GREY
- F11 - PAINTED - MID GREY

DATE	No.	REVISION HISTORY	DRW	CHK	QA
01/03/2024	CP02	SSDA ISSUE	KT	AH	ME
09/02/2024	CP01	SSDA ISSUE	KT	AH	ME

PRINCIPAL CONSULTANTS

Architect HDR

Services Aurecon

Structural TTW

PRINCIPAL CONTRACTOR

CLIENT

NEXTDC

NEXTDC
GPO Box 3219
Brisbane QLD 4001
T: +61 7 3177 4777

PROJECT ARCHITECT

Level 24, 25 Martin Place, Sydney NSW 2000, Australia
+61 2 9956 2666 | hdrinc.com
HDR Pty. Limited ABN 76 158 075 220 trading as HDR

Document Author Project Number

10335877

Key Plan

Site:	Stage:	NEXTDC Project Number:

Project Address:

16 JOHNSTON CRESCENT,
HORSLEY PARK, NSW 2175
AUSTRALIA

Project Name:

SHIRAZ 4

Drawing title

SSDA GENERAL ARRANGEMENT - ELEVATIONS - SHEET 2

Drawing Status:

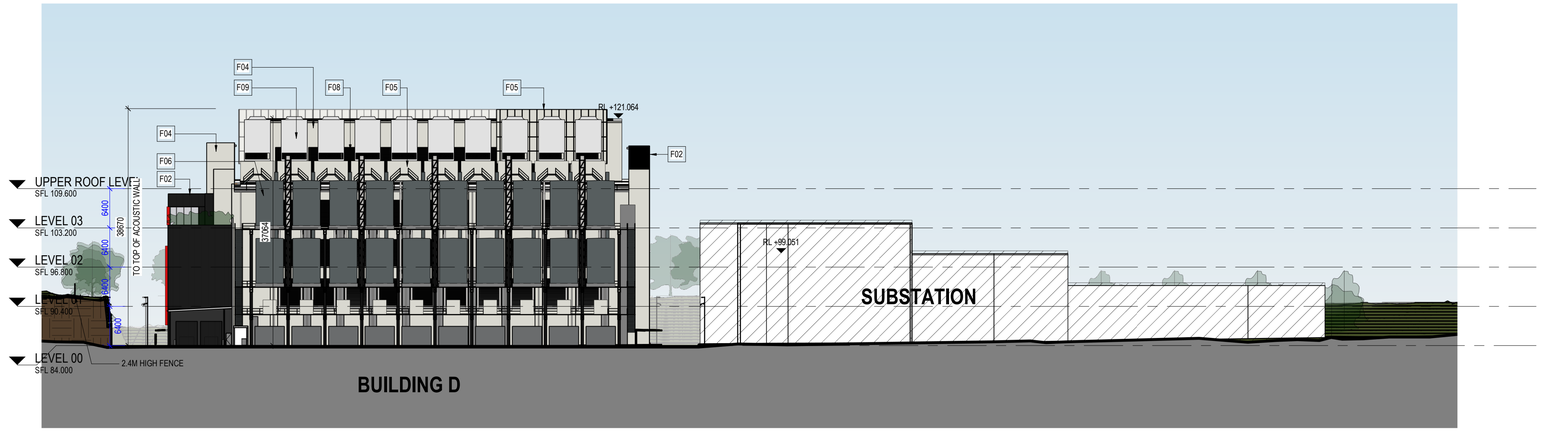
STATE SIGNIFICANT DEVELOPMENT APPLICATION (SSDA)

Drawn	Date
KT	01/03/2024
CHK	Date
SF	01/03/2024

Scale:	Sheet:	File Name:
As indicated	A1	

Drawing Number	Rev
S4-ARC-HDR-DRG-00000-7002	CP02

3/04/2024 5:20:13 PM

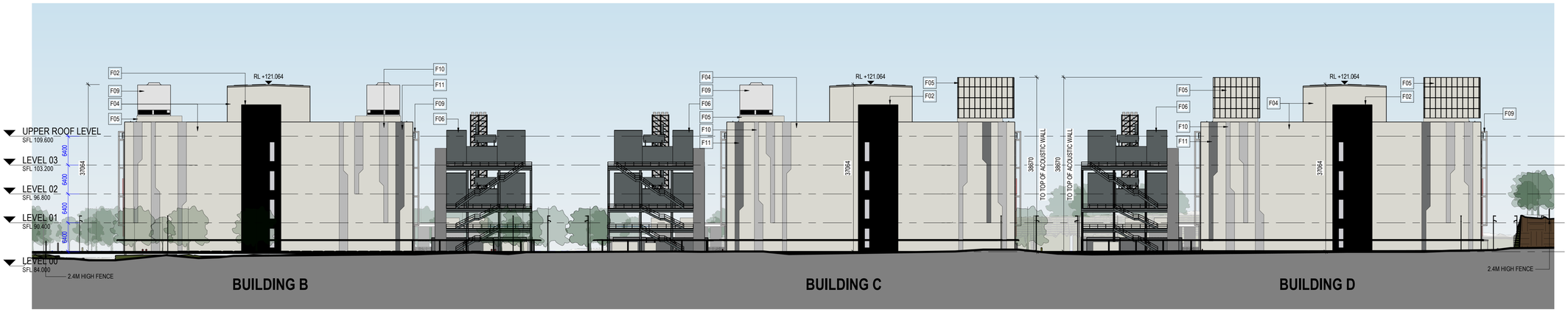


8 ELEVATION 8

1 : 500

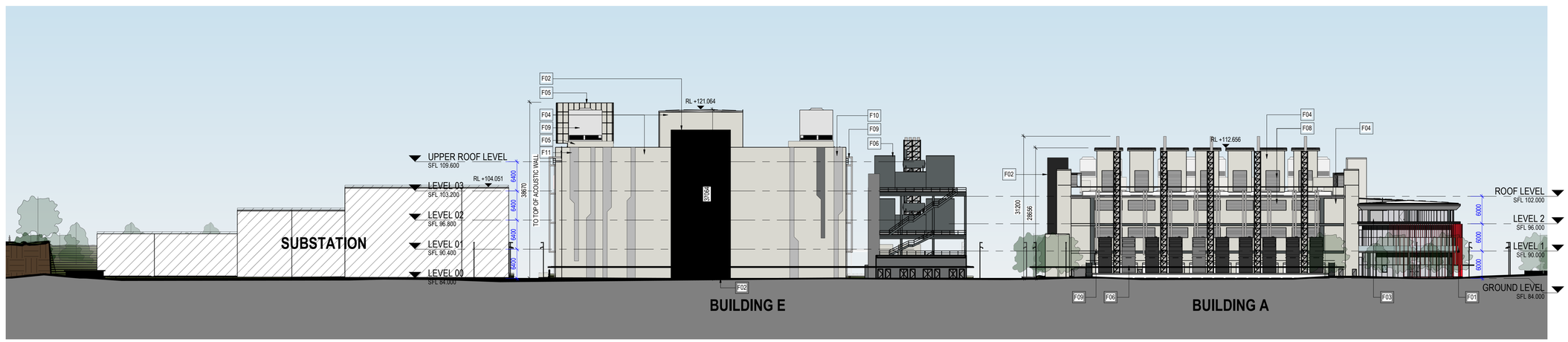
LEGEND - MATERIALS AND FINISHES:

- F01 - VERTICAL FACADE FINS
- F02 - METAL CLADDING - DARK GREY
- F03 - GLAZING - GREY TINTED
- F04 - PAINTED - LIGHT GREY
- F05 - POWDER COAT - LIGHT GREY
- F06 - POWDER COAT - MID GREY
- F07 - METAL SCREEN - MID GREY
- F08 - LOUVRES - MID GREY
- F09 - SERVICES - STAINLESS STEEL
- F10 - PAINTED - GREY
- F11 - PAINTED - MID GREY



9 ELEVATION 9

1 : 500



10 ELEVATION 10

1 : 500

DATE	No.	REVISION HISTORY	DRW	CHK	QA
01/03/2024	CP02	SSDA ISSUE	KT	AH	ME
09/02/2024	CP01	SSDA ISSUE	KT	AH	ME

PRINCIPAL CONSULTANTS

Architect HDR

Services Aurecon

Structural TTW

PRINCIPAL CONTRACTOR

CLIENT

NEXTDC

NEXTDC
GPO Box 3219
Brisbane QLD 4001
T: +61 7 3177 4777

PROJECT ARCHITECT

HDR

Level 24, 25 Martin Place, Sydney NSW 2000, Australia
+61 2 9956 2666 | hdrinc.com
HDR Pty. Limited ABN 76 158 075 220 trading as HDR

Document Author Project Number

10335877

Key Plan

Site:	Stage:	NEXTDC Project Number:

Project Address:

16 JOHNSTON CRESCENT,
HORSLEY PARK, NSW 2175
AUSTRALIA

Project Name:

SHIRAZ 4

Drawing title

SSDA GENERAL ARRANGEMENT - ELEVATIONS - SHEET 3

Drawing Status:

STATE SIGNIFICANT DEVELOPMENT APPLICATION (SSDA)

Drawn	Date
KT	01/03/2024
CHK	Date
SF	01/03/2024

Scale:	Sheet:	File Name:
As indicated	A1	

Drawing Number	Rev
S4-ARC-HDR-DRG-00000-7003	CP02

3/04/2024 5:24:01 PM

Appendix 2

TfNSW Correspondence

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+61 2 9439 7288 | | sophie.slade@ttw.com.au
TTW Engineers | Sydney
Read our latest news here

From: Sophie Slade
Sent: Monday, December 18, 2023 4:25 PM
To: Development Sydney <Development.Sydney@transport.nsw.gov.au>
Cc: Grace Carpp <grace.carpp@ttw.com.au>; Paul Yannoulatos <Paul.Yannoulatos@ttw.com.au>
Subject: SSDA - 63741210 Seeking TfNSW Pre-Development Advice

Hello,

TTW have been engaged to work on a State Significant data centre development project located at 3 – 5 Johnston Crescent, Horsley Park (SSDA-63741210). Please see site below.

Project Overview:
Construction and operation of a data centre development comprising six data centre buildings with associated car parking, internal private roads, heavy vehicle loading docks and access driveways connecting with Johnston Crescent.

We are modelling the following three intersections as part of our TIA assessment:

1. Telopea Place / Lenore Dr / Old Wallgrove Rd (signalised)
2. Old Wallgrove Rd / Millner Ave (signalised)
3. Old Wallgrove Rd / Johnston Cres / Burley Rd

We are kindly seeking Pre-Development Application advice from TfNSW with respect to the above SSDA and TfNSW's perspective on the traffic and access implications of this site.

Additionally, any information on the Southern Link Road Corridor project and its status and design that can be provided to address its impacts on the proposed development, would be appreciated.

Please feel free to reach out for further or clarifying information, or if you would like to schedule a meeting to discuss.

Thank you.

Best,

This email is intended only for the addressee and may contain confidential information. If you receive this email in error please delete it and any attachments and notify the sender immediately by reply email. Transport for NSW takes all care to ensure that attachments are free from viruses or other defects. Transport for NSW assume no liability for any loss, damage or other consequences which may arise from opening or using an attachment.

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Consider the environment. Please don't print this e-mail unless really necessary.

From: Brett Morrison (TAR TECHN) <Brett.Morrison4@transport.nsw.gov.au>
Sent: Tuesday, January 16, 2024 11:03 AM
To: Sophie Slade <sophie.slade@ttw.com.au>
Cc: Grace Carpp <grace.carpp@ttw.com.au>; Paul Yannoulatos <Paul.Yannoulatos@ttw.com.au>
Subject: RE: SSDA - 63741210 Seeking TfNSW Pre-Development Advice

You don't often get email from brett.morrison4@transport.nsw.gov.au. Learn why this is important

[External Email]: Do not click links or open attachments unless you recognize the sender and know the content is safe.

Sophie,
Please find below pre-DA comments

For Modelling purposes, it needs to be a staged approach

Model Year 2026 - 1. Telopea Place / Lenore Dr / Old Wallgrove Rd (signalised)
2. Old Wallgrove Rd / Millner Ave (signalised)
3. Old Wallgrove Rd / Johnston Cres / Burley Rd

Model Year 2036 - 1. Telopea Place / Lenore Dr / Old Wallgrove Rd (signalised)
2. Old Wallgrove Rd / Millner Ave (signalised)
3. Old Wallgrove Rd / Johnston Cres (future SLR) / Burley Rd (future SLR) - (4 lane signalised)
4. Burley Rd (future SLR) / Wallgrove Rd - (4lane signalised)

If the DA involves the creation of a TCS then we will require an AIP.
To initiate an Agreement in Principle process, the following supporting documents will need to be provided by the applicant:

Traffic Signal Warrant Assessment
SIDRA intersection modelling
Turning paths for design and check vehicles
Concept TCS Plan

Also note the general stipulations included in an Agreement-in-Principle as shown below:

Please note that following the commencement of the detailed design review unforeseen constraints may be identified which significantly affect the delivery of the project agreed to in principal by this form. This includes, but is not limited to, utility works, land ownership, property acquisition, and drainage.

Under normal circumstances this Agreement in Principle expires after the latter of:
5 years after the date of the signatures provided above;
5 years after the Notice of the Determination for a Development Application from a Consent Authority.

For comments can be provided on receipt of the TIA

Note: It is emphasised that the comments provided above are informal and of a Pre-DA nature, they are not to be interpreted as binding upon Transport for New South Wales (TfNSW) and may change following formal assessment of a submitted development application from the appropriate consent authority.

Brett Morrison
Senior Land Use Planner
Land Use Assessment Western
Planning and Programs
Greater Sydney
Transport for NSW

E Brett.Morrison4@transport.nsw.gov.au

27-31 Argyle Street

Sophie Slade

From: Brett Morrison (TAR TECHN) <Brett.Morrison4@transport.nsw.gov.au>
Sent: Tuesday, 20 February 2024 11:36 AM
To: Sophie Slade
Cc: Grace Carpp; Paul Yannoulatos
Subject: RE: ***SYD23/01387*** NEW SYD & ALIAS SSDA-63741210 Seeking TfNSW Pre-Development Advice
Attachments: image006.emz

Some people who received this message don't often get email from brett.morrison4@transport.nsw.gov.au. Learn why this is important

[External Email]: Do not click links or open attachments unless you recognize the sender and know the content is safe.

See comments in red below.

Brett Morrison
Senior Land Use Planner
Land Use Assessment Western
Planning and Programs
Greater Sydney
Transport for NSW

E Brett.Morrison4@transport.nsw.gov.au
4 Parramatta Square, 12 Darcy Street, Parramatta NSW 2150
PO Box 973 Parramatta CBD NSW 2124

NSW GOVERNMENT Transport for NSW

I acknowledge the Aboriginal people of the country on which I work, their traditions, culture and a shared history and identity. I also pay my respects to Elders past and present and recognise the continued connection to country.

Please consider the environment before printing this email.

OFFICIAL: Sensitive – NSW Government

OFFICIAL

From: Sophie Slade <sophie.slade@ttw.com.au>
Sent: Monday, February 5, 2024 4:52 PM
To: Brett Morrison (TAR TECHN) <Brett.Morrison4@transport.nsw.gov.au>; Development Sydney <Development.Sydney@transport.nsw.gov.au>

Cc: Grace Carpp <grace.carpp@ttw.com.au>; Paul Yannoulatos <Paul.Yannoulatos@ttw.com.au>
Subject: ***SYD23/01387*** NEW SYD & ALIAS SSDA-63741210 Seeking TfNSW Pre-Development Advice

Some people who received this message don't often get email from sophie.slade@ttw.com.au. Learn why this is important

CAUTION: This email is sent from an external source. Do not click any links or open attachments unless you recognise the sender and know the content is safe.

Hello,

We have received some pre-development advice below with respect to SSDA – 63741210. We have attempted to contact TfNSW to follow up on some required information with respect to the requested traffic modelling.

Could any current information TfNSW has with respect to the layout and configurations of the future intersections *(Old Wallgrove Rd / Johnston Cres (future SLR) / Burley Rd (future SLR) - (4 lane signalised) and Burley Rd (future SLR) / Wallgrove Rd - (4lane signalised))* please be provided for our reference? Not clear on the specific question, they will be 4 lane signlaised intersections in the future with provision for 6 lanes

Additionally, is there a specific growth rate that TfNSW would like to be applied to the existing traffic volumes to achieve the 2036 scenario? Use TZP data

Can you confirm if the information within the February 2023 *Southern Link Road Traffic Modelling and Assessment* by GHD is accurate and can be relied upon for our assessment? The report could be outdated, if you have any specific assumptions that need require a need for modelling, we are able to clarify to update.

Thank you!

Best,

Sophie Slade | Senior Traffic Engineer
+61 2 9439 7288 | | sophie.slade@ttw.com.au
TTW Engineers | Sydney
Read our latest news here

OFFICIAL

From: Sophie Slade
Sent: Thursday, January 25, 2024 10:30 AM
To: 'Brett Morrison (TAR TECHN)' <Brett.Morrison4@transport.nsw.gov.au>
Cc: Grace Carpp <grace.carpp@ttw.com.au>; Paul Yannoulatos <Paul.Yannoulatos@ttw.com.au>
Subject: RE: SSDA - 63741210 Seeking TfNSW Pre-Development Advice

Hi Brett,

Just touching base about my email below with respect to the SLR road configuration and traffic volume data that should be incorporated into our 20256 and 2036 models as requested.

Thank you!

Appendix 3

Existing Traffic Volumes

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Horsley Park - Traffic Flows

MATRIX
Traffic and Transport Data

Search By Time and Classification

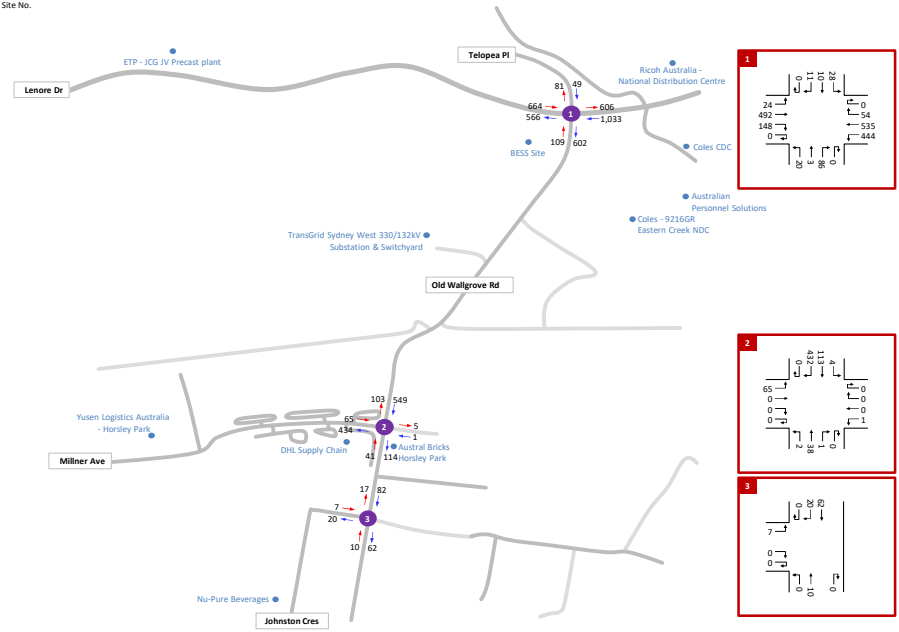
AM / PM	Start Time	End Time	Classification
AM	7:00	8:00	Lights

Volume Forecasting

0 % * 0 = original survey data

(e.g. input 20 for volume increase 20% or -20 for volume decrease 20%)

1 Site No.



Horsley Park - Traffic Flows

MATRIX
Traffic and Transport Data

Search By Time and Classification

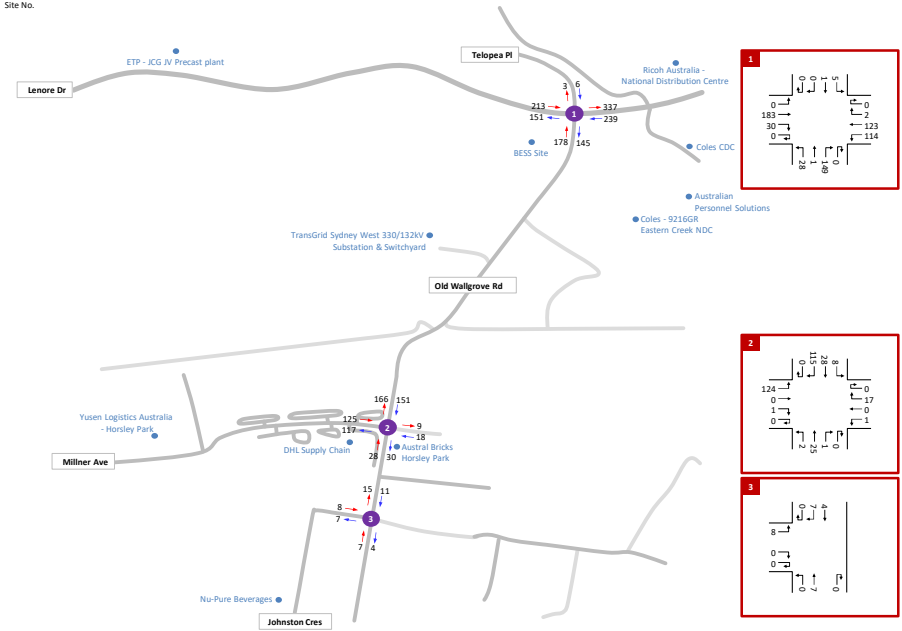
AM / PM	Start Time	End Time	Classification
AM	7:00	8:00	Heavies

Volume Forecasting

0 % * 0 = original survey data

(e.g. input 20 for volume increase 20% or -20 for volume decrease 20%)

1 Site No.



Horsley Park - Traffic Flows

MATRIX Traffic and Transport Data

Search By Time and Classfication

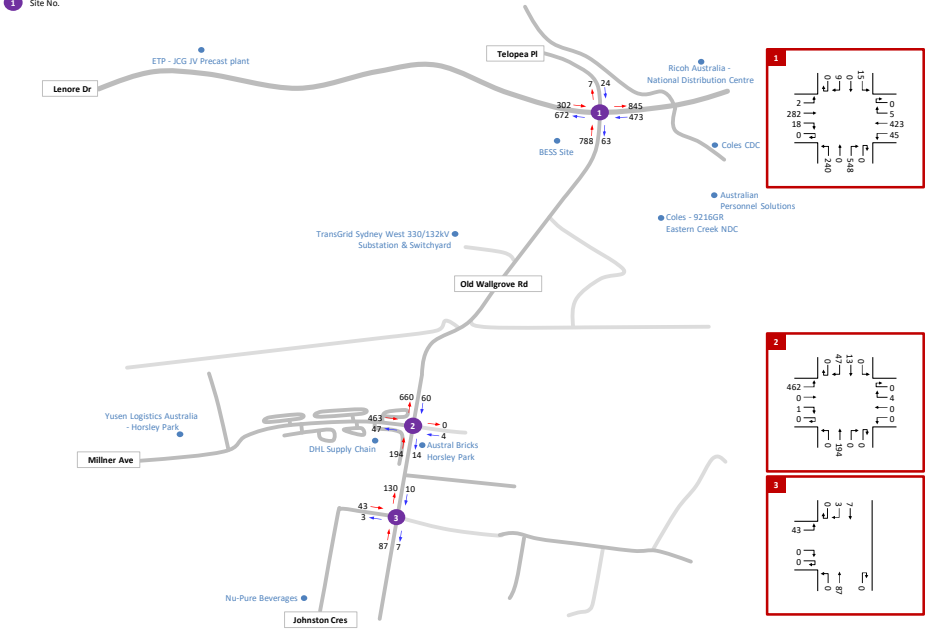
AM / PM	Start Time	End Time	Classification
PM	16:15	17:15	Lights

Volume Forecasting

0 % * 0 = original survey data

(e.g. input 20 for volume increase 20% or -20 for volume decrease 20%)

1 Site No.



Horsley Park - Traffic Flows

MATRIX
Traffic and Transport Data

Search By Time and Classification

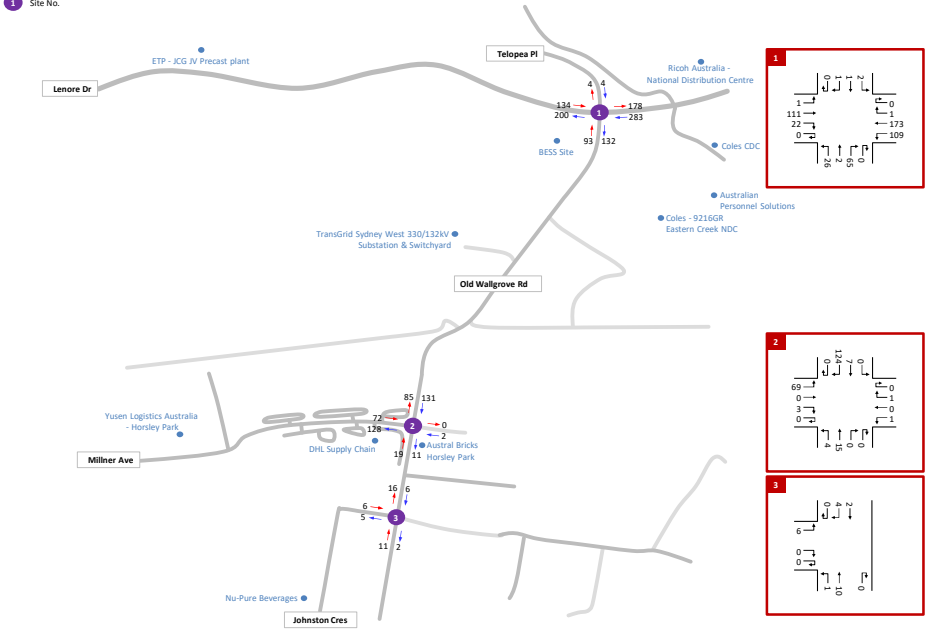
AM / PM	Start Time	End Time	Classification
PM	16:15	17:15	Heavies

Volume Forecasting

0 % * 0 = original survey data

(e.g. input 20 for volume increase 20% or -20 for volume decrease 20%)

1 Site No.



Appendix 4

Existing SIDRA Outputs

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MOVEMENT SUMMARY

Site: 101 [Telopea Pl & Old Wallgrove Rd & Lenore Dr - AM (Site Folder: Existing Scenario 2023)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Existing Scenario - AM
AM Peak: 7:00 - 8:00am
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 128 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old Wallgrove Road															
1	L2	All MCs	51	58.3	51	58.3	0.579	13.6	LOS A	8.0	84.8	0.93	0.84	0.93	47.5
2	T1	All MCs	4	25.0	4	25.0	* 0.579	61.9	LOS E	8.0	84.8	0.93	0.84	0.93	48.1
3	R2	All MCs	247	63.4	247	63.4	0.579	61.7	LOS E	8.3	90.1	0.94	0.83	0.94	42.7
Approach			302	62.0	302	62.0	0.579	53.6	LOS D	8.3	90.1	0.94	0.83	0.94	43.6
East: Old Wallgrove Road															
4	L2	All MCs	587	20.4	587	20.4	0.517	10.8	LOS A	9.8	80.7	0.37	0.72	0.37	65.8
5	T1	All MCs	693	18.7	693	18.7	* 0.622	41.8	LOS C	18.6	151.4	0.90	0.78	0.90	38.7
6	R2	All MCs	59	3.6	59	3.6	0.471	79.3	LOS F	3.7	26.9	1.00	0.76	1.00	19.9
Approach			1339	18.8	1339	18.8	0.622	29.9	LOS C	18.6	151.4	0.67	0.75	0.67	49.7
North: Telopea Pl															
7	L2	All MCs	35	15.2	35	15.2	0.114	10.8	LOS A	1.1	8.5	0.70	0.66	0.70	36.9
8	T1	All MCs	12	9.1	12	9.1	* 0.114	47.6	LOS D	1.1	8.5	0.70	0.66	0.70	60.8
9	R2	All MCs	12	0.0	12	0.0	0.116	70.5	LOS F	0.7	5.0	0.98	0.68	0.98	26.7
Approach			58	10.9	58	10.9	0.116	30.1	LOS C	1.1	8.5	0.76	0.66	0.76	40.3
West: Lenore Drive															
10	L2	All MCs	25	0.0	25	0.0	0.016	7.9	LOS A	0.1	0.9	0.13	0.63	0.13	58.3
11	T1	All MCs	711	27.1	711	27.1	0.491	25.7	LOS B	15.5	133.9	0.75	0.66	0.75	46.9
12	R2	All MCs	187	16.9	187	16.9	* 0.610	59.2	LOS E	10.9	87.4	0.97	0.82	0.97	46.9
Approach			923	24.3	923	24.3	0.610	32.0	LOS C	15.5	133.9	0.77	0.69	0.77	47.1
All Vehicles			2622	25.5	2622	25.5	0.622	33.4	LOS C	18.6	151.4	0.74	0.74	0.74	47.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Old Wallgrove Road												

P1 Full	1	1	58.1	LOS E	0.0	0.0	0.95	0.95	212.0	200.0	0.94
East: Old Wallgrove Road											
P2 Full	1	1	58.1	LOS E	0.0	0.0	0.95	0.95	212.0	200.0	0.94
North: Telopea Pl											
P3 Full	1	1	58.1	LOS E	0.0	0.0	0.95	0.95	212.0	200.0	0.94
West: Lenore Drive											
P4 Full	1	1	58.1	LOS E	0.0	0.0	0.95	0.95	212.0	200.0	0.94
All Pedestrians	4	4	58.1	LOS E	0.0	0.0	0.95	0.95	212.0	200.0	0.94

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

SIDRA INTERSECTION 9.1 | Copyright © 2000-2023 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 102 [Millner Ave & Old Wallgrove Rd - AM (Site Folder: Existing Scenario 2023)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Existing Scenario - AM
AM Peak: 7:00 - 8:00am
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 86 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old Wallgrove Road															
1	L2	All MCs	4	50.0	4	50.0	*0.266	26.5	LOS B	1.3	12.3	0.97	0.72	0.97	35.2
2	T1	All MCs	66	39.7	66	39.7	*0.266	39.3	LOS C	1.4	13.5	0.97	0.72	0.97	54.4
3	R2	All MCs	2	50.0	2	50.0	0.017	48.8	LOS D	0.1	0.8	0.94	0.62	0.94	23.0
Approach			73	40.6	73	40.6	0.266	38.8	LOS C	1.4	13.5	0.97	0.71	0.97	52.9
East: Access Road															
4	L2	All MCs	2	50.0	2	50.0	0.210	48.5	LOS D	0.9	11.1	0.97	0.71	0.97	20.7
5	T1	All MCs	1	0.0	1	0.0	*0.210	43.3	LOS D	0.9	11.1	0.97	0.71	0.97	26.0
6	R2	All MCs	18	100.0	18	100.0	0.210	48.5	LOS D	0.9	11.1	0.97	0.71	0.97	41.4
Approach			21	90.0	21	90.0	0.210	48.3	LOS D	0.9	11.1	0.97	0.71	0.97	39.5
North: Old Wallgrove Road															
7	L2	All MCs	13	66.7	13	66.7	0.043	10.5	LOS A	0.7	6.2	0.38	0.40	0.38	63.8
8	T1	All MCs	148	19.9	148	19.9	0.102	6.5	LOS A	1.8	14.9	0.40	0.35	0.40	74.2
9	R2	All MCs	576	21.0	576	21.0	*0.629	17.5	LOS B	13.5	111.8	0.73	0.81	0.73	58.4
Approach			737	21.6	737	21.6	0.629	15.2	LOS B	13.5	111.8	0.66	0.71	0.66	60.8
West: Millner Avenue															
10	L2	All MCs	199	65.6	199	65.6	0.134	13.5	LOS A	1.9	21.0	0.48	0.66	0.48	55.0
11	T1	All MCs	1	0.0	1	0.0	0.134	62.9	LOS E	1.9	21.0	0.54	0.67	0.54	38.3
12	R2	All MCs	1	100.0	1	100.0	0.134	68.2	LOS E	1.9	21.0	0.54	0.67	0.54	37.9
Approach			201	65.4	201	65.4	0.134	14.0	LOS A	1.9	21.0	0.48	0.66	0.48	54.9
All Vehicles			1032	32.9	1032	32.9	0.629	17.3	LOS B	13.5	111.8	0.65	0.70	0.65	58.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec

South: Old Wallgrove Road												
P1	Full	1	1	37.2	LOS D	0.0	0.0	0.93	0.93	191.1	200.0	1.05
East: Access Road												
P2	Full	1	1	37.2	LOS D	0.0	0.0	0.93	0.93	191.1	200.0	1.05
West: Millner Avenue												
P4	Full	1	1	37.2	LOS D	0.0	0.0	0.93	0.93	191.1	200.0	1.05
All Pedestrians		3	3	37.2	LOS D	0.0	0.0	0.93	0.93	191.1	200.0	1.05

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

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MOVEMENT SUMMARY

Site: 103v [Johnston Cres & Old Wallgrove Rd - AM (Site Folder: Existing Scenario 2023)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Existing Scenario - AM
AM Peak: 7:00 - 8:00am
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Johnston Crescent															
1	L2	All MCs	1	0.0	1	0.0	0.019	5.6	LOS A	0.1	0.6	0.18	0.50	0.18	52.3
2	T1	All MCs	18	41.2	18	41.2	0.019	5.2	LOS A	0.1	0.6	0.18	0.50	0.18	50.9
Approach			19	38.9	19	38.9	0.019	5.3	LOS A	0.1	0.6	0.18	0.50	0.18	51.0
North: Old Wallgrove Road															
8	T1	All MCs	69	6.1	69	6.1	0.055	0.0	LOS A	0.2	1.4	0.01	0.17	0.01	58.4
9	R2	All MCs	28	25.9	28	25.9	0.055	5.8	LOS A	0.2	1.4	0.01	0.17	0.01	53.2
Approach			98	11.8	98	11.8	0.055	1.7	NA	0.2	1.4	0.01	0.17	0.01	57.0
West: Johnston Crescent															
10	L2	All MCs	16	53.3	16	53.3	0.012	6.2	LOS A	0.0	0.1	0.02	0.56	0.02	47.9
12	R2	All MCs	1	0.0	1	0.0	0.012	5.6	LOS A	0.0	0.1	0.02	0.56	0.02	52.1
Approach			17	50.0	17	50.0	0.012	6.1	NA	0.0	0.1	0.02	0.56	0.02	48.2
All Vehicles			134	20.5	134	20.5	0.055	2.8	NA	0.2	1.4	0.04	0.27	0.04	54.9

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

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

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

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [Telopea Pl & Old Wallgrove Rd & Lenore Dr - PM (Site Folder: Existing Scenario 2023)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Existing Scenario - PM
PM Peak: 4:15 - 5:15pm
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 103 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old Wallgrove Road															
1	L2	All MCs	280	9.8	280	9.8	0.673	14.3	LOS A	16.1	123.0	0.84	0.89	0.84	55.5
2	T1	All MCs	2	100.0	2	100.0	* 0.673	47.0	LOS D	16.1	123.0	0.84	0.89	0.84	56.3
3	R2	All MCs	645	10.6	645	10.6	0.673	40.5	LOS C	18.9	144.7	0.87	0.86	0.87	52.4
Approach			927	10.6	927	10.6	0.673	32.6	LOS C	18.9	144.7	0.86	0.87	0.86	53.4
East: Old Wallgrove Road															
4	L2	All MCs	162	70.8	162	70.8	0.154	10.0	LOS A	1.4	15.2	0.25	0.65	0.25	62.7
5	T1	All MCs	627	29.0	627	29.0	* 0.741	42.1	LOS C	15.4	135.0	0.98	0.87	1.04	37.6
6	R2	All MCs	6	16.7	6	16.7	0.066	62.8	LOS E	0.3	2.5	0.97	0.66	0.97	22.5
Approach			796	37.4	796	37.4	0.741	35.7	LOS C	15.4	135.0	0.83	0.83	0.88	43.0
North: Telopea Pl															
7	L2	All MCs	18	11.8	18	11.8	0.026	15.2	LOS B	0.4	3.4	0.52	0.63	0.52	39.4
8	T1	All MCs	1	100.0	1	100.0	* 0.026	40.6	LOS C	0.4	3.4	0.52	0.63	0.52	61.6
9	R2	All MCs	11	10.0	11	10.0	0.091	56.7	LOS E	0.5	4.0	0.96	0.67	0.96	29.4
Approach			29	14.3	29	14.3	0.091	30.9	LOS C	0.5	4.0	0.68	0.64	0.68	35.4
West: Lenore Drive															
10	L2	All MCs	3	33.3	3	33.3	0.002	8.2	LOS A	0.0	0.1	0.12	0.61	0.12	56.7
11	T1	All MCs	414	28.2	414	28.2	0.486	35.9	LOS C	9.1	79.2	0.90	0.75	0.90	40.3
12	R2	All MCs	42	55.0	42	55.0	* 0.542	64.5	LOS E	2.3	23.5	1.00	0.77	1.06	44.2
Approach			459	30.7	459	30.7	0.542	38.3	LOS C	9.1	79.2	0.91	0.75	0.91	41.1
All Vehicles			2212	24.5	2212	24.5	0.741	34.9	LOS C	18.9	144.7	0.86	0.83	0.88	48.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec

P1 Full	1	1	58.1	LOS E	0.0	0.0	0.95	0.95	212.0	200.0	0.94
East: Old Wallgrove Road											
P2 Full	1	1	58.1	LOS E	0.0	0.0	0.95	0.95	212.0	200.0	0.94
North: Telopea Pl											
P3 Full	1	1	58.1	LOS E	0.0	0.0	0.95	0.95	212.0	200.0	0.94
West: Lenore Drive											
P4 Full	1	1	58.1	LOS E	0.0	0.0	0.95	0.95	212.0	200.0	0.94
All Pedestrians	4	4	58.1	LOS E	0.0	0.0	0.95	0.95	212.0	200.0	0.94

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

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MOVEMENT SUMMARY

Site: 102 [Millner Ave & Old Wallgrove Rd - PM (Site Folder: Existing Scenario 2023)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Existing Scenario - PM
PM Peak: 4:15 - 5:15pm
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 74 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old Wallgrove Road															
1	L2	All MCs	4	100.0	4	100.0	0.121	9.3	LOS A	2.2	16.9	0.57	0.47	0.57	45.9
2	T1	All MCs	220	7.2	220	7.2	0.121	11.3	LOS A	2.2	16.9	0.57	0.47	0.57	70.4
3	R2	All MCs	1	0.0	1	0.0	0.001	17.5	LOS B	0.0	0.1	0.52	0.62	0.52	40.2
Approach			225	8.9	225	8.9	0.121	11.3	LOS A	2.2	16.9	0.57	0.47	0.57	70.0
East: Access Road															
4	L2	All MCs	1	100.0	1	100.0	0.323	53.9	LOS D	0.3	2.9	1.00	0.65	1.00	19.4
5	T1	All MCs	1	0.0	1	0.0	*0.323	48.4	LOS D	0.3	2.9	1.00	0.65	1.00	25.0
6	R2	All MCs	5	20.0	5	20.0	0.323	53.1	LOS D	0.3	2.9	1.00	0.65	1.00	43.1
Approach			7	28.6	7	28.6	0.323	52.5	LOS D	0.3	2.9	1.00	0.65	1.00	38.4
North: Old Wallgrove Road															
7	L2	All MCs	1	100.0	1	100.0	0.008	15.7	LOS B	0.1	1.1	0.52	0.40	0.52	53.8
8	T1	All MCs	21	35.0	21	35.0	0.020	10.5	LOS A	0.3	2.6	0.53	0.39	0.53	70.7
9	R2	All MCs	180	72.5	180	72.5	*0.451	23.7	LOS B	4.6	52.3	0.72	0.78	0.72	55.5
Approach			202	68.8	202	68.8	0.451	22.3	LOS B	4.6	52.3	0.70	0.74	0.70	56.7
West: Millner Avenue															
10	L2	All MCs	559	13.0	559	13.0	0.442	24.1	LOS B	8.0	62.2	0.80	0.79	0.80	53.6
11	T1	All MCs	1	0.0	1	0.0	*0.442	19.5	LOS B	7.7	60.0	0.80	0.79	0.80	34.1
12	R2	All MCs	4	75.0	4	75.0	0.442	24.5	LOS B	7.7	60.0	0.80	0.79	0.80	33.3
Approach			564	13.4	564	13.4	0.442	24.1	LOS B	8.0	62.2	0.80	0.79	0.80	53.5
All Vehicles			999	23.7	999	23.7	0.451	21.1	LOS B	8.0	62.2	0.73	0.70	0.73	56.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped	Dist]	Prop. Que	Eff. Stop Rate	Travel Time	Travel Dist.	Aver. Speed

	ped/h	ped/h	sec		ped	m			sec	m	m/sec
South: Old Wallgrove Road											
P1 Full	1	1	31.2	LOS D	0.0	0.0	0.92	0.92	185.1	200.0	1.08
East: Access Road											
P2 Full	1	1	31.2	LOS D	0.0	0.0	0.92	0.92	185.1	200.0	1.08
West: Millner Avenue											
P4 Full	1	1	31.2	LOS D	0.0	0.0	0.92	0.92	185.1	200.0	1.08
All Pedestrians	3	3	31.2	LOS D	0.0	0.0	0.92	0.92	185.1	200.0	1.08

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

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MOVEMENT SUMMARY

Site: 103v [Johnston Cres & Old Wallgrove Rd - PM (Site Folder: Existing Scenario 2023)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Existing Scenario - PM
PM Peak: 4:15 - 5:15pm
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Johnston Crescent															
1	L2	All MCs	1	100.0	1	100.0	0.087	6.8	LOS A	0.3	2.5	0.16	0.50	0.16	48.2
2	T1	All MCs	102	10.3	102	10.3	0.087	4.8	LOS A	0.3	2.5	0.16	0.50	0.16	52.3
Approach			103	11.2	103	11.2	0.087	4.8	LOS A	0.3	2.5	0.16	0.50	0.16	52.2
North: Old Wallgrove Road															
8	T1	All MCs	9	22.2	9	22.2	0.011	0.0	LOS A	0.0	0.4	0.01	0.26	0.01	58.1
9	R2	All MCs	7	57.1	7	57.1	0.011	6.2	LOS A	0.0	0.4	0.01	0.26	0.01	51.1
Approach			17	37.5	17	37.5	0.011	2.7	NA	0.0	0.4	0.01	0.26	0.01	55.0
West: Johnston Crescent															
10	L2	All MCs	52	12.2	52	12.2	0.030	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	50.0
12	R2	All MCs	1	0.0	1	0.0	0.030	5.6	LOS A	0.0	0.0	0.00	0.57	0.00	52.1
Approach			53	12.0	53	12.0	0.030	5.7	NA	0.0	0.0	0.00	0.57	0.00	50.1
All Vehicles			173	14.0	173	14.0	0.087	4.9	NA	0.3	2.5	0.10	0.50	0.10	51.9

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

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

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

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Appendix 5

Staffing Occupancy Schedule

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S4 Staff Occupancy Calculations

			Total Headcount	*Normal Office hours or Shift based*	*Max on site at any time*	*Notes*
Buidling A						
	NEXTDC Staff					
		NEXTDC Executive & Sales	15	Normal	11	
		NEXTDC Security / CSR / Concierge	9	Shift	3	
		NEXTDC Operational	19	Shift	6	
	MCX (Mission Critical Office Space)		87	Shift	65	during emergencies
	Café Staff		2	Normal	2	
	External Maintenance Contractors		15	As required	5	As required - short site durations
			147		**92**	
Hyperscale Blocks	Buildings B-E					
per block						
	Client Executives		15	Normal	11	
	Security		12	Shift	4	
	Operational Staff		19	Shift	6	
	External Maintenance Contractors		20	as required	5	As required - short site durations
		per block	**66**		**26**	
Total Buildings B-E			**264**		**104**	
	S4 TOTALS		**411**		**196**	

Notes Access to Site is pre-approved by NEXTDC
Shifts = 3 x 8 hr

Appendix 6

Swept Path Plans

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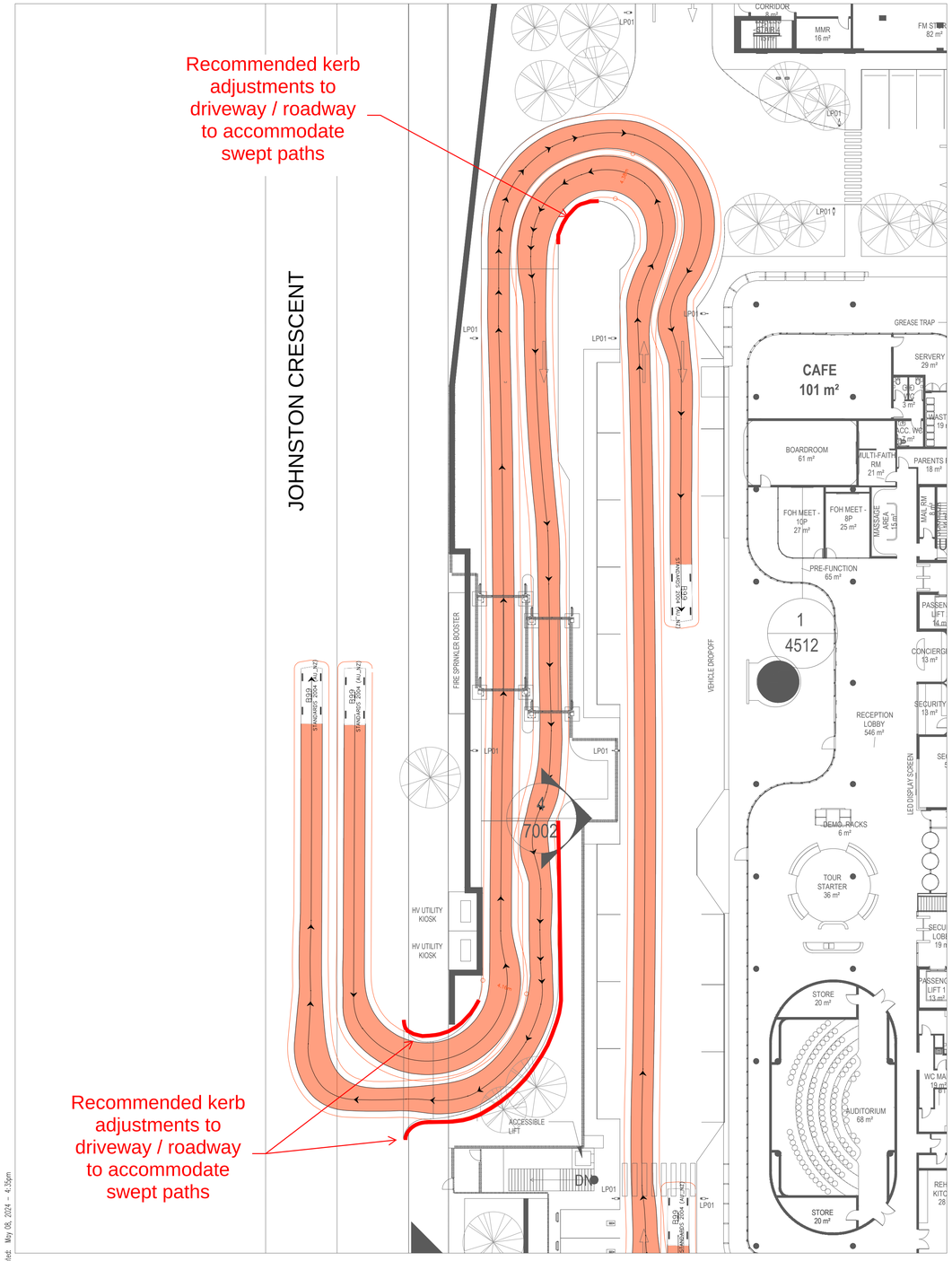
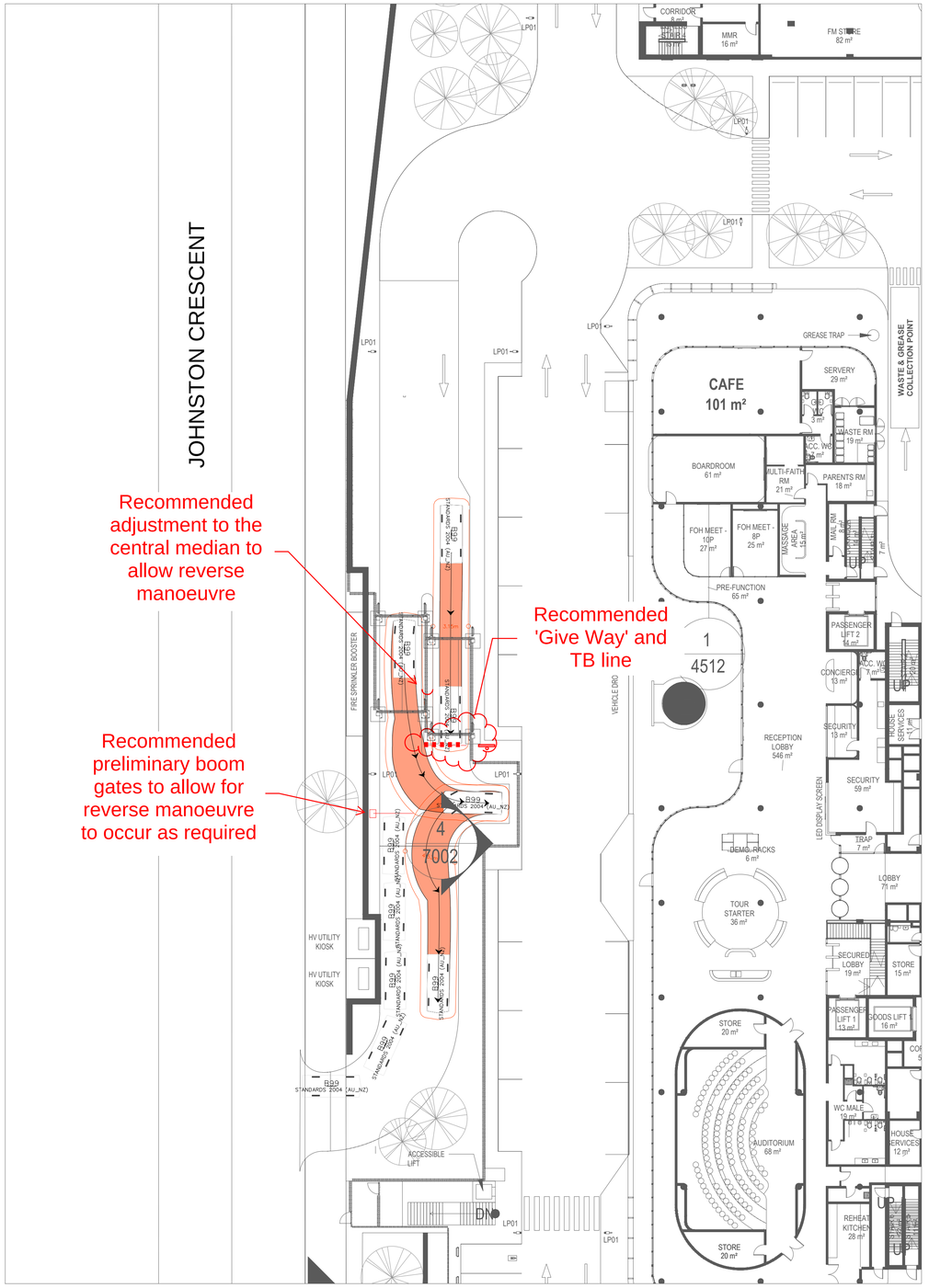
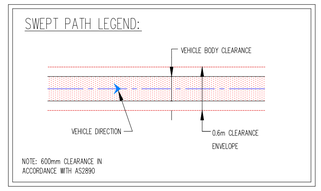
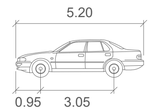


B99 PASSENGER VEHICLE ENTRY / EXIT



B99 PERMISSION DENIED - REVERSE MOVEMENT





B99

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Track	:	1.84
Lock to Lock Time	:	6.0
Steering Angle	:	33.9

FileName: SK30.dwg - USER: sophies - Plot File Created: May 08, 2024 - 4:35pm

A1 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	SS	EW	23.01.24

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Project
NEXTDC S4 DATA CENTER

Sheet Subject
SWEPT PATH ANALYSIS
B99 PASSENGER VEHICLE SITE ENTRY / EXIT

PRELIMINARY
NOT FOR CONSTRUCTION

Scale : A1	Drawn	Authorised
1:400	SS	

Job No	Drawing No	Revision
211085	SK30	P1

Plot File Created: May 08, 2024 - 4:35pm

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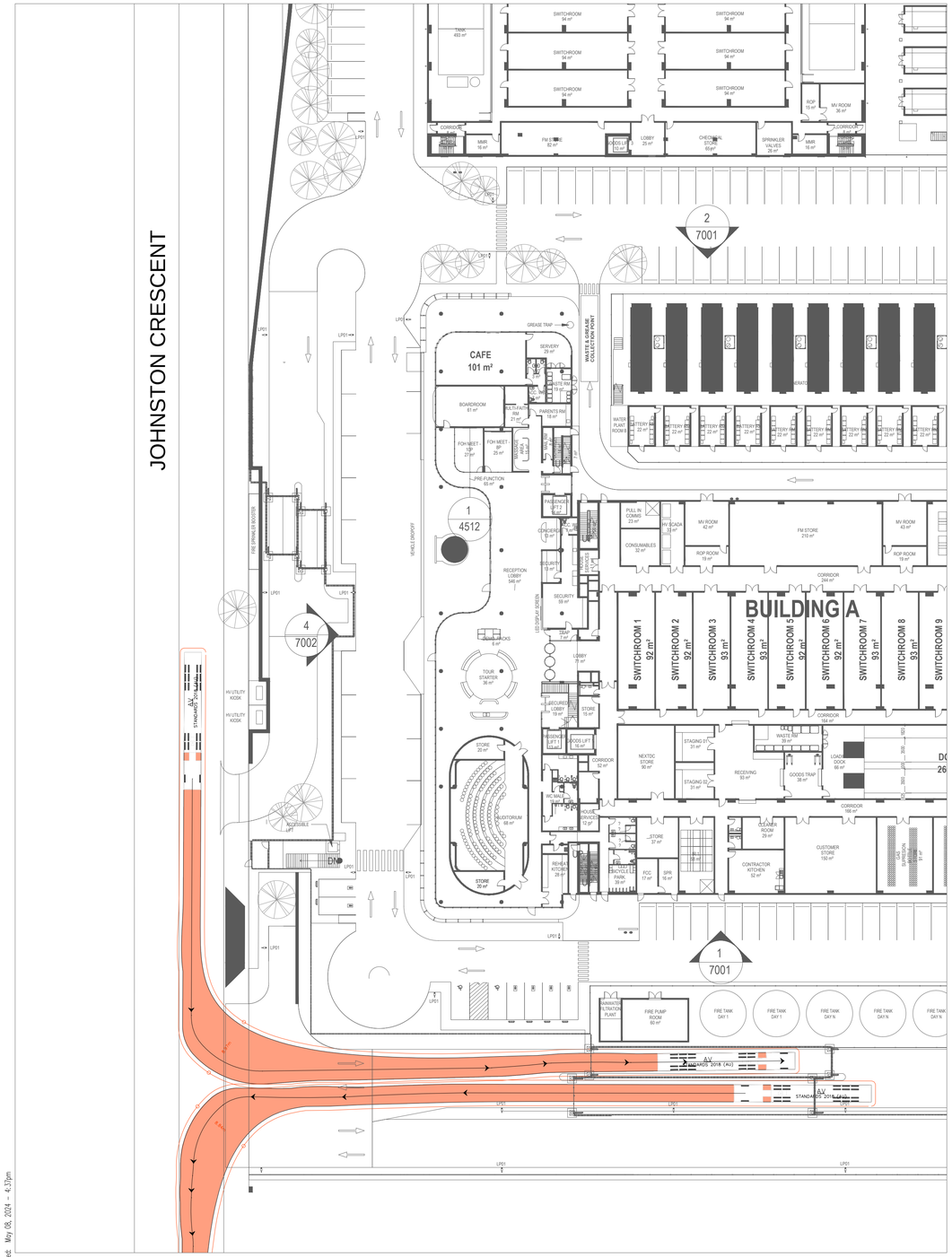
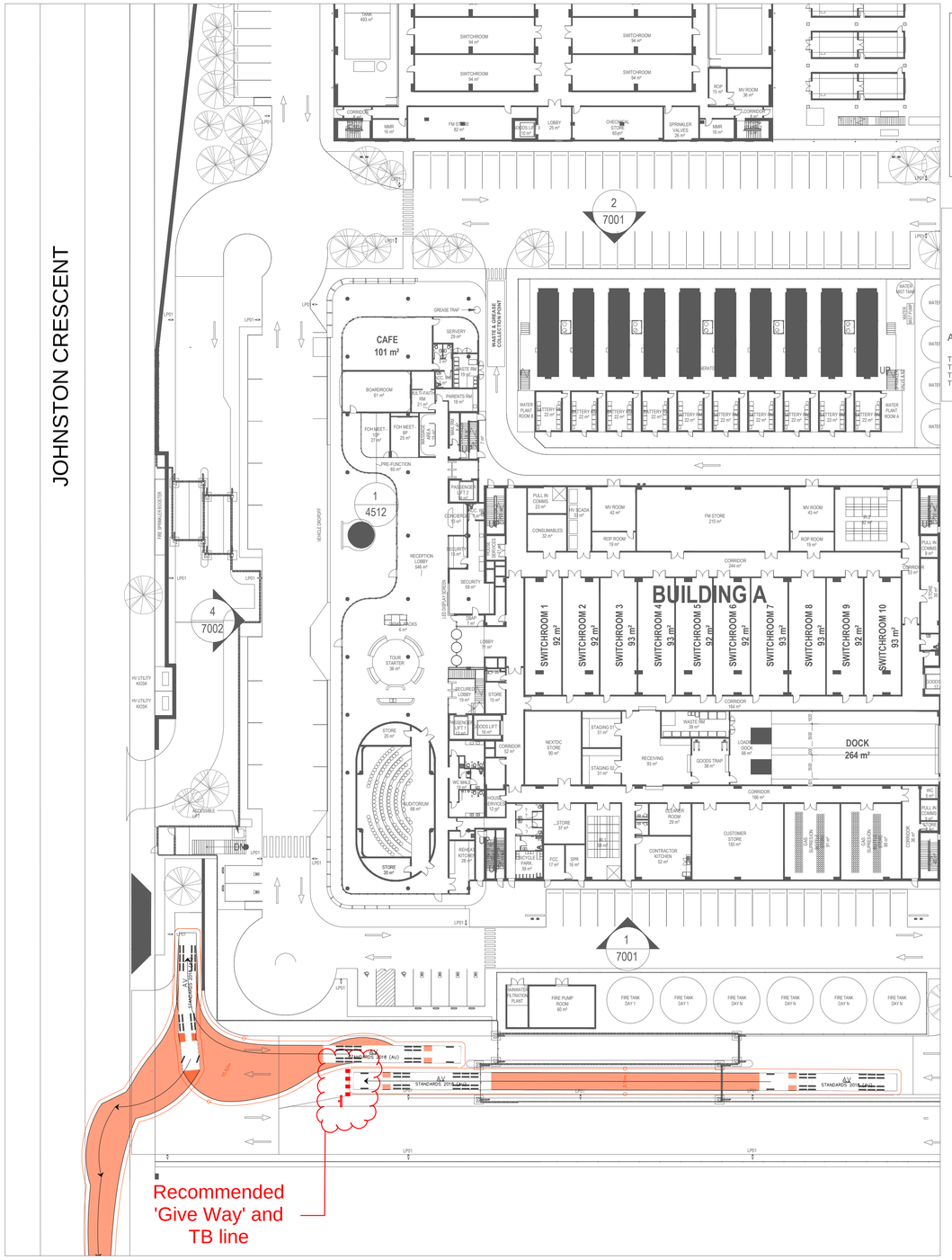
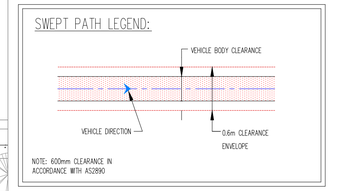
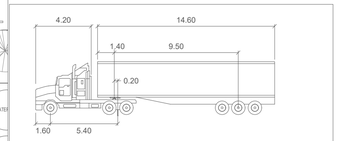


AV SITE ENTRY AND EXIT



AV PERMISSION DENIED - REVERSE MOVEMENT





AV

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 28.3
Tractor Track	: 2.50	Articulating Angle	: 72.0
Trailer Track	: 2.50		

FileName: SK29.dwg - USER: sophies - Plot File Created: May 08, 2024 - 4:37pm

A1 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	SS	ED/W	23.01.24

Architect
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612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

Project
NEXTDC S4 DATA CENTER

Sheet Subject
SWEPT PATH ANALYSIS
AV ENTRY, EXIT AND REVERSE

PRELIMINARY
NOT FOR CONSTRUCTION

Scale : A1	Drawn	Authorised
1:250	SS	

Job No	Drawing No	Revision
211085	SK29	P1

Plot File Created: May 08, 2024 - 4:37pm

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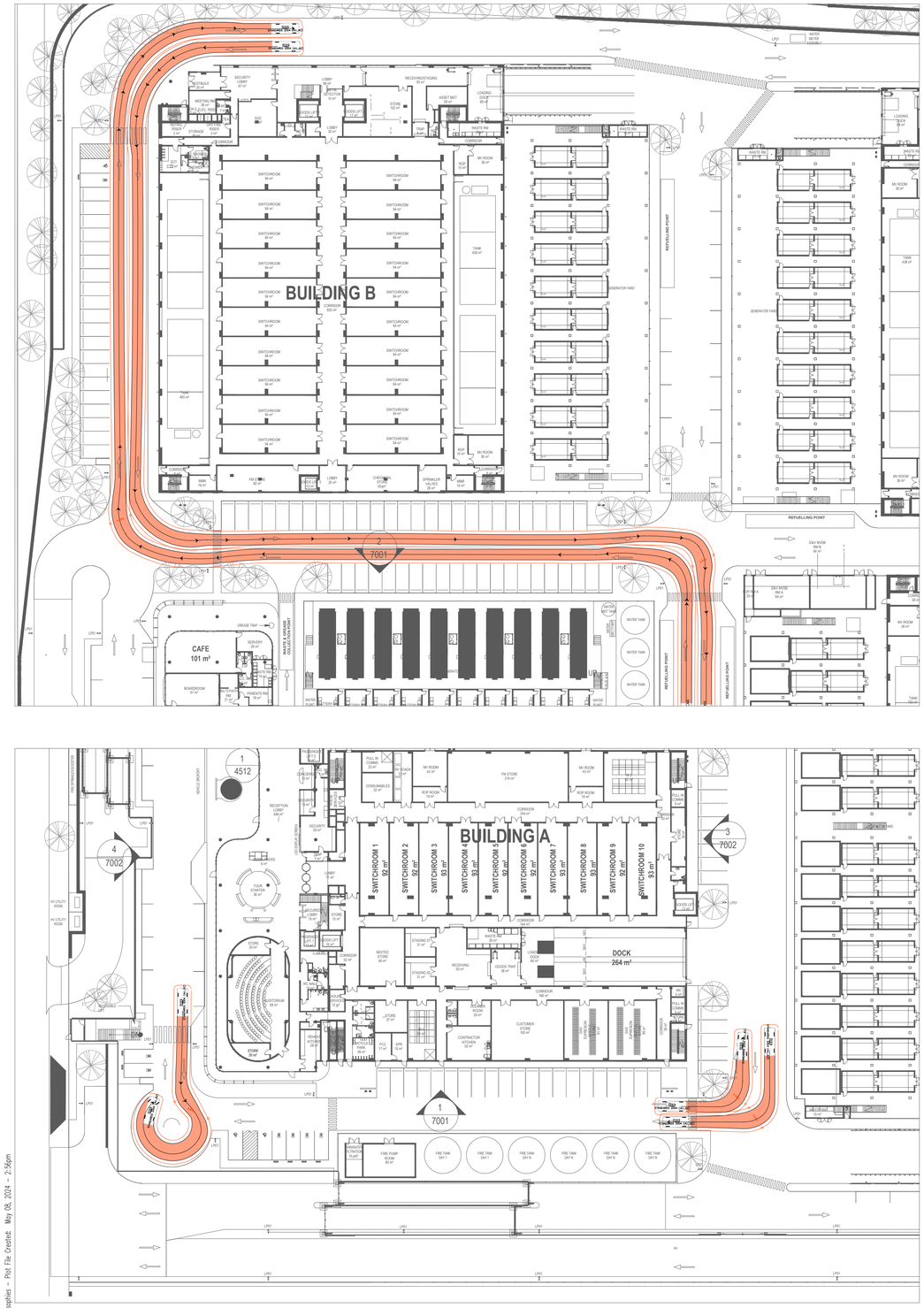
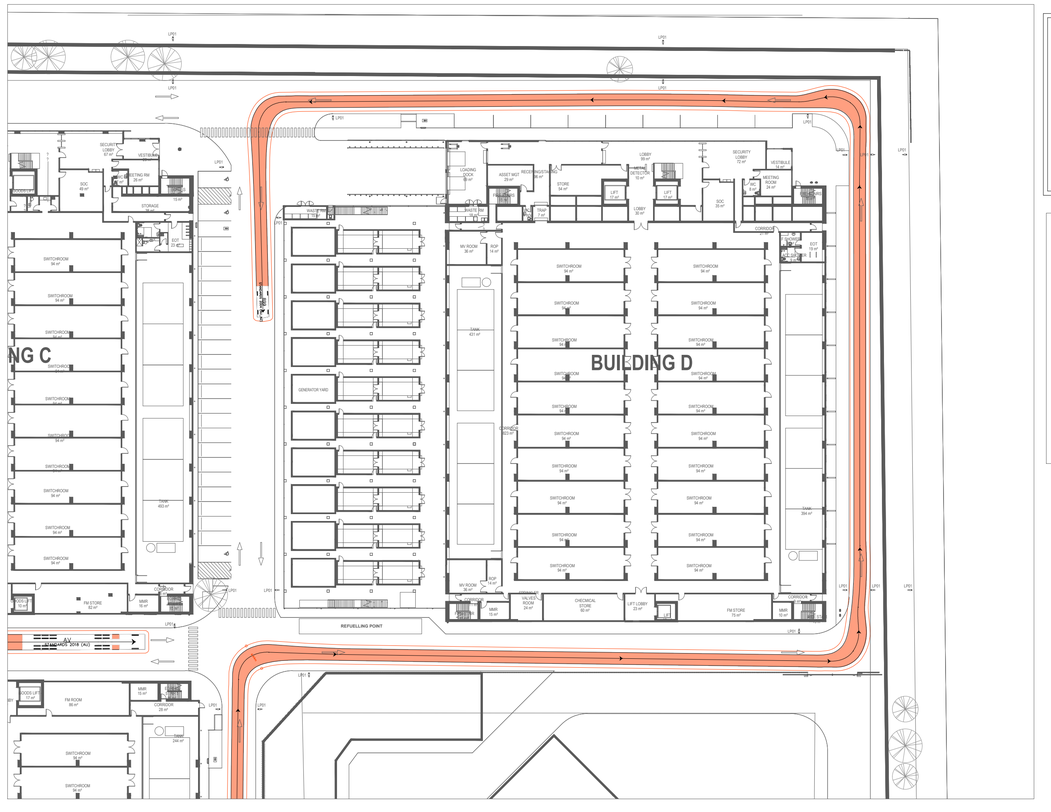
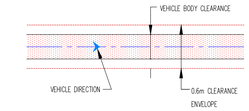
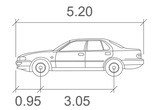




SWEPT PATH LEGEND:



NOTE: 600mm CLEARANCE IN ACCORDANCE WITH AS2890



B99

	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.9

PASSENGER VEHICLE INTERNAL CIRCULATION

FileName: SK28.dwg - USER: sophies - Plot File Created: May 08, 2024 - 2:56pm

A1 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	SS	EDW	23.01.24

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Project
NEXTDC S4 DATA CENTER

Sheet Subject
SWEPT PATH ANALYSIS
B99 PASSENGER VEHICLES

PRELIMINARY
NOT FOR CONSTRUCTION

Scale : A1	Drawn	Authorised
1:200	SS	

Job No	Drawing No	Revision
211085	SK28	P1

Plot File Created: May 08, 2024 - 2:56pm

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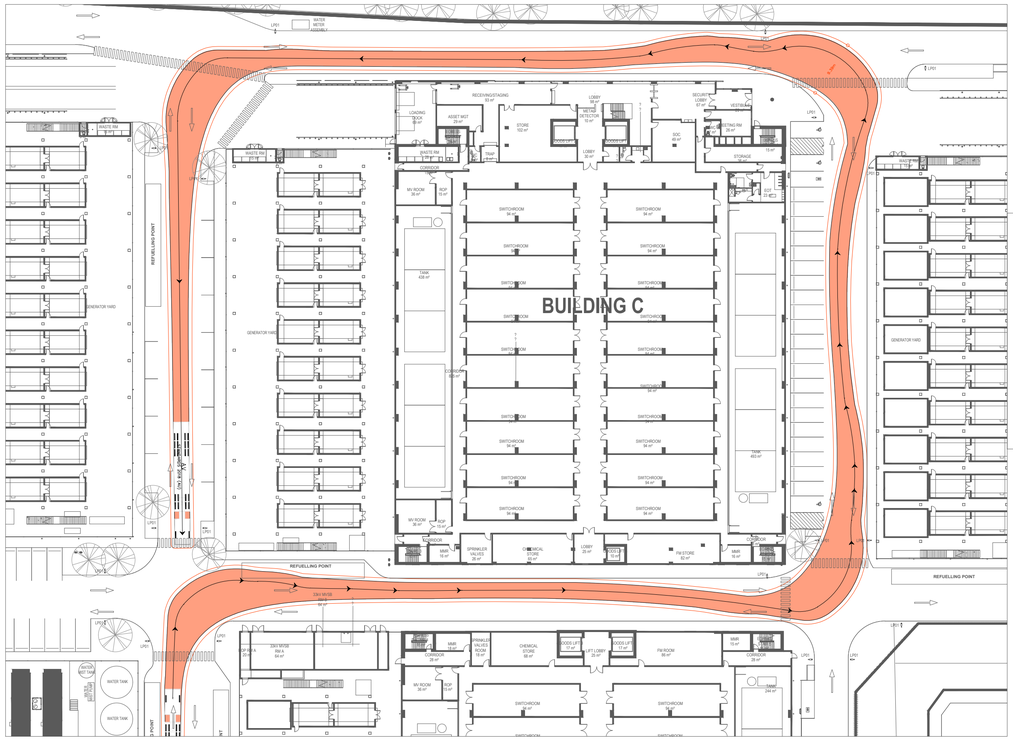
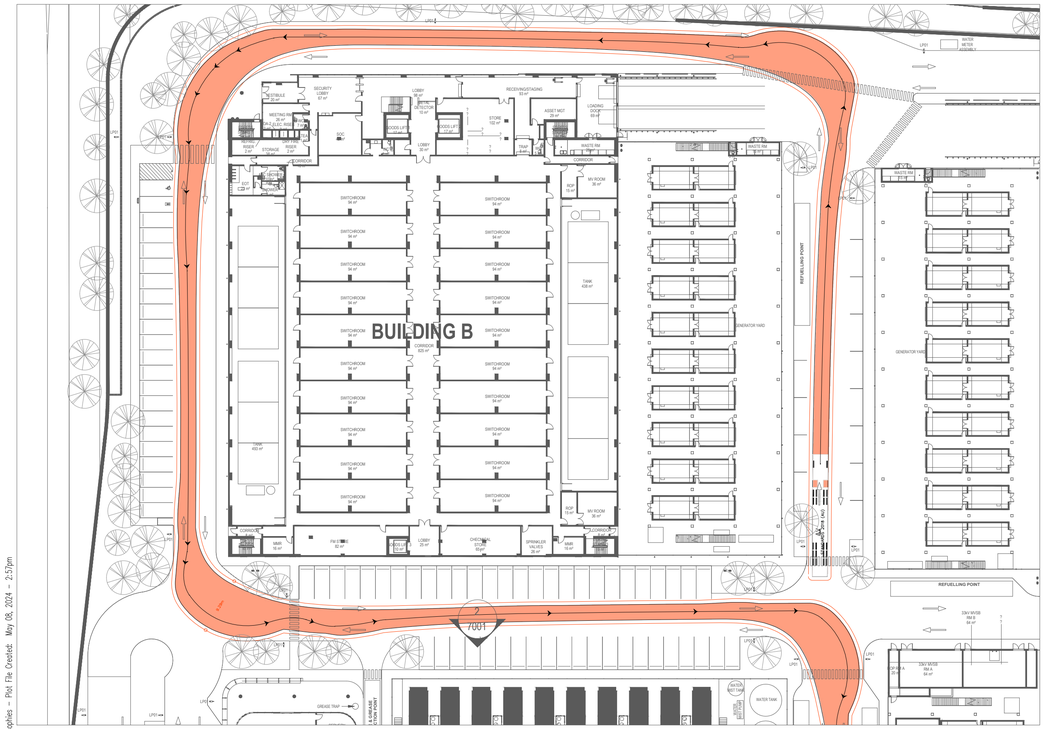
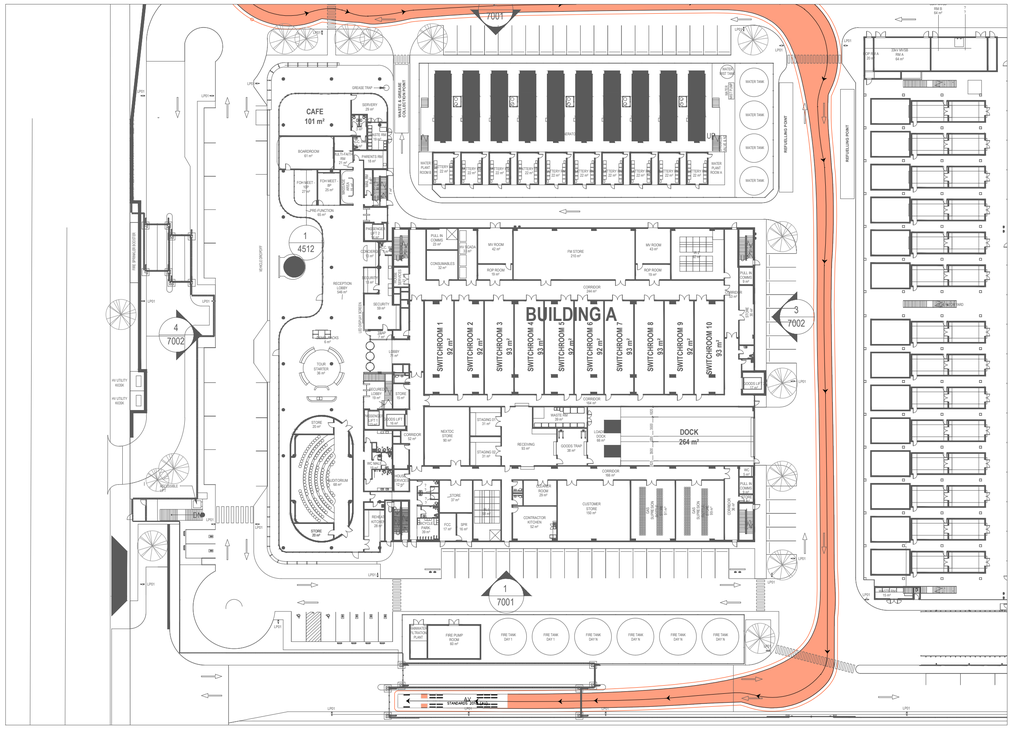
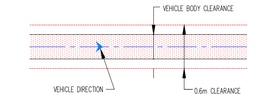


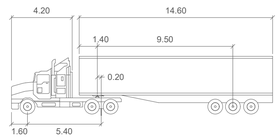




SWEPT PATH LEGEND:



NOTE: 600mm CLEARANCE IN ACCORDANCE WITH AS2890



AV

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 28.3
Tractor Track	: 2.50	Articulating Angle	: 72.0
Trailer Track	: 2.50		

AV INTERNAL CIRCULATION

FileName: SK32.dwg - USER: sophies - Plot File Created: May 08, 2024 - 2:57pm

A1 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	SS	EDW	23.01.24

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Project
NEXTDC S4 DATA CENTER

Sheet Subject
SWEPT PATH ANALYSIS
20m LONG AV INTERNAL CIRCULATION

PRELIMINARY
NOT FOR CONSTRUCTION

Scale : A1	Drawn	Authorised
1:200	SS	

Job No	Drawing No	Revision
211085	SK32	P1

Plot File Created: May 08, 2024 - 2:57pm

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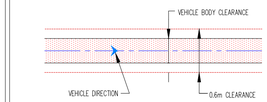
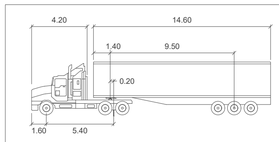
DOCK A ENTRY

DOCK A EXIT

SWEPT PATH LEGEND:



NOTE: 600mm CLEARANCE IN ACCORDANCE WITH AS2890



AV

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 28.3
Tractor Track	: 2.50	Articulating Angle	: 72.0
Trailer Track	: 2.50		

FileName: SK27.dwg - USER: sophies - Plot File Created: May 08, 2024 - 2:58pm

A1 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	SS	EDW	23.01.24

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Project
NEXTDC S4 DATA CENTER

Sheet Subject
SWEPT PATH ANALYSIS
DOCK A ENTRY AND EXIT

PRELIMINARY
NOT FOR CONSTRUCTION

Scale : A1	Drawn	Authorised
1:250	SS	

Job No	Drawing No	Revision
211085	SK27	P1

Plot File Created: May 08, 2024 - 2:58pm

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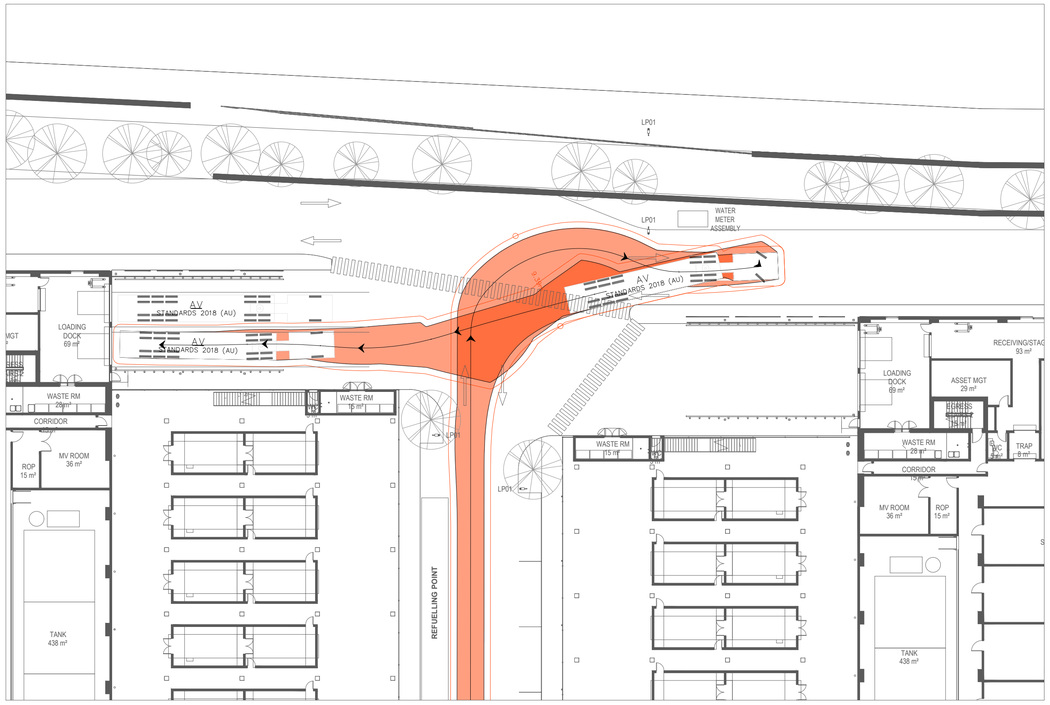
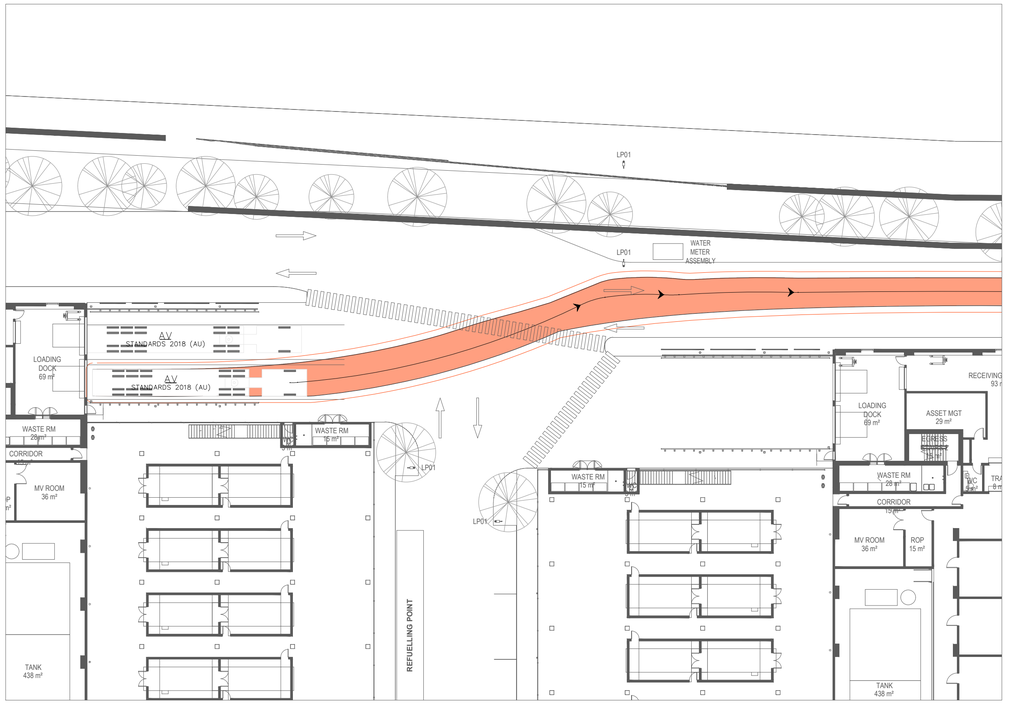
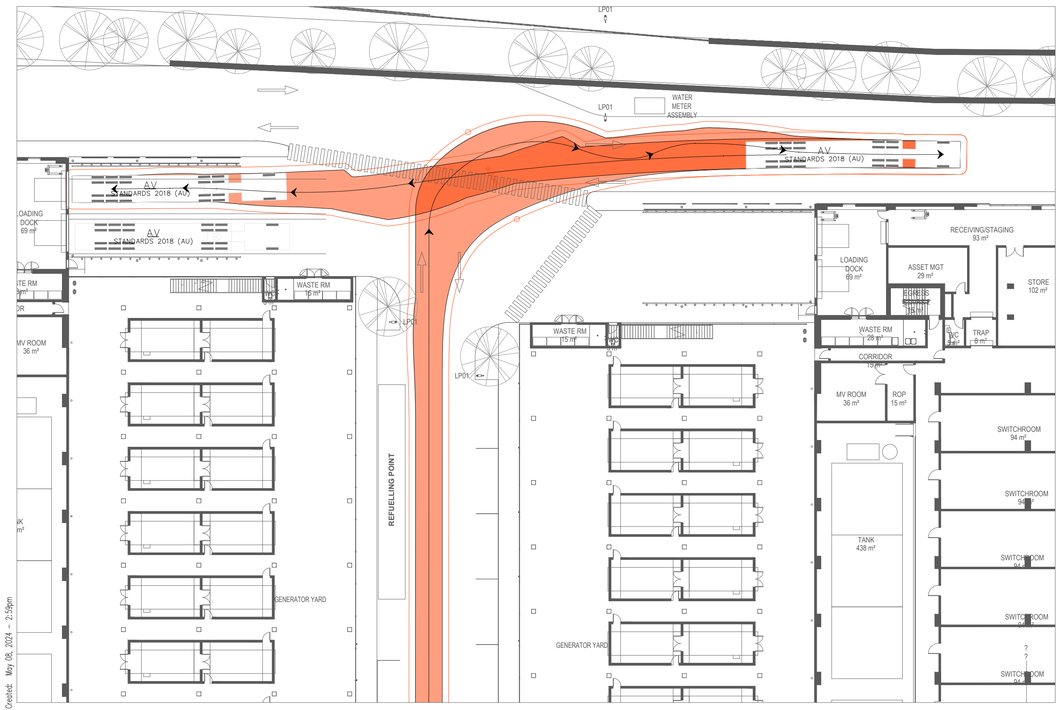
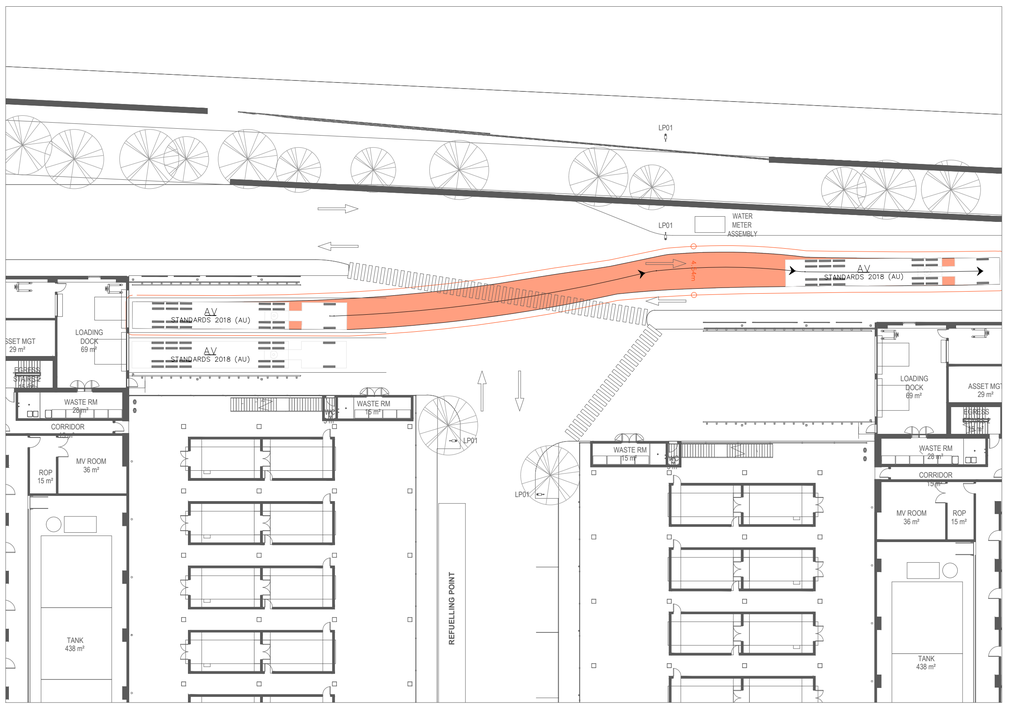




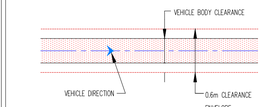
DOCK B ENTRY



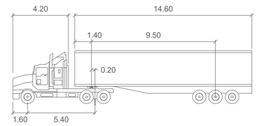


DOCK B EXIT

SWEPT PATH LEGEND:



NOTE: 600mm CLEARANCE IN ACCORDANCE WITH AS2890



AV

meters			
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 28.3
Tractor Track	: 2.50	Articulating Angle	: 72.0
Trailer Track	: 2.50		

FileName: SK26.dwg - USER: sspyles - Plot File Created: May 08, 2024 - 2:59pm

A1 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	SS	ED/#	23.01.24

Architect
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Project
NEXTDC S4 DATA CENTER

Sheet Subject
SWEPT PATH ANALYSIS
DOCK B ENTRY AND EXIT

PRELIMINARY
NOT FOR CONSTRUCTION

Scale : A1	Drawn	Authorised
1:350	SS	

Job No	Drawing No	Revision
211085	SK26	P1

Plot File Created: May 08, 2024 - 2:59pm

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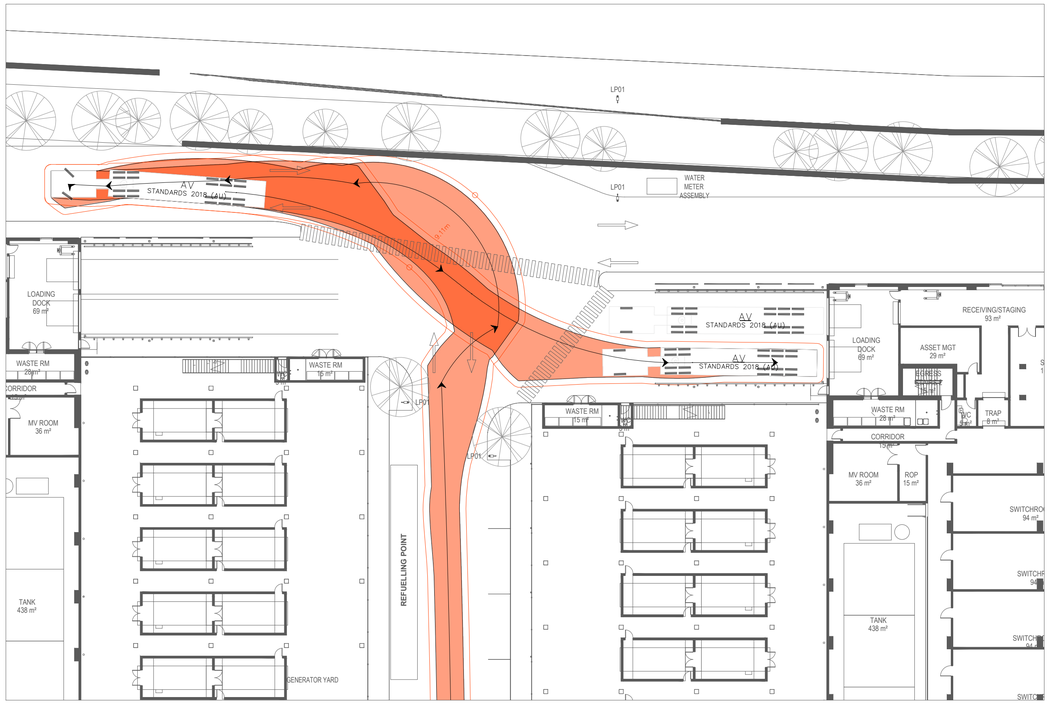
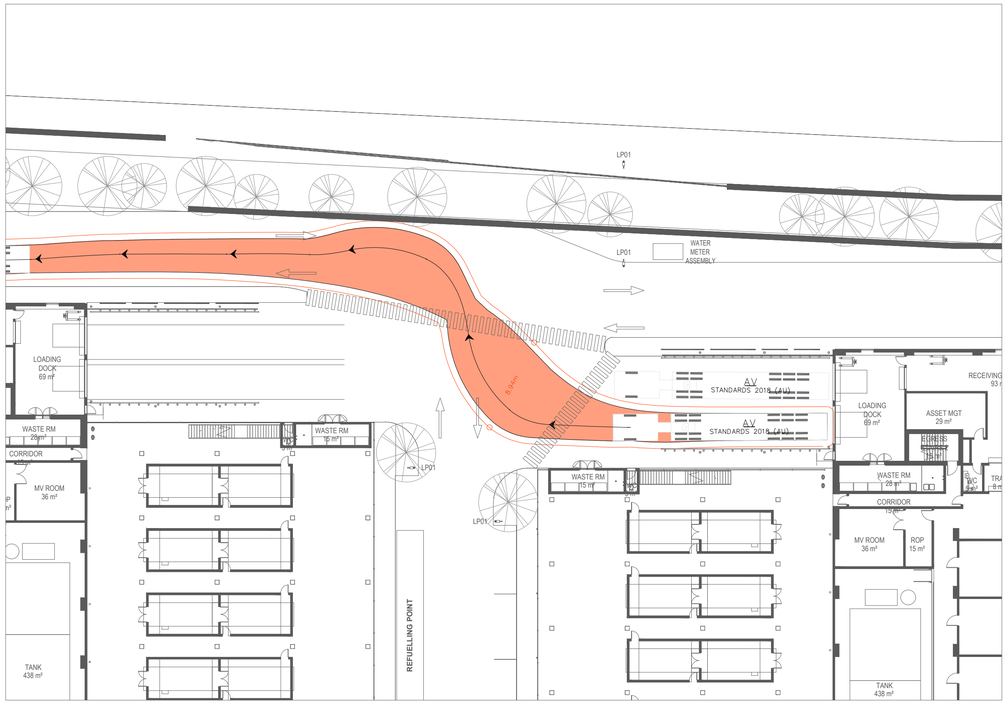
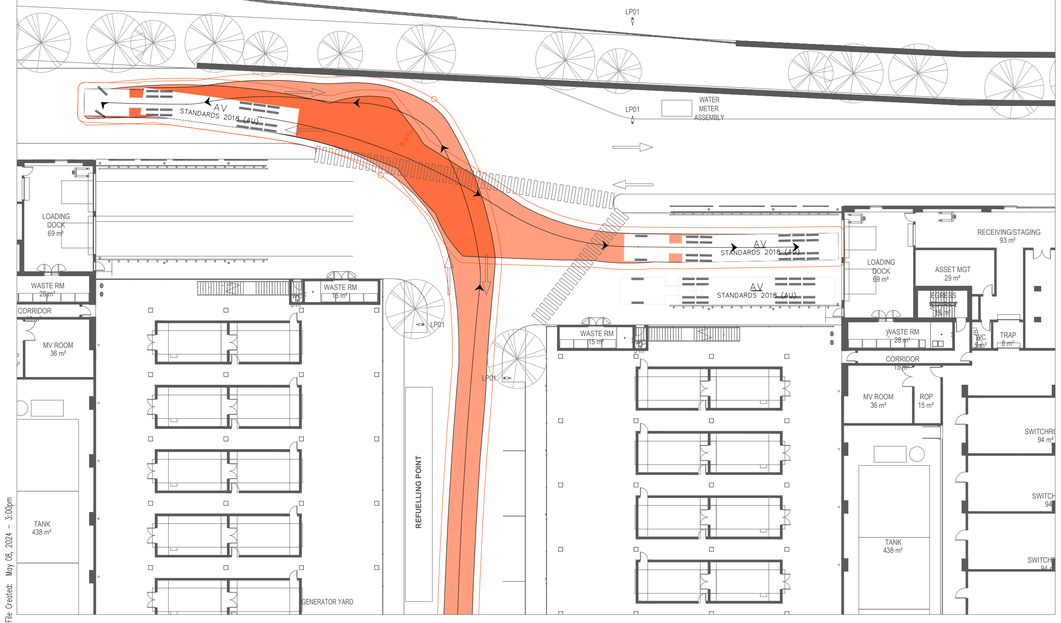
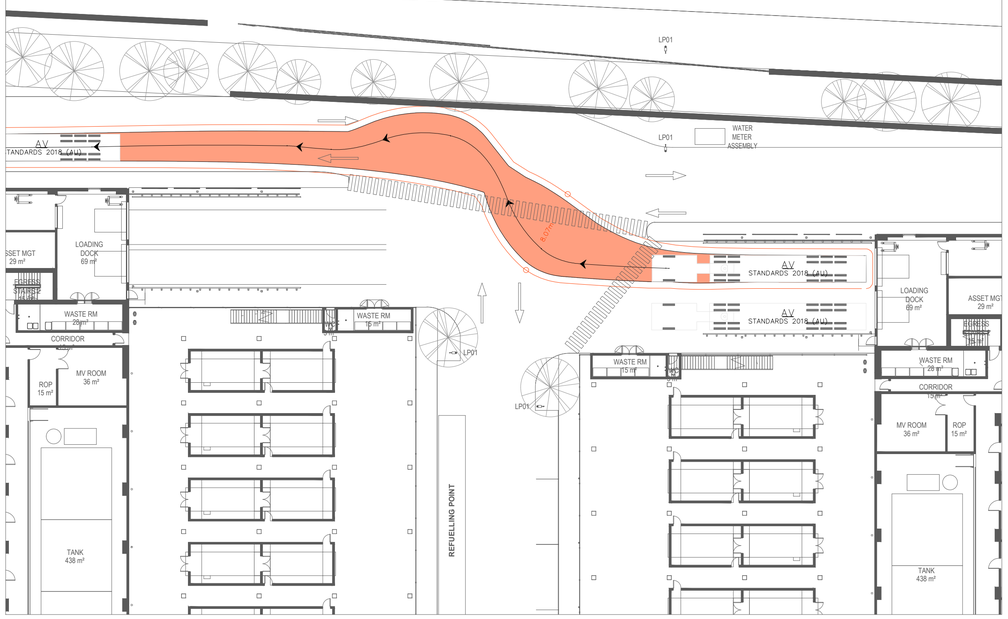




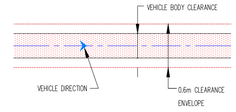
DOCK C ENTRY



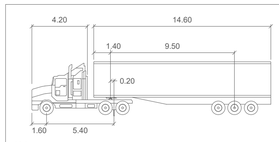


DOCK C EXIT

SWEPT PATH LEGEND:



NOTE: 600mm CLEARANCE IN ACCORDANCE WITH AS2890



AV

meters			
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 28.3
Tractor Track	: 2.50	Articulating Angle	: 72.0
Trailer Track	: 2.50		

FileName: SK33-v2.dwg - USER: sophies - Plot File Created: May 08, 2024 - 3:00pm

A1 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	SS	EDW	23.01.24

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Project
NEXTDC S4 DATA CENTER

Sheet Subject
SWEPT PATH ANALYSIS
DOCK B ENTRY AND EXIT

PRELIMINARY
NOT FOR CONSTRUCTION

Scale : A1	Drawn	Authorised
1:350	SS	

Job No	Drawing No	Revision
211085	SK26	P1

Plot File Created: May 08, 2024 - 3:00pm

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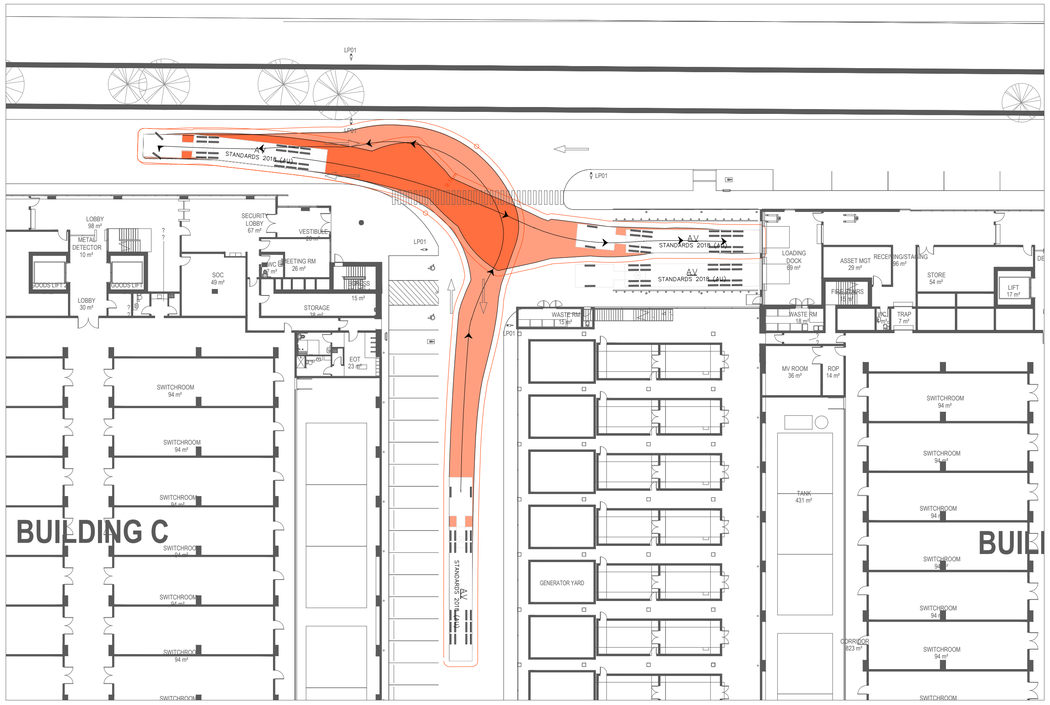
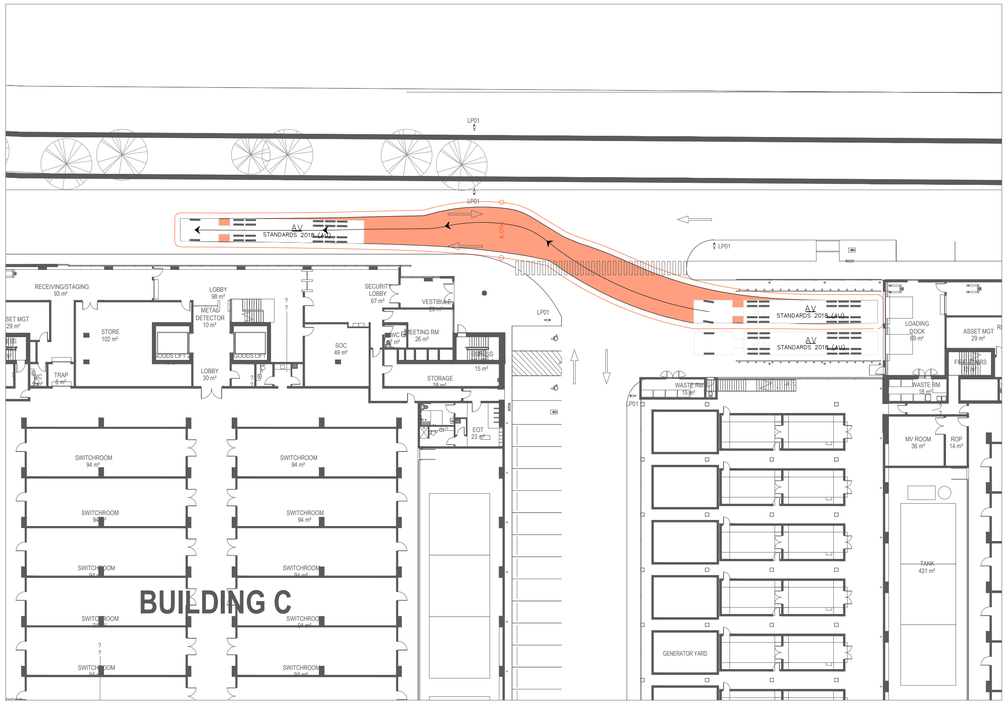
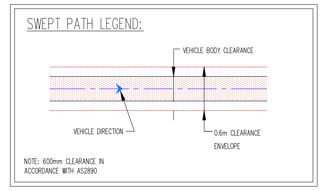
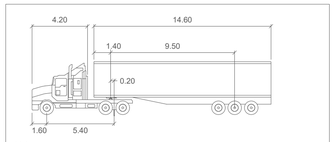


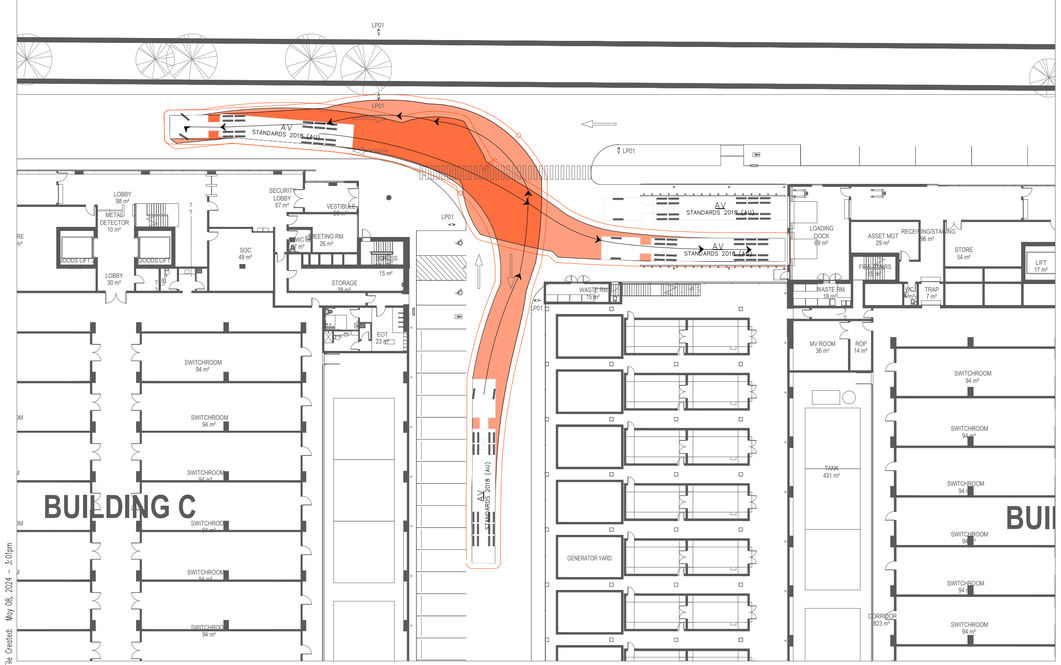




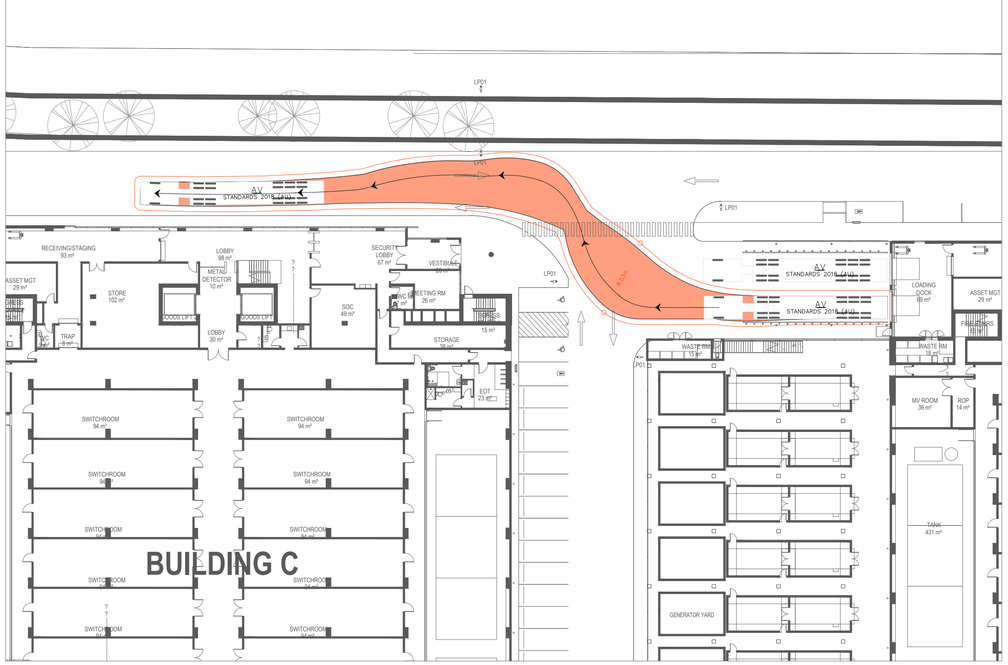


AV

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 28.3
Tractor Track	: 2.50	Articulating Angle	: 72.0
Trailer Track	: 2.50		



DOCK D ENTRY



DOCK D EXIT

PRELIMINARY
NOT FOR CONSTRUCTION

FileName: SK25.dwg - USER: sophies - Plot File Created: May 08, 2024 - 3:01pm

A1 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	SS	ED/W	23.01.24

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PH: +61 2 9956 2600

Civil Engineer
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612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

Project
NEXTDC S4 DATA CENTER

Sheet Subject
SWEPT PATH ANALYSIS
DOCK D ENTRY AND EXIT

Scale : A1	Drawn	Authorised
1:300	SS	

Job No	Drawing No	Revision
211085	SK25	P1

Plot File Created: May 08, 2024 - 3:01pm

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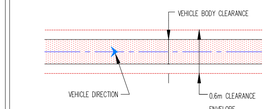
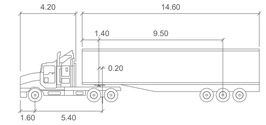
DOCK E ENTRY

DOCK E EXIT

SWEPT PATH LEGEND:



NOTE: 600mm CLEARANCE IN ACCORDANCE WITH AS2890



AV

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 28.3
Tractor Track	: 2.50	Articulating Angle	: 72.0
Trailer Track	: 2.50		

FileName: SK24.dwg - USER: sophies - Plot File Created: May 08, 2024 - 3:02pm

A1 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	SS	EDW	23.01.24

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Sydney, NSW 2000, Australia
PH: +61 2 9956 2600

Civil Engineer
Taylor Thomson Whitting
612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

Project
NEXTDC S4 DATA CENTER

Sheet Subject
SWEPT PATH ANALYSIS
DOCK E ENTRY AND EXIT

PRELIMINARY
NOT FOR CONSTRUCTION

Scale : A1	Drawn	Authorised
1:200	SS	

Job No	Drawing No	Revision
211085	SK24	P1

Plot File Created: May 08, 2024 - 3:02pm

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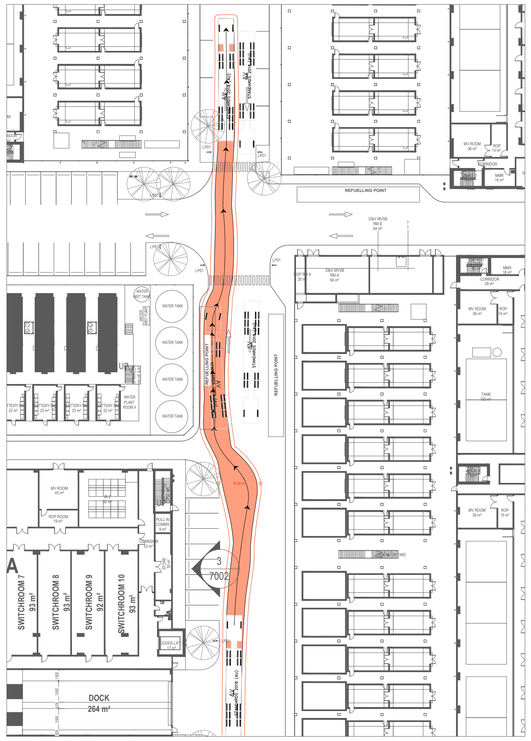
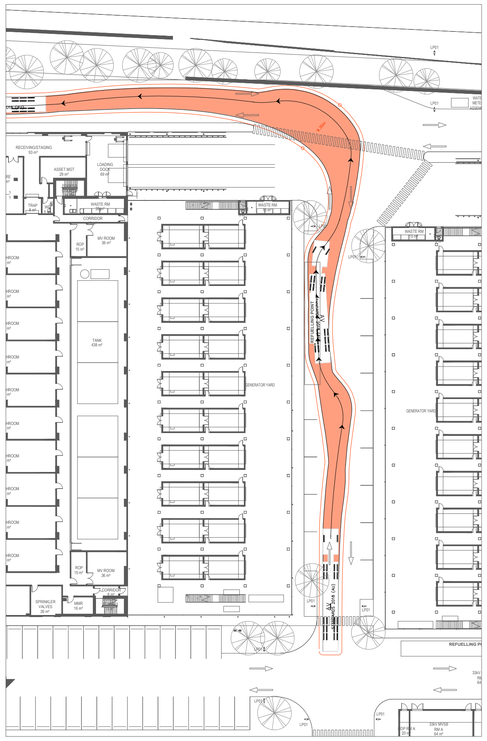


BUILDING A REFUELING POINT



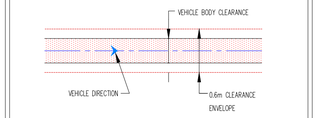
BUILDING B REFUELING POINT

BUILDING C REFUELING POINT

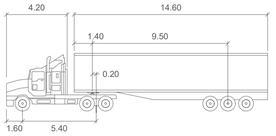
BUILDING D REFUELING POINT

BUILDING E REFUELING POINT

SWEPT PATH LEGEND:



NOTE: 600mm CLEARANCE IN ACCORDANCE WITH AS2890



AV

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 28.3
Tractor Track	: 2.50	Articulating Angle	: 72.0
Trailer Track	: 2.50		

FileName: SK34.dwg - USER: sgolies - Plot File Created: May 08, 2024 - 3:03pm

A1 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	SS	EDW	23.01.24

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Project
NEXTDC S4 DATA CENTER

Sheet Subject
SWEPT PATH ANALYSIS
20m LONG AV REFUELING MANOEUVRABILITY

PRELIMINARY
NOT FOR CONSTRUCTION

Scale : A1	Drawn	Authorised
1:200	SS	

Job No	Drawing No	Revision
211085	SK32	P1

Plot File Created: May 08, 2024 - 3:03pm

Appendix 7

2026 SIDRA Outputs

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MOVEMENT SUMMARY

Site: 101 [Telopea Pl & Old Wallgrove Rd & Lenore Dr - AM - Approved Upgrades (Site Folder: 2026)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

2026 Scenario - AM
AM Peak: 7:00 - 8:00am
Site Category: Upgraded Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 128 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old Wallgrove Road															
1	L2	All MCs	77	42.5	77	42.5	0.074	12.1	LOS A	1.2	11.1	0.31	0.66	0.31	63.4
2	T1	All MCs	4	25.0	4	25.0	*0.781	63.5	LOS E	11.6	114.7	1.00	0.90	1.15	42.2
3	R2	All MCs	353	48.1	353	48.1	0.781	69.4	LOS E	11.6	114.7	1.00	0.90	1.15	39.3
Approach			434	46.8	434	46.8	0.781	59.2	LOS E	11.6	114.7	0.88	0.86	1.00	42.5
East: Old Wallgrove Road															
4	L2	All MCs	864	17.3	864	17.3	0.517	7.9	LOS A	0.0	0.0	0.00	0.59	0.00	68.2
5	T1	All MCs	693	18.7	693	18.7	*0.796	58.1	LOS E	22.1	179.4	1.00	0.91	1.08	32.8
6	R2	All MCs	59	3.6	59	3.6	0.419	82.9	LOS F	3.7	26.5	0.99	0.76	0.99	20.2
Approach			1616	17.4	1616	17.4	0.796	32.1	LOS C	22.1	179.4	0.46	0.73	0.50	49.8
North: Telopea Pl															
7	L2	All MCs	35	15.2	35	15.2	0.131	15.5	LOS B	1.5	11.4	0.67	0.66	0.67	35.8
8	T1	All MCs	12	9.1	12	9.1	*0.131	40.6	LOS C	1.5	11.4	0.67	0.66	0.67	59.8
9	R2	All MCs	12	0.0	12	0.0	0.116	70.5	LOS F	0.7	5.0	0.98	0.68	0.98	26.7
Approach			58	10.9	58	10.9	0.131	31.5	LOS C	1.5	11.4	0.73	0.66	0.73	39.6
West: Lenore Drive															
10	L2	All MCs	25	0.0	25	0.0	0.016	7.9	LOS A	0.1	0.9	0.13	0.63	0.13	58.3
11	T1	All MCs	711	27.1	711	27.1	0.406	20.2	LOS B	13.6	117.1	0.66	0.58	0.66	51.6
12	R2	All MCs	464	13.2	464	13.2	*0.795	50.9	LOS D	27.2	212.1	0.97	0.89	1.02	49.6
Approach			1200	21.1	1200	21.1	0.795	31.8	LOS C	27.2	212.1	0.77	0.70	0.78	50.5
All Vehicles			3307	22.5	3307	22.5	0.796	35.5	LOS C	27.2	212.1	0.63	0.74	0.67	48.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Old Wallgrove Road												

South: Old Wallgrove Road												
P1	Full	1	1	45.7	LOS E	0.0	0.0	0.94	0.94	199.5	200.0	1.00
East: Old Wallgrove Road												
P2	Full	1	1	45.7	LOS E	0.0	0.0	0.94	0.94	199.5	200.0	1.00
North: Telopea Pl												
P3	Full	1	1	45.7	LOS E	0.0	0.0	0.94	0.94	199.5	200.0	1.00
West: Lenore Drive												
P4	Full	1	1	45.7	LOS E	0.0	0.0	0.94	0.94	199.5	200.0	1.00
All Pedestrians		4	4	45.7	LOS E	0.0	0.0	0.94	0.94	199.5	200.0	1.00

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

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MOVEMENT SUMMARY

Site: 102 [Millner Ave & Old Wallgrove Rd - AM - Approved Upgrades (Site Folder: 2026)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

2026 Scenario - AM
AM Peak: 7:00 - 8:00am
Site Category: Upgraded Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 86 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old Wallgrove Road															
1	L2	All MCs	4	50.0	4	50.0	*0.543	31.3	LOS C	3.4	28.5	1.00	0.79	1.02	32.0
2	T1	All MCs	152	22.9	152	22.9	*0.543	44.4	LOS D	3.4	28.5	1.00	0.78	1.02	52.1
3	R2	All MCs	2	50.0	2	50.0	0.020	49.3	LOS D	0.1	0.9	0.94	0.62	0.94	22.9
Approach			158	24.0	158	24.0	0.543	44.1	LOS D	3.4	28.5	1.00	0.78	1.02	51.4
East: Access Road															
4	L2	All MCs	2	50.0	2	50.0	0.280	48.9	LOS D	1.5	13.8	0.97	0.73	0.97	21.0
5	T1	All MCs	1	0.0	1	0.0	*0.280	43.0	LOS D	1.5	13.8	0.97	0.73	0.97	26.3
6	R2	All MCs	64	39.3	64	39.3	0.280	47.9	LOS D	1.5	13.8	0.97	0.73	0.97	44.0
Approach			67	39.1	67	39.1	0.280	47.8	LOS D	1.5	13.8	0.97	0.73	0.97	43.3
North: Old Wallgrove Road															
7	L2	All MCs	200	20.0	200	20.0	0.151	8.2	LOS A	0.7	5.8	0.17	0.64	0.17	66.1
8	T1	All MCs	515	11.0	515	11.0	0.308	7.4	LOS A	6.7	51.7	0.46	0.40	0.46	73.6
9	R2	All MCs	576	21.0	576	21.0	*0.648	17.8	LOS B	13.5	111.8	0.76	0.82	0.76	58.3
Approach			1291	16.9	1291	16.9	0.648	12.2	LOS A	13.5	111.8	0.55	0.62	0.55	64.5
West: Millner Avenue															
10	L2	All MCs	199	65.6	199	65.6	0.134	13.5	LOS A	1.9	21.0	0.48	0.66	0.48	55.0
11	T1	All MCs	1	0.0	1	0.0	0.134	62.9	LOS E	1.9	21.0	0.54	0.67	0.54	38.3
12	R2	All MCs	1	100.0	1	100.0	0.134	68.2	LOS E	1.9	21.0	0.54	0.67	0.54	37.9
Approach			201	65.4	201	65.4	0.134	14.0	LOS A	1.9	21.0	0.48	0.66	0.48	54.9
All Vehicles			1717	24.1	1717	24.1	0.648	16.7	LOS B	13.5	111.8	0.60	0.65	0.60	60.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Old Wallgrove Road												

P1 Full	1	1	37.2	LOS D	0.0	0.0	0.93	0.93	191.1	200.0	1.05
East: Access Road											
P2 Full	1	1	37.2	LOS D	0.0	0.0	0.93	0.93	191.1	200.0	1.05
North: Old Wallgrove Road											
P3 Full	1	1	37.2	LOS D	0.0	0.0	0.93	0.93	191.1	200.0	1.05
West: Millner Avenue											
P4 Full	1	1	37.2	LOS D	0.0	0.0	0.93	0.93	191.1	200.0	1.05
All Pedestrians	4	4	37.2	LOS D	0.0	0.0	0.93	0.93	191.1	200.0	1.05

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

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MOVEMENT SUMMARY

Site: 103v [Johnston Cres & Old Wallgrove Rd - AM (Site Folder: 2026)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

2026 Scenario - AM
AM Peak: 7:00 - 8:00am
Site Category: 2026 + Dev + Cumulative
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Johnston Crescent															
1	L2	All MCs	1	0.0	1	0.0	0.079	5.7	LOS A	0.3	2.2	0.35	0.57	0.35	51.9
2	T1	All MCs	74	14.3	74	14.3	0.079	5.8	LOS A	0.3	2.2	0.35	0.57	0.35	51.5
Approach			75	14.1	75	14.1	0.079	5.8	LOS A	0.3	2.2	0.35	0.57	0.35	51.5
North: Old Wallgrove Road															
8	T1	All MCs	317	3.7	317	3.7	0.199	0.0	LOS A	0.5	3.4	0.01	0.10	0.01	59.1
9	R2	All MCs	62	20.3	62	20.3	0.199	5.7	LOS A	0.5	3.4	0.01	0.10	0.01	54.2
Approach			379	6.4	379	6.4	0.199	0.9	NA	0.5	3.4	0.01	0.10	0.01	58.3
West: Johnston Crescent															
10	L2	All MCs	24	39.1	24	39.1	0.017	6.0	LOS A	0.0	0.1	0.03	0.57	0.03	48.6
12	R2	All MCs	1	0.0	1	0.0	0.017	6.6	LOS A	0.0	0.1	0.03	0.57	0.03	52.0
Approach			25	37.5	25	37.5	0.017	6.1	NA	0.0	0.1	0.03	0.57	0.03	48.7
All Vehicles			479	9.2	479	9.2	0.199	2.0	NA	0.5	3.4	0.06	0.20	0.06	56.6

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

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

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

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [Telopea Pl & Old Wallgrove Rd & Lenore Dr - PM Approved Upgrades (Site Folder: 2026)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

2026 Scenario - PM
PM Peak: 4:15 - 5:15pm
Site Category: Upgraded Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 103 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old Wallgrove Road															
1	L2	All MCs	433	10.0	433	10.0	0.391	11.9	LOS A	7.0	53.5	0.42	0.72	0.42	64.1
2	T1	All MCs	2	100.0	2	100.0	0.782	36.3	LOS C	23.5	179.4	0.95	0.89	1.00	51.3
3	R2	All MCs	1000	10.4	1000	10.4	* 0.782	41.1	LOS C	23.5	179.4	0.95	0.89	1.00	49.5
Approach			1435	10.4	1435	10.4	0.782	32.3	LOS C	23.5	179.4	0.79	0.84	0.83	53.6
East: Old Wallgrove Road															
4	L2	All MCs	225	54.2	225	54.2	0.166	8.4	LOS A	0.0	0.0	0.00	0.57	0.00	65.5
5	T1	All MCs	627	29.0	627	29.0	* 0.771	44.5	LOS D	15.9	139.2	0.99	0.90	1.09	36.7
6	R2	All MCs	6	16.7	6	16.7	0.044	59.0	LOS E	0.3	2.4	0.94	0.66	0.94	23.5
Approach			859	35.5	859	35.5	0.771	35.1	LOS C	15.9	139.2	0.73	0.81	0.80	44.6
North: Telopea Pl															
7	L2	All MCs	18	11.8	18	11.8	0.045	26.6	LOS B	0.6	4.9	0.71	0.67	0.71	32.7
8	T1	All MCs	1	100.0	1	100.0	* 0.045	46.5	LOS D	0.6	4.9	0.71	0.67	0.71	55.8
9	R2	All MCs	11	10.0	11	10.0	0.091	56.7	LOS E	0.5	4.0	0.96	0.67	0.96	29.4
Approach			29	14.3	29	14.3	0.091	38.0	LOS C	0.6	4.9	0.80	0.67	0.80	32.3
West: Lenore Drive															
10	L2	All MCs	3	33.3	3	33.3	0.002	8.2	LOS A	0.0	0.1	0.12	0.61	0.12	56.7
11	T1	All MCs	414	28.2	414	28.2	0.505	36.9	LOS C	9.2	80.3	0.91	0.76	0.91	39.9
12	R2	All MCs	98	30.1	98	30.1	* 0.733	62.7	LOS E	5.3	46.6	1.00	0.87	1.19	45.5
Approach			515	28.6	515	28.6	0.733	41.6	LOS C	9.2	80.3	0.93	0.78	0.96	41.9
All Vehicles			2838	21.4	2838	21.4	0.782	34.9	LOS C	23.5	179.4	0.80	0.82	0.84	49.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec

South: Old Wallgrove Road												
P1	Full	1	1	45.7	LOS E	0.0	0.0	0.94	0.94	199.5	200.0	1.00
East: Old Wallgrove Road												
P2	Full	1	1	45.7	LOS E	0.0	0.0	0.94	0.94	199.5	200.0	1.00
North: Telopea Pl												
P3	Full	1	1	45.7	LOS E	0.0	0.0	0.94	0.94	199.5	200.0	1.00
West: Lenore Drive												
P4	Full	1	1	45.7	LOS E	0.0	0.0	0.94	0.94	199.5	200.0	1.00
All Pedestrians		4	4	45.7	LOS E	0.0	0.0	0.94	0.94	199.5	200.0	1.00

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

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MOVEMENT SUMMARY

Site: 102 [Millner Ave & Old Wallgrove Rd - PM Approved Upgrades (Site Folder: 2026)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

2026 Scenario - PM
PM Peak: 4:15 - 5:15pm
Site Category: Upgraded Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 74 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old Wallgrove Road															
1	L2	All MCs	4	100.0	4	100.0	* 0.638	20.3	LOS B	9.7	72.5	0.96	0.81	0.97	36.1
2	T1	All MCs	560	7.0	560	7.0	* 0.638	29.8	LOS C	9.7	72.5	0.96	0.81	0.97	58.7
3	R2	All MCs	1	0.0	1	0.0	0.003	30.8	LOS C	0.0	0.2	0.79	0.61	0.79	31.3
Approach			565	7.6	565	7.6	0.638	29.8	LOS C	9.7	72.5	0.96	0.81	0.97	58.6
East: Access Road															
4	L2	All MCs	1	100.0	1	100.0	0.545	42.9	LOS D	3.3	26.8	1.00	0.78	1.02	21.9
5	T1	All MCs	1	0.0	1	0.0	* 0.545	37.3	LOS C	3.3	26.8	1.00	0.78	1.02	27.9
6	R2	All MCs	172	16.6	172	16.6	0.545	41.9	LOS C	3.3	26.8	1.00	0.78	1.03	46.9
Approach			174	17.0	174	17.0	0.545	41.9	LOS C	3.3	26.8	1.00	0.78	1.03	46.7
North: Old Wallgrove Road															
7	L2	All MCs	43	19.5	43	19.5	0.033	8.2	LOS A	0.1	1.1	0.17	0.63	0.17	66.1
8	T1	All MCs	100	14.7	100	14.7	0.072	8.6	LOS A	1.2	9.5	0.50	0.39	0.50	72.4
9	R2	All MCs	180	72.5	180	72.5	* 0.453	21.1	LOS B	3.7	41.9	0.83	0.79	0.83	56.7
Approach			323	47.6	323	47.6	0.453	15.5	LOS B	3.7	41.9	0.64	0.64	0.64	61.6
West: Millner Avenue															
10	L2	All MCs	559	13.0	559	13.0	0.388	20.6	LOS B	7.4	57.8	0.74	0.77	0.74	54.9
11	T1	All MCs	1	0.0	1	0.0	0.388	39.4	LOS C	6.8	53.4	0.75	0.77	0.75	35.3
12	R2	All MCs	4	75.0	4	75.0	0.388	44.4	LOS D	6.8	53.4	0.75	0.77	0.75	34.2
Approach			564	13.4	564	13.4	0.388	20.8	LOS B	7.4	57.8	0.74	0.77	0.74	54.8
All Vehicles			1626	18.6	1626	18.6	0.638	25.1	LOS B	9.7	72.5	0.82	0.76	0.83	56.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec

South: Old Wallgrove Road												
P1	Full	1	1	31.2	LOS D	0.0	0.0	0.92	0.92	185.1	200.0	1.08
East: Access Road												
P2	Full	1	1	31.2	LOS D	0.0	0.0	0.92	0.92	185.1	200.0	1.08
North: Old Wallgrove Road												
P3	Full	1	1	31.2	LOS D	0.0	0.0	0.92	0.92	185.1	200.0	1.08
West: Millner Avenue												
P4	Full	1	1	31.2	LOS D	0.0	0.0	0.92	0.92	185.1	200.0	1.08
All Pedestrians		4	4	31.2	LOS D	0.0	0.0	0.92	0.92	185.1	200.0	1.08

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

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MOVEMENT SUMMARY

Site: 103v [Johnston Cres & Old Wallgrove Rd - PM (Site Folder: 2026)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

2026 Scenario - PM
PM Peak: 4:15 - 5:15pm
Site Category: 2026 + Dev + Cumulative
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Johnston Crescent															
1	L2	All MCs	1	100.0	1	100.0	0.298	6.8	LOS A	1.4	9.9	0.28	0.53	0.28	47.8
2	T1	All MCs	341	4.9	341	4.9	0.298	5.1	LOS A	1.4	9.9	0.28	0.53	0.28	52.1
Approach			342	5.2	342	5.2	0.298	5.1	LOS A	1.4	9.9	0.28	0.53	0.28	52.1
North: Old Wallgrove Road															
8	T1	All MCs	63	8.3	63	8.3	0.043	0.0	LOS A	0.1	0.8	0.01	0.11	0.01	59.2
9	R2	All MCs	14	38.5	14	38.5	0.043	6.0	LOS A	0.1	0.8	0.01	0.11	0.01	53.1
Approach			77	13.7	77	13.7	0.043	1.1	NA	0.1	0.8	0.01	0.11	0.01	58.1
West: Johnston Crescent															
10	L2	All MCs	77	13.7	77	13.7	0.045	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	49.9
12	R2	All MCs	1	0.0	1	0.0	0.045	5.6	LOS A	0.0	0.0	0.00	0.57	0.00	52.1
Approach			78	13.5	78	13.5	0.045	5.7	NA	0.0	0.0	0.00	0.57	0.00	50.0
All Vehicles			497	7.8	497	7.8	0.298	4.6	NA	1.4	9.9	0.20	0.47	0.20	52.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Appendix 8

2036 SIDRA Outputs

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MOVEMENT SUMMARY

Site: 101 [Telopea Pl & Old Wallgrove Rd & Lenore Dr - AM - Approved Upgrades (Site Folder: 2036)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

2036 Scenario - AM
AM Peak: 7:00 - 8:00am
Site Category: Upgraded Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 128 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old Wallgrove Road															
1	L2	All MCs	92	37.9	92	37.9	0.091	12.1	LOS A	1.4	13.1	0.32	0.67	0.32	63.5
2	T1	All MCs	4	25.0	4	25.0	*0.729	61.3	LOS E	9.4	96.6	1.00	0.87	1.11	42.8
3	R2	All MCs	288	56.2	288	56.2	0.729	67.2	LOS E	9.4	96.6	1.00	0.87	1.11	39.5
Approach			384	51.5	384	51.5	0.729	54.0	LOS D	9.4	96.6	0.84	0.82	0.92	44.0
East: Old Wallgrove Road															
4	L2	All MCs	758	18.5	758	18.5	0.484	7.9	LOS A	0.0	0.0	0.00	0.59	0.00	68.1
5	T1	All MCs	693	18.7	693	18.7	*0.726	49.7	LOS D	20.3	165.0	0.96	0.84	0.97	35.8
6	R2	All MCs	59	3.6	59	3.6	0.424	80.8	LOS F	3.7	26.5	0.99	0.76	0.99	20.2
Approach			1509	18.0	1509	18.0	0.726	29.9	LOS C	20.3	165.0	0.48	0.71	0.49	50.6
North: Telopea Pl															
7	L2	All MCs	35	15.2	35	15.2	0.131	16.4	LOS B	1.5	11.7	0.67	0.66	0.67	35.2
8	T1	All MCs	12	9.1	12	9.1	*0.131	41.5	LOS C	1.5	11.7	0.67	0.66	0.67	59.3
9	R2	All MCs	12	0.0	12	0.0	0.116	70.5	LOS F	0.7	5.0	0.98	0.68	0.98	26.7
Approach			58	10.9	58	10.9	0.131	32.3	LOS C	1.5	11.7	0.74	0.67	0.74	39.2
West: Lenore Drive															
10	L2	All MCs	25	0.0	25	0.0	0.016	7.9	LOS A	0.1	0.9	0.13	0.63	0.13	58.3
11	T1	All MCs	711	27.1	711	27.1	0.446	21.3	LOS B	14.1	121.9	0.68	0.60	0.68	50.6
12	R2	All MCs	352	12.9	352	12.9	*0.726	51.7	LOS D	20.0	155.2	0.96	0.86	0.97	49.4
Approach			1087	21.9	1087	21.9	0.726	30.8	LOS C	20.0	155.2	0.76	0.69	0.76	50.0
All Vehicles			3039	23.5	3039	23.5	0.729	33.3	LOS C	20.3	165.0	0.63	0.72	0.64	49.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Old Wallgrove Road												

P1 Full	1	1	58.1	LOS E	0.0	0.0	0.95	0.95	212.0	200.0	0.94
East: Old Wallgrove Road											
P2 Full	1	1	58.1	LOS E	0.0	0.0	0.95	0.95	212.0	200.0	0.94
North: Telopea Pl											
P3 Full	1	1	58.1	LOS E	0.0	0.0	0.95	0.95	212.0	200.0	0.94
West: Lenore Drive											
P4 Full	1	1	58.1	LOS E	0.0	0.0	0.95	0.95	212.0	200.0	0.94
All Pedestrians	4	4	58.1	LOS E	0.0	0.0	0.95	0.95	212.0	200.0	0.94

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

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MOVEMENT SUMMARY

Site: 102 [Millner Ave & Old Wallgrove Rd - AM - Approved Upgrades (Site Folder: 2036)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

2036 Scenario - AM
AM Peak: 7:00 - 8:00am
Site Category: Upgraded Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 86 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old Wallgrove Road															
1	L2	All MCs	4	50.0	4	50.0	*0.403	29.5	LOS C	2.4	21.4	0.98	0.76	0.98	33.0
2	T1	All MCs	115	27.5	115	27.5	0.403	42.0	LOS C	2.5	21.4	0.98	0.75	0.98	53.2
3	R2	All MCs	96	17.6	96	17.6	*0.716	53.6	LOS D	4.4	35.2	1.00	0.86	1.20	22.3
Approach			215	23.5	215	23.5	0.716	47.0	LOS D	4.4	35.2	0.99	0.80	1.08	41.8
East: Access Road															
4	L2	All MCs	25	20.8	25	20.8	0.360	48.9	LOS D	1.9	16.3	0.98	0.74	0.98	22.2
5	T1	All MCs	1	0.0	1	0.0	*0.360	43.6	LOS D	1.9	16.3	0.98	0.74	0.98	26.0
6	R2	All MCs	53	46.0	53	46.0	0.360	48.8	LOS D	1.9	16.3	0.98	0.74	0.98	43.4
Approach			79	37.3	79	37.3	0.360	48.8	LOS D	1.9	16.3	0.98	0.74	0.98	38.4
North: Old Wallgrove Road															
7	L2	All MCs	151	21.0	151	21.0	0.129	8.8	LOS A	0.9	7.4	0.23	0.66	0.23	65.7
8	T1	All MCs	352	13.2	352	13.2	0.222	6.9	LOS A	4.3	33.6	0.44	0.37	0.44	73.9
9	R2	All MCs	576	21.0	576	21.0	*0.687	18.2	LOS B	14.1	116.5	0.78	0.83	0.78	58.1
Approach			1078	18.5	1078	18.5	0.687	13.2	LOS A	14.1	116.5	0.59	0.65	0.59	63.2
West: Millner Avenue															
10	L2	All MCs	199	65.6	199	65.6	0.156	13.7	LOS A	2.0	21.5	0.49	0.66	0.49	54.9
11	T1	All MCs	1	0.0	1	0.0	0.156	58.1	LOS E	1.9	21.3	0.54	0.67	0.54	38.5
12	R2	All MCs	1	100.0	1	100.0	0.156	63.3	LOS E	1.9	21.3	0.54	0.67	0.54	38.1
Approach			201	65.4	201	65.4	0.156	14.2	LOS A	2.0	21.5	0.49	0.66	0.49	54.8
All Vehicles			1573	26.1	1573	26.1	0.716	19.7	LOS B	14.1	116.5	0.65	0.68	0.67	57.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Old Wallgrove Road												

P1 Full	1	1	37.2	LOS D	0.0	0.0	0.93	0.93	191.1	200.0	1.05
East: Access Road											
P2 Full	1	1	37.2	LOS D	0.0	0.0	0.93	0.93	191.1	200.0	1.05
North: Old Wallgrove Road											
P3 Full	1	1	37.2	LOS D	0.0	0.0	0.93	0.93	191.1	200.0	1.05
West: Millner Avenue											
P4 Full	1	1	37.2	LOS D	0.0	0.0	0.93	0.93	191.1	200.0	1.05
All Pedestrians	4	4	37.2	LOS D	0.0	0.0	0.93	0.93	191.1	200.0	1.05

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

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MOVEMENT SUMMARY

Site: 101 [SLR & Old Wallgrove Rd & Johnston Cres - AM (Site Folder: 2036)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

2036 Scenario - AM
AM Peak: 7:00 - 8:00am
Site Category: Future 2036 Conditions
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Johnston Crescent															
1	L2	All MCs	20	57.9	20	57.9	0.036	21.9	LOS B	0.5	4.9	0.58	0.65	0.58	43.4
2	T1	All MCs	60	42.1	60	42.1	* 0.086	28.0	LOS B	1.2	11.6	0.79	0.59	0.79	41.4
3	R2	All MCs	42	35.0	42	35.0	0.360	64.5	LOS E	2.8	25.1	0.98	0.74	0.98	28.8
Approach			122	42.2	122	42.2	0.360	39.6	LOS C	2.8	25.1	0.82	0.65	0.82	36.2
East: SLR															
4	L2	All MCs	82	16.7	82	16.7	0.081	31.5	LOS C	2.0	16.2	0.38	0.63	0.38	47.0
5	T1	All MCs	1429	15.9	1429	15.9	* 1.633	647.0	LOS F	133.8	1063.5	1.00	2.45	3.37	5.3
6	R2	All MCs	805	16.6	805	16.6	* 1.667	655.5	LOS F	80.2	641.6	1.00	2.08	3.46	5.0
Approach			2317	16.2	2317	16.2	1.667	628.2	LOS F	133.8	1063.5	0.98	2.26	3.29	5.1
North: Old Wallgrove Road															
7	L2	All MCs	377	26.5	377	26.5	0.267	14.6	LOS B	5.5	47.1	0.46	0.68	0.46	46.8
8	T1	All MCs	100	22.1	100	22.1	* 0.247	34.8	LOS C	4.9	40.5	0.84	0.67	0.84	38.5
9	R2	All MCs	475	26.8	475	26.8	1.300	359.7	LOS F	37.4	321.7	1.00	1.69	2.54	8.8
Approach			952	26.2	952	26.2	1.300	188.9	LOS F	37.4	321.7	0.77	1.18	1.54	14.7
West: SLR															
10	L2	All MCs	277	49.8	277	49.8	* 0.501	23.4	LOS B	8.1	81.3	0.77	0.79	0.77	41.4
11	T1	All MCs	846	29.0	846	29.0	* 1.504	546.8	LOS F	76.1	664.5	1.00	2.06	3.08	6.3
12	R2	All MCs	28	37.0	28	37.0	0.089	85.9	LOS F	0.9	8.7	0.92	0.70	0.92	27.3
Approach			1152	34.2	1152	34.2	1.504	409.6	LOS F	76.1	664.5	0.94	1.72	2.47	7.6
All Vehicles			4542	23.5	4542	23.5	1.667	464.9	LOS F	133.8	1063.5	0.92	1.85	2.65	6.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Johnston Crescent												

P1	Full	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
P1B	Slip/ Bypass	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
East: SLR												
P2	Full	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
P2B	Slip/ Bypass	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
North: Old Wallgrove Road												
P3	Full	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
P3B	Slip/ Bypass	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
West: SLR												
P4	Full	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
P4B	Slip/ Bypass	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
All Pedestrians		400	421	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90

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

MOVEMENT SUMMARY

Site: 101 [SLR & Wallgrove Rd & Chandos Rd - AM (Site Folder: 2036)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

2036 Scenario - AM
AM Peak: 7:00 - 8:00am
Site Category: Future 2036 Conditions
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Wallgrove Road															
1	L2	All MCs	529	11.9	529	11.9	0.766	37.4	LOS C	22.9	176.8	0.92	0.88	0.95	37.8
2	T1	All MCs	967	11.3	967	11.3	* 0.920	54.1	LOS D	28.7	220.3	1.00	1.14	1.32	32.1
3	R2	All MCs	264	7.6	264	7.6	0.592	29.9	LOS C	3.4	25.5	0.99	0.79	1.00	39.3
Approach			1761	10.9	1761	10.9	0.920	45.5	LOS D	28.7	220.3	0.97	1.01	1.16	34.6
East: Chandos Road															
4	L2	All MCs	28	63.0	28	63.0	0.052	30.3	LOS C	0.6	6.4	0.56	0.65	0.56	44.5
5	T1	All MCs	948	18.4	948	18.4	* 0.903	61.2	LOS E	27.7	224.9	1.00	1.11	1.28	33.2
6	R2	All MCs	165	29.3	165	29.3	0.836	69.8	LOS E	4.6	40.6	1.00	0.96	1.41	28.4
Approach			1142	21.1	1142	21.1	0.903	61.7	LOS E	27.7	224.9	0.99	1.08	1.28	29.8
North: Wallgrove Road															
7	L2	All MCs	232	15.5	232	15.5	0.417	27.8	LOS B	7.8	61.6	0.82	0.79	0.82	40.0
8	T1	All MCs	363	27.2	363	27.2	0.395	30.3	LOS C	7.1	61.5	0.84	0.70	0.84	40.3
9	R2	All MCs	208	37.4	208	37.4	* 0.605	31.1	LOS C	2.8	25.8	0.99	0.80	1.03	38.5
Approach			803	26.5	803	26.5	0.605	29.8	LOS C	7.8	61.6	0.87	0.75	0.89	39.7
West: SLR															
10	L2	All MCs	628	12.7	628	12.7	0.394	18.3	LOS B	8.0	61.8	0.68	0.75	0.68	44.7
11	T1	All MCs	880	24.5	880	24.5	0.851	42.2	LOS C	23.0	195.0	1.00	1.01	1.17	35.6
12	R2	All MCs	151	45.5	151	45.5	* 0.862	67.9	LOS E	4.3	42.2	1.00	0.99	1.50	27.8
Approach			1659	22.0	1659	22.0	0.862	35.5	LOS C	23.0	195.0	0.88	0.91	1.02	37.5
All Vehicles			5365	18.8	5365	18.8	0.920	43.5	LOS D	28.7	224.9	0.93	0.96	1.10	34.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Wallgrove Road												

P1	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	198.1	200.0	1.01
P1B	Slip/ Bypass	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	198.1	200.0	1.01
East: Chandos Road												
P2	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	198.1	200.0	1.01
P2B	Slip/ Bypass	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	198.1	200.0	1.01
North: Wallgrove Road												
P3	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	198.1	200.0	1.01
P3B	Slip/ Bypass	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	198.1	200.0	1.01
West: SLR												
P4	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	198.1	200.0	1.01
P4B	Slip/ Bypass	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	198.1	200.0	1.01
All Pedestrians		400	421	44.3	LOS E	0.1	0.1	0.94	0.94	198.1	200.0	1.01

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

MOVEMENT SUMMARY

Site: 101 [Telopea Pl & Old Wallgrove Rd & Lenore Dr - PM - Approved Upgrades (Site Folder: 2036)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

2036 Scenario - PM
PM Peak: 4:15 - 5:15pm
Site Category: Upgraded Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 103 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old Wallgrove Road															
1	L2	All MCs	436	10.4	436	10.4	0.400	12.3	LOS A	7.4	56.6	0.44	0.72	0.44	63.8
2	T1	All MCs	2	100.0	2	100.0	0.729	36.7	LOS C	18.3	140.2	0.94	0.87	0.97	51.1
3	R2	All MCs	801	10.8	801	10.8	* 0.729	41.5	LOS C	18.3	140.2	0.94	0.87	0.97	49.3
Approach			1239	10.8	1239	10.8	0.729	31.2	LOS C	18.3	140.2	0.77	0.82	0.78	54.1
East: Old Wallgrove Road															
4	L2	All MCs	200	60.0	200	60.0	0.175	8.5	LOS A	0.0	0.0	0.00	0.57	0.00	65.0
5	T1	All MCs	627	29.0	627	29.0	* 0.721	38.9	LOS C	15.0	131.2	0.96	0.85	1.00	39.1
6	R2	All MCs	6	16.7	6	16.7	0.046	57.8	LOS E	0.3	2.4	0.94	0.66	0.94	23.5
Approach			834	36.4	834	36.4	0.721	31.8	LOS C	15.0	131.2	0.73	0.78	0.76	46.0
North: Telopea Pl															
7	L2	All MCs	18	11.8	18	11.8	0.041	23.0	LOS B	0.6	4.5	0.66	0.66	0.66	34.5
8	T1	All MCs	1	100.0	1	100.0	* 0.041	45.3	LOS D	0.6	4.5	0.66	0.66	0.66	57.5
9	R2	All MCs	11	10.0	11	10.0	0.094	56.8	LOS E	0.5	4.0	0.96	0.68	0.96	29.4
Approach			29	14.3	29	14.3	0.094	35.9	LOS C	0.6	4.5	0.77	0.67	0.77	33.2
West: Lenore Drive															
10	L2	All MCs	3	33.3	3	33.3	0.003	8.2	LOS A	0.0	0.1	0.12	0.61	0.12	56.7
11	T1	All MCs	414	28.2	414	28.2	0.472	33.5	LOS C	8.8	76.9	0.88	0.74	0.88	41.8
12	R2	All MCs	80	35.5	80	35.5	* 0.681	62.3	LOS E	4.3	39.3	1.00	0.84	1.15	45.4
Approach			497	29.4	497	29.4	0.681	38.0	LOS C	8.8	76.9	0.89	0.75	0.92	43.0
All Vehicles			2599	22.6	2599	22.6	0.729	32.8	LOS C	18.3	140.2	0.78	0.79	0.80	50.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec

South: Old Wallgrove Road												
P1	Full	1	1	45.7	LOS E	0.0	0.0	0.94	0.94	199.5	200.0	1.00
East: Old Wallgrove Road												
P2	Full	1	1	45.7	LOS E	0.0	0.0	0.94	0.94	199.5	200.0	1.00
North: Telopea Pl												
P3	Full	1	1	45.7	LOS E	0.0	0.0	0.94	0.94	199.5	200.0	1.00
West: Lenore Drive												
P4	Full	1	1	45.7	LOS E	0.0	0.0	0.94	0.94	199.5	200.0	1.00
All Pedestrians		4	4	45.7	LOS E	0.0	0.0	0.94	0.94	199.5	200.0	1.00

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

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MOVEMENT SUMMARY

Site: 102 [Millner Ave & Old Wallgrove Rd - PM - Approved Upgrades (Site Folder: 2036)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

2036 Scenario - PM
PM Peak: 4:15 - 5:15pm
Site Category: Upgraded Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 74 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old Wallgrove Road															
1	L2	All MCs	4	100.0	4	100.0	* 0.629	22.1	LOS B	7.3	55.4	0.98	0.82	1.01	34.7
2	T1	All MCs	407	7.5	407	7.5	* 0.629	33.5	LOS C	7.3	55.4	0.98	0.82	1.01	56.9
3	R2	All MCs	21	15.0	21	15.0	0.032	17.5	LOS B	0.4	3.0	0.61	0.68	0.61	39.2
Approach			433	8.8	433	8.8	0.629	32.6	LOS C	7.3	55.4	0.96	0.81	0.99	56.4
East: Access Road															
4	L2	All MCs	84	17.5	84	17.5	0.449	13.2	LOS A	2.9	23.0	0.93	0.77	0.93	32.7
5	T1	All MCs	1	0.0	1	0.0	* 0.449	33.0	LOS C	2.9	23.0	0.93	0.77	0.93	35.4
6	R2	All MCs	128	17.2	128	17.2	0.449	38.8	LOS C	3.0	24.3	0.96	0.77	0.96	50.3
Approach			214	17.2	214	17.2	0.449	28.6	LOS C	3.0	24.3	0.95	0.77	0.95	46.0
North: Old Wallgrove Road															
7	L2	All MCs	32	20.0	32	20.0	0.033	11.2	LOS A	0.3	2.8	0.39	0.66	0.39	64.0
8	T1	All MCs	64	18.0	64	18.0	0.154	28.6	LOS C	1.4	11.6	0.88	0.65	0.88	59.4
9	R2	All MCs	180	72.5	180	72.5	* 0.484	22.2	LOS B	4.0	45.9	0.84	0.79	0.84	56.2
Approach			276	53.8	276	53.8	0.484	22.4	LOS B	4.0	45.9	0.79	0.74	0.79	57.6
West: Millner Avenue															
10	L2	All MCs	559	13.0	559	13.0	0.382	19.3	LOS B	7.2	55.7	0.71	0.76	0.71	55.5
11	T1	All MCs	1	0.0	1	0.0	0.382	39.7	LOS C	6.5	51.3	0.72	0.76	0.72	36.0
12	R2	All MCs	4	75.0	4	75.0	0.382	44.8	LOS D	6.5	51.3	0.72	0.76	0.72	34.7
Approach			564	13.4	564	13.4	0.382	19.5	LOS B	7.2	55.7	0.71	0.76	0.71	55.4
All Vehicles			1486	20.1	1486	20.1	0.629	25.2	LOS B	7.3	55.7	0.83	0.77	0.84	55.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Old Wallgrove Road												

P1 Full	1	1	31.2	LOS D	0.0	0.0	0.92	0.92	185.1	200.0	1.08
East: Access Road											
P2 Full	1	1	31.2	LOS D	0.0	0.0	0.92	0.92	185.1	200.0	1.08
North: Old Wallgrove Road											
P3 Full	1	1	31.2	LOS D	0.0	0.0	0.92	0.92	185.1	200.0	1.08
West: Millner Avenue											
P4 Full	1	1	31.2	LOS D	0.0	0.0	0.92	0.92	185.1	200.0	1.08
All Pedestrians	4	4	31.2	LOS D	0.0	0.0	0.92	0.92	185.1	200.0	1.08

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

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MOVEMENT SUMMARY

Site: 101 [SLR & Old Wallgrove Rd & Johnston Cres - PM (Site Folder: 2036)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

2036 Scenario - PM
PM Peak: 4:15 - 5:15pm
Site Category: Future 2036 Conditions
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Johnston Crescent															
1	L2	All MCs	28	25.9	28	25.9	0.035	14.8	LOS B	0.5	4.0	0.46	0.64	0.46	47.1
2	T1	All MCs	96	14.3	96	14.3	* 0.111	26.2	LOS B	1.8	14.1	0.80	0.61	0.80	42.3
3	R2	All MCs	78	10.8	78	10.8	0.370	57.1	LOS E	4.7	35.9	0.96	0.76	0.96	30.7
Approach			202	14.6	202	14.6	0.370	36.5	LOS C	4.7	35.9	0.81	0.67	0.81	37.4
East: SLR															
4	L2	All MCs	35	33.3	35	33.3	0.037	13.5	LOS A	0.8	7.2	0.36	0.61	0.36	46.9
5	T1	All MCs	711	25.3	711	25.3	* 1.267	311.4	LOS F	49.1	418.2	1.00	1.71	2.40	9.7
6	R2	All MCs	264	23.1	264	23.1	* 1.110	162.4	LOS F	11.2	94.2	1.00	1.35	1.97	13.9
Approach			1009	25.0	1009	25.0	1.267	262.2	LOS F	49.1	418.2	0.98	1.58	2.22	10.4
North: Old Wallgrove Road															
7	L2	All MCs	973	11.3	973	11.3	0.666	25.9	LOS B	26.8	206.0	0.68	0.83	0.68	42.2
8	T1	All MCs	53	40.0	53	40.0	* 0.149	30.9	LOS C	2.3	21.9	0.81	0.63	0.81	40.1
9	R2	All MCs	252	49.4	252	49.4	0.622	70.7	LOS F	8.8	88.1	0.98	0.82	0.99	27.3
Approach			1277	20.0	1277	20.0	0.666	34.9	LOS C	26.8	206.0	0.74	0.82	0.74	38.0
West: SLR															
10	L2	All MCs	477	21.4	477	21.4	* 0.600	71.7	LOS F	15.4	127.9	0.77	0.80	0.77	43.1
11	T1	All MCs	1319	12.4	1319	12.4	* 1.729	743.6	LOS F	133.2	1030.9	1.00	2.46	3.56	4.7
12	R2	All MCs	17	50.0	17	50.0	0.044	82.2	LOS F	0.5	5.3	0.87	0.67	0.87	28.6
Approach			1813	15.1	1813	15.1	1.729	560.7	LOS F	133.2	1030.9	0.94	2.01	2.80	5.8
All Vehicles			4301	18.8	4301	18.8	1.729	309.9	LOS F	133.2	1030.9	0.88	1.49	1.96	9.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Johnston Crescent												

P1	Full	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
P1B	Slip/ Bypass	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
East: SLR												
P2	Full	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
P2B	Slip/ Bypass	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
North: Old Wallgrove Road												
P3	Full	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
P3B	Slip/ Bypass	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
West: SLR												
P4	Full	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
P4B	Slip/ Bypass	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
All Pedestrians		400	421	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90

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

MOVEMENT SUMMARY

Site: 101 [SLR & Wallgrove Rd & Chandos Rd - PM (Site Folder: 2036)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

2036 Scenario - PM
PM Peak: 4:15 - 5:15pm
Site Category: Future 2036 Conditions
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Wallgrove Road															
1	L2	All MCs	217	27.2	217	27.2	0.427	49.1	LOS D	12.0	103.9	0.81	0.79	0.81	33.7
2	T1	All MCs	406	13.2	406	13.2	0.432	48.2	LOS D	12.2	95.2	0.87	0.73	0.87	33.8
3	R2	All MCs	55	9.6	55	9.6	0.084	34.1	LOS C	1.0	7.5	0.85	0.70	0.85	37.6
Approach			678	17.4	678	17.4	0.432	47.3	LOS D	12.2	103.9	0.85	0.75	0.85	34.0
East: Chandos Road															
4	L2	All MCs	412	9.2	412	9.2	0.538	36.0	LOS C	14.0	105.8	0.77	0.80	0.77	42.3
5	T1	All MCs	876	22.7	876	22.7	* 1.007	100.4	LOS F	39.9	334.1	1.00	1.28	1.46	21.4
6	R2	All MCs	419	21.6	419	21.6	0.578	66.2	LOS E	13.5	111.9	0.93	0.82	0.93	29.9
Approach			1706	19.2	1706	19.2	1.007	76.5	LOS F	39.9	334.1	0.93	1.05	1.16	24.4
North: Wallgrove Road															
7	L2	All MCs	232	15.5	232	15.5	0.348	53.0	LOS D	10.7	85.1	0.74	0.77	0.74	37.5
8	T1	All MCs	907	10.9	907	10.9	* 1.040	138.5	LOS F	52.6	402.7	1.00	1.39	1.56	19.4
9	R2	All MCs	603	12.9	603	12.9	* 0.957	88.7	LOS F	22.6	175.5	1.00	1.12	1.36	24.2
Approach			1742	12.2	1742	12.2	1.040	109.9	LOS F	52.6	402.7	0.96	1.21	1.38	21.5
West: SLR															
10	L2	All MCs	182	16.2	182	16.2	0.129	20.4	LOS B	2.5	19.7	0.58	0.70	0.58	44.3
11	T1	All MCs	944	11.0	944	11.0	0.991	101.8	LOS F	46.0	352.4	1.00	1.25	1.39	22.8
12	R2	All MCs	522	11.9	522	11.9	* 1.034	139.5	LOS F	27.1	209.1	1.00	1.20	1.62	18.2
Approach			1648	11.9	1648	11.9	1.034	104.8	LOS F	46.0	352.4	0.95	1.17	1.37	22.1
All Vehicles			5775	14.8	5775	14.8	1.040	91.2	LOS F	52.6	402.7	0.94	1.10	1.25	23.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Wallgrove Road												

P1	Full	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
P1B	Slip/ Bypass	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
East: Chandos Road												
P2	Full	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
P2B	Slip/ Bypass	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
North: Wallgrove Road												
P3	Full	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
P3B	Slip/ Bypass	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
West: SLR												
P4	Full	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
P4B	Slip/ Bypass	50	53	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90
All Pedestrians		400	421	69.3	LOS F	0.2	0.2	0.96	0.96	223.1	200.0	0.90

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