Industrial Warehouse Development: Storage and Distribution Warehouse

Traffic Impact Assessment

17 July 2025

HB&B Property

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Our Ref:

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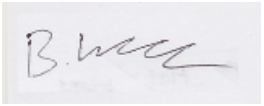

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Acronyms and abbreviations

Acronym	Definition
AIBP	Alspec Industrial Business Park
EP&A Act	Environmental Planning and Assessment Act 1979
EIS	Environmental Impact Statement
PLM	Parklife Metro
SEAR	Secretary's Environmental Assessment Requirements
SSTOM	Stations, Systems, Trains, Operations and Maintenance (Sydney Metro)
TfNSW	Transport for NSW
TIA	Traffic Impact Assessment
GTP	Green Travel Plan
HV	Heavy Vehicle
LV	Light Vehicle
DA	Development Approval

Executive Summary

This Traffic Impact Assessment (TIA) has been prepared by Arcadis to accompany a State Significant Development Application (SSDA) SSD-81434988 for a Storage and Distribution Warehouse. The project seeks detailed approval for a new Storage and Distribution Warehouse within the Alspec Industrial Business Park (AIBP) at 221-235 Luddenham Road, Orchard Hills (the site). The site is legally described as Lot 1 in DP 1293805. However, the proposed warehouse will be designated as lot 11 in the new community subdivision plan (DP271602) following completion of the estate subdivision.

This report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued for the project (SSD-81434988).

- This report concludes that the proposed development is suitable and warrants approval subject to the implementation of the following mitigation measures.
- Access to the site will be provided via the internal road within the AIBP development with access to the broader road network via Patons Lane or Luddenham Road.
- The traffic demands associated with the potential development during construction and the operation of the site is expected to be accommodated safely.
- The provided car parking meets the anticipated demands generated by the site. Provisions for accessible parking and bicycle parking will be accommodated during further development of the proposal.
- The internal configuration of the site has been designed in accordance with Penrith City Council's DCP and the relevant Australian Standards.

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

1 Introduction

This report has been prepared in support of a development at 221-235 Luddenham Road, Orchard Hills (the site), including detailed approval for a Storage and Distribution Centre. The project seeks to deliver a new a new Storage and Distribution Warehouse within the Alspec Industrial Business Park (AIBP).

Specifically, the project comprises the following:

- Construction of a new warehouse with a two-level ancillary office. The warehouse is predominantly 14.7 metres in height, with a high-bay warehouse component at the western portion of the building which achieves a maximum height of 39 metres.
- A total building area of 45,449 m^2; broken down as follows:
  - Warehouse area: 43,606 m^2
  - Office Area: 1,843 m^2
- Loading areas at the north and south sides of the warehouse, with hardstand surrounding the perimeter of the warehouse. Hardstand and carpark areas are accessed via four new driveways from the AIBP internal estate road.
- Provision of vehicular parking onsite to accommodate cars, vans, semi-trailers and B-doubles. It is envisaged that approximately 329 spaces will be provided on site within the proposed hardstand and carparking areas.
- Perimeter landscaping and tree planting with a total area of 10,134 m^2 (10%).

A Traffic Impact Assessment (TIA) is required for the development, where subsequent traffic impacts on the construction and operation phases are explored.

1.1 SEARs

This TIA (and accompanying Construction Traffic Management Plan (CTMP)) has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 4 April 2025 and issued for the SSDA (SSD-81434988). Specifically, this report has been prepared to respond to the SEARs requirement and government agency comments issued below (Table 1-1).

Table 1-1 SEARs requirements & Government Agency comments

Item	Description of Requirement	Report Reference
6.1	Details of all daily and peak traffic volumes likely to be generated during all key stages of construction and operation, including a description of key access / haul routes.	Storage and Distribution Warehouse TIA, Section 5
6.2	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).	Storage and Distribution Warehouse CTMP, Section 4 Storage and Distribution Warehouse TIA, Section 5
6.3	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	Storage and Distribution Warehouse TIA, Section 7
6.4	Details and plans of the proposed internal road network, loading docks, pedestrian and cycling facilities and on-site parking in accordance with the relevant Australian Standards	Storage and Distribution Warehouse TIA, Section 6 and 7
6.5	Swept path analysis for the largest vehicle requiring access to the development	Storage and Distribution Warehouse TIA, Appendix B

6.6	Details of road upgrades, infrastructure works, or new roads or access points required for the development if necessary.	Storage and Distribution Warehouse CTMP, Section 3
6.7	Provide a Construction Traffic Management Plan detailing predicted construction vehicle, routes, access and parking arrangements, coordination with other construction occurring in the area, and how impacts on existing traffic, pedestrian and bicycle networks would be managed and mitigated	Storage and Distribution Warehouse CTMP, Section 3, 4 and 5

1.2 Background

HB&B Property Ltd has engaged Arcadis to undertake a TIA for the proposed storage and distribution warehouse development at 221 Luddenham Road, Orchard Hills.

The proposal is to develop a 45,449 m^2 warehouse at the above address to accommodate a mix of warehouse, industrial and office land uses. The AIBP development is proposed to be completed by 2028, with various road and other infrastructure works required. In preparing this assessment, the subject site and its surroundings have been inspected, along with development plans. Relevant traffic and parking data have been reviewed and analysed.

1.3 Scope of the report

This report has been structured as follows:

- Section 2 describes the existing conditions in relation to the site, including surrounding land uses, the road network and available transport modes.
- Section 3 outlines the future development and road network changes expected to occur around the site over the next 20 years.
- Section 4 outlines the development proposal for the construction of the storage and distribution warehouse.
- Section 5 outlines the expected traffic generated by the development during the construction and operational phase and their associated impact on the surrounding road network.
- Section 6 outlines the expected parking requirements associated with the proposed development in accordance with local relevant planning policies.
- Section 7 assesses the access and internal design of the warehouse, describing transport movements and identifying any potential issues from the current development application (DA) plans.
- Section 8 provides a summary of the TIA.

1.4 Reference documents

In preparing this report, reference has been made to the following documents:

- Schedule of Classified Roads and Unclassified Regional Roads (Roads and Maritime, 2014)
- Development Control Plan (DCP) (Penrith Council, 2021)
- Guide to Transport Impact Assessments (TfNSW, 2024)
- Technical Direction (TDT 2013/04a) (Roads and Maritime, 2013)
- 221 Luddenham Road, Orchard Hills –Alspec Industrial Business Park Traffic Impact Assessment (Arcadis, April 2023).

2 Existing conditions

2.1 Site location

The subject site is located on Luddenham Road, south of Patons Lane, in Orchard Hills. Located approximately 30 kilometres west of Parramatta CBD and is part of the larger AIBP development. The AIBP site is irregular in shape, with frontages across both Luddenham Road and Patons Lane.

The storage and distribution warehouse site is rectangular, encompassing a total area of 104,959 m^2. It features frontage to an internal road within the AIBP site, providing access to the broader road network via Patons Lane and Luddenham Road. The site location of the warehouse site within AIBP is shown in Figure 2-1.

Figure 2-1 AIBP site location

2.2 Land use

As shown in Figure 2-2, the subject site is in a General Industrial Zone (E4). The region surrounding the site is a mix of Environmental Conservation (C2) and Rural Landscape Zone (RU2). To the east of Mamre Road, the more common land uses are General Industrial (IN1) and Low Density Residential (R2).

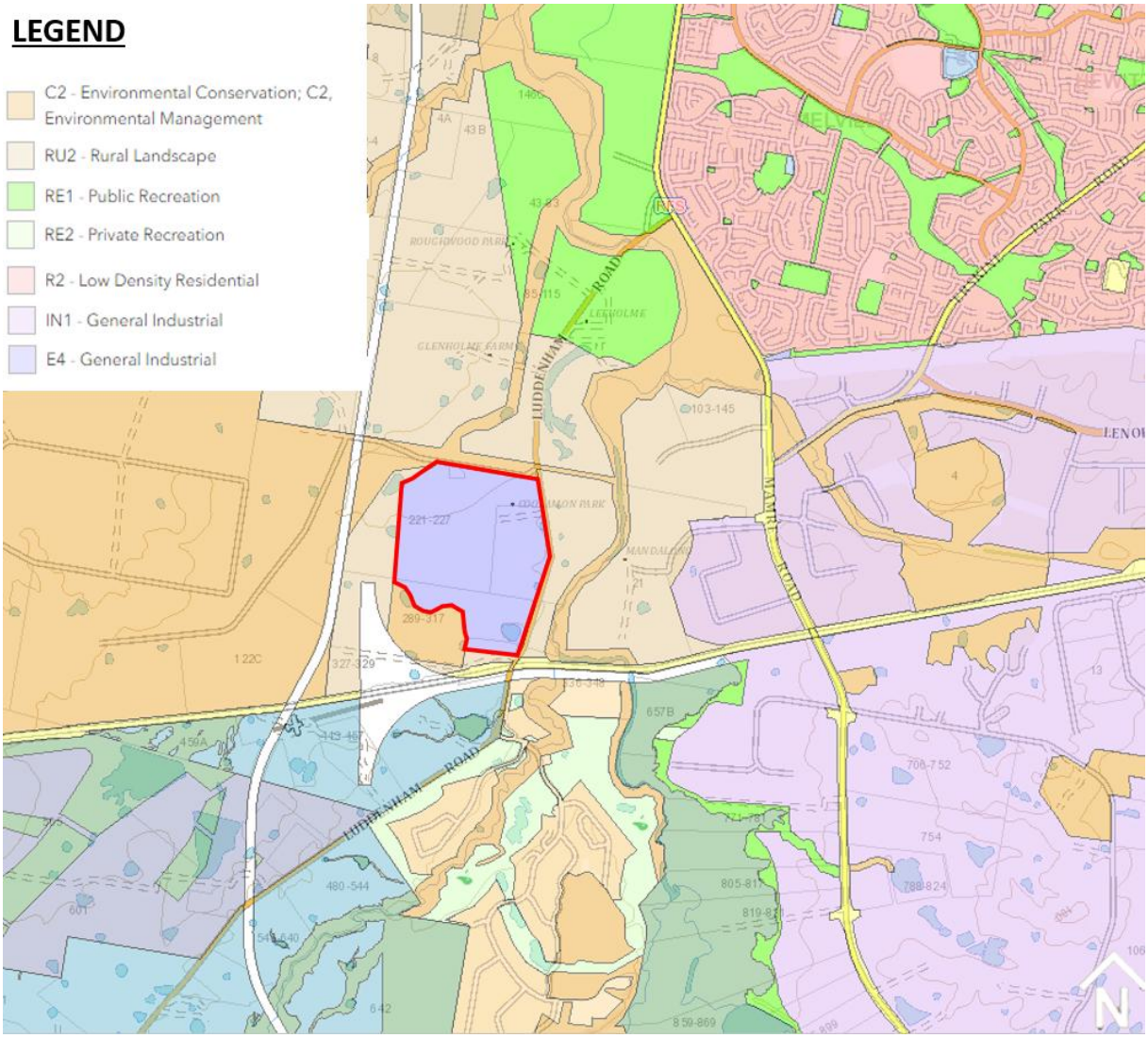


Figure 2-2 Land Zoning Map (Source: ePlanning Spatial Viewer – NSW Planning Portal)

2.3 Road network

The existing roads which will be impacted by the development application are described below:

Luddenham Road

Luddenham Road is a regional road under the control and management of Penrith City Council. Near the site, Luddenham Road is aligned in a general north-east/south-west direction. It is a two-way road configured with a two-lane, seven-metre-wide carriageway, set within an approximately 21-metre-wide road reserve. Luddenham Road carries approximately 3,000 vehicles per day and has a posted speed limit of 80 km/h. Photos of Luddenham Road in the vicinity of the site are provided in Figure 2-3 and Figure 2-4.

Figure 2-3 Luddenham Road, facing north

Figure 2-4 Luddenham Road, facing south

Patons Lane

Patons Lane is a local road under the control and management of Penrith City Council. Near the site, Patons Lane has a posted speed limit of 50 km/h and is generally aligned in an east/west orientation. It is a two-way road configured with a two-lane, 6.6-metre-wide carriageway with 1.2-metre-wide sealed shoulders on both sides of the road, set within a road reserve that is approximately 19 metres wide.

Stations, Systems, Trains, Operations and Maintenance (SSTOM) Contractors conducted traffic surveys in March 2024 which indicated Patons Lane carries approximately 1,260 vehicles per day, due to the construction of the Sydney Metro project. Lower daily traffic volumes are to be expected once construction of the Metro is completed.

Photos of Patons Lane in the vicinity of the site are provided in Figure 2-5 and Figure 2-6.

Figure 2-5 Patons Lane, facing west

Figure 2-6 Patons Lane, facing east

Mamre Road

Mamre Road is a state road under the control and management of Transport for NSW (TfNSW). Within the context of the study area, Mamre Road is aligned in a north/ south orientation and is currently configured as a two-lane undivided carriageway, set within a 45-metre-wide road reserve.

Mamre Road carries approximately 15,000 vehicles per day and has a posted speed limit of 80 km/h. Mamre Road passes through the Western Sydney Priority Growth Area and provides connections to the Western Sydney Employment Area (WSEA), making it a key route for regional trips.

Photos of Mamre Road close to the intersection with Luddenham Road are shown in Figure 2-7 and Figure 2-8.

Figure 2-7 Mamre Road, facing north (Source: Google Earth)

Figure 2-8 Mamre Road, facing south (Source: Google Earth)

Elizabeth Drive

Elizabeth Drive is a state road under the control and management of TfNSW. It is aligned in an east/west orientation and carries approximately 11,000 vehicles per day.

Elizabeth Drive is configured as a two-lane undivided carriageway with unsealed shoulders and is set within a 35-metre-wide road reserve. The speed limit is posted as 80 km/h in both directions of travel. To the east, Elizabeth Drive connects to the Westlink M7 Motorway and to the west it connects with The Northern Road.

Photos of Elizabeth Drive near the intersection with Luddenham Road is shown in Figure 2-9 and Figure 2-10.

Figure 2-9 Elizabeth Drive, facing east (Source: Google Earth)

Figure 2-10 Elizabeth Drive, facing west (Source: Google Earth)

2.4 Public transport network

A review of the public transport available in the vicinity of the site indicates that there are three bus services (Routes 775, 776 and 779) that operate in the St Clair/ Erskine Park area to the northeast of the site. No bus services connect past the site to the south. Overall, the area is currently underserviced by public transport.

However, the level of service provision reflects the low travel demands of the locality. Figure 2-11 shows a map of the existing public transport network for the Orchard Hills area.

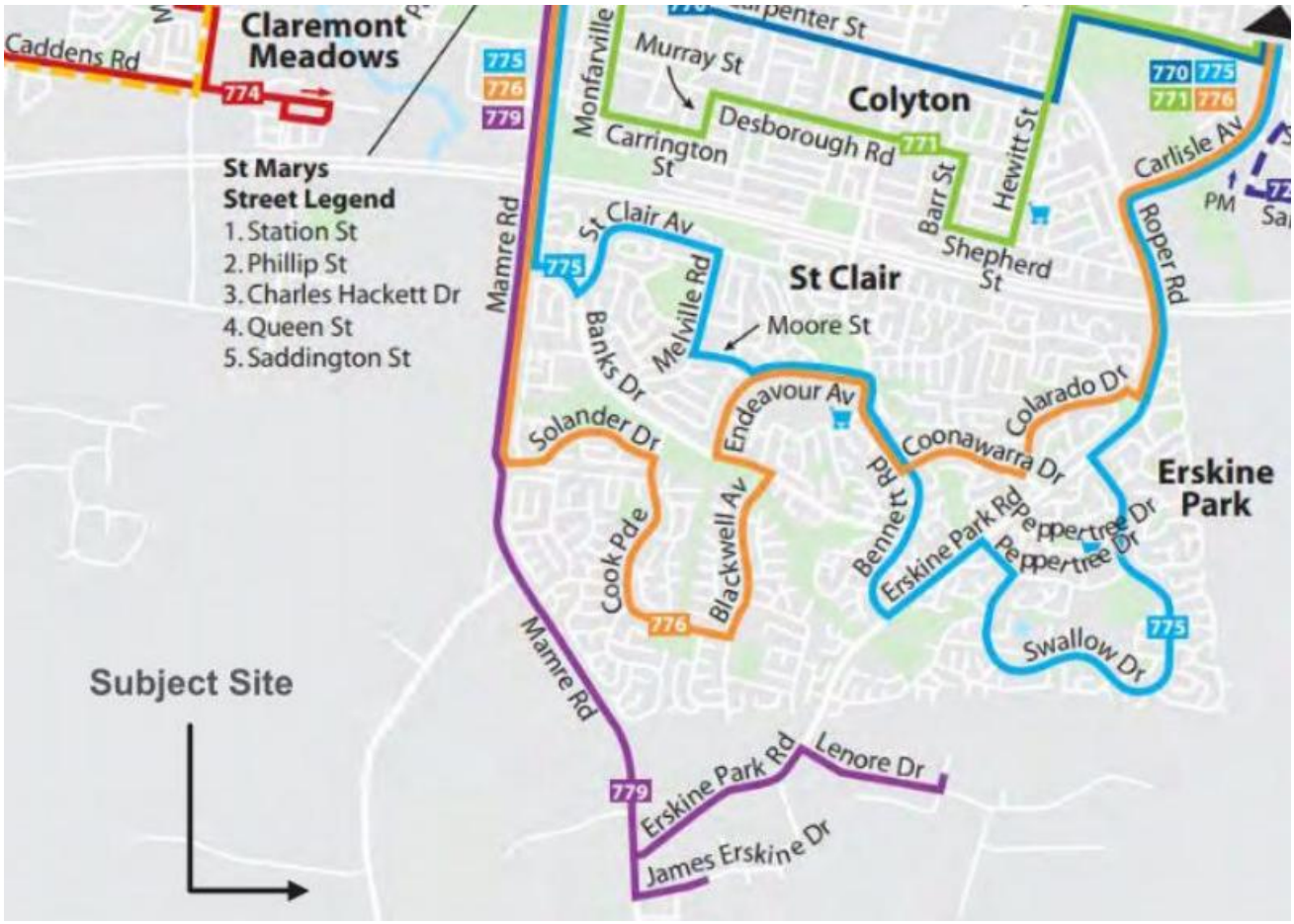


Figure 2-11 Existing Public Transport Network - Orchard Hills area

2.5 Active transport

There is currently limited pedestrian or cyclist infrastructure provided in the vicinity of the site, mainly due to the nature of land use in the vicinity and the limited demand for such facilities at present.

2.6 Road safety

Historical crash data has been evaluated between 2019 and 2023 as part of this assessment to obtain an understating of current road safety characteristics and trends for Luddenham Road between Mamre Road and Elizabeth Drive. A summary of the crash statistics for crashes occurring along Luddenham Road is provided in Table 2-1.

Table 2-1 Crash history along Luddenham Road for the five-year period between 2019-2023

Crash severity	Year				
	2019	2020	2021	2022	2023
Non-casualty	1	4	2	1	2
Minor/ other injury	-	2	1	-	-

Crash severity	Year				
	2019	2020	2021	2022	2023
Moderate injury	2	1	1	4	-
Serious injury	-	1	3	1	5
Fatal	-	-	-	-	-
Total	**3**	**8**	**7**	**6**	**7**

The crash data revealed:

- A total of 31 vehicles were involved in crashes occurring along the length of Luddenham Road between Mamre Road and Elizabeth Drive over a five-year period between 2019 and 2023, averaging 0.017 per day or 6.2 per year.
- 68 per cent of the crashes resulted in an injury, and there were no fatalities recorded.
- 26 per cent involved vehicles travelling off the road and hitting an object which resulted in an injury.
- 27 per cent of recorded crashes involved a head on collision.
- 47 per cent of recorded crashes involved multiple vehicles in this period.
- 47 per cent of crashes occurred in dusk or darkness conditions.
- Seven per cent of crashes involved vehicles striking animals while travelling along the roadway.

The crash statistics indicate that a relatively high number of crashes involved head on collisions and vehicles colliding objects after veering off the roadway. Any future upgrade to Luddenham Road should address this trend and related safety issues.

3 Future development and road network changes

The area and road network around the site are expected to undergo significant changes over the next 20 years to support the growth of the broader the Greater Penrith to Eastern Creek (GPEC) Growth Area, Western Sydney Employment Area (WSEA) and the Aerotropolis. This section outlines key transport policy influences, as well as land use and road network changes within proximity to the site.

Figure 3-1 highlights the location of these projects in relation to the subject site.

Figure 3-1 Proposed transport network - Orchard Hills area

3.1 State transport policy

The Future Transport Strategy

The Future Transport Strategy (The NSW Government) was published in September 2022 and is an update of NSW's *Future Transport 2056: Shaping the Future* (2018). The Strategy contains a wide range of planning vision, directions, and outcomes on how transport can support the population and economy.

The Future Transport Strategy aims to enable safe, healthy, sustainable, accessible, and integrated passenger and freight journeys in NSW. It outlines the direction for investment, services, and policy to improve connections for people and goods. This will revitalise the six cities and allow people and goods to move seamlessly between the cities.

Existing and potential transit connections, together with new technology and innovation, will make the broader transport network more responsive to demand and better able to manage congestion in the future. For the six cities identified, more specific outcomes listed as part of the strategy which will benefit the site's transport context, include:

- C1.1 – Enhance 30-minute metropolitan cities

The proposal will create jobs within Luddenham and provide jobs for residents in proximity to the development. According to the economic analysis conducted by Urbis [1]. the development is forecasted to generate up to 3,730 direct jobs. This will enable residents living within future land release areas more job opportunities within 30 minutes of their residence.

- E2.1 – Promote travel behaviour change to manage networks

Attractive infrastructure, appropriate policies, and programs are required to encourage more sustainable travel behaviours and reduce congestion. The development will contain infrastructure such as shared paths, end of trip facilities, and secure bicycle parking to promote more people walking and people cycling. The shared paths within the site should connect to future cycling routes to be located on Luddenham Road.

A Green Travel Plan and Travel Access Guide influenced by Travel Demand Management will influence the policies and encourage a modal shift for more sustainable modes of travel.

- P1.3 – Ensure public transport is available on day one

The future Luddenham station as part of the Sydney Metro Western Sydney Airport line will crucial public transport infrastructure required for the site. Rapid bus networks are proposed along Luddenham Road. The provision of rapid bus stops within proximity of the proposal will provide efficient and attractive journeys via public transport.

3.2 Key developments and land use changes

The site is in close proximity to a number of region and city shaping development opportunities that will shape economic activity and movement into the future. These will attract significant freight, logistics, advanced manufacturing, health, education and science activities and jobs that will direct investment across the metropolitan area.

Key projects that will influence demands around the subject site include:

- **The Western Sydney Airport** is a committed new international airport in Badgerys Creek. Set to open in 2026, the airport will serve passenger and freight operations and is expected to generate over 30,000 jobs from airport operations by 2060.
- **The Sydney Science Park** is a proposed new specialised centre comprising of a range of research and development, employment, education, retail, and residential uses located at 565-609 Luddenham Road, Luddenham, approximately 2.5 kilometres south of the subject development.

3.3 Transport network improvements and changes

The Australian and NSW Governments are progressively planning for and funding the delivery of a broad range of transport infrastructure improvements across the Greater Western Sydney region. These projects are intended to support an integrated transport solution for the region and capitalise on the economic benefits from developing the new Western Sydney airport and the broader land use changes across the area.

[1] Economic Analysis to Underpin the Planning Proposal to Rezone 21-227 & 289-317 Luddenham Road, Orchard Hills (Dated 30th of June 2020)

Key infrastructure upgrades in relation to the subject site include:

- **The Sydney Metro – Western Sydney Airport**, a new metro railway connecting the new Western Sydney International Airport with the Greater Western Sydney, which provides connection to the existing Sydney Trains suburban T1 Western Line. The new rail line consists of six stations, including one at Luddenham which is around one kilometre south of the subject site and one at Orchard Hills, three kilometres north of the subject site. The station will serve a future employment, research, and knowledge-based employment precinct, along with a mixed-use residential development. The Luddenham Station will provide an interchange with future bus and active transport networks.
- **The Outer Sydney Orbital**, which will provide for a future north south motorway and freight rail line to support the growth of Western Sydney and the distribution of freight across Sydney and regional NSW. The recommended alignment runs directly adjacent to the subject site, and it is expected that some portion of land would be acquired for Outer Sydney Orbital project in the future.
- **The M12 motorway project** will provide direct access between the Western Sydney Airport at Badgerys Creek and Sydney's motorway network, connecting the M7 Motorway, Cecil Hills, and The Northern Road, Luddenham. The link forms a key part of the Western Sydney Infrastructure Plan, a joint initiative of the Australian and NSW governments to fund a $4.1 billion road and transport program for Western Sydney.
- **The Mamre Road upgrade**, which will provide an additional lane in each direction for the 10-kilometre section between the M4 Motorway and Kerrs Road, as well as a wide central median for the provision of an additional traffic lane in the future. Preliminary designs indicate the intersection of Luddenham Road and Mamre Road, will be converted to traffic signals as part of this project. The NSW Government has committed $220 million to upgrade Stage 1 of these work between the M4 Western Motorway and Erskine Park Road.
- **The Elizbeth Drive Upgrade**, which will provide an additional lane in each direction between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham, with future provision for additional lanes. Preliminary designs indicate the intersection of Luddenham Road and Elizbeth Drive, will be converted to traffic signals as part of this project.
- **The proposed Western Sydney Freight Line**, which will be a dedicated freight rail line running from the future Outer Sydney Orbital near Luddenham to the M7 Motorway. This new freight line will allow the transport of goods by rail across Western Sydney, linking growing industrial areas and distribution centres. The current proposed rail alignment is to the south of the subject site.
- **The potential upgrade of Luddenham Road**, which will provide an additional lane in each direction along the length of Luddenham Road between Mamre Road and Elizabeth Drive, with future provision for additional lanes. This initiative has been identified in broader infrastructure planning assessments for the region.

4 Development proposal

The proposal is for the development of a 104,959 m^2 parcel of land as part of the wider AIBP development. The Storage and Distribution development will comprise of warehouse and office land uses, as well as supporting car parking for both heavy vehicles and cars.

Figure 4-1shows the plan for the proposed development.

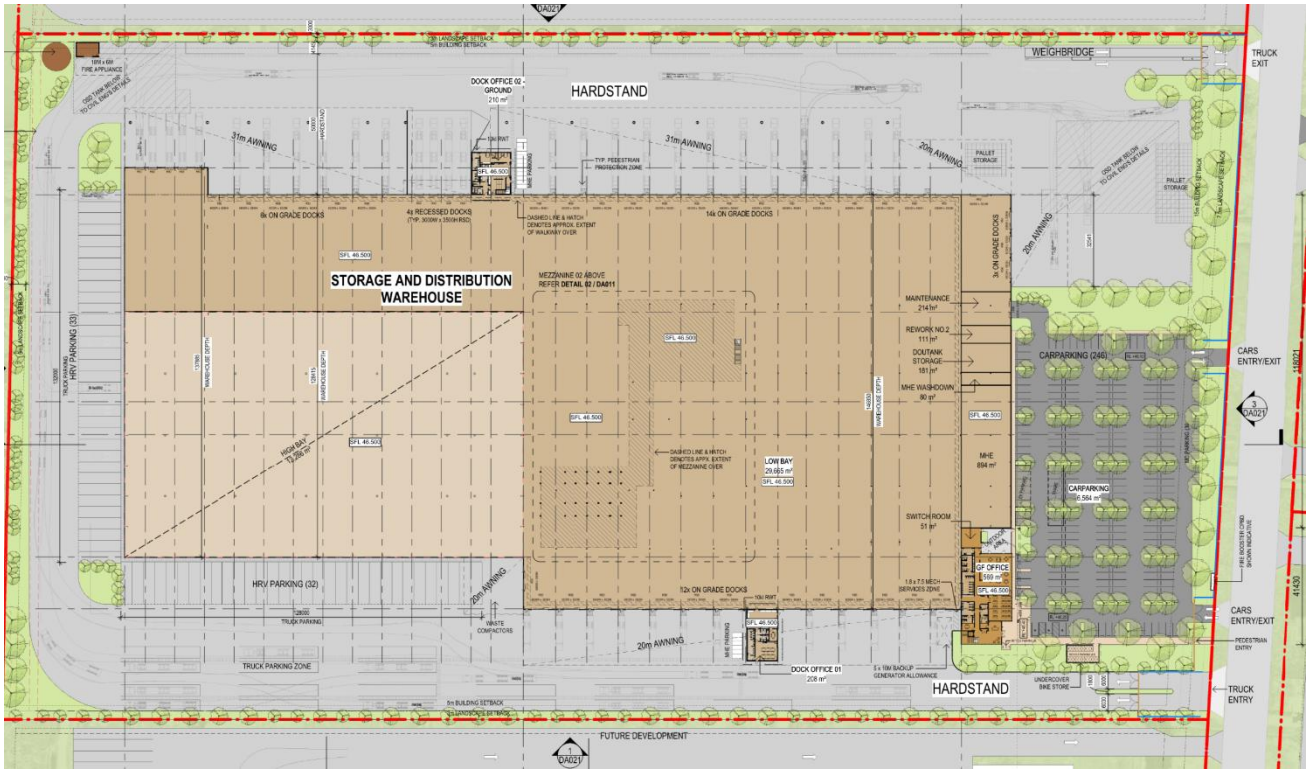


Figure 4-1 Proposed storage and distribution site layout

A summary of the land use mix for the storage and distribution warehouse development is provided in Table 4-1.

Table 4-1 Indicative land use mix for storage and distribution warehouse development

	Land use	Total building GFA (m^2)
Storage and distribution warehouse SSDA	Warehouse	43,606
	Office	1,843
	Total building	**45,449**
	Total car park	**6,564**
	Total landscape	**10,134**
	Total site area	**104,959**

4.1.1 AIBP construction timeline

Construction of the storage and distribution warehouse will be in conjunction with other infrastructure works as part of the AIBP development. Figure 4-2 shows an expected timeline for 2025-2027 construction period of AIBP, inclusive of the Storage and Distribution SSDA and other concurrent DA construction works.

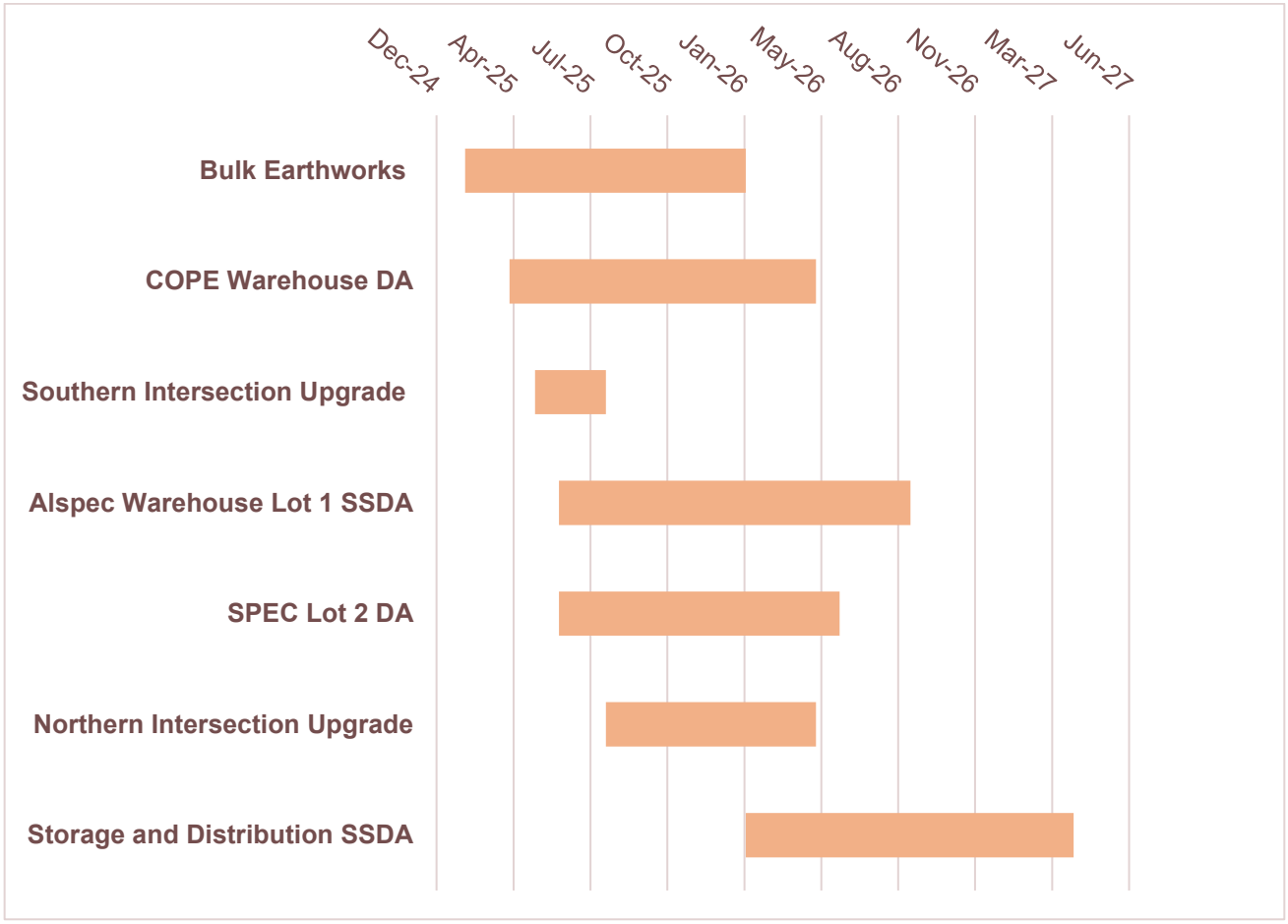


Figure 4-2 Indicative AIBP construction timeline

5 Traffic impact assessment

An assessment of the likely traffic impact has been completed to understand the implications of the proposed development and the associated staging on the performance of the surrounding network.

5.1 Traffic generation rate

TMX has provided information on the peak average day hardstand two-way movements for heavy vehicles and rigid delivery vans during operations. Table 5-1 presents the anticipated hardstand movements during peak operations.

Table 5-1 Storage and Distribution warehouse - peak operational hardstand movements

	Daily peak operational hardstand traffic – two-way movements	
Heavy vehicle type	**IN**	**OUT**
B-doubles	110	110
Semi-trailers	123	123
Rigid delivery vans	112	112
Total	**345**	**345**

The anticipated operational window for each heavy vehicle type is as follows:

- B-doubles – evenly spread over a 20 hour operational window, between 1am to 9pm.
- Semi-trailers – evenly spread over a 20 hour operational window, between 1am to 9pm.
- Rigid delivery vans – leave over approximately three hours in the morning and return in the afternoon. Morning window is between 5am to 8am, afternoon window is between 3pm to 6pm.

In addition, TMX has provided a breakdown of the expected staff numbers for the warehouse during a day of peak operations. Table 5-2 summarises the peak staff numbers anticipated for the main office, warehouse and warehouse office.

Table 5-2 Expected staff numbers for the proposal

Shift Time	**Staff Numbers**			
	Main Office	**Warehouse**	**Dock Offices**	**Total**
6am to 2pm	26	45	14	**85**
2pm to 10pm	0	40	13	**53**
10pm to 6pm	0	15	6	**21**
Total Staff	**26**	**100**	**33**	**159**

The following assumptions have been made for light vehicle movements in the operational traffic assessment:

- Given the current absence of active and public transport options surrounding the site, a 90% vehicle mode share was adopted
- Staff is expected to arrive / leave the site in the hours around the start / end of their shift times
- Between shift times, additional light vehicle trips have been considered to allow for staff taking breaks or performing work duties external to the site.

5.1.1 Operational traffic

Table 5-3 summarises the application of TMX's provided data to the Storage and Distribution warehouse development.

Table 5-3 Storage and Distribution warehouse operational traffic generation summary

Vehicle type*	AM peak (7:00-8:00am)			PM peak (5:00-6:00pm)		
	IN	OUT	Total	IN	OUT	Total
Light vehicles (LVs)	14	2	**16**	1	2	**3**
Heavy vehicles (HVs)	13	51	**64**	51	13	**64**
Total	**27**	**53**	**80**	**52**	**15**	**67**

An expected peak operational daily profile for the proposed development is provided in Figure 5-1. Note that the operational modelling assessment considers cumulative operational traffic demand from the AIBP. Consequently, the morning and afternoon peak hours for the Storage and Distribution warehouse differs from concurrent AIBP warehouse operations.

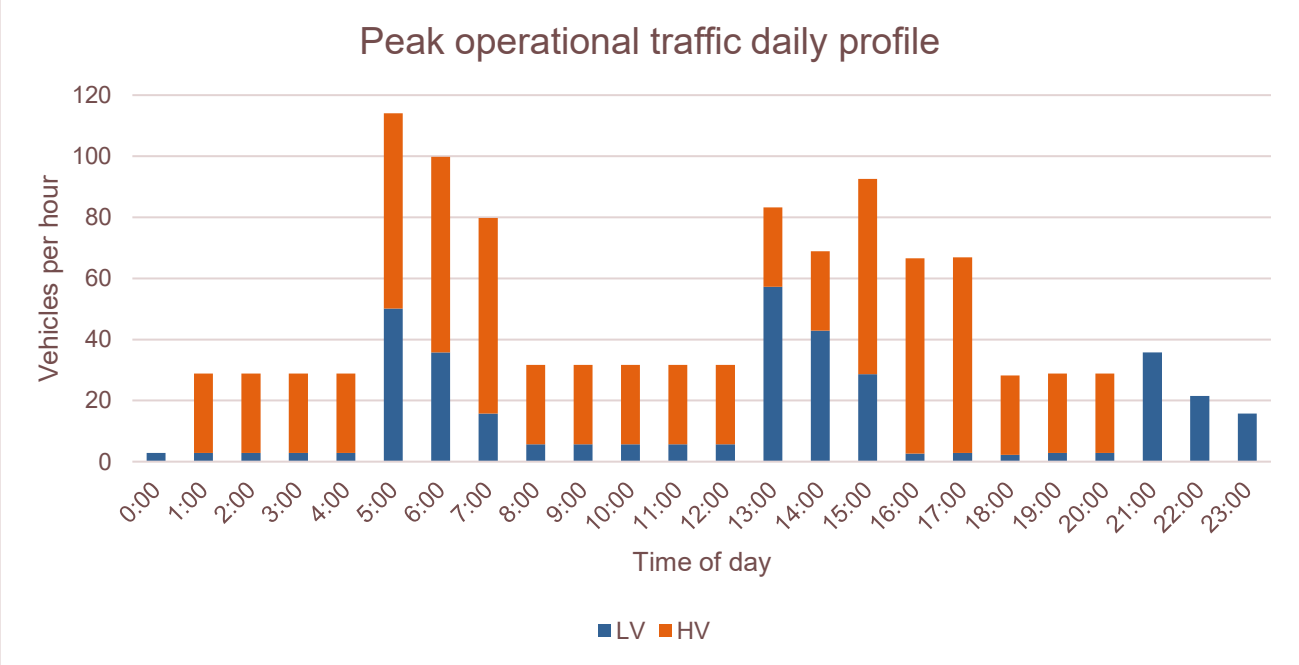


Figure 5-1 Peak operational daily traffic profile - Storage and Distribution warehouse

5.1.2 Cumulative construction traffic

A cumulative construction assessment has been conducted to reflect the concurrent construction activities for the broader development site in 2025 to 2026. After consideration of the AIBP construction program, the cumulative assessment considers peak construction traffic from each project, which is expected to be between August 2025 to February 2026. Since the storage and distribution warehouse construction will be yet to commence, and the southern intersection upgrade works will be completed by this stage, traffic volumes from these construction activities have not been considered in the cumulative assessment. The estimated peak daily construction traffic for each project is summarised in Table 5-4.

Table 5-4 AIBP peak daily construction traffic volumes - 2025/26

	Daily peak construction traffic – two-way movements	
Project	**LVs**	**HVs**
Storage and distribution warehouse SSDA*	80	30
Bulk earthworks	160	100
COPE warehouse DA	60	20
Southern Intersection Upgrade*	12	20
Alspec warehouse Lot 1 SSDA	80	30
SPEC Lot 2 DA	50	16
Northern Intersection Upgrade	30	80
Total	**380**	**250**

Refer to the *Construction Traffic and Pedestrian Management Plan for Bulk Earthworks DA (Arcadis, July 2025)* for the anticipated traffic generations and impacts.

Construction Hours

Proposed construction hours for the site are as follows:

- Monday to Friday 6am to 6pm
- Saturday 8am to 1pm
- Sunday No work.

5.2 Background traffic volumes

5.2.1 Sydney Metro – Western Sydney Airport stabling and maintenance facility

To assess the overall impact of traffic on the performance of Patons Lane and Luddenham Road, traffic generated by the Patons Lane Resource Recovery Centre (RRC) and the Sydney Metro – Western Sydney Airport stabling, and maintenance facility has been included in this assessment.

The Sydney Metro – Western Sydney Airport stabling and maintenance facility will be located at Orchard Hills, south of Blaxland Creek and north of Patons Lane. Access to the facilities is provided by Patons Lane.

Construction of the facility has commenced and is expected to be operational by 2027. It is forecasted that traffic will be generated from the stabling and maintenance facility during its construction and operation.

Peak hour construction movements as reported in the *Construction Traffic Management Plan – SSTOM – Orchard Hills Stabling and Maintenance Facility (Environmental Impact Statement (EIS) and Park Life Metro (PLM))* have been considered for the modelled scenarios, with traffic data shown in Table 5-5 and Table 5-6, respectively.

Table 5-5 Peak construction movements in 2024/ 2025 for the Sydney Metro – Western Sydney Airport stabling and maintenance facility (EIS)
Source: Construction Traffic Management Plan – Orchard Hills Stabling and Maintenance Facility (Table 6)

Vehicle Type*	AM peak (7:30-8:30am)			PM peak (4:30-5:30pm)		
	IN	OUT	Total	IN	OUT	Total
LV Staff	56	0	**56**	0	56	**56**
LV Deliveries	1	1	**2**	1	1	**2**
HV	11	11	**22**	11	11	**22**
Total	**68**	**12**	**80**	**12**	**68**	**80**

Table 5-6 Peak construction movements in 2024/ 2025 for the Sydney Metro – Western Sydney Airport stabling and maintenance facility (PLM)
Source: Construction Traffic Management Plan – Orchard Hills Stabling and Maintenance Facility (Table 6)

Vehicle Type*	AM peak (7:30-8:30am)			PM peak (4:30-5:30pm)		
	IN	OUT	Total	IN	OUT	Total
LV Staff	30	0	**30**	0	50	**50**
LV Deliveries	1	1	**2**	1	1	**2**
HV	8	8	**16**	8	8	**16**
Total	**39**	**9**	**48**	**9**	**59**	**68**

The cumulative construction assessment has incorporated the higher background traffic volumes from Table 5-5 on Patons Lane.

Oversize-overmass (OSOM) vehicles are expected to access the SSTOM site during 2025 and 2026, for deliveries of large items such as rolling stock, transformers and other large components. OSOM vehicles required for SSTOM's construction site are expected to be completed overnight or outside of general peak periods, under full traffic control and using escort vehicles. Sydney Metro will provide notice of their scheduled deliveries to ensure access via Patons Lane is maintained and potential conflicts are managed. AIBP construction vehicles will not be permitted to access the site overnight, with construction vehicle movements anticipated to occur between 6am and 6pm only. Therefore, SSTOM's OSOM vehicles are not anticipated to experience any disruptions due to AIBP's construction vehicles.

5.2.2 Luddenham Road and Patons Lane traffic survey

Matrix was commissioned between Monday 24 March to Friday 28 March 2025, to provide five-day intersection traffic counts at the Luddenham Road and Patons Lane intersection. The survey captures current construction traffic volumes for the Sydney Metro stabling and maintenance facility and traffic generated by the operational Patons Lane Resource Recovery Centre.

To align with this assessment, the five-day survey data for the AM period between 6am and 9am and PM period between 3pm and 6pm was analysed. AM and PM peak hours for assessment were determined by taking the highest combined hourly northbound and southbound through movements on Luddenham Road from the survey. As a result, the AM peak hour assessed was based on survey data on 27 March, between 7am and 8am, while the PM peak hour assessed was based on survey data on 26 March, between 4:30pm and 5:30pm. The survey counts for the AM and PM peak have been summarised in Figure 5-2.

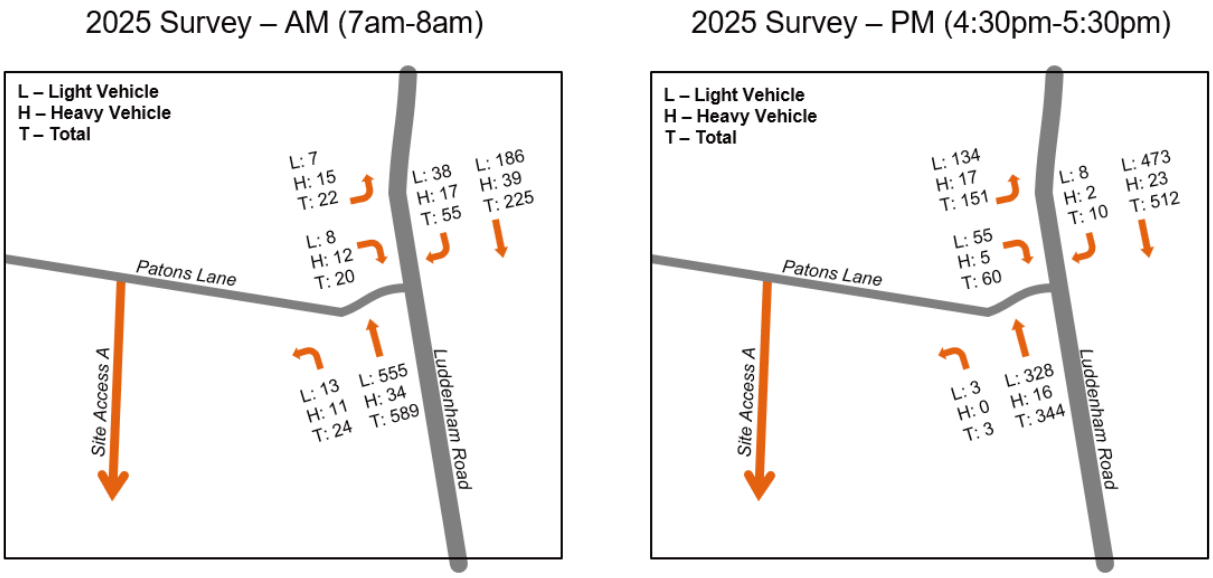


Figure 5-2 Matrix survey (2025) Luddenham Road / Patons Lane intersection counts

Furthermore, as part of the on-going consultation process, Sydney Metro / Park Life have provided traffic volumes during the identified survey peak periods illustrated above for the existing stabling and maintenance facility construction site. The traffic attributed to the existing Sydney Metro construction site is summarised in Table 5-7 below.

Table 5-7 Survey (2025) - Sydney Metro construction traffic volumes

Vehicle Type*	AM peak (7:00-8:00am)			PM peak (4:30-5:30pm)		
	IN	OUT	Total	IN	OUT	Total
LV	10	2	**12**	0	68	**68**
HV	2	6	**8**	1	5	**6**
Total	**12**	**8**	**20**	**1**	**73**	**74**

For the assessment, an annual traffic growth rate of 2.5% has been applied to the survey data. Sydney Metro construction traffic volumes above have been deducted from the peak construction traffic anticipated by the stabling and maintenance facility (refer Table 5-5).

5.2.3 STFM model

Background traffic volumes for Luddenham Road were derived from TfNSW traffic forecasting modelling for the morning peak period (7am to 9am) and the afternoon peak period (4pm to 6pm) to inform the future year 2036 traffic assessment. These forecasts were provided from a model that was based on land use forecasts from LU2019 and demand matrices from Strategic Transport Model V3.8. Traffic volumes were factored by 0.55 to estimate peak hour volumes. Table 5-8 summarises the peak hour traffic volumes on Luddenham Road.

This assessment (Scenario B) adopts the decreased traffic volumes in line with the traffic forecast.

Table 5-8 Forecasted background traffic volumes for Luddenham Road determined from STFM inputs

	AM peak (7-8am)		PM peak (5-6pm)	
	Northbound	Southbound	Northbound	Southbound
2036	760	470	480	650

A copy of the STFM outputs is provided in Appendix C.

5.2.4 Other construction surrounding the site

M12 Motorway Project

The M12 Motorway Project expects its peak construction volumes to occur in 2024. However, within the M12 Motorway EIS, Section 6.2.3 of Transport and Traffic describes the site access routes for the project, which is via Elizabeth Drive, Mame Road, The Northern Road and Wallgrove Road (Source: *M12 Motorway Amendment Report, Section 6.2*) The construction traffic assessment did not include Luddenham Road and Patons Lane as an access route during construction. Therefore, the cumulative traffic impact for this TIA did not consider the expected traffic induced by the M12 Motorway.

Western Sydney Airport

Construction for the Western Sydney Airport (WSA) is underway and expected to be completed by 2026. The WSA EIS report describes the construction traffic accesses the site via Elizabeth Drive, Anton Road, The Northern Road, and Badgerys Creek Road. The construction traffic assessment did not include Luddenham Road and Patons Lane as an access route during construction. Therefore, the cumulative traffic impact for this TIA did not consider the expected traffic induced by WSA.

Mamre Road Upgrade

As part of this project, the intersection of Luddenham Road and Mamre Road will be converted to a multiple lane, signalised intersection, to improve safety and traffic flow. Construction of the intersection is underway as of June 2025, resulting in a small section of Luddenham Road being closed between Old Luddenham Road and Mamre Road. The closure is expected to be in place until early 2026. TfNSW has diverted Luddenham Road traffic onto Old Luddenham Road, under the guidance of traffic control.

While there is no publicly available construction traffic assessment for the Luddenham Road and Mamre Road intersection upgrade, it is not anticipated that construction vehicles for the project will use Luddenham Road as an access route. The construction traffic assessment for the Mamre Road and Abbotts Road intersection upgrade (also part of the Mamre Road upgrade project), conducted by Ason Group, makes no reference to Luddenham Road as an access route for heavy and light construction vehicles.

5.3 Traffic distribution

For the cumulative operational assessment, the following assumptions were made for traffic generated by the various components of the concurrent warehouse developments, based on STFM outputs:

- In the AM peak, 80 per cent of traffic generated by the proposal travelled inbound to the site, and 20 per cent outbound.
- In the PM peak, 60 per cent of traffic generated by the proposal travelled inbound to the site, and 40 per cent outbound.

The directional distribution and assignment of traffic generated by the proposed development will be influenced by several factors, including:

- The future transport and road configuration in the vicinity of the site: the dominant freeway in the area is the M4 Western Motorway in the north, but the importance of the southern areas will be increasing with the proposed M12 and the development of the broader Aerotropolis (Northern Gateway Precinct).
- The distribution of residential, commercial, and other land use development in the surrounding areas.
- The likely distribution of employees' places of residence in relation to the site.
- The configuration and staging of the access points to the site.

In consideration of the above, the following distribution and assignments were adopted in this assessment, based on STFM outputs:

- To/ from Luddenham Road north (towards Mamre Road): 70 per cent
- To/ from Luddenham Road south (towards Elizabeth Drive): 30 per cent.

5.4 Modelling approach and assessment criteria

The assessment of the performance of the intersections were tested using SIDRA Intersection 9.0. Unless otherwise specified, the default model parameters were adopted for the intersection models. All traffic models were modelled as a 'Network' site in SIDRA 9.0.

The operational performance of the intersection was evaluated by assessing the average vehicle delay and the corresponding **Level of Service** (LoS). The average vehicle delay and level of service were assessed in accordance with the RMS Traffic Modelling Guidelines and is summarised in Table 5-9.

The RMS Traffic Modelling Guidelines recommends that LoS is determined by the critical movement with the highest delay for priority intersections such as roundabout and sign-controlled intersections. With these intersection controls (roundabout, stop and give way sign controls), some movements may experience high levels of delay while others may experience a minimal delay.

The level of service criteria for a signalised intersection is related to the average intersection delay measure in seconds per vehicle.

Table 5-9 LOS criteria for intersection capacity analysis

Level of service	Traffic signals	Description of intersection operation
A	d ≤14	Good operation
B	15 ≤ d ≤ 28	Good with acceptable delays and spare capacity
C	29 ≤ d ≤ 42	Satisfactory

D	43 ≤ d ≤ 56	Operating near capacity
E	57 < d ≤ 70	At capacity, at signals, incidents will cause excessive delays Roundabouts require other control mode
F	d > 70	Unsatisfactory and requires additional capacity.

Source: RMS Traffic Modelling Guidelines, 2013

Degree of Saturation (DoS) is equal to the *demand to capacity ratio* for each traffic movement, with the overall intersection DoS defined as the highest DoS of all individual movements calculated at the intersection. For various intersection controls, the following DoS ratings are defined in Table 5-10.

Table 5-10 Degree of Saturation (SIDRA 9.0)

Degree of Saturation (DoS)	Rating
DoS < 0.6	Excellent
0.6 < X < 0.7	Very good
0.7 < X < 0.8	Good
0.8 < X < 0.9	Acceptable
0.9 < X < 1.0	Poor
X > 1.0	Very poor

The intersection traffic performance targets established for this assessment include:

- An overall intersection level of service (LoS) D or better
- A degree of saturation (DoS) of:
  - Less than 0.85 for roundabouts
  - Less than 0.90 for signalised intersections.

5.5 Operational traffic impact assessment

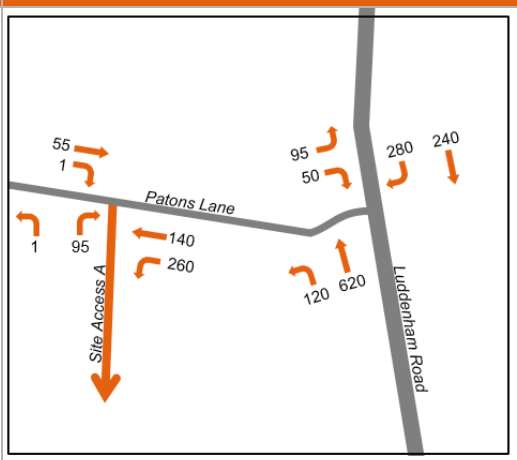
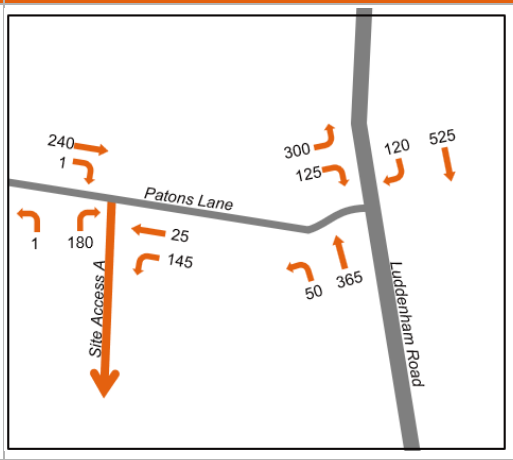
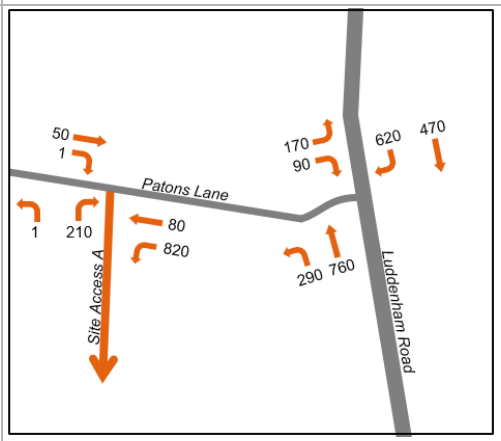
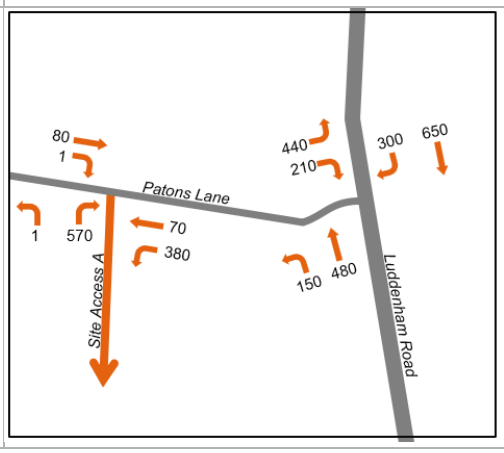
5.5.1 Assessed network and traffic demand

This traffic impact assessment includes traffic modelling using SIDRA Network software to assess the impacts of the Storage and Distribution warehouse development, and concurrent AIBP warehouse developments at the Luddenham Road/ Patons Lane intersection and Patons Lane/ Site Access A intersection. For each of these intersections the following scenarios (A and B) have been considered:

- **Scenario A –** 2027 AIBP development with storage and distribution operational demand and adjacent warehouse's operational demand.
- **Scenario B –** 2036 AIBP development with storage and distribution operational demand and complete AIBP masterplan operational demand.

Table 5-11 summarises the turning movements that result from the generation and distribution of operational trips during the AM and PM peak periods for the storage and distribution warehouse, 2027 project state of the wider AIBP development (storage and distribution plus other concurrent warehouse developments), and the ultimate development state for AIBP.

Table 5-11 Turning movement demands

	AM peak hour (7-8am)	PM peak hour (5-6pm)
Scenario A (2027)		
Scenario B (2036)		

Detailed modelling for the AIBP masterplan, which includes expected operational traffic from the Storage and Distribution warehouse, was conducted as part of the TIA (*Arcadis, 2023)*. The 221 Luddenham Road, Orchard Hills TIA indicated no adverse impact on the traffic distribution of the surrounding road networks. The modelling approach and assessment criteria, as well as the intersection capacity assessment, are included in the TIA (*Arcadis, 2023*).

In addition, Table 5-12 summarises the projected traffic for the entire AIBP and the Storage and Distribution warehouse, along with construction phase traffic.

Table 5-12 Development demand comparison

Assessment		AM peak hour	PM peak hour
AIPB Traffic Impact Assessment (Arcadis, 2023)	Ultimate development operational demand	**844 vehicles**	**823 vehicles**
Storage and Distribution warehouse assessment (this report)	Operational demand (excluding staff)	**80 vehicles**	**67 vehicles**
	Construction demand	**80 vehicles**	**30 vehicles**

The following intersections were assessed in the scenarios as part of this traffic impact assessment:

- Luddenham Road and Patons Lane:
  The intersection was modelled as a signalised intersection where Luddenham Road was configured with a northbound and southbound auxiliary lane, two right-hand turn short lanes on the northern approach and a high entry left turn lane on the southern approach. Patons lane was modelled as two lanes on both east and west approach.

- Patons Lane and Site Access Road:
  The intersection was modelled as a two-lane roundabout with Patons Lane modelled as two lanes on both east and south approaches and one lane on the west approach.

The assessed network configuration is provided in

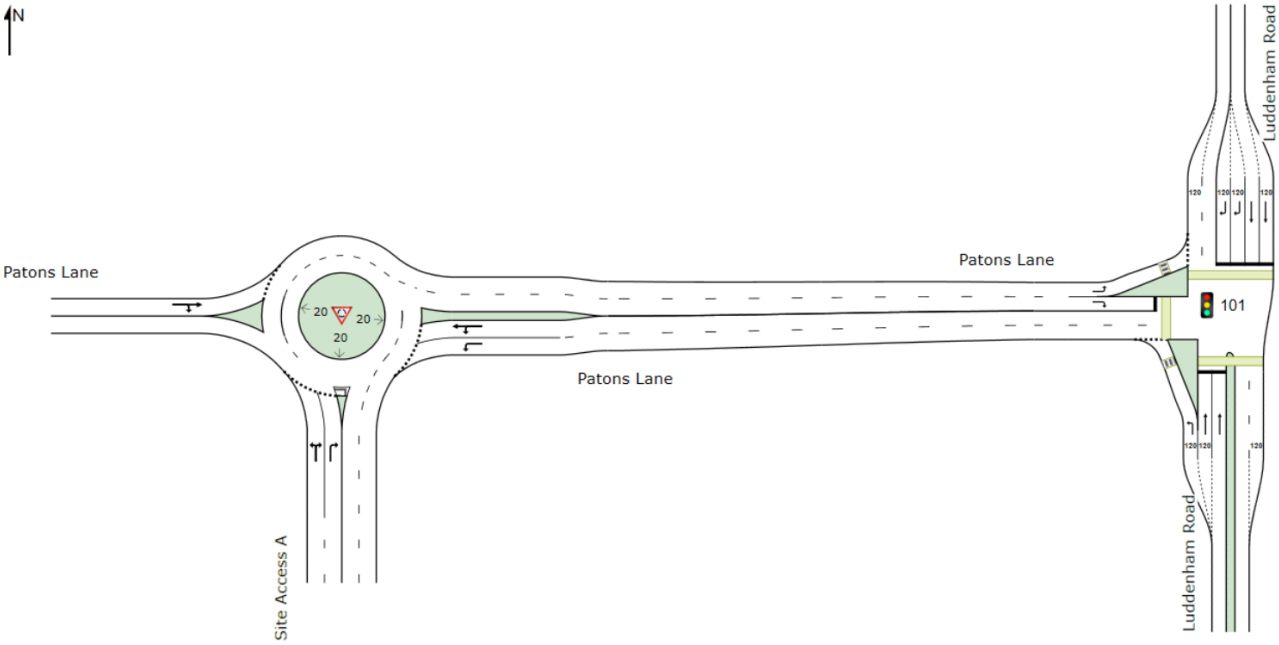


Figure 5-3 Network layout for the assessed intersection at Luddenham Road and Patons Lane

5.5.2 Findings and results

The AM and PM peak intersection performance results for Scenario A and Scenario B is summarised in Table 5-13 and Table 5-14, respectively.

Table 5-13 Scenario A intersection modelling results for storage and distribution warehouse

Year	Intersection	Intersection treatment	Peak hour	Volume	Average delay (sec)	DoS	LoS
2027	**Scenario A -** Patons Lane / Site Access A Road	Roundabout	AM	566	5.5	0.152	A
			PM	617	6.4	0.263	A

	Scenario A - Luddenham Road/ Patons Lane	Signalised intersection	AM	1481	24.4	0.554	B
			PM	1544	19.0	0.344	B

Table 5-14 Scenario B intersection modelling results for storage and distribution warehouse

Year	Intersection	Intersection treatment	Peak hour	Volume	Average delay (sec)	DoS	LoS
2036	**Scenario B -** Patons Lane / Site Access A Road	Roundabout	AM	1223	5.4	0.340	A
			PM	1160	7.3	0.240	A
	Scenario B - Luddenham Road/ Patons Lane	Signalised intersection	AM	2526	31.3	0.851	C
			PM	2347	23.7	0.573	B

The assessment identified that the Patons Lane and Site Access Road intersection meets both the traffic performance criteria for capacity and delay in the ultimate state scenario.

For the Luddenham Road and Patons Lane intersection, the signalised intersection treatments meet the traffic performance criteria for delay in the ultimate state scenario. The signalised intersection meets the criteria for capacity in the ultimate stage with a maximum DoS of 0.851. This is within the acceptable DoS of 0.9 set by the RMS modelling guidelines.

Further development of the ultimate scenario may be required including a review of the forecasted volumes given the likelihood of key road corridor upgrades that may be completed by 2036.

A copy of the SIDRA modelling outputs is provided in Appendix D.

5.5.3 Operational traffic impact

Based on a comparison of traffic demand against the broader AIBP traffic impact assessment, and the operational traffic generated by the proposed development, the future road network will accommodate the operational traffic in both the project state (Stage 1 of the AIBP development) and the ultimate state. The total traffic demand for this proposal is less than the modelled demand, with the SIDRA results demonstrating both the Site Access Road/ Patons Lane and Patons Lane/ Luddenham Road intersections performing at a LoS C or better in both scenarios.

A swept path analysis has been undertaken for the warehouse hardstand movements to accommodate B-double truck movements. The clearances for the trucks in this area was deemed sufficient and a copy of the swept path diagram is provided in Appendix B of this report.

5.5.4 Operational traffic management measures

To support non-private vehicle access to the site during normal operations, a Green Travel Plan has been prepared that outlines the management measures that can be adopted for the development.

A copy of the Green Travel Plan is provided in Appendix E of this report.

5.6 Cumulative construction traffic impact

5.6.1 Construction impact

For this assessment, the existing intersection of Luddenham Road and Patons Lane, with a through lane in each direction on Luddenham Road, a southbound right-turn lane from Luddenham Road into Patons Lane, and a left and right turn approach lane out of Patons Lane into Luddenham Road was modelled to assess:

- **Base Case –** 2025 traffic conditions, as per survey conducted by Matrix and calibrated to reflect the surveyed queue lengths.
- **Scenario A –** 2025 traffic conditions, as per survey conducted by Matrix and calibrated to reflect the surveyed queue lengths, Sydney Metro peak EIS construction traffic, without construction traffic from AIBP works.
- **Scenario B –** 2025 traffic conditions, as per survey conducted by Matrix and calibrated to reflect the surveyed queue lengths, Sydney Metro peak EIS construction traffic, cumulative peak hour AIBP construction traffic demand.

The results summary of the SIDRA assessment for the construction traffic scenarios identified above is provided in Table 5-15.

Table 5-15 SIDRA modelling outputs – construction

Year	Intersection	Intersection treatment	Peak hour	Volume	Average delay (sec)	DoS	LoS
2025	**Base Case -** Luddenham Rd/Patons Lane	Sign controlled intersection	AM	984	42.9	0.353	D
			PM	1137	84.9	0.888	F
	Scenario A - Luddenham Rd/Patons Lane	Sign controlled intersection	AM	1049	52.0	0.395	D
			PM	1163	115.3	0.987	F
	Scenario B - Luddenham Rd/Patons Lane	Sign controlled intersection	AM	1176	67.9	0.465	E
			PM	1245	329.3	1.282	F

For the detailed cumulative construction impact assessment, refer to *Construction Traffic and Pedestrian Management Plan for Bulk Earthworks DA (Arcadis, July 2025)*.

5.6.2 Construction mitigation and management measures

A range of mitigation and management measures would be needed to manage the impacts to traffic and transport during construction. These include:

- A Construction Traffic Management Plan (CTMP) would be prepared and implemented in accordance with the Traffic control at work sites, version 6.1 (TfNSW, 2022). The construction traffic management plan would enable the safe management of traffic, provide for the safety of construction personnel, and minimise impacts on the local community. The plan would include as a minimum:

  - Hours of construction activity and haulage, which do not impose on peak periods and school drop-off and pick-up times
  - Haulage routes, including the source locations and their access points for the site
  - Design and construction of access points in accordance with TfNSW and Council requirements
  - The design of temporary works required to accommodate the heavy vehicle movements along the short sections of local roads required for access to ancillary sites
  - Designated areas within the proposal area for heavy vehicle turning movements, parking, loading and unloading
  - On-site parking arrangements for construction, supervisory and management personnel
  - Safety principles for construction activities, such as speed limits around the site and procedures for specific activities
  - Induction requirements for construction, supervisory and management personnel
  - Procedures for inspections and record keeping for maintaining traffic control measures
  - Contact details of key proposal personnel.
- For each stage of construction, detailed Traffic Guidance Schemes would be prepared and implemented in accordance with the Traffic control at work sites, version 6.1 (TfNSW, 2022) by suitably qualified personnel.
- Dilapidation surveys of roads around the proposal area would be undertaken prior to their use for construction as well as after construction is complete. Any damage to roads will be repaired.
- When AIBP construction vehicles are using Patons Lane for access and egress during off peak periods, full time traffic controllers will be located at the Luddenham Road and Patons Lane intersection, east of the Patons Lane site access. In addition, full time traffic controllers will be located at the existing site access driveway on Luddenham Road, south of the existing Luddenham Road and Patons Lane intersection. This will ensure that traffic movements to/ from the AIBP site are coordinated with Sydney Metro construction vehicle movements, minimising disruptions for Sydney Metro's construction activities and deliveries.
- During the AM and PM peak hours, Sydney Metro construction traffic will be given priority access via Patons Lane.
- Traffic surveys are to be undertaken during construction around the site of works, to monitor how the site is being accessed by AIBP vehicles and to give confidence that AIBP construction traffic is not contributing to delays for Sydney Metro construction vehicles. These surveys will also enable AIBP to monitor their contribution to the traffic on the surrounding road network throughout the construction period.
- Patons Lane access must always be maintained to not impede on Sydney Metro's construction activities. AIBP construction vehicles are not permitted to access the site during critical OSOM deliveries for Sydney Metro. OSOM deliveries such as rolling stock and transformers will have priority access to Patons Lane overnight, with the Sydney Metro team providing notice to the AIBP site team of their delivery schedule.
- All vehicles accessing the site for the purpose of material delivery and construction works would be fitted with safety flashing lights located on the top of the vehicle and functioning reverse beepers. All operators will be licensed for the particular item of plant/ equipment and will demonstrate competence in the use of the plant/ equipment as part of the site management and safety plan.
- Direct access at the frontages would be provided with adequate sight distances relating to the posted road speed. This will allow vehicles on the main road to see vehicles emerging from the construction compound and will allow ample room to slow down and stop if necessary. Similarly, it will allow vehicles waiting to emerge from the site access, adequate sight distance to see approaching vehicles and determine acceptable gaps for them to enter the main road traffic.

Site access to Sydney Metro Western Sydney Airport stabling and maintenance facility

Patons Lane is the sole vehicular access road to the Sydney Metro Western Sydney Airport stabling and maintenance facility. Access to the Sydney Metro facility along Patons Lane must be always maintained as there are no alternative access options. Ongoing stakeholder consultation with Sydney Metro's D&C is required during construction to understand the vehicular movements associated with the stabling and maintenance facility and to mitigate any reduction in access and negative traffic impacts.

6 Car parking assessment

The site has specific provisions with parking outlined in the Penrith Development Control Plan (DCP) E18 Luddenham Road Industrial Business Park. A summary of the rates is outlined in Table 6-1.

Table 6-1 Parking requirements for Luddenham Road Industrial Business Park (Source: Penrith DCP E18 Luddenham Road Industrial Business Park)

Activity	Parking requirement
Freight transport facilities	1 per transport vehicle present at peak vehicle accumulation plus 1 per 2 employees, or to be determined by a car parking survey of a comparable facility
Industries	1 space per 200 m^2 GFA or 1 space per 2 employees, whichever is the greater
Vehicle body repair workshops/ vehicle repair stations	3 spaces per 100 m^2 GFA or 6 per work bay, whichever is the greater
Warehouses or distribution centres	**1 space per 300 m^2 GFA or 1 space per 4 employees, whichever is the greater**
Ancillary office space	**1 space per 40 m^2 GFA**
Neighbourhood shops	1 space per 40 m^2 of gross leasable floor area (GLFA)
Accessible parking	Accessible car spaces should be in accordance with the Access to Premises Standards, Building Code of Australia and AS2890.
Bicycle parking	1 space per 600 m^2 GFA of office and retail space (over 1200 m^2 GFA) 1 space per 1000m^2 GFA of industrial activities (over 2000 m^2 GFA)
Electric vehicle	1 space per 40 car spaces
Car share	1 space per 40 car spaces
Electric bicycle	A charging station for electric bicycles is provided for the first 5 bicycle spaces within a development, and for every 10 bicycle spaces thereafter
Motorcycle parking	1 space per 10 car spaces

6.1 Proposed parking provisions

The parking provisions for the site are identified in the Penrith DCP E18 Luddenham Road Industrial Park. The minimum requirements stipulated in the Penrith DCP aims to ensure that the development functions efficiently and there is limited impact on street parking and congestion. The car parking requirements for warehouse developments are:

- 1 space per 300 m^2 of warehouse GFA.
- 1 space per 40 m^2 of GFA for ancillary office spaces.

An assessment of the parking requirements for the proposed development is provided in Table 6-2.

Table 6-2 Parking requirements

Land use	Area (m^2)	Parking rate	Parking requirement (spaces)
Storage and distribution warehouse	45,449		
Warehouse	43,606	1 space per 300 m^2 GFA	146
Office	1,843	1 space per 40 m^2 GFA	46
		Total	**192**

The current construction plans for the storage and distribution warehouse facility indicate 246 private vehicle car spaces will be provided for the development. This exceeds the expected minimum parking demand generated by the proposal according to Penrith DCP E18.

Electric vehicle parking

As outlined in the Penrith DCP E18 Luddenham Road Industrial Business Park, electric vehicle parking and charging stations are to be integrated into car park design on the development site. This includes:

- Charging stations to be located within or immediately adjacent to the parking spaces.
- The charging stations to be located clear of pedestrian paths of travel and do not impede desire lines.
- A provision for electric vehicle parking of is identified as one space per 40 car spaces.

To meet the Penrith DCP E18 Luddenham Road Industrial Business Park controls, at least seven car spaces must be designated for electric vehicles with charging stations. The Penrith DCP E18 Luddenham Road Industrial Business Park controls outline all car parking spaces should be designed to be easily converted into electric charging stations.

Car share parking

The Penrith DCP E18 Luddenham Road Industrial Business Park outlines car share parking rates for the development. One space per 40 car spaces will be allocated for car share. To meet the requirements outlined in the Penrith DCP, at least seven car spaces are to be provided for car sharing spaces.

Motorcycle parking

The motorcycle parking requirements are outlined in the Penrith DCP E18 Luddenham Road Industrial Business Park. The site-specific controls outline one motorcycle space per 10 car spaces. To meet the minimum requirements, the site must provide at least 25 motorcycle spaces.

6.2 Accessible parking

As outlined in Part C10 of the Penrith Developmental Control Plan (DCP), accessible parking is to be provided in accordance with the Disability (Access to Premises – Buildings) Standards 2010 from the Building Code of Australia and Australian Standard AS 2890.

The accessible (disabled) parking requirements in the Disability (Access to Premises – Buildings) Standards states for offices (Class 5) and warehouses (Class 7) should be provided at the rate of one space for every 100 car spaces or part thereof.

Accessible (disabled) spaces within the industrial development are to be designed in accordance with the Australian Standard AS 2890.6 for accessible (disabled) parking. These parking spaces shall be designed with minimum dimensions of 2.4-metre width and 5.4-metre length with an aisle width of 5.8 metres.

For the proposal to meet the requirements stipulated in the Penrith DCP, the development will be required to provide at least three accessible parking spaces.

6.3 Bicycle parking

Regarding bicycle parking and end-of-trip facilities, the Penrith DCP E18 Luddenham Road Industrial Business Park permits bicycle parking to be in secure, visible, and accessible locations, and provided with weather protection, in accordance with AS2890.3:1993 Bicycle Parking Facilities.

The following associated facilities are to be provided:

- For ancillary office and retail space with a gross floor area over 2,500 m^2, at least one shower cubicle with ancillary change rooms.
- For industrial activities with a gross floor area over 4,000 m^2, at least one shower cubicle with ancillary change rooms.
- Change and shower facilities for cyclists and are to be conveniently located close to the bicycle storage areas.
- Where the building is to be strata-titled, the bicycle storage facilities and shower/ change facilities are to be made available to all occupants of the building.

In terms of overall bicycle parking provision, the Penrith DCP E18 Luddenham Road Industrial Business Park provides the following bicycle parking rates for the site:

- 1 space per 600 m^2 GFA of office and retail space (over 1,200 m^2 GFA)
- 1 space per 1,000 m^2 GFA of industrial activities (over 2,000 m^2).

As the proposal is developed, appropriate bicycle parking and storage will be provided in accordance with the Penrith DCP. A total of 46 bicycle parking spaces must be provided on site.

6.3.1 Electric bicycle parking

Requirements for electric bicycle facilities are set out in the Penrith DCP E18 Luddenham Road Industrial Business Park. Charging stations will be provided on-site at a rate in accordance with the DCP as the proposal is developed.

Charging stations for electric bicycles should be provided for the first five bicycle spaces within a development, and for every 10 bicycle spaces afterwards. A total of five electric bicycle charging station will be provided at the completion of the proposal.

6.4 Parking summary

The storage and distribution warehouse development currently includes a provision of a total of 246 private vehicle car spaces, which meets the minimum parking requirement of 194 car spaces. From the 246 car spaces proposed:

- At least seven car spaces with charging stations for electric vehicles.
- At least seven spaces should be provided as car share spaces.
- At least 25 spaces should be provided for motorcycles.
- At least three accessible parking spaces should be provided.

The bicycle parking rates required to meet the requirements specified in the Penrith DCP have been outlined in this report and will be accommodated during the proposal development.

In summary, the parking demand generated by the land uses will be met on-site and will meet the requirements set out in the Penrith DCP E18 Luddenham Road Industrial Business Park. Current site plans for the car parking and manoeuvring were deemed to be satisfactory after being assessed against AS 2890 Parts 1, 2 and 6, and the Penrith DCP.

7 Access and internal design assessment

7.1 Site access and internal configuration layout

The development plans show four vehicle access points along the eastern side of the warehouse boundary, within AIBP's internal road network. Light and passenger vehicle access is separated from heavy vehicle access, with dedicated entry/exit driveways provided for each within the development.

Light vehicles will be permitted to enter/exit the private vehicle carpark from two separate access points, with one located roughly at the centre of the eastern boundary and the other further towards the south. There are 246 LV car spots located within the pervious parking area, to be used for staff and customers during warehouse operations.

The truck entry access to the hardstand is provided on the southern boundary of the site, with the hardstand wrapping around the warehouse. To facilitate smooth traffic flow, all heavy vehicles will travel in a clockwise direction around the hardstand to reach the truck exit, located on the northern boundary of the site. All docks have been designed for right hand down movements.

A range of heavy vehicle facilities have been provided on the hardstand, including docking stations (on-grade and recessed docks), heavy vehicle parking bays, pallet van parking a waste collection point, service zones and a weighbridge.

7.2 Car parking

A total of 246 private vehicle parking spaces are accessible along the eastern site boundary of the warehouse. The design of the parking area complies with the guidance on driveway access into the development, warehouses and car parking spaces shown in AS 2890.1 Off-street car parking. Provisions for accessible parking spaces, as identified in Section 5.2, should be considered in accordance with AS 2890.6 Parking facilities Off-street parking for people with disabilities.

In addition, the hardstand accommodates 64 heavy rigid vehicle (HRV) and 19 B-double parking spaces. Vehicle movements on the hardstand have been designed for one-way traffic flow in a clockwise direction. This will reduce the risk of congestion for heavy vehicles manoeuvring through the site during operations. A swept path analysis indicated the design of the hardstand is acceptable for B-double movements (Appendix B).

7.3 Pedestrian access

Along the frontage of the site, the road reserve width is sufficient to accommodate footpaths along both sides of the road in accordance with the requirements of the Penrith DCP. It is anticipated that the frontage onto Luddenham Road and Patons Lane will have footpaths as part of the Luddenham Road widening construction works. Within the site, pedestrian access is provided to the office and warehouse, via the pedestrian gate located between the southern private vehicle and truck entry access points. The pedestrian gate and pathway to the warehouse is separate from the light and heavy vehicle access points. This will allow pedestrians clear access from the building into the broader pedestrian network outside the site.

Within the site, pedestrian pathways have been clearly identified within the warehouse. Delineation of pathways for pedestrians across the hardstand have been provided from the heavy vehicle parking areas to access the two dock offices at the northern and southern sections of the hardstand.

8 Summary

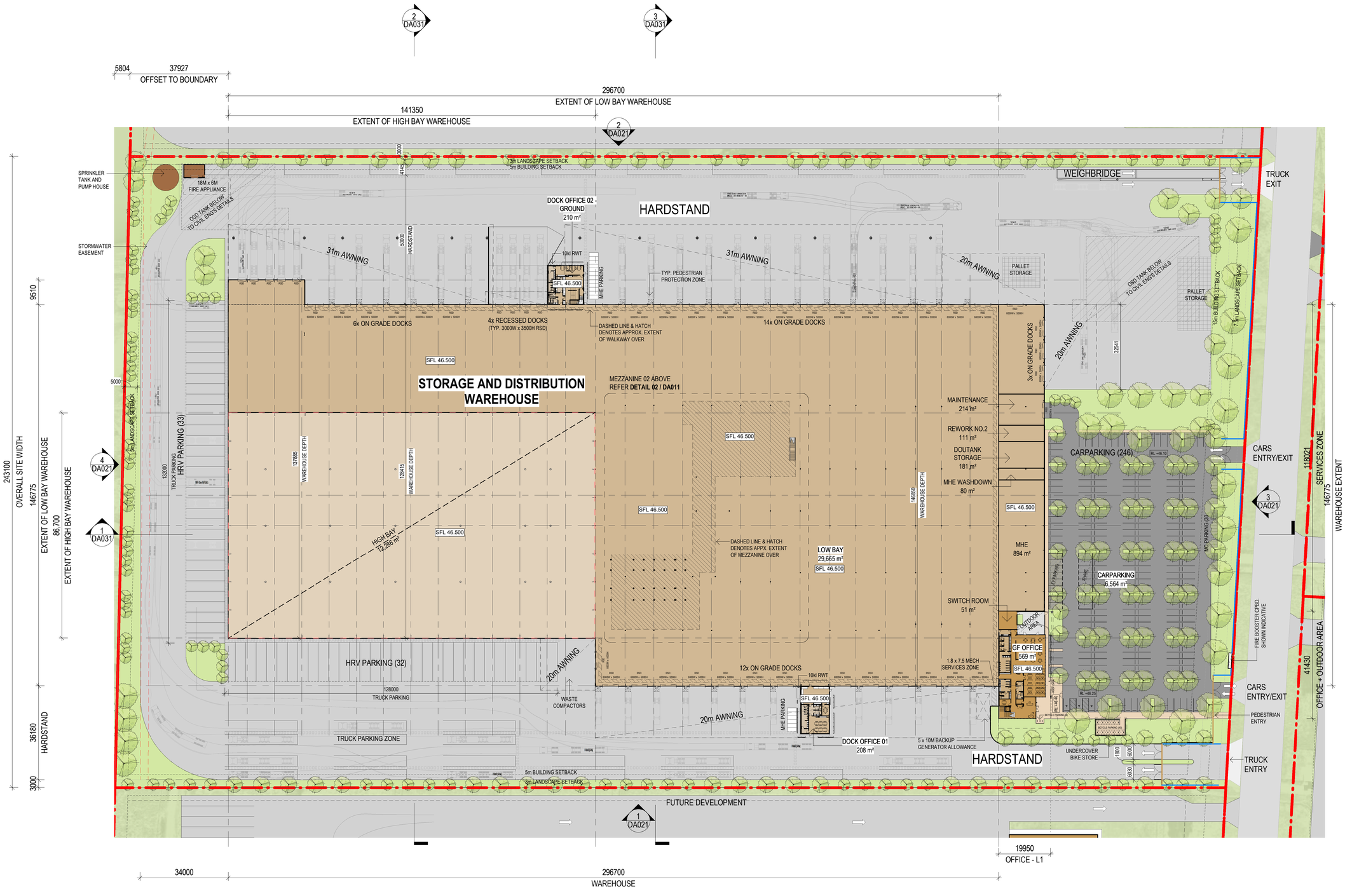
The proposal is for the development of a 104,959 m^2 parcel of land as part of Alspec Industrial Business Park (AIBP) construction. The Storage and Distribution warehouse development comprises a 43,606 m^2 warehouse, 1,843 m^2 between two offices office, 30,939 m^2 hardstand, and supports car parking for both heavy and light vehicles.

The key findings of this assessment are:

- Access to the site will be provided via the internal road within the AIBP development with access to the broader road network via Patons Lane or Luddenham Road.
- The traffic demands associated with the potential development during construction and the operation of the site is expected to be accommodated safely.
- The provided car parking meets the anticipated demands generated by the site. Provisions for accessible parking and bicycle parking will be accommodated during further development of the proposal.
- The internal configuration of the site has been designed in accordance with Penrith City Council's DCP and the relevant Australian Standards.

It is therefore concluded that the proposed Storage and Distribution warehouse development at the subject site of 221 Luddenham Road, Orchard Hills, is supportable on traffic planning grounds.

Appendix A Site plans



STORAGE AND DISTRIBUTION...
LUDDENHAM ROAD, ORCHARD HILLS

SITE AREA (m²)	**104,959**
Total Building Foot Print	44,593
WAREHOUSE AREA - GROUND FLOOR TOTAL (m²)	**41,950**
LOW BAY AREA (m²)	29,665
HIGH BAY AREA (m²)	12,285
WAREHOUSE AREA - MEZZANINES TOTAL (m²)	**2,708**
MEZZANINE 1 AREA (m²)	2,385
MEZZANINE 2 AREA (m²)	323
TOTAL WAREHOUSE AREA (m²)	**44,658**
MHE	894
MHE WASHDOWN	80
MAINTENANCE	214
REWORK NO.02	111
DOUTANK STORAGE	181
SWITCHROOM - MSB	51
PUMP ROOM AND TANKS	125
TOTAL SERVICES AREA (m²)	**1,656**
WAREHOUSE & SERVICES AREA	**46,314**
DOCK OFFICE 01(m²)	208
DOCK OFFICE 02 (m²) - Ground	210
DOCK OFFICE 02 (m²) - Level 1	210
MAIN OFFICE (m²) - Ground	569
MAIN OFFICE (m²) - Level 1	646
TOTAL OFFICE AREA (m²)	**1,843**
TOTAL GLA AREA	**48,157**
FSR	**0.46**
PARKING	
BICYCLE PARKING	46
MOTORCYCLE PARKING	30
VEHICLE PARKING	
CAR PARKING	246
HRV PARKING	64
B-DOUBLE PARKING	19
TOTAL VEHICLE PARKING	**329**
EXTERNAL AREAS	
CANOPIES	12,062
CAR PARKING	6,564
HARDSTAND	30,939
LANDSCAPE AREA	10,134
LIGHTDUTY CONCRETE	n/a
PAVEMENT - BRUSHED CONCRETE	n/a
PAVEMENT - EXPOSED CONCRETE	570
OUTDOOR AREA	97
TOTAL	48,304
TOTAL	10,134
LANDSCAPE PERCENTAGE	**10%**

Client

Project Name
Alspec Industrial Business Park
Storage and Distribution Warehouse

Project Address
Luddenham Road, Orchard Hills NSW

Drawing Title:
GENERAL ARRANGEMENT PLAN - WAREHOUSE

Date: **23/05/25**
Sheet Size: **A1**
Scale: **1:750**
Drawing Number: **14291_DA010**
Issue: **P5**
0 15000

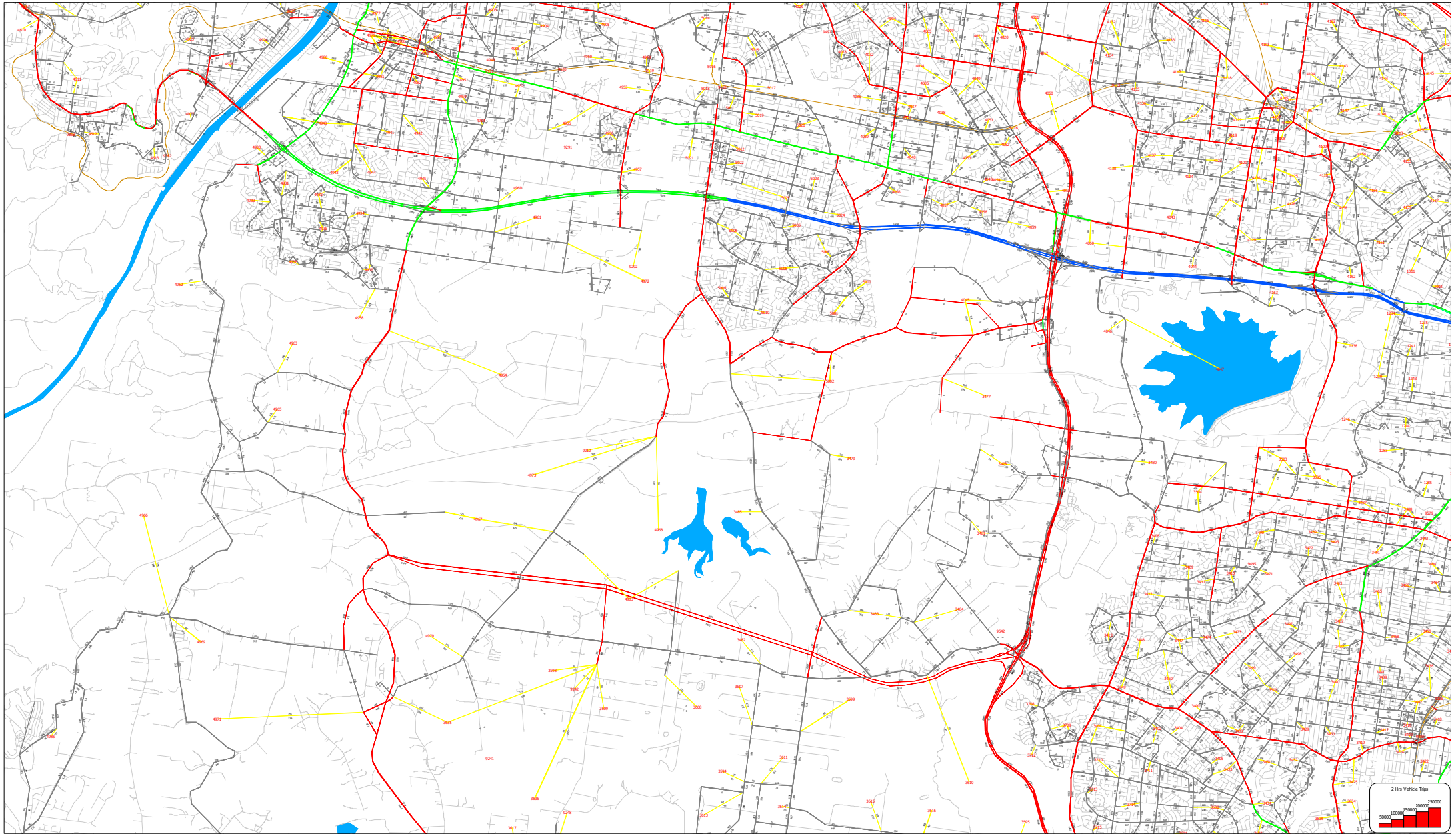
nettletontribe

Appendix B Swept path diagram

3m LANDSCAPE SETBACK
5m BUILDING SETBACK
WEIGHBRIDGE
TRUCK EXIT
5000
18M x 6M FIRE APPLIANCE HARDSTAND
STORM WATER EASEMENT
4x RECESSED DOCKS
DOCK OFFICE 02 - GROUND
210 m²
30m AWNING
141350
31000 AWNING
155350
17550
20m AWNING
5200
6000
9510
6x ON GRADE DOCKS
11x ON GRADE DOCKS
46off LANES
Rework Centre
41683
49665
73388
33982
17550
3x ON GRADE DOCKS
29m AWNING
64250
Keg Palletising Area
15m BUILDING SETBACK
7.5m LANDSCAPE SETBACK
5m LANDSCAPE SETBACK
HRV PARKING (33)
STORAGE AND DISTRIBUTION WAREHOUSE
41,950 m²
MAINTENANCE
214 m²
REWORK NO.2
111 m²
DOUTANK STORAGE
181 m²
CARPARKING (246)
CARS ENTRY/EXIT
31704
156285
126375
11642
86692
43346
HIGH BAY
MHE WASHDOWN
80 m²
147,065 mm
MHE
894 m²
51800
31500
27510
OUTDOOR AREA
GF OFFICE
620 m²
18400
HRV PARKING (32)
HARDSTAND
31,350 m²
20m AWNING
MECH SERVICES ZONE
12x ON GRADE DOCKS
WASTE COMPACTOR
DOCK OFFICE 01
208 m²
36180
5m BUILDING SETBACK
3m LANDSCAPE SETBACK
3000
FUTURE DEVELOPMENT
OFFICE
TRUCK ENTRY

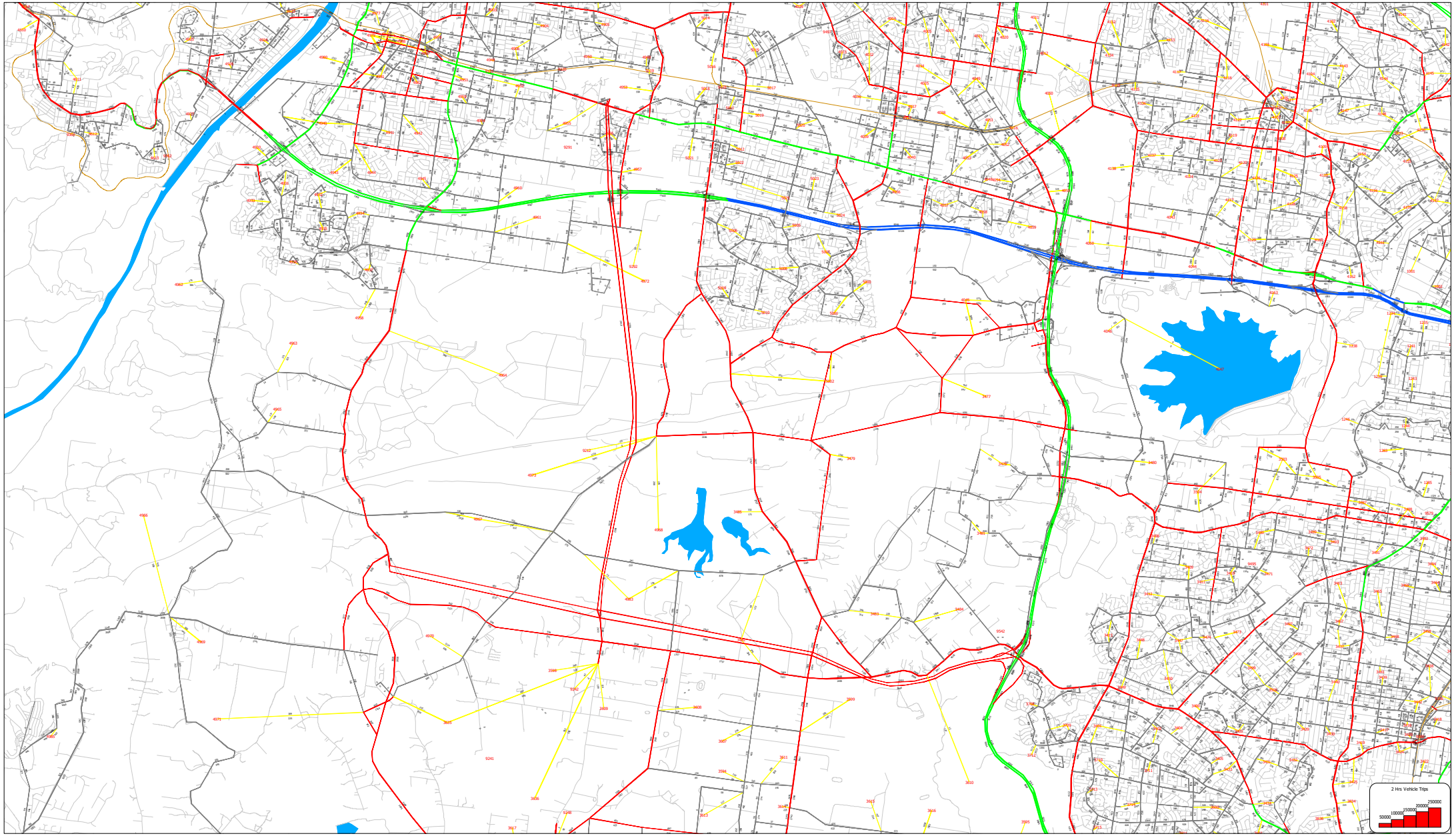
Appendix C STFM outputs

TRAFFIC VOLUMES__



SYDNEY GMA STRATEGIC TRAFFIC FORECASTING MODEL(STFM)
Scenario 2026: 2026 ROAD NETWORK MODEL(TZP19STMV3.8FMMV7.1)-7-9AM(mf34)
2021-12-10 07:09

TRAFFIC VOLUMES__



SYDNEY GMA STRATEGIC TRAFFIC FORECASTING MODEL(STFM)
Scenario 20360: 2036 ROAD NETWORK MODEL(TZP19STMV3.8FMMV7.1)-4-6PM(mf56)
2021-12-10 07:10

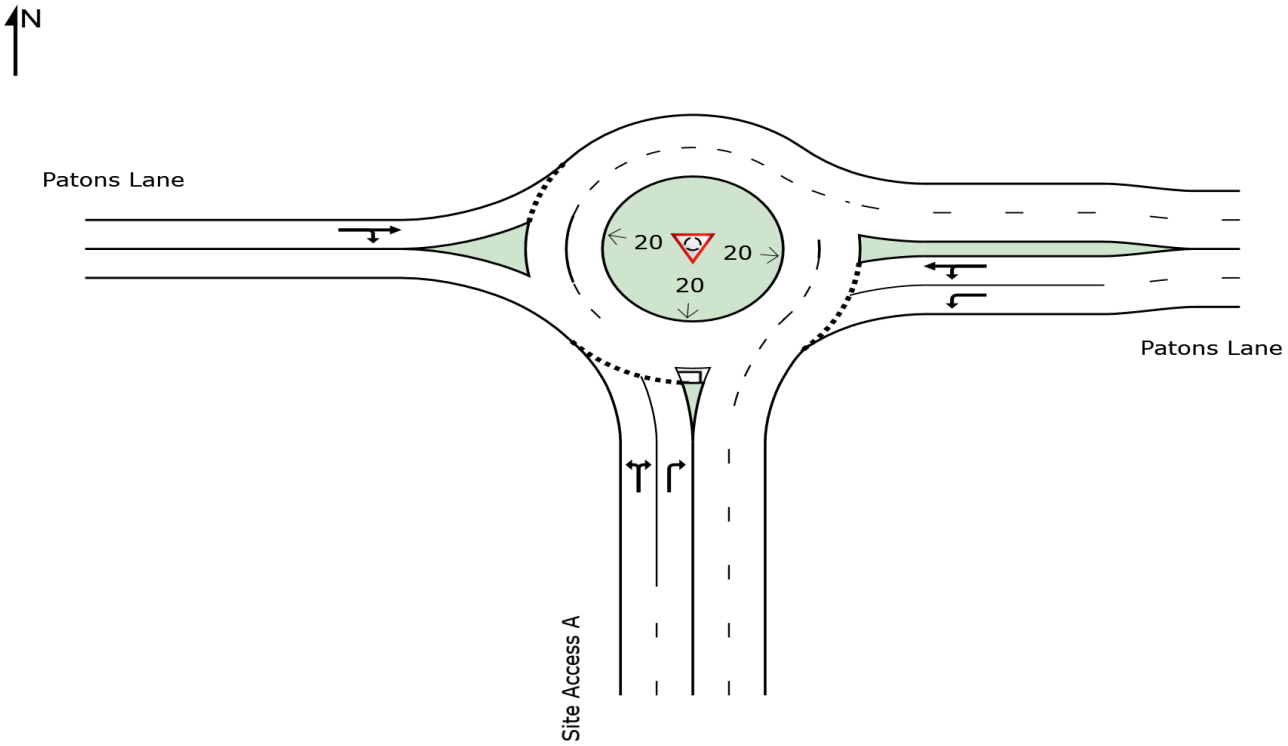
Appendix D SIDRA outputs – operations

SITE LAYOUT

Site: [Patons Ln/Site Access A - AM Peak - Storage Scenario A (Site Folder: Storage and Distribution - Scenario A 2027 - AM)]

NA
Site Category: NA
Roundabout

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



MOVEMENT SUMMARY

Site: [Patons Ln/Site Access A - AM Peak - Storage Scenario A (Site Folder: Storage and Distribution - Scenario A 2027 - AM)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

NA
Site Category: NA
Roundabout

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: Site Access A															
1	L2	All MCs	1	0.0	1	0.0	0.059	4.7	LOS A	0.3	3.9	0.36	0.58	0.36	47.5
		LV	1		1		0.059	4.7	LOS A	0.3	3.9	NA	NA	NA	47.5
		HV	0		0		-	-	-	-	-	NA	NA	NA	-
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
3	R2	All MCs	96	76.9	96	76.9	0.059	9.9	LOS A	0.3	4.1	0.37	0.58	0.37	34.5
		LV	22		22		0.059	9.2	LOS A	0.3	4.1	NA	NA	NA	34.8
		HV	52		52		0.059	9.9	LOS A	0.3	4.1	NA	NA	NA	34.5
		TR	22		22		0.059	10.7	LOS A	0.3	4.1	NA	NA	NA	34.1
Approach			97	76.1	97	76.1	0.059	9.9	LOS A	0.3	4.1	0.37	0.58	0.37	34.6
East: Patons Lane															
4	L2	All MCs	269	28.5	269	28.5	0.152	4.5	LOS A	0.7	6.7	0.02	0.48	0.02	47.0
		LV	193		193		0.152	4.5	LOS A	0.7	6.9	NA	NA	NA	47.0
		HV	54		54		0.152	4.5	LOS A	0.7	6.9	NA	NA	NA	47.0
		TR	23		23		0.152	4.5	LOS A	0.7	6.9	NA	NA	NA	47.0
5	T1	All MCs	146	27.3	146	27.3	0.152	4.3	LOS A	0.7	6.7	0.02	0.42	0.02	53.6
		LV	106		106		0.152	4.3	LOS A	0.7	6.7	NA	NA	NA	53.6
		HV	32		32		0.152	4.3	LOS A	0.7	6.7	NA	NA	NA	53.6
		TR	8		8		0.152	4.3	LOS A	0.7	6.7	NA	NA	NA	53.6
Approach			416	28.1	416	28.1	0.152	4.4	LOS A	0.7	6.9	0.02	0.46	0.02	49.5
West: Patons Lane															
11	T1	All MCs	53	66.0	53	66.0	0.069	5.8	LOS A	0.3	3.3	0.32	0.47	0.32	50.9
		LV	18		18		0.069	5.3	LOS A	0.3	3.3	NA	NA	NA	51.4
		HV	32		32		0.069	6.0	LOS A	0.3	3.3	NA	NA	NA	50.7
		TR	3		3		0.069	6.5	LOS A	0.3	3.3	NA	NA	NA	50.4
12	R2	All MCs	1	0.0	1	0.0	0.069	9.3	LOS A	0.3	3.3	0.32	0.47	0.32	51.2
		LV	1		1		0.069	9.3	LOS A	0.3	3.3	NA	NA	NA	51.2
		HV	0		0		-	-	-	-	-	NA	NA	NA	-
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			54	64.7	54	64.7	0.069	5.9	LOS A	0.3	3.3	0.32	0.47	0.32	50.9
All Vehicles			566	39.8	566	39.8	0.152	5.5	LOS A	0.7	6.9	0.11	0.48	0.11	46.5

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.
Roundabout 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.

MOVEMENT SUMMARY

Site: [Patons Ln/Site Access A - PM Peak - Storage Scenario A (Site Folder: Storage and Distribution - Scenario A 2027 - PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

NA
Site Category: NA
Roundabout

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: Site Access A															
1	L2	All MCs	1	0.0	1	0.0	0.072	4.3	LOS A	0.3	3.2	0.13	0.59	0.13	49.3
		LV	1		1		0.072	4.3	LOS A	0.3	3.2	NA	NA	NA	49.3
		HV	0		0		-	-	-	-	-	NA	NA	NA	-
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
3	R2	All MCs	188	25.7	188	25.7	0.072	9.2	LOS A	0.3	3.2	0.14	0.59	0.14	42.6
		LV	140		140		0.072	9.2	LOS A	0.3	3.2	NA	NA	NA	42.7
		HV	36		36		0.072	9.3	LOS A	0.3	3.2	NA	NA	NA	42.5
		TR	13		13		0.072	9.4	LOS A	0.3	3.2	NA	NA	NA	42.5
Approach			189	25.6	189	25.6	0.072	9.2	LOS A	0.3	3.2	0.14	0.59	0.14	42.7
East: Patons Lane															
4	L2	All MCs	148	67.4	148	67.4	0.079	4.9	LOS A	0.4	4.5	0.02	0.48	0.02	41.4
		LV	48		48		0.079	4.9	LOS A	0.4	4.7	NA	NA	NA	41.4
		HV	69		69		0.079	4.9	LOS A	0.4	4.7	NA	NA	NA	41.4
		TR	31		31		0.079	4.9	LOS A	0.4	4.7	NA	NA	NA	41.4
5	T1	All MCs	26	48.0	26	48.0	0.079	4.5	LOS A	0.4	4.5	0.02	0.46	0.02	52.9
		LV	14		14		0.079	4.5	LOS A	0.4	4.5	NA	NA	NA	52.9
		HV	9		9		0.079	4.5	LOS A	0.4	4.5	NA	NA	NA	52.9
		TR	3		3		0.079	4.5	LOS A	0.4	4.5	NA	NA	NA	52.9
Approach			175	64.5	175	64.5	0.079	4.8	LOS A	0.4	4.7	0.02	0.48	0.02	43.1
West: Patons Lane															
11	T1	All MCs	252	12.1	252	12.1	0.263	5.5	LOS A	1.2	9.6	0.38	0.50	0.38	52.1
		LV	221		221		0.263	5.3	LOS A	1.2	9.6	NA	NA	NA	52.3
		HV	22		22		0.263	6.7	LOS A	1.2	9.6	NA	NA	NA	51.2
		TR	8		8		0.263	7.7	LOS A	1.2	9.6	NA	NA	NA	50.3
12	R2	All MCs	1	100.0	1	100.0	0.263	12.4	LOS A	1.2	9.6	0.38	0.50	0.38	46.3
		LV	0		0		-	-	-	-	-	NA	NA	NA	-
		HV	1		1		0.263	12.4	LOS A	1.2	9.6	NA	NA	NA	46.3
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			253	12.5	253	12.5	0.263	5.5	LOS A	1.2	9.6	0.38	0.50	0.38	52.1
All Vehicles			617	31.2	617	31.2	0.263	6.4	LOS A	1.2	9.6	0.21	0.52	0.21	46.7

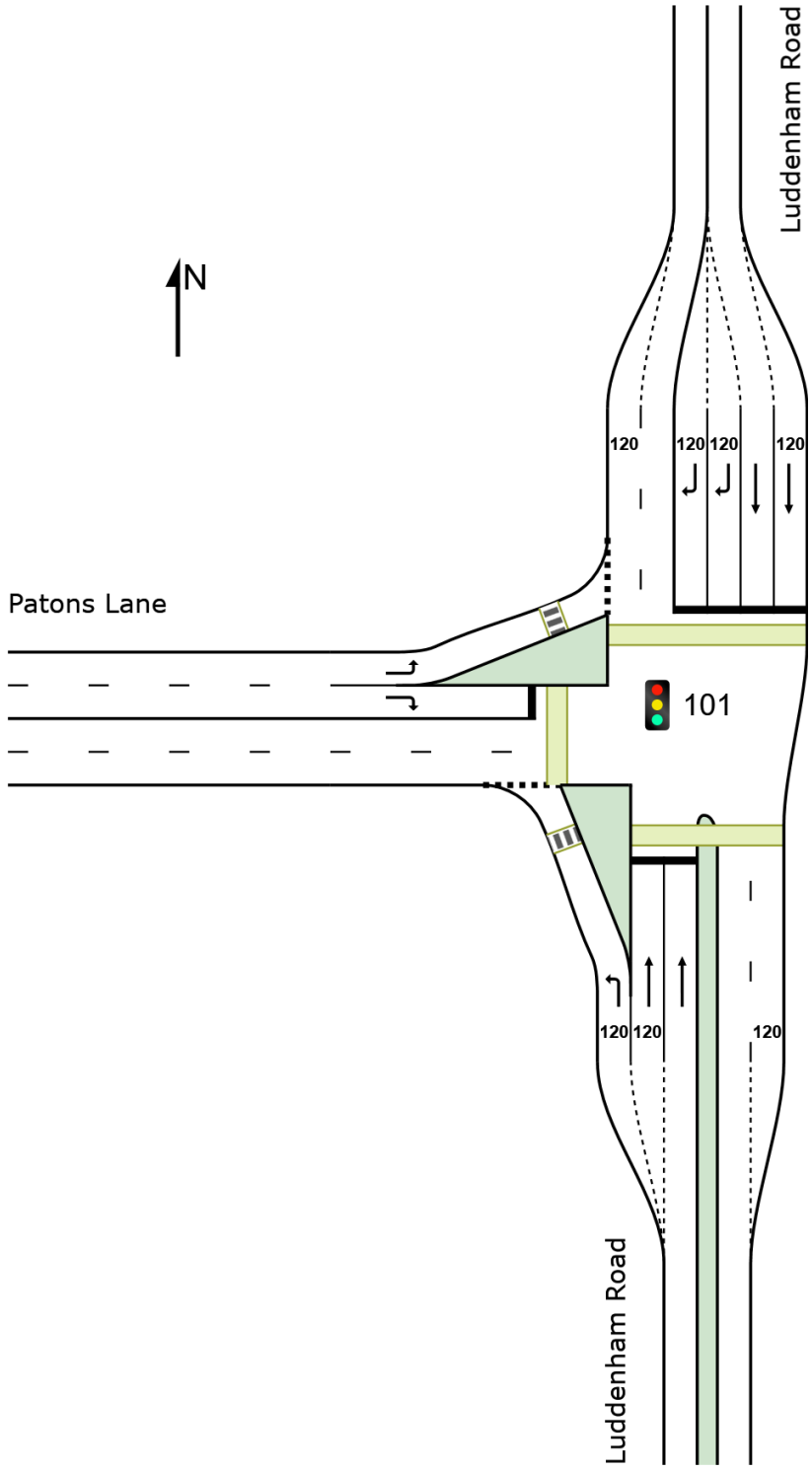
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout 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.

SITE LAYOUT

Site: 101 [Luddenham Rd/Patons Ln - AM Peak- Storage Scenario A (Site Folder: Storage and Distribution - Scenario A 2027 - AM)]

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

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



MOVEMENT SUMMARY

Site: 101 [Luddenham Rd/Patons Ln - AM Peak- Storage Scenario A (Site Folder: Storage and Distribution - Scenario A 2027 - AM)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)

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: Luddenham Road															
1	L2	All MCs	125	30.3	125	30.3	0.123	8.0	LOS A	1.0	10.2	0.28	0.62	0.28	51.8
		LV	87		87		0.123	8.0	LOS A	1.0	10.2	NA	NA	NA	51.8
		HV	27		27		0.123	8.0	LOS A	1.0	10.2	NA	NA	NA	51.8
		TR	11		11		0.123	8.0	LOS A	1.0	10.2	NA	NA	NA	51.8
2	T1	All MCs	667	8.5	667	8.5	*0.554	24.2	LOS B	15.0	117.9	0.79	0.68	0.79	46.6
		LV	611		611		*0.554	24.2	LOS B	15.0	117.9	NA	NA	NA	46.6
		HV	38		38		0.554	24.2	LOS B	15.0	117.9	NA	NA	NA	46.6
		TR	19		19		0.554	24.2	LOS B	15.0	117.9	NA	NA	NA	46.6
Approach			793	12.0	793	12.0	0.554	21.7	LOS B	15.0	117.9	0.71	0.67	0.71	47.2
North: Luddenham Road															
8	T1	All MCs	248	17.4	248	17.4	0.137	6.8	LOS A	2.7	21.6	0.39	0.32	0.39	55.5
		LV	205		205		0.137	6.8	LOS A	2.7	21.6	NA	NA	NA	55.5
		HV	43		43		0.137	6.8	LOS A	2.7	21.6	NA	NA	NA	55.5
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
9	R2	All MCs	291	27.2	291	27.2	*0.549	46.8	LOS D	6.7	63.8	0.95	0.81	0.95	30.5
		LV	212		212		*0.549	46.8	LOS D	6.7	63.8	NA	NA	NA	30.5
		HV	56		56		0.549	46.8	LOS D	6.7	63.8	NA	NA	NA	30.5
		TR	23		23		0.549	46.8	LOS D	6.7	63.8	NA	NA	NA	30.5
Approach			539	22.7	539	22.7	0.549	28.4	LOS B	6.7	63.8	0.69	0.58	0.69	41.0
West: Patons Lane															
10	L2	All MCs	98	75.3	98	75.3	0.173	12.9	LOS A	1.3	18.4	0.39	0.64	0.39	46.0
		LV	24		24		0.173	12.9	LOS A	1.3	18.4	NA	NA	NA	46.0
		HV	53		53		0.173	12.9	LOS A	1.3	18.4	NA	NA	NA	46.0
		TR	21		21		0.173	12.9	LOS A	1.3	18.4	NA	NA	NA	46.0
12	R2	All MCs	52	69.4	52	69.4	*0.269	45.5	LOS D	2.3	30.1	0.89	0.75	0.89	35.2
		LV	16		16		*0.269	45.5	LOS D	2.3	30.1	NA	NA	NA	35.2
		HV	26		26		0.269	45.5	LOS D	2.3	30.1	NA	NA	NA	35.2
		TR	9		9		0.269	45.5	LOS D	2.3	30.1	NA	NA	NA	35.2
Approach			149	73.2	149	73.2	0.269	24.2	LOS B	2.3	30.1	0.56	0.68	0.56	40.7
All Vehicles			1481	22.0	1481	22.0	0.554	24.4	LOS B	15.0	117.9	0.69	0.64	0.69	44.4

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: Luddenham Road												
P1	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	210.9	200.0	0.95
North: Luddenham Road												
P3	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	210.9	200.0	0.95
West: Patons Lane												
P4	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	210.9	200.0	0.95
All Pedestrians		150	158	44.3	LOS E	0.1	0.1	0.94	0.94	210.9	200.0	0.95

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

MOVEMENT SUMMARY

Site: 101 [Luddenham Rd/Patons Ln - PM Peak- Storage Scenario A (Site Folder: Storage and Distribution - Scenario A 2027 - PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)

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: Luddenham Road															
1	L2	All MCs	52	65.3	52	65.3	0.061	7.8	LOS A	0.3	3.9	0.22	0.58	0.22	51.0
		LV	18		18		0.061	7.8	LOS A	0.3	3.9	NA	NA	NA	51.0
		HV	23		23		0.061	7.8	LOS A	0.3	3.9	NA	NA	NA	51.0
		TR	11		11		0.061	7.8	LOS A	0.3	3.9	NA	NA	NA	51.0
2	T1	All MCs	381	4.7	381	4.7	* 0.344	24.9	LOS B	8.2	60.2	0.76	0.63	0.76	46.0
		LV	363		363		* 0.344	24.9	LOS B	8.2	60.2	NA	NA	NA	46.0
		HV	16		16		0.344	24.9	LOS B	8.2	60.2	NA	NA	NA	46.0
		TR	2		2		0.344	24.9	LOS B	8.2	60.2	NA	NA	NA	46.0
Approach			433	11.9	433	11.9	0.344	22.9	LOS B	8.2	60.2	0.70	0.63	0.70	46.5
North: Luddenham Road															
8	T1	All MCs	548	4.6	548	4.6	0.297	10.5	LOS A	7.7	57.1	0.51	0.44	0.51	53.4
		LV	523		523		0.297	10.5	LOS A	7.7	57.1	NA	NA	NA	53.4
		HV	21		21		0.297	10.5	LOS A	7.7	57.1	NA	NA	NA	53.4
		TR	4		4		0.297	10.5	LOS A	7.7	57.1	NA	NA	NA	53.4
9	R2	All MCs	123	65.0	123	65.0	* 0.332	46.9	LOS D	2.8	36.6	0.91	0.77	0.91	29.9
		LV	43		43		* 0.332	46.9	LOS D	2.8	36.6	NA	NA	NA	29.9
		HV	56		56		0.332	46.9	LOS D	2.8	36.6	NA	NA	NA	29.9
		TR	24		24		0.332	46.9	LOS D	2.8	36.6	NA	NA	NA	29.9
Approach			672	15.7	672	15.7	0.332	17.2	LOS B	7.7	57.1	0.58	0.50	0.58	48.5
West: Patons Lane															
10	L2	All MCs	312	18.2	312	18.2	0.324	9.0	LOS A	3.1	27.5	0.34	0.65	0.34	49.6
		LV	255		255		0.324	9.0	LOS A	3.1	27.5	NA	NA	NA	49.6
		HV	39		39		0.324	9.0	LOS A	3.1	27.5	NA	NA	NA	49.6
		TR	18		18		0.324	9.0	LOS A	3.1	27.5	NA	NA	NA	49.6
12	R2	All MCs	128	17.2	128	17.2	* 0.336	39.5	LOS C	5.2	45.6	0.86	0.78	0.86	37.8
		LV	106		106		* 0.336	39.5	LOS C	5.2	45.6	NA	NA	NA	37.8
		HV	15		15		0.336	39.5	LOS C	5.2	45.6	NA	NA	NA	37.8
		TR	7		7		0.336	39.5	LOS C	5.2	45.6	NA	NA	NA	37.8
Approach			440	17.9	440	17.9	0.336	17.9	LOS B	5.2	45.6	0.49	0.69	0.49	44.5
All Vehicles			1544	15.3	1544	15.3	0.344	19.0	LOS B	8.2	60.2	0.59	0.59	0.59	46.9

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: Luddenham Road												
P1	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	210.9	200.0	0.95
North: Luddenham Road												
P3	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	210.9	200.0	0.95
West: Patons Lane												
P4	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	210.9	200.0	0.95
All Pedestrians		150	158	44.3	LOS E	0.1	0.1	0.94	0.94	210.9	200.0	0.95

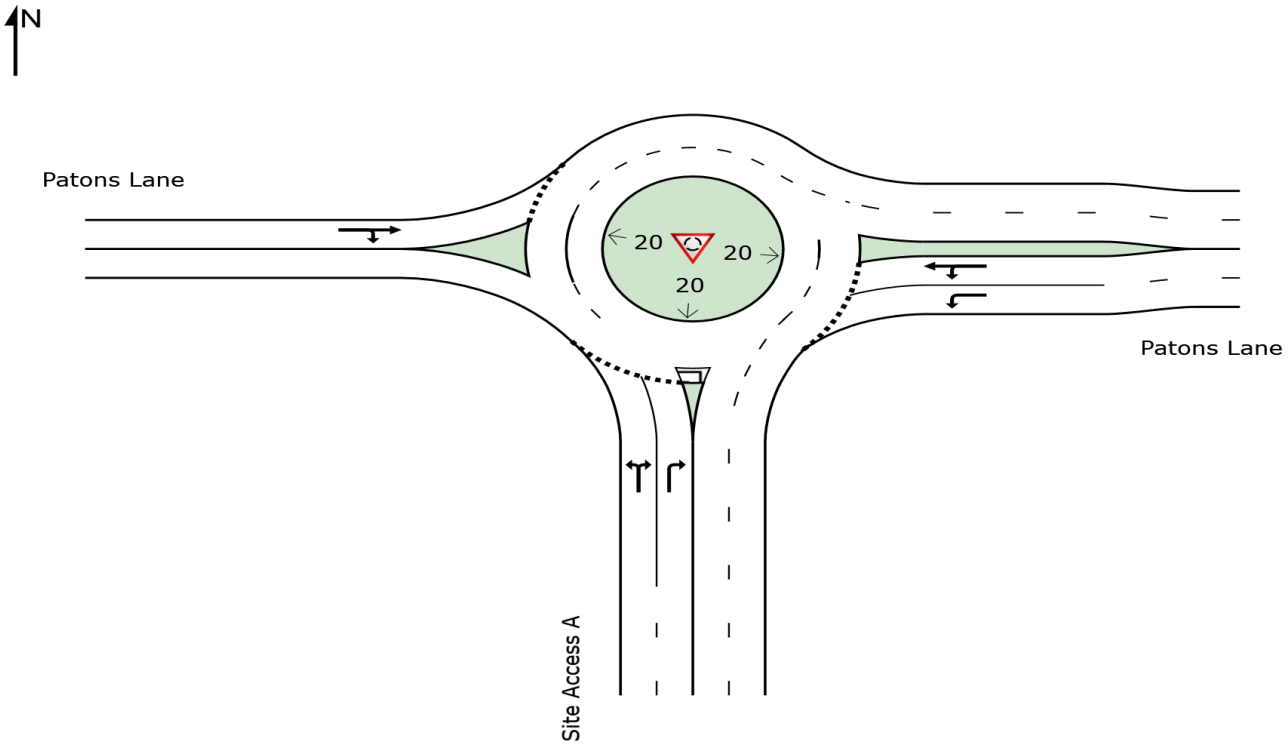
Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: [Patons Ln/Site Access A - AM Peak - Storage Scenario B (Site Folder: Storage and Distribution - Scenario B 2036 - AM)]

NA
Site Category: NA
Roundabout

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



MOVEMENT SUMMARY

Site: [Patons Ln/Site Access A - AM Peak - Storage Scenario B (Site Folder: Storage and Distribution - Scenario B 2036 - AM)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

NA
Site Category: NA
Roundabout

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: Site Access A															
1	L2	All MCs	1	100.0	1	100.0	0.092	5.9	LOS A	0.4	4.2	0.23	0.59	0.23	45.5
		LV	0		0		-	-	-	-	-	NA	NA	NA	-
		HV	1		1		0.092	5.9	LOS A	0.4	4.2	NA	NA	NA	45.5
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
3	R2	All MCs	221	30.0	221	30.0	0.092	9.5	LOS A	0.4	4.2	0.23	0.59	0.23	45.3
		LV	155		155		0.092	9.4	LOS A	0.4	4.2	NA	NA	NA	45.4
		HV	55		55		0.092	9.8	LOS A	0.4	4.2	NA	NA	NA	45.1
		TR	11		11		0.092	10.1	LOS A	0.4	4.2	NA	NA	NA	44.8
Approach			222	30.3	222	30.3	0.092	9.5	LOS A	0.4	4.2	0.23	0.59	0.23	45.3
East: Patons Lane															
4	L2	All MCs	863	30.0	863	30.0	0.340	4.5	LOS A	2.0	18.2	0.03	0.48	0.03	46.8
		LV	604		604		0.340	4.5	LOS A	2.0	18.8	NA	NA	NA	46.8
		HV	216		216		0.340	4.5	LOS A	2.0	18.8	NA	NA	NA	46.8
		TR	43		43		0.340	4.5	LOS A	2.0	18.8	NA	NA	NA	46.8
5	T1	All MCs	84	10.0	84	10.0	0.340	4.2	LOS A	2.0	18.2	0.03	0.47	0.03	54.0
		LV	76		76		0.340	4.2	LOS A	2.0	18.2	NA	NA	NA	54.0
		HV	8		8		0.340	4.2	LOS A	2.0	18.2	NA	NA	NA	54.0
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			947	28.2	947	28.2	0.340	4.4	LOS A	2.0	18.8	0.03	0.48	0.03	47.5
West: Patons Lane															
11	T1	All MCs	53	14.0	53	14.0	0.058	5.4	LOS A	0.2	1.7	0.36	0.50	0.36	52.2
		LV	45		45		0.058	5.2	LOS A	0.2	1.7	NA	NA	NA	52.4
		HV	7		7		0.058	6.5	LOS A	0.2	1.7	NA	NA	NA	51.3
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
12	R2	All MCs	1	100.0	1	100.0	0.058	12.1	LOS A	0.2	1.7	0.36	0.50	0.36	47.0
		LV	0		0		-	-	-	-	-	NA	NA	NA	-
		HV	1		1		0.058	12.1	LOS A	0.2	1.7	NA	NA	NA	47.0
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			54	15.7	54	15.7	0.058	5.5	LOS A	0.2	1.7	0.36	0.50	0.36	52.1
All Vehicles			1223	28.1	1223	28.1	0.340	5.4	LOS A	2.0	18.8	0.08	0.50	0.08	47.3

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.
Roundabout 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.

MOVEMENT SUMMARY

Site: [Patons Ln/Site Access A - PM Peak - Storage Scenario B (Site Folder: Storage and Distribution - Scenario B 2036 - PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

NA
Site Category: NA
Roundabout

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: Site Access A															
1	L2	All MCs	1	100.0	1	100.0	0.240	5.9	LOS A	1.3	12.5	0.24	0.58	0.24	45.4
		LV	0		0		-	-	-	-	-	NA	NA	NA	-
		HV	1		1		0.240	5.9	LOS A	1.3	12.5	NA	NA	NA	45.4
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
3	R2	All MCs	600	30.0	600	30.0	0.240	9.5	LOS A	1.3	12.6	0.25	0.58	0.25	45.3
		LV	420		420		0.240	9.4	LOS A	1.3	12.6	NA	NA	NA	45.4
		HV	150		150		0.240	9.8	LOS A	1.3	12.6	NA	NA	NA	45.0
		TR	30		30		0.240	10.2	LOS A	1.3	12.6	NA	NA	NA	44.7
Approach			601	30.1	601	30.1	0.240	9.5	LOS A	1.3	12.6	0.25	0.58	0.25	45.3
East: Patons Lane															
4	L2	All MCs	400	30.0	400	30.0	0.169	4.5	LOS A	0.9	8.3	0.02	0.48	0.02	46.8
		LV	280		280		0.169	4.5	LOS A	0.9	8.3	NA	NA	NA	46.8
		HV	100		100		0.169	4.5	LOS A	0.9	8.3	NA	NA	NA	46.8
		TR	20		20		0.169	4.5	LOS A	0.9	8.3	NA	NA	NA	46.8
5	T1	All MCs	74	11.0	74	11.0	0.169	4.2	LOS A	0.9	7.7	0.02	0.46	0.02	54.0
		LV	66		66		0.169	4.2	LOS A	0.9	7.7	NA	NA	NA	54.0
		HV	8		8		0.169	4.2	LOS A	0.9	7.7	NA	NA	NA	54.0
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			474	27.0	474	27.0	0.169	4.4	LOS A	0.9	8.3	0.02	0.48	0.02	48.1
West: Patons Lane															
11	T1	All MCs	84	10.0	84	10.0	0.117	6.9	LOS A	0.4	3.3	0.53	0.65	0.53	51.5
		LV	76		76		0.117	6.6	LOS A	0.4	3.3	NA	NA	NA	51.7
		HV	8		8		0.117	9.8	LOS A	0.4	3.3	NA	NA	NA	49.2
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
12	R2	All MCs	1	100.0	1	100.0	0.117	15.5	LOS B	0.4	3.3	0.53	0.65	0.53	46.2
		LV	0		0		-	-	-	-	-	NA	NA	NA	-
		HV	1		1		0.117	15.5	LOS B	0.4	3.3	NA	NA	NA	46.2
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			85	11.1	85	11.1	0.117	7.0	LOS A	0.4	3.3	0.53	0.65	0.53	51.4
All Vehicles			1160	27.5	1160	27.5	0.240	7.3	LOS A	1.3	12.6	0.18	0.54	0.18	46.9

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.
Roundabout 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

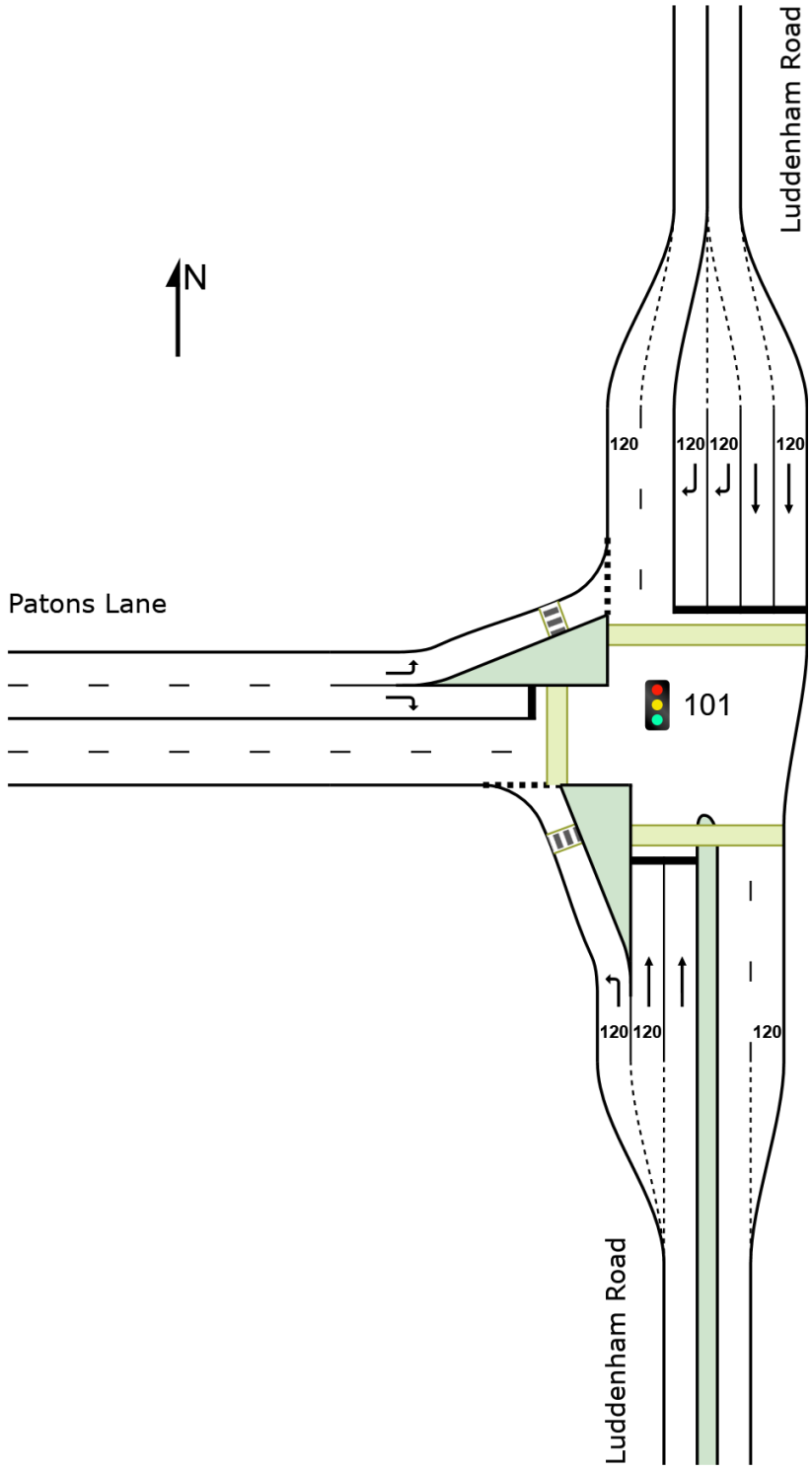
Constraint effects.

SITE LAYOUT

Site: 101 [Luddenham Rd/Patons Ln - AM Peak- Storage Scenario B (Site Folder: Storage and Distribution - Scenario B 2036 - AM)]

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

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



MOVEMENT SUMMARY

Site: 101 [Luddenham Rd/Patons Ln - AM Peak- Storage Scenario B (Site Folder: Storage and Distribution - Scenario B 2036 - AM)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)

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: Luddenham Road															
1	L2	All MCs	305	22.0	305	22.0	0.338	12.3	LOS A	5.6	49.8	0.51	0.71	0.51	49.6
		LV	238		238		0.338	12.3	LOS A	5.6	49.8	NA	NA	NA	49.6
		HV	52		52		0.338	12.3	LOS A	5.6	49.8	NA	NA	NA	49.6
		TR	15		15		0.338	12.3	LOS A	5.6	49.8	NA	NA	NA	49.6
2	T1	All MCs	800	10.0	800	10.0	*0.851	38.3	LOS C	24.9	189.5	0.95	0.90	1.05	41.0
		LV	720		720		*0.851	38.3	LOS C	24.9	189.5	NA	NA	NA	41.0
		HV	80		80		0.851	38.3	LOS C	24.9	189.5	NA	NA	NA	41.0
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			1105	13.3	1105	13.3	0.851	31.1	LOS C	24.9	189.5	0.83	0.85	0.90	42.9
North: Luddenham Road															
8	T1	All MCs	495	10.0	495	10.0	0.255	7.6	LOS A	5.9	44.5	0.43	0.37	0.43	55.1
		LV	445		445		0.255	7.6	LOS A	5.9	44.5	NA	NA	NA	55.1
		HV	49		49		0.255	7.6	LOS A	5.9	44.5	NA	NA	NA	55.1
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
9	R2	All MCs	653	30.0	653	30.0	*0.846	52.1	LOS D	17.5	164.4	1.00	0.96	1.22	29.0
		LV	457		457		*0.846	52.1	LOS D	17.5	164.4	NA	NA	NA	29.0
		HV	163		163		0.846	52.1	LOS D	17.5	164.4	NA	NA	NA	29.0
		TR	33		33		0.846	52.1	LOS D	17.5	164.4	NA	NA	NA	29.0
Approach			1147	21.4	1147	21.4	0.846	32.9	LOS C	17.5	164.4	0.75	0.70	0.88	38.9
West: Patons Lane															
10	L2	All MCs	179	30.0	179	30.0	0.233	15.3	LOS B	3.2	30.2	0.49	0.69	0.49	46.0
		LV	125		125		0.233	15.3	LOS B	3.2	30.2	NA	NA	NA	46.0
		HV	45		45		0.233	15.3	LOS B	3.2	30.2	NA	NA	NA	46.0
		TR	9		9		0.233	15.3	LOS B	3.2	30.2	NA	NA	NA	46.0
12	R2	All MCs	95	30.0	95	30.0	*0.362	45.2	LOS D	4.2	39.1	0.91	0.78	0.91	35.8
		LV	66		66		*0.362	45.2	LOS D	4.2	39.1	NA	NA	NA	35.8
		HV	24		24		0.362	45.2	LOS D	4.2	39.1	NA	NA	NA	35.8
		TR	5		5		0.362	45.2	LOS D	4.2	39.1	NA	NA	NA	35.8
Approach			274	30.0	274	30.0	0.362	25.7	LOS B	4.2	39.1	0.64	0.72	0.64	41.1
All Vehicles			2526	18.8	2526	18.8	0.851	31.3	LOS C	24.9	189.5	0.77	0.77	0.86	41.0

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: Luddenham Road												
P1	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	210.9	200.0	0.95
North: Luddenham Road												
P3	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	210.9	200.0	0.95
West: Patons Lane												
P4	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	210.9	200.0	0.95
All Pedestrians		150	158	44.3	LOS E	0.1	0.1	0.94	0.94	210.9	200.0	0.95

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

MOVEMENT SUMMARY

Site: 101 [Luddenham Rd/Patons Ln - PM Peak- Storage Scenario B (Site Folder: Storage and Distribution - Scenario B 2036 - PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)

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: Luddenham Road															
1	L2	All MCs	158	30.0	158	30.0	0.156	8.2	LOS A	1.4	13.3	0.30	0.63	0.30	51.8
		LV	111		111		0.156	8.2	LOS A	1.4	13.3	NA	NA	NA	51.8
		HV	39		39		0.156	8.2	LOS A	1.4	13.3	NA	NA	NA	51.8
		TR	8		8		0.156	8.2	LOS A	1.4	13.3	NA	NA	NA	51.8
2	T1	All MCs	505	10.0	505	10.0	*0.555	31.2	LOS C	12.5	95.1	0.86	0.73	0.86	43.6
		LV	455		455		*0.555	31.2	LOS C	12.5	95.1	NA	NA	NA	43.6
		HV	51		51		0.555	31.2	LOS C	12.5	95.1	NA	NA	NA	43.6
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			663	14.8	663	14.8	0.555	25.7	LOS B	12.5	95.1	0.73	0.71	0.73	45.2
North: Luddenham Road															
8	T1	All MCs	684	10.0	684	10.0	0.409	13.3	LOS A	11.2	85.0	0.58	0.50	0.58	52.0
		LV	616		616		0.409	13.3	LOS A	11.2	85.0	NA	NA	NA	52.0
		HV	68		68		0.409	13.3	LOS A	11.2	85.0	NA	NA	NA	52.0
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
9	R2	All MCs	316	30.0	316	30.0	*0.573	46.3	LOS D	7.2	67.9	0.95	0.81	0.95	30.6
		LV	221		221		*0.573	46.3	LOS D	7.2	67.9	NA	NA	NA	30.6
		HV	79		79		0.573	46.3	LOS D	7.2	67.9	NA	NA	NA	30.6
		TR	16		16		0.573	46.3	LOS D	7.2	67.9	NA	NA	NA	30.6
Approach			1000	16.3	1000	16.3	0.573	23.7	LOS B	11.2	85.0	0.70	0.60	0.70	44.8
West: Patons Lane															
10	L2	All MCs	463	30.0	463	30.0	0.531	12.8	LOS A	7.8	73.4	0.51	0.72	0.51	47.5
		LV	324		324		0.531	12.8	LOS A	7.8	73.4	NA	NA	NA	47.5
		HV	116		116		0.531	12.8	LOS A	7.8	73.4	NA	NA	NA	47.5
		TR	23		23		0.531	12.8	LOS A	7.8	73.4	NA	NA	NA	47.5
12	R2	All MCs	221	30.0	221	30.0	*0.573	40.0	LOS C	9.5	89.0	0.91	0.82	0.91	37.4
		LV	155		155		*0.573	40.0	LOS C	9.5	89.0	NA	NA	NA	37.4
		HV	55		55		0.573	40.0	LOS C	9.5	89.0	NA	NA	NA	37.4
		TR	11		11		0.573	40.0	LOS C	9.5	89.0	NA	NA	NA	37.4
Approach			684	30.0	684	30.0	0.573	21.6	LOS B	9.5	89.0	0.64	0.75	0.64	43.0
All Vehicles			2347	19.9	2347	19.9	0.573	23.7	LOS B	12.5	95.1	0.69	0.67	0.69	44.4

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: Luddenham Road												
P1	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	210.9	200.0	0.95
North: Luddenham Road												
P3	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	210.9	200.0	0.95
West: Patons Lane												
P4	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	210.9	200.0	0.95
All Pedestrians		150	158	44.3	LOS E	0.1	0.1	0.94	0.94	210.9	200.0	0.95

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

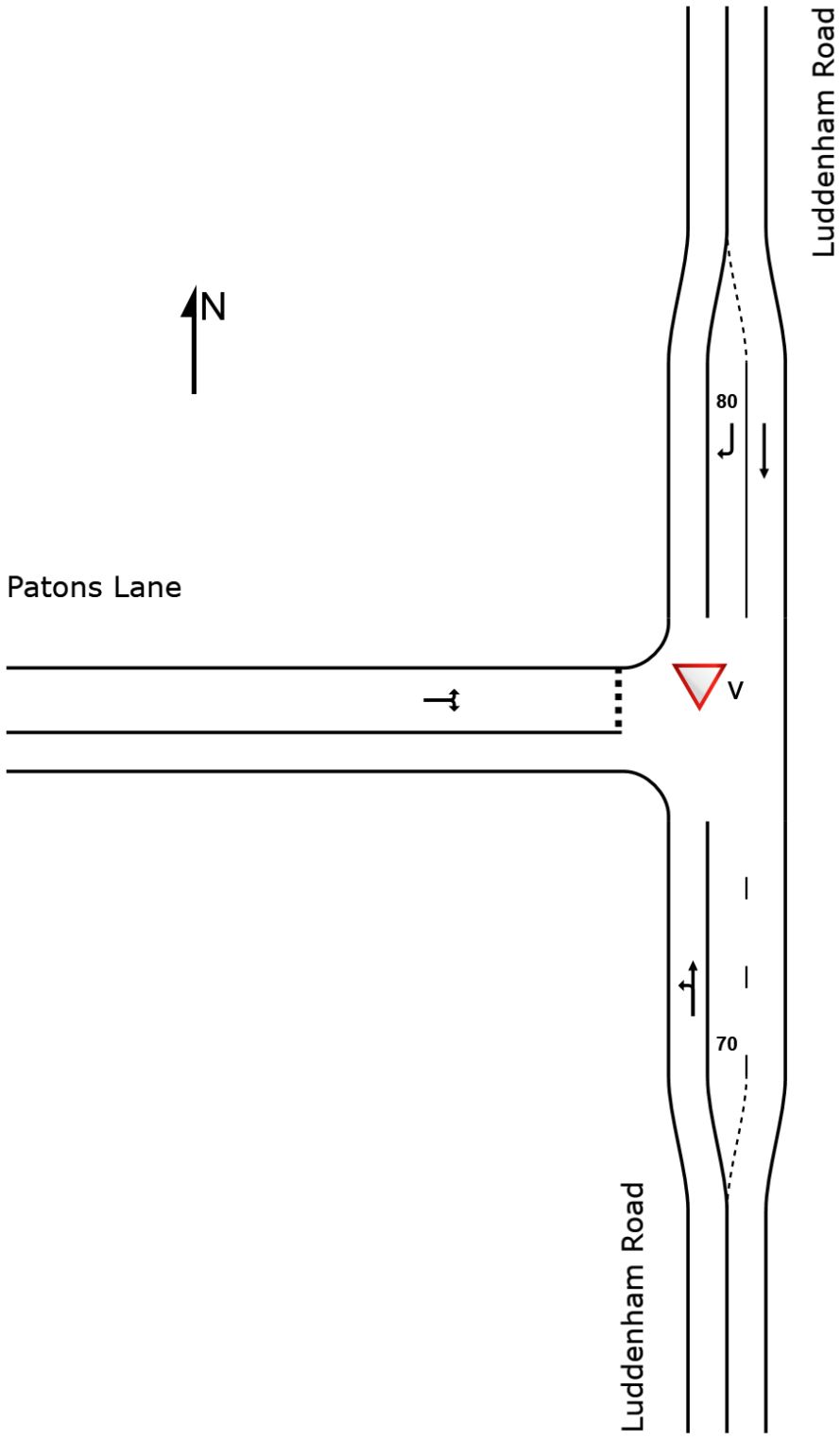
Appendix E SIDRA outputs – construction

SITE LAYOUT

Site: v [Luddenham Rd/Patons Ln (2025) - AM Peak - Base Case (Site Folder: AM Base Case - 2025 Survey)]

NA
Site Category: (None)
Give-Way (Two-Way)

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



MOVEMENT SUMMARY

Site: v [Luddenham Rd/Patons Ln (2025) - AM Peak - Base Case (Site Folder: AM Base Case - 2025 Survey)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

NA
Site Category: (None)
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: Luddenham Road															
1	L2	All MCs	25	45.8	25	45.8	0.353	7.9	LOS A	0.0	0.0	0.00	0.03	0.00	63.4
		LV	14		14		0.353	7.9	LOS A	0.0	0.0	NA	NA	NA	63.4
		HV	12		12		0.353	7.9	LOS A	0.0	0.0	NA	NA	NA	63.4
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
2	T1	All MCs	620	5.8	620	5.8	0.353	0.1	LOS A	0.0	0.0	0.00	0.03	0.00	79.5
		LV	584		584		0.353	0.1	LOS A	0.0	0.0	NA	NA	NA	79.5
		HV	36		36		0.353	0.1	LOS A	0.0	0.0	NA	NA	NA	79.5
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			645	7.3	645	7.3	0.353	0.4	NA	0.0	0.0	0.00	0.03	0.00	78.8
North: Luddenham Road															
8	T1	All MCs	237	17.3	237	17.3	0.141	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
		LV	196		196		0.141	0.0	LOS A	0.0	0.0	NA	NA	NA	79.9
		HV	41		41		0.141	0.0	LOS A	0.0	0.0	NA	NA	NA	79.9
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
9	R2	All MCs	58	30.9	58	30.9	0.102	11.8	LOS A	0.3	2.8	0.57	0.84	0.57	49.8
		LV	40		40		0.102	10.2	LOS A	0.3	2.8	NA	NA	NA	51.1
		HV	18		18		0.102	15.5	LOS B	0.3	2.8	NA	NA	NA	47.1
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			295	20.0	295	20.0	0.141	2.3	NA	0.3	2.8	0.11	0.17	0.11	73.8
West: Patons Lane															
10	L2	All MCs	23	68.2	23	68.2	0.268	17.9	LOS B	0.9	9.5	0.84	0.97	0.96	30.7
		LV	7		7		0.268	11.7	LOS A	0.9	9.5	NA	NA	NA	32.7
		HV	16		16		0.268	20.8	LOS B	0.9	9.5	NA	NA	NA	29.9
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
12	R2	All MCs	21	60.0	21	60.0	0.268	42.9	LOS D	0.9	9.5	0.84	0.97	0.96	40.9
		LV	8		8		0.268	21.5	LOS B	0.9	9.5	NA	NA	NA	51.2
		HV	13		13		0.268	57.1	LOS E	0.9	9.5	NA	NA	NA	36.0
Approach			44	64.3	44	64.3	0.268	29.8	LOS C	0.9	9.5	0.84	0.97	0.96	35.7
All Vehicles			984	13.7	984	13.7	0.353	2.3	NA	0.9	9.5	0.07	0.11	0.08	74.2

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.

MOVEMENT SUMMARY

Site: v [Luddenham Rd/Patons Ln (2025) - PM Peak - Base Case (Site Folder: PM Base Case - 2025 Survey)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

NA
Site Category: (None)
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: Luddenham Road															
1	L2	All MCs	3	0.0	3	0.0	0.194	7.0	LOS A	0.0	0.0	0.00	0.01	0.00	74.4
		LV	3		3		0.194	7.0	LOS A	0.0	0.0	NA	NA	NA	74.4
		HV	0		0		-	-	-	-	-	NA	NA	NA	-
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
2	T1	All MCs	362	4.7	362	4.7	0.194	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	79.8
		LV	345		345		0.194	0.1	LOS A	0.0	0.0	NA	NA	NA	79.8
		HV	17		17		0.194	0.1	LOS A	0.0	0.0	NA	NA	NA	79.8
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			365	4.6	365	4.6	0.194	0.1	NA	0.0	0.0	0.00	0.01	0.00	79.8
North: Luddenham Road															
8	T1	All MCs	539	4.5	539	4.5	0.286	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
		LV	515		515		0.286	0.1	LOS A	0.0	0.0	NA	NA	NA	79.8
		HV	24		24		0.286	0.1	LOS A	0.0	0.0	NA	NA	NA	79.8
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
9	R2	All MCs	11	20.0	11	20.0	0.011	8.7	LOS A	0.0	0.3	0.38	0.64	0.38	52.5
		LV	8		8		0.011	8.3	LOS A	0.0	0.3	NA	NA	NA	52.8
		HV	2		2		0.011	10.1	LOS A	0.0	0.3	NA	NA	NA	51.3
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			549	4.8	549	4.8	0.286	0.2	NA	0.0	0.3	0.01	0.01	0.01	79.3
West: Patons Lane															
10	L2	All MCs	159	11.3	159	11.3	0.888	30.4	LOS C	8.4	63.9	0.93	1.81	3.12	30.8
		LV	141		141		0.888	29.9	LOS C	8.4	63.9	NA	NA	NA	31.0
		HV	18		18		0.888	34.9	LOS C	8.4	63.9	NA	NA	NA	29.5
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
12	R2	All MCs	63	8.3	63	8.3	0.888	84.9	LOS F	8.4	63.9	0.93	1.81	3.12	37.7
		LV	58		58		0.888	72.9	LOS F	8.4	63.9	NA	NA	NA	42.1
		HV	5		5		0.888	217.3	LOS F	8.4	63.9	NA	NA	NA	17.5
Approach			222	10.4	222	10.4	0.888	45.9	LOS D	8.4	63.9	0.93	1.81	3.12	32.9
All Vehicles			1137	5.8	1137	5.8	0.888	9.1	NA	8.4	63.9	0.19	0.36	0.61	65.6

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.

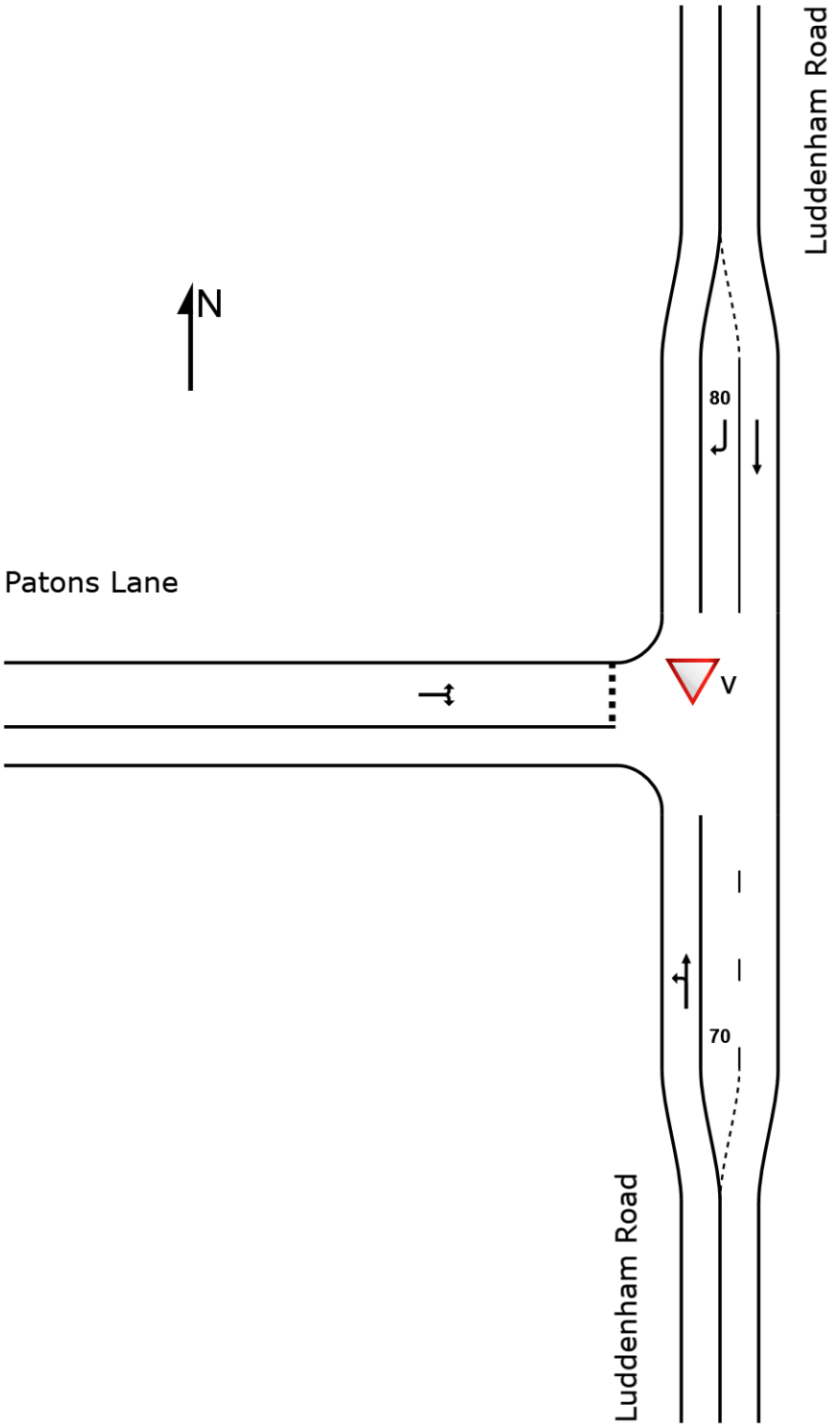
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SITE LAYOUT

Site: v [Luddenham Rd/Patons Ln (2025) - AM Peak - Scenario A (Site Folder: AM EW - Scenario A (Base Case + Metro))]

NA
Site Category: (None)
Give-Way (Two-Way)

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



MOVEMENT SUMMARY

Site: v [Luddenham Rd/Patons Ln (2025) - AM Peak - Scenario A (Site Folder: AM EW - Scenario A (Base Case + Metro))]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

NA
Site Category: (None)
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: Luddenham Road															
1	L2	All MCs	43	34.1	43	34.1	0.365	7.7	LOS A	0.0	0.0	0.00	0.04	0.00	65.5
		LV	28		28		0.365	7.7	LOS A	0.0	0.0	NA	NA	NA	65.5
		HV	11		11		0.365	7.7	LOS A	0.0	0.0	NA	NA	NA	65.5
		TR	4		4		0.365	7.7	LOS A	0.0	0.0	NA	NA	NA	65.5
2	T1	All MCs	620	5.8	620	5.8	0.365	0.1	LOS A	0.0	0.0	0.00	0.04	0.00	79.3
		LV	584		584		0.365	0.1	LOS A	0.0	0.0	NA	NA	NA	79.3
		HV	36		36		0.365	0.1	LOS A	0.0	0.0	NA	NA	NA	79.3
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			663	7.6	663	7.6	0.365	0.6	NA	0.0	0.0	0.00	0.04	0.00	78.3
North: Luddenham Road															
8	T1	All MCs	237	17.3	237	17.3	0.141	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
		LV	196		196		0.141	0.0	LOS A	0.0	0.0	NA	NA	NA	79.9
		HV	41		41		0.141	0.0	LOS A	0.0	0.0	NA	NA	NA	79.9
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
9	R2	All MCs	99	24.5	99	24.5	0.171	11.9	LOS A	0.5	4.5	0.59	0.85	0.59	49.8
		LV	75		75		0.171	10.4	LOS A	0.5	4.5	NA	NA	NA	51.0
		HV	24		24		0.171	16.4	LOS B	0.5	4.5	NA	NA	NA	46.5
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			336	19.4	336	19.4	0.171	3.5	NA	0.5	4.5	0.17	0.25	0.17	70.8
West: Patons Lane															
10	L2	All MCs	29	71.4	29	71.4	0.395	33.4	LOS C	1.3	15.6	0.88	1.05	1.14	27.3
		LV	8		8		0.395	15.1	LOS B	1.3	15.6	NA	NA	NA	32.4
		HV	15		15		0.395	24.4	LOS B	1.3	15.6	NA	NA	NA	29.6
		TR	6		6		0.395	78.7	LOS F	1.3	15.6	NA	NA	NA	19.6
12	R2	All MCs	21	60.0	21	60.0	0.395	52.0	LOS D	1.3	15.6	0.88	1.05	1.14	36.7
		LV	8		8		0.395	26.6	LOS B	1.3	15.6	NA	NA	NA	46.7
		HV	13		13		0.395	69.0	LOS E	1.3	15.6	NA	NA	NA	32.1
Approach			51	66.7	51	66.7	0.395	41.1	LOS C	1.3	15.6	0.88	1.05	1.14	31.2
All Vehicles			1049	14.2	1049	14.2	0.395	3.5	NA	1.3	15.6	0.10	0.16	0.11	71.9

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.

MOVEMENT SUMMARY

Site: v [Luddenham Rd/Patons Ln (2025) - PM Peak - Scenario A (Site Folder: PM EW - Scenario A (Base Case + Metro))]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

NA
Site Category: (None)
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: Luddenham Road															
1	L2	All MCs	6	50.0	6	50.0	0.198	7.9	LOS A	0.0	0.0	0.00	0.01	0.00	62.6
		LV	3		3		0.198	7.9	LOS A	0.0	0.0	NA	NA	NA	62.6
		HV	2		2		0.198	7.9	LOS A	0.0	0.0	NA	NA	NA	62.6
		TR	1		1		0.198	7.9	LOS A	0.0	0.0	NA	NA	NA	62.6
2	T1	All MCs	362	4.7	362	4.7	0.198	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	79.8
		LV	345		345		0.198	0.1	LOS A	0.0	0.0	NA	NA	NA	79.8
		HV	17		17		0.198	0.1	LOS A	0.0	0.0	NA	NA	NA	79.8
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			368	5.4	368	5.4	0.198	0.2	NA	0.0	0.0	0.00	0.01	0.00	79.5
North: Luddenham Road															
8	T1	All MCs	539	4.5	539	4.5	0.286	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
		LV	515		515		0.286	0.1	LOS A	0.0	0.0	NA	NA	NA	79.8
		HV	24		24		0.286	0.1	LOS A	0.0	0.0	NA	NA	NA	79.8
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
9	R2	All MCs	15	35.7	15	35.7	0.018	9.3	LOS A	0.1	0.5	0.40	0.66	0.40	51.9
		LV	9		9		0.018	8.7	LOS A	0.1	0.5	NA	NA	NA	52.4
		HV	5		5		0.018	10.5	LOS A	0.1	0.5	NA	NA	NA	50.9
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			554	5.3	554	5.3	0.286	0.3	NA	0.1	0.5	0.01	0.02	0.01	79.1
West: Patons Lane															
10	L2	All MCs	175	13.9	175	13.9	0.987	57.6	LOS E	14.0	113.2	0.99	2.40	4.58	24.1
		LV	151		151		0.987	55.9	LOS D	14.0	113.2	NA	NA	NA	24.4
		HV	17		17		0.987	61.3	LOS E	14.0	113.2	NA	NA	NA	23.4
		TR	7		7		0.987	84.1	LOS F	14.0	113.2	NA	NA	NA	20.0
12	R2	All MCs	66	7.9	66	7.9	0.987	115.3	LOS F	14.0	113.2	0.99	2.40	4.58	29.9
		LV	61		61		0.987	102.7	LOS F	14.0	113.2	NA	NA	NA	32.7
		HV	5		5		0.987	261.6	LOS F	14.0	113.2	NA	NA	NA	14.9
Approach			241	12.2	241	12.2	0.987	73.5	LOS F	14.0	113.2	0.99	2.40	4.58	25.8
All Vehicles			1163	6.8	1163	6.8	0.987	15.4	NA	14.0	113.2	0.21	0.51	0.95	59.6

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).
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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

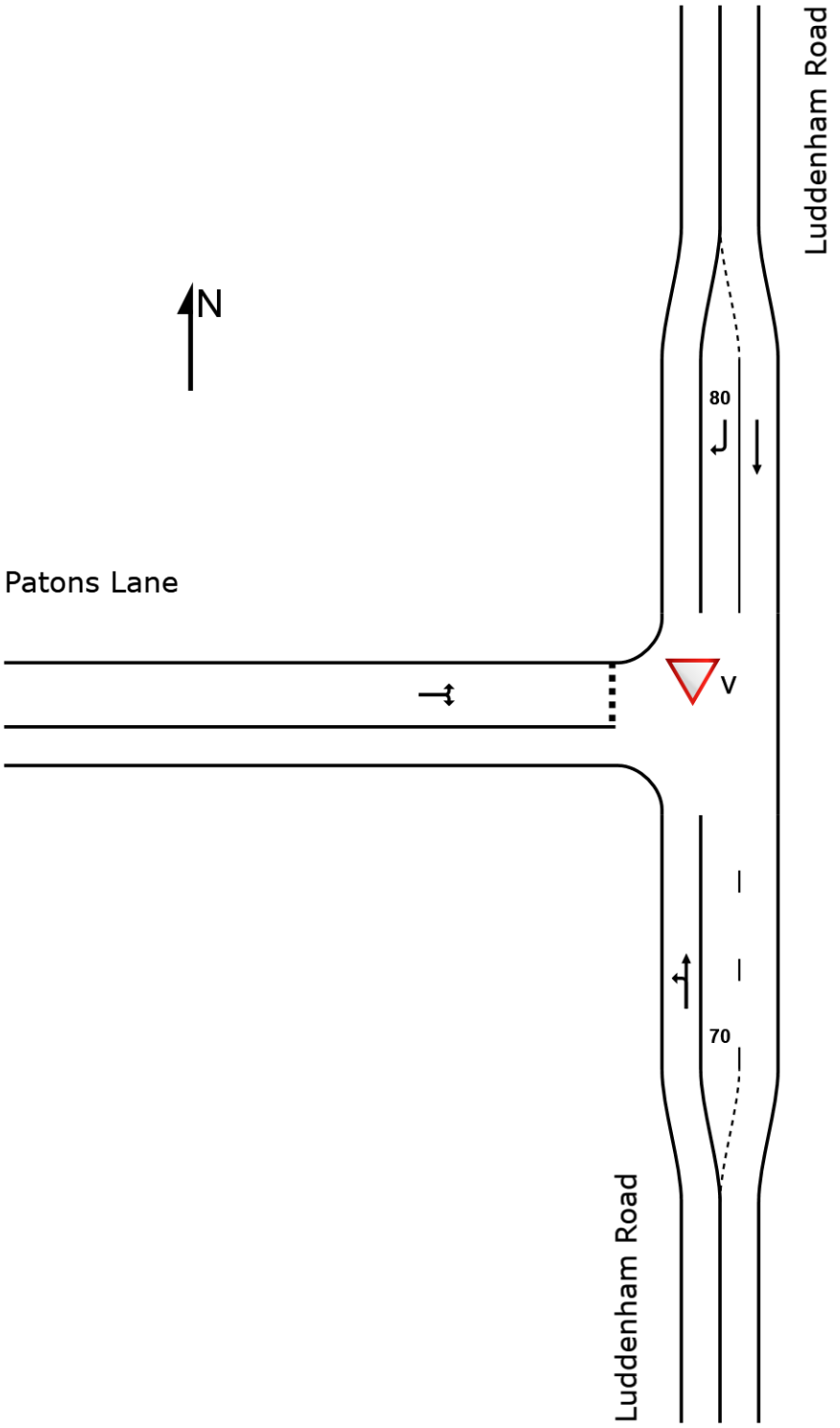
Constraint effects.

SITE LAYOUT

Site: v [Luddenham Rd/Patons Ln (2025) - AM Peak - Scenario B (Site Folder: AM EW - Scenario B (Base Case + Metro + AIBP))]

NA
Site Category: (None)
Give-Way (Two-Way)

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



MOVEMENT SUMMARY

Site: v [Luddenham Rd/Patons Ln (2025) - AM Peak - Scenario B (Site Folder: AM EW - Scenario B (Base Case + Metro + AIBP))]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

NA
Site Category: (None)
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: Luddenham Road															
1	L2	All MCs	81	27.3	81	27.3	0.390	7.6	LOS A	0.0	0.0	0.00	0.07	0.00	66.6
		LV	59		59		0.390	7.6	LOS A	0.0	0.0	NA	NA	NA	66.6
		HV	16		16		0.390	7.6	LOS A	0.0	0.0	NA	NA	NA	66.6
		TR	6		6		0.390	7.6	LOS A	0.0	0.0	NA	NA	NA	66.6
2	T1	All MCs	620	5.8	620	5.8	0.390	0.2	LOS A	0.0	0.0	0.00	0.07	0.00	78.8
		LV	584		584		0.390	0.2	LOS A	0.0	0.0	NA	NA	NA	78.8
		HV	36		36		0.390	0.2	LOS A	0.0	0.0	NA	NA	NA	78.8
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			701	8.3	701	8.3	0.390	1.0	NA	0.0	0.0	0.00	0.07	0.00	77.4
North: Luddenham Road															
8	T1	All MCs	237	17.3	237	17.3	0.141	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
		LV	196		196		0.141	0.0	LOS A	0.0	0.0	NA	NA	NA	79.9
		HV	41		41		0.141	0.0	LOS A	0.0	0.0	NA	NA	NA	79.9
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
9	R2	All MCs	187	23.0	187	23.0	0.342	13.5	LOS A	1.3	11.0	0.67	0.93	0.85	48.6
		LV	144		144		0.342	11.8	LOS A	1.3	11.0	NA	NA	NA	49.9
		HV	43		43		0.342	19.3	LOS B	1.3	11.0	NA	NA	NA	44.6
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			424	19.9	424	19.9	0.342	6.0	NA	1.3	11.0	0.30	0.41	0.38	65.5
West: Patons Lane															
10	L2	All MCs	29	71.4	29	71.4	0.465	36.2	LOS C	1.5	18.2	0.90	1.08	1.24	25.4
		LV	8		8		0.465	17.9	LOS B	1.5	18.2	NA	NA	NA	29.8
		HV	15		15		0.465	27.2	LOS B	1.5	18.2	NA	NA	NA	27.4
		TR	6		6		0.465	81.6	LOS F	1.5	18.2	NA	NA	NA	18.6
12	R2	All MCs	21	60.0	21	60.0	0.465	67.9	LOS E	1.5	18.2	0.90	1.08	1.24	34.3
		LV	8		8		0.465	33.0	LOS C	1.5	18.2	NA	NA	NA	47.3
		HV	13		13		0.465	91.2	LOS F	1.5	18.2	NA	NA	NA	28.9
Approach			51	66.7	51	66.7	0.465	49.4	LOS D	1.5	18.2	0.90	1.08	1.24	29.2
All Vehicles			1176	15.0	1176	15.0	0.465	4.9	NA	1.5	18.2	0.15	0.24	0.19	69.2

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

MOVEMENT SUMMARY

Site: v [Luddenham Rd/Patons Ln (2025) - PM Peak - Scenario B (Site Folder: PM EW - Scenario B (Base Case + Metro + AIBP))]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

NA
Site Category: (None)
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: Luddenham Road															
1	L2	All MCs	6	50.0	6	50.0	0.198	7.9	LOS A	0.0	0.0	0.00	0.01	0.00	62.6
		LV	3		3		0.198	7.9	LOS A	0.0	0.0	NA	NA	NA	62.6
		HV	2		2		0.198	7.9	LOS A	0.0	0.0	NA	NA	NA	62.6
		TR	1		1		0.198	7.9	LOS A	0.0	0.0	NA	NA	NA	62.6
2	T1	All MCs	362	4.7	362	4.7	0.198	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	79.8
		LV	345		345		0.198	0.1	LOS A	0.0	0.0	NA	NA	NA	79.8
		HV	17		17		0.198	0.1	LOS A	0.0	0.0	NA	NA	NA	79.8
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			368	5.4	368	5.4	0.198	0.2	NA	0.0	0.0	0.00	0.01	0.00	79.5
North: Luddenham Road															
8	T1	All MCs	539	4.5	539	4.5	0.286	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
		LV	515		515		0.286	0.1	LOS A	0.0	0.0	NA	NA	NA	79.8
		HV	24		24		0.286	0.1	LOS A	0.0	0.0	NA	NA	NA	79.8
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
9	R2	All MCs	15	35.7	15	35.7	0.018	9.3	LOS A	0.1	0.5	0.40	0.66	0.40	51.9
		LV	9		9		0.018	8.7	LOS A	0.1	0.5	NA	NA	NA	52.4
		HV	5		5		0.018	10.5	LOS A	0.1	0.5	NA	NA	NA	50.9
		TR	0		0		-	-	-	-	-	NA	NA	NA	-
Approach			554	5.3	554	5.3	0.286	0.3	NA	0.1	0.5	0.01	0.02	0.01	79.1
West: Patons Lane															
10	L2	All MCs	234	13.5	234	13.5	1.282	274.1	LOS F	51.7	417.1	1.00	4.98	11.22	9.1
		LV	202		202		1.282	272.3	LOS F	51.7	417.1	NA	NA	NA	9.1
		HV	21		21		1.282	277.8	LOS F	51.7	417.1	NA	NA	NA	9.0
		TR	11		11		1.282	301.0	LOS F	51.7	417.1	NA	NA	NA	8.4
12	R2	All MCs	89	5.9	89	5.9	1.282	329.3	LOS F	51.7	417.1	1.00	4.98	11.22	12.0
		LV	84		84		1.282	319.8	LOS F	51.7	417.1	NA	NA	NA	12.4
		HV	5		5		1.282	481.3	LOS F	51.7	417.1	NA	NA	NA	8.5
Approach			323	11.4	323	11.4	1.282	289.4	LOS F	51.7	417.1	1.00	4.98	11.22	9.9
All Vehicles			1245	6.9	1245	6.9	1.282	75.3	NA	51.7	417.1	0.26	1.30	2.92	32.8

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.
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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 F Green Travel Plan

Industrial Warehouse Development: Storage and Distribution Warehouse

Green Travel Plan

5 June 2025

[Report Title]

HB&B Property

Industrial Warehouse Development: Storage and Distribution Warehouse

Waste Management Plan

5 June 2025

Our Ref:

30088823-TP-06-STORAGE-RPT-02-GTP

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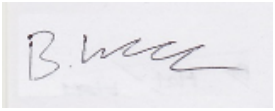

Brandon Williams

Author

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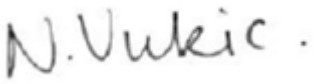


Nicole Vukic

Approver

Version Control

Revision No.	Date Issued	Description	Author	Approver
0.1	10 March 2025	Draft report	B. Williams	N. Vukic
1.0	14 April 2025	Final report	B. Williams	N. Vukic
1.1	5 June 2025	Final report	B. Williams	N. Vukic

Contents

Tables

Figures

Acronyms and abbreviations

Acronym	Definition
AIBP	Alspec Industrial Business Park
GTP	Green Travel Plan
TIA	Traffic Impact Assessment
TAG	Transport Access Guide

1 Introduction

This report has been prepared in support of a development at 221-235 Luddenham Road, Orchard Hills (the site), including detailed approval for a Storage and Distribution Centre. The project seeks to deliver a new a new Storage and Distribution Warehouse within the Alspec Industrial Business Park (AIBP).

Specifically, the project comprises the following:

- Construction of a new warehouse with a two-level ancillary office. The warehouse is predominantly 14.7 metres in height, with a high-bay warehouse component at the western portion of the building which achieves a maximum height of 39 metres.
- A total building area of 45,449 m^2; broken down as follows:
  - Warehouse and services area: 43,606 m^2
  - Office area: 1,843 m^2.
- Loading areas at the north and south sides of the warehouse, with hardstand surrounding the perimeter of the warehouse. Hardstand and carpark areas are accessed via four new driveways from the AIBP internal estate road.
- Provision of vehicular parking onsite to accommodate cars, vans, semi-trailers and B-doubles. It is envisaged that approximately 329 spaces will be provided on site within the proposed hardstand and carparking areas.
- Perimeter landscaping and tree planting with a total area of 10,134 m^2 (10%).

1.1 Background

This Green Travel Plan (GTP) has been prepared to accompany a Traffic Impact Assessment (TIA) for the proposed storage and distribution warehouse development at 221 Luddenham Road, Orchard Hills.

The proposal is to develop a 45,449 m^2 warehouse at the above address to accommodate a mix of warehouse, industrial and office land uses. The development is proposed to be completed in three stages, with various road and other infrastructure works required at each stage.

The subject site is located on Luddenham Road, south of Patons Lane, in Orchard Hills. Situated approximately 30 kilometres west of Parramatta CBD, the proposed Storage and Distribution warehouse is part of the larger Alspec Industrial Business Park (AIBP) development. The AIBP site is irregular in shape, with the Alspec warehouse making up one of many split frontages across both Luddenham Road and Patons Lane.

The site location is shown in Figure 1-1 and current development plans are provided in Figure 1-2.

Figure 1-1 AIBP site location

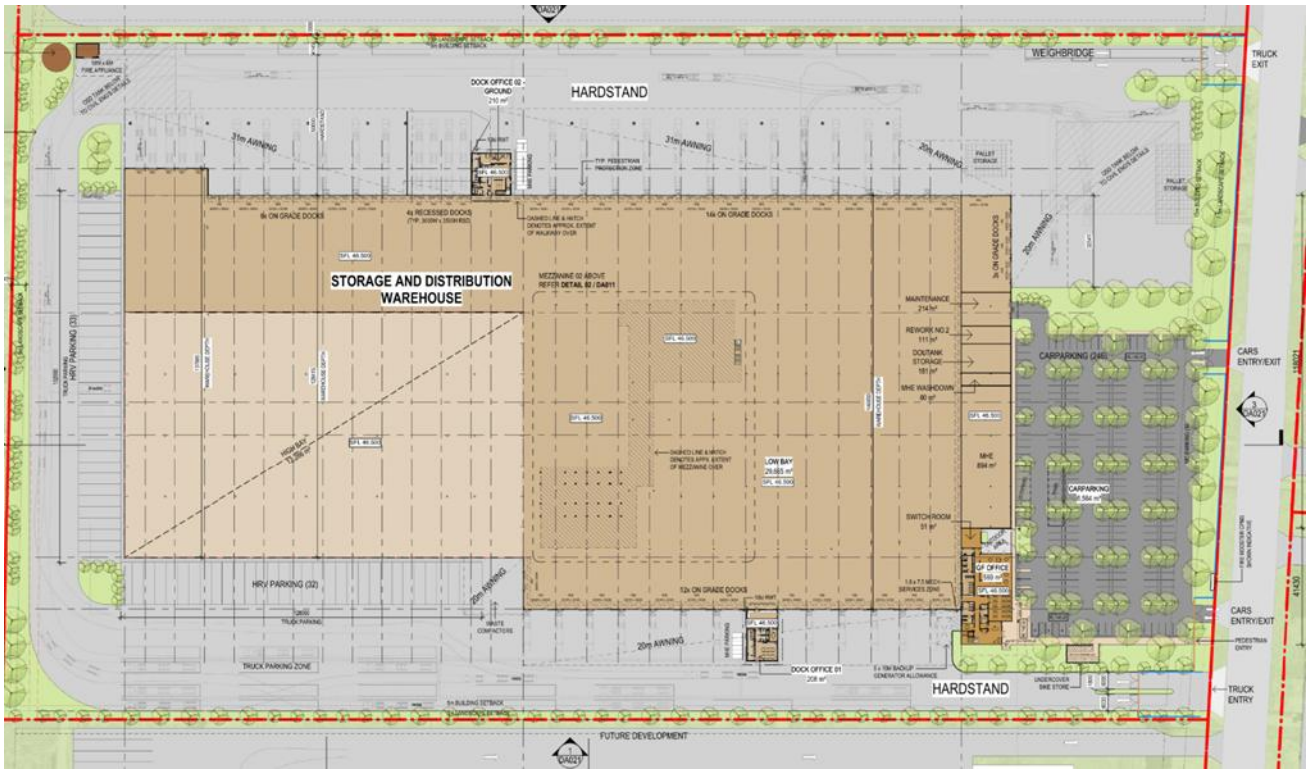


Figure 1-2 Proposed storage and distribution site layout

1.2 Report purpose

The use of private vehicles is a major contributor towards both greenhouse gas emissions and traffic congestion on Sydney's roads, with significant environmental and social costs. As well as delivering better environmental outcomes such as reduced air and noise pollution, the promotion of sustainable travel options will provide both health and social benefits to the community and reduce traffic congestion.

The objective of this GTP is to provide information and recommendations on potential green travel options for commuters to the development site, and to make apparent, encourage and support the use of sustainable travel options.

1.3 Report structure

The report is structured as follows:

- **Section 2: Green Travel Plan measures** provides an overview of the changes to the existing transport use due to the proposed development and summarises actions to encourage sustainable transport opportunities.
- **Section 3: Monitoring and review** provides an overview of ongoing monitoring actions to obtain maximum benefit from the GTP.

2 Subject site

The subject site is located at 221 Luddenham Road, Orchard Hills and has a surface area of 104,959 m^2 (warehouse + hardstand + car park + landscape area). Currently, the site is largely a greenfield development with an underutilised surrounding network, which is expected to undergo significant changes over time.

2.1 Existing transport infrastructure

The following transport infrastructure is available at the subject site as of March 2025.

2.1.1 Active transport infrastructure

There is limited pedestrian or cyclist infrastructure provided close to the site, mainly due to the nature of land use in the vicinity and the limited demand for such facilities at present.

2.1.2 Public transport

A review of the public transport available in the vicinity of the site indicates that there are three bus services (routes 775, 776 and 779) that operate in the St Clair/ Erskine Park area to the northeast of the site. No bus services connect past the site to the south.

There is no existing rail stations close to the site.

Overall, the area is currently underserviced by public transport. Figure 2-1 shows a map of the existing public transport network for the Orchard Hills area and Table 2-1 shows the convenient transport services closest to the development.

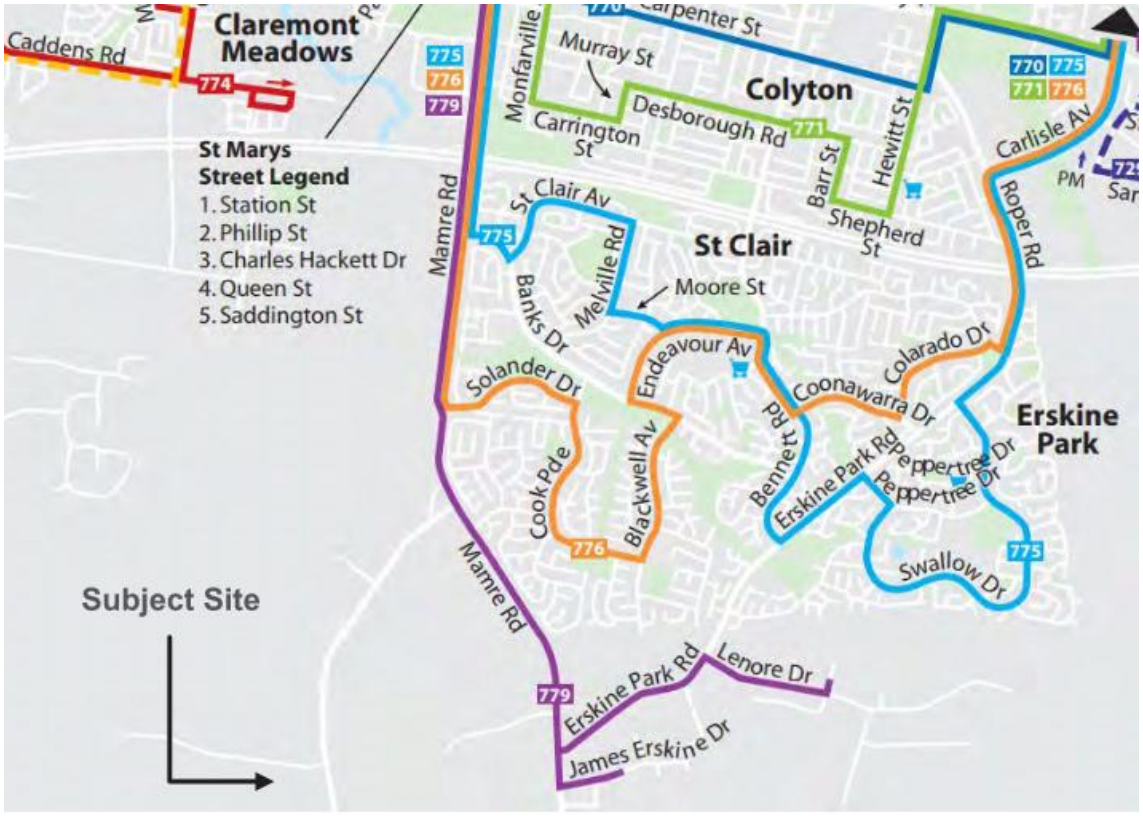


Figure 2-1 Existing public transport network - Orchard Hills area

Table 2-1 Public transport services

Transport system	Closet stop	Route	Route extents	Frequency
Train	St. Marys Station	Blue Mountains Line	Bathurst – Central	Peak: 30min Off Peak: 60min
Bus	St. Clair Avenue/Banks Drive	775	Mount Druitt Station – St Marys Station	Peak: 25min Off Peak: 35min
Bus	Solander Drive after Madison	776	St Marys Station – Mount Druitt Station	Peak: 15min Off Peak: 35min
Bus	Erskine Road/Mamre Road	779	St Marys Station – Emporium Avenue	Peak: 30min Off Peak: 45-60min

2.1.3 Car share and taxi service

Car share and taxi services are available close to the site. However, major centres where is such as Penrith and Blacktown, may be distant from the site to provide quick transport options.

3 Green Travel Plan

3.1 Targets

The area and road network around the site are expected to undergo significant changes over the next 20 years to support the broader Greater Penrith to Eastern Creek (GPEC) Growth Area, Western Sydney Employment Area (WSEA) and the Aerotropolis. The Aerotropolis precinct plan aims to ensure that all developments are within walking distance of the metro station and other public transport services available within proximity. While the site lies just to the north of the Aerotropolis, targets adopted by the area set a good benchmark.

Based on the site location, existing transport infrastructure and the aspirations of the adjacent Aerotropolis Precinct Plan, the following target is developed:

- ≤65% of employees commuting to work by single occupant vehicle by 2036
- ≥30% of the primary mode of travel to be by public transport by 2036.

3.2 Actions

The following section provides recommendations to encourage the use of sustainable transport modes for the workers and visitors of the storage and distribution development. The responsibility of implementing these actions is generally with either the developer or building management depending on the timeframe for the action.

A Transport Access Guide (TAG) will be provided to users of a building or facility, intended to inform of ways to access the site through walking, cycling or public transport. The objective of the TAG is to simplify the process of trip planning for visitors and can assist in increasing the proportion of trips made to the site through public and active transport modes. TAGs are typically updated annually to ensure the information is accurate and up to date.

A TAG has been specifically developed for the storage and distribution warehouse and provided as Appendix A. This will be updated as part of the review process outlined in Section 3.

General measures	Timeframe	Responsible party
Introduce a travel coordinator role to execute the recommendations of this plan. This could potentially be incorporated into the facilities management function.	Prior to occupation	Building Management
Utilise social media opportunities to inform tenants and visitors of available sustainable transport options and facilities. To increase the use of the social media site this could be combined with other useful information including local events and building maintenance activities.	During operation	Building Management
Monitor the mode share, use and demand of facilities to inform future updates of the GTP.	During operation	Building Management
Prepare a Transport Access Guide that is provided to building occupants that details transport options to the site, a public transport map surrounding the site area, and site specific transport provisions. The TAG is recommended to be updated annually with the latest transport details.	Prior to and during operation	Building Management

General measures	Timeframe	Responsible party
Hold Travel Smart Get to Workdays in the form of workshops encouraging employees to travel by walking, cycling and public modes of transport.	During operation	Building Management

Walking measures	Timeframe	Responsible party
Work with other stakeholders to improve wayfinding signage to public transport (bus stops, future rail networks) between the development and nearby infrastructure hubs such as St Clair and Erskine Park.	Prior to occupation	Building Management
Produce a walking map showing safe and pleasurable walking routes to and from the building with times, to local facilities, such as shops and bus stops	Prior to and during operation	Building Management
As part of building management activities, promote walking for short trips in lieu of using a private vehicle.	During operation	Building Management

Cycling measures	Timeframe	Responsible party
Provide at least 46 secure bicycle parking spaces to meet employee and visitor needs. Bicycle spaces to be easily accessible, well-lit and secure.	Prior to occupation	Architect / Contractor
Supply a communal bicycle repair toolkit for employees and visitors.	Prior to occupation	Building Management
Maintain a TAG (updated annually) that effectively informs employees and visitors of: • Safe and accessible cycling routes as well as end-of-trip facilities provided by the building. • Cycling clubs and bicycle user groups (BUGs) that may be lobbying for the improvement of cycle facilities in the surrounding area.	Prior to and during operation	Building Management
Ensure the bicycle parking and end of trip facilities within the building are maintained.	During operation	Building Management
Come to an arrangement with a local bicycle retailer for servicing of bikes and other incentives.	During operation	Building Management
Participate in annual events such as 'Ride to Work Day'.	During operation	Building Management

Public transport measures	Timeframe	Responsible party
Provide employees and visitors a map showing public transport stops in the surrounding area and expected walk times needed to access the locations.	Prior to and during operation	Building Management
Provide train and bus timetables for services in the local area as part of household welcome packs for all new employees.	During operation	Building Management

Carpooling and car share measures	Timeframe	Responsible party
Promote the cost savings of car share over commuting via private vehicle to employees through the TAG.	During operation	Building Management
Allocate spaces as required for car-sharing within the Storage and Distribution warehouse.	During operation	Building Management

Car parking measures	Timeframe	Responsible party
Provide electric car charging stations within the site.	Prior to occupation	Architect / Contractor
Provide clear signage for and advertisement (within the TAG) of electric car charging stations within the site.	Prior to occupation	Architect / Contractor

4 Monitoring and review

4.1 Updates to the Green Travel Plan

For this GTP to be effective, it should be reviewed and amended by building management regularly to ensure that the objectives are being met. Travel surveys should be conducted, and the GTP and TAGs should be updated annually to achieve sustainable travel targets more effectively.

The following approach will be adopted for reviewing and updating this GTP:

- Prior to occupation:
    - Existing transportation options, infrastructure and potential amenities that support sustainable commuting will be evaluated and reviewed
    - New employees/ relocated employees will be provided comprehensive information on sustainable travel options and incentives.
- Three to six months after occupation:
    - Travel surveys will be conducted to gather data on commuting habits, preferences and challenges faced by employees and visitors to identify areas for improvement. An example travel survey is provided in Appendix B
    - Based on the survey findings, challenges will be addressed through sit specific initiatives including carpooling, cycling or public transport system.
- Annual reviews:
    - The GTP and TAGs should be updated with the latest data, trends and best practices pertaining to sustainable transportation
    - Regular travel surveys can help assess employee commuting patterns to identify areas for improvement
    - Implemented measures should be reviewed to evaluate the effectiveness of initiatives introduced, identify successes and areas needing improvement for continual enhancement of the green travel plan.

4.2 Responsibility

To ensure that the goals of this GTP are achieved, it is necessary to identify an individual or committee responsible for monitoring and managing various aspects of the plan. This group will monitor travel patterns and the effectiveness of the GTP, conduct ongoing travel surveys, and carry out the initiatives outlined in this plan.

Appendix A Transport Access Guide

Getting to and from STORAGE AND DISTRIBUTION WAREHOUSE

The Alspec Industrial Business Park (AIBP) is approximately 6.8 kilometres from St Marys Train Station. The walking route from the Station (Station Street) to AIBP takes you along Mamre Road to Luddenham Road, and then along Luddenham Road to Patons Lane and the COPE site. Walking time from St Marys Station to AIBP is approximately 2 hours and is marked on the map in this TAG.

Bus services

The nearest bus services to the site are:

Route 775 which runs run from Mount Druitt to Penrith via St Clair and Erskine Park. The nearest bus stop is approximately 5 km away from the site, on St Clair Avenue just after Banks Drive.

Route 776 runs from Mt Druitt to Penrith via St Clair and Erskine Park. The nearest bus stop is approximately 3.7 km away from the site. The nearest bus stop is at Solander Drive after Madison Circuit.

Route 779 services run from Mount Druitt to Kemps Creek along Erskine Park. The nearest stop is on Erskine Road after Mamre Road.

For more information on bus timetables, see https://transportnsw.info/

Rail and Metro services

The nearest train station to AIBP is St Marys Station, located 6.8km north of AIBP.

A future Metro Station, Luddenham, is located 2km south of the site, and is anticipated to open in 2026.

Parking

All employee car parking is located on site. Entry to the parking area is on the AIBP access road, south of Patons Lane.

Electric vehicle charging infrastructure is available on site.

Accessible parking is provided on site, near the main building entrance.

Bicycle parking

Secure and visible parking spaces are available for bicycles and electric bicycles with charging stations and storage facilities available on site.

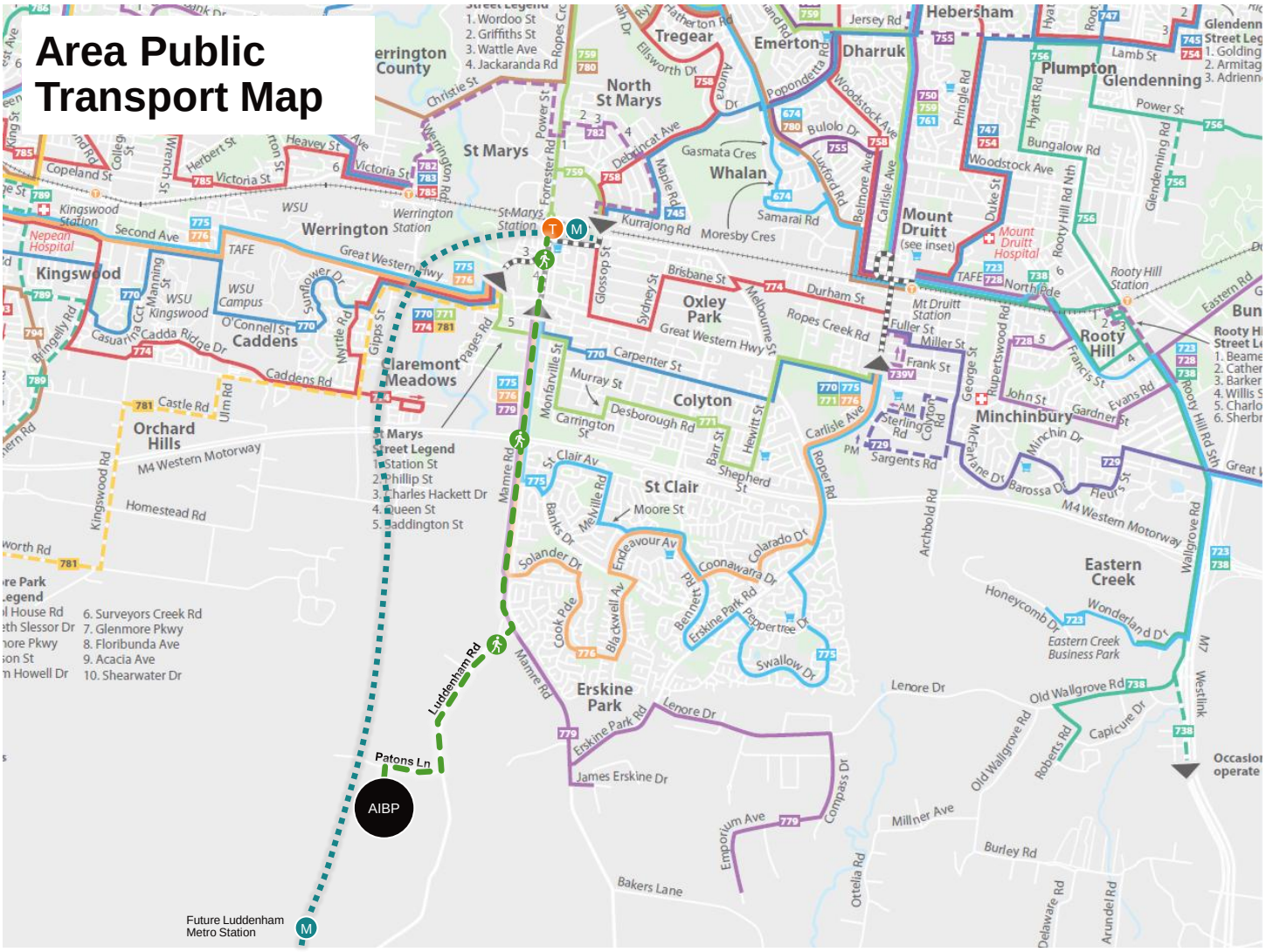
End of trip facilities are conveniently located close to bicycle storage areas.

For more information speak to the Facilities Manager at XXXX XXXX or at (email)

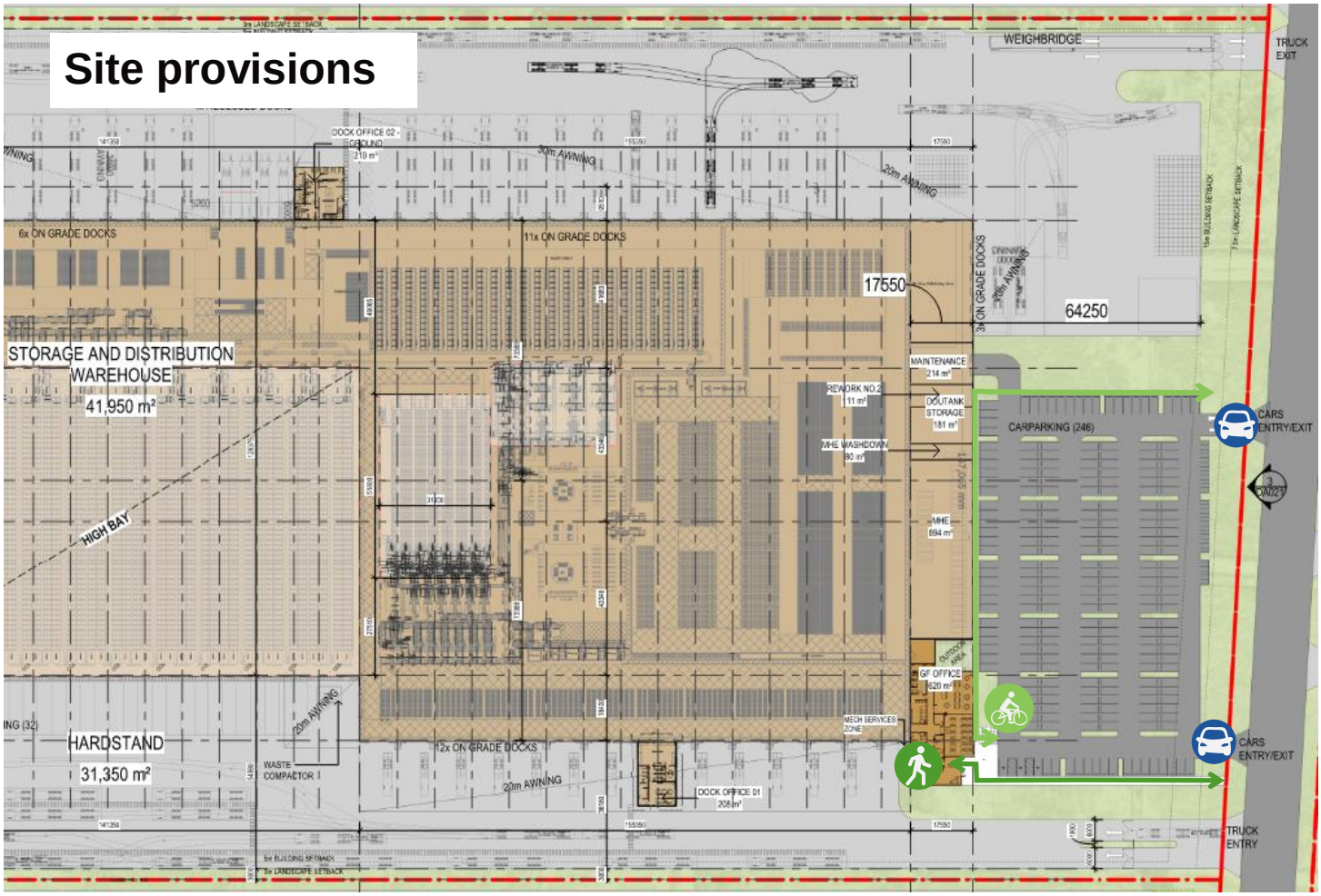
PRELIMINARY INFORMATION

This draft Transport Access Guide will be updated prior to occupation

Area Public Transport Map



Site provisions



Appendix B Example employee commute survey

The purpose of a travel survey is to understand the reasons for which commuters to and from the site select their preferred travel modes. In turn, this allows for more effective incentives and initiatives to be developed in increasing the mode share of sustainable travel options.

An example of a travel survey has been provided below.

You are invited to participate in the Employee Commute Survey being conducted by xxx. The purpose of this survey is to anticipate the transport related environmental impacts of the establishment and encourage the use of sustainable transport.

The survey will take about 5-10 minutes to complete.

Q1. Which of the following do you identify as?

- ☐ *Resident*
- ☐ *Employee*
- ☐ *Visitor*

Q2. What is your postcode? _____

Q3. How did you travel here today?

- ☐ *Walk only*
- ☐ *Bicycle*
- ☐ *Bus*
- ☐ *Train*
- ☐ *Light rail*
- ☐ *Combination of public transport*
- ☐ *Car driver*
- ☐ *Car passenger*
- ☐ *Other (please state)* _____

Q4. . If you travelled via car (as a single driver), what was the primary reason for you to travel this way?

- ☐ *Only option*
- ☐ *More comfortable*
- ☐ *Safety concerns with other types of transport options*
- ☐ *Poor end to end connectivity*
- ☐ *Cost effective*
- ☐ *Poor infrastructure/information for other modes of transport*
- ☐ *Other (please state)* _____

Q5. If your general mode of commuting is by car (single driver); what services could be provided to you to use other modes of travelling such as car share or car pool or biking.

About Arcadis

Arcadis is the leading global Design & Consultancy firm for natural and built assets. Applying our deep market sector insights and collective design, consultancy, engineering, project and management services we work in partnership with our clients to deliver exceptional and sustainable outcomes throughout the lifecycle of their natural and built assets. We are 27,000 people, active in over 70 countries that generate €3.3 billion in revenues. We support UN-Habitat with knowledge and expertise to improve the quality of life in rapidly growing cities around the world.

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Appendix G GTIA scope requirements

Appendix E

– Scoping checklist

Appendix E – Scoping checklist

The following table serves as a checklist of typical items that are considered or developed in TISs and TIAs. The final column also includes considerations for subdivision TIAs. This checklist is not prescriptive and aims to assist practitioners in optimising a TIA or TIS to focus on critical and impactful elements.

Y = Generally Required. **M** = May be Required depending on Development Circumstances.

Deliverables and Actions Checklist	GTIA Cross Reference	Conditions where this may be required	TIS	TIA	Subdivision
Scoping					
Determine suitable assessment: Transport Impact Statement (TIS)	Chapter 3, Section 3.2.5	Small impact developments, generally below the T&I SEPP Schedule 3 thresholds	Y	-	-
Determine suitable assessment: Transport Impact Assessment (TIA)	Chapter 3, Section 3.2.5	Medium to large impact developments, generally meet or above the T&I SEPP Schedule 3 thresholds	-	Y	Y
Proposed development					
Alignment with relevant transport strategies, plans and planning controls	Chapter 2, Section 2.3.1	Always	Y	Y	Y
Relevant site characteristics, including location and proposed land use mix	Chapter 2, Section 2.3.1	Always	Y	Y	Y
Plans showing layout of site and access arrangements for all modes	Chapter 7	Always	Y	Y	Y
Travel demand management measures	Chapter 4, Section 4.2	To reduce dependency on private vehicle travel when there is (or proposed to be) adequate accessibility to alternative transport modes	-	M	M
Travel Plan	Chapter 4, Section 4.3	At the consent authority's discretion, typically to mitigate significant impact	-	M	M
Parking provisions and facilities by mode and vehicle type, on-street and off-street	Chapter 8	Always	Y	Y	Y
Movement and place roles of internal roads	Chapter 7, Section 7.4	Subdivisions	-	-	Y
Freight and servicing plan	Chapter 6, Section 6.2.3	Significant and/or complex freight and servicing	M	Y	Y
Delivery and Servicing Plan (refer to TfNSW's Last Mile Toolkit)	Chapter 6, Section 6.4.4	At the consent authority's discretion, typically in urban centres	-	M	M

Appendix E – Scoping checklist (continued)

Y = Generally Required. **M** = May be Required depending on Development Circumstances.

Deliverables and Actions Checklist	GTIA Cross Reference	Conditions where this may be required	TIS	TIA	Subdivision
Existing Conditions					
Area of influence and peak periods identified by mode	Chapter 6, Section 6.2.2	Always	Y	Y	Y
Surrounding transport networks, and origins and destinations connected					
Walking network	Chapter 6, Section 6.2.3	Walking demand	M	Y	Y
Cycling network	Chapter 6, Section 6.2.3	Significant cycling demand and/or limited cycling capacity	M	Y	Y
Public transport network, including service frequencies	Chapter 6, Section 6.2.3	Significant public transport demand and/or limited public transport capacity	M	Y	Y
Road network, including movement and place roles	Chapter 6, Section 6.2.3	Significant road network demand and/or limited road capacity	M	Y	Y
Existing and future baseline transport network conditions					
Walking space analysis	Chapter 6, Section 6.2.3	Walking demand	M	Y	Y
Cycling connections analysis	Chapter 6, Section 6.2.3	Significant cycling demand and/or limited cycling capacity	M	Y	Y
Public transport capacity and accessibility analysis	Chapter 6, Section 6.2.3	Significant public transport demand and/or limited public transport capacity	M	Y	Y
Road performance analysis	Chapter 6, Section 6.2.3	Significant road network demand and/or limited road capacity	M	Y	Y
Road safety assessment	Chapter 6, Section 6.2.3	Road user demand	M	Y	Y

Appendix E – Scoping checklist (continued)

Y = Generally Required. **M** = May be Required depending on Development Circumstances.

Deliverables and Actions Checklist	GTIA Cross Reference	Conditions where this may be required	TIS	TIA	Subdivision
Development Impacts					
Trips generated to/from the development by mode	Chapter 5, Section 5.5	Always	Y	Y	Y
Trip distribution and network assignment at an appropriate scale	Chapter 5, Section 5.5.5	Always	Y	Y	Y
Development impacts on the surrounding transport network in peak periods					
Walking space analysis to key points of interest	Chapter 6, Section 6.2.3	Significant walking demand	M	M	Y
Cycling connections analysis	Chapter 6, Section 6.2.3	Significant cycling demand	M	Y	Y
Public transport capacity and accessibility analysis	Chapter 6, Section 6.2.3	Significant public transport demand	M	Y	Y
Public transport interchange capacity and safety analysis	Chapter 6, Section 6.2.3	Significant pedestrian demand at station precincts or interchanges	M	M	M
Road performance analysis	Chapter 6, Section 6.2.3	Significant road demand	M	Y	Y
Road signal warrant and turn lane warrant analysis	Chapter 6, Section 6.2.3	Significant road demand	M	Y	Y
Road safety assessment (see Transport's Road Safety Assessment Methods)	Chapter 6, Section 6.2.3	Always	M	Y	Y
Road safety audit (see Transport's Guidelines for Road Safety Audit Practices)	Chapter 6, Section 6.2.3	Significant road safety risk	M	M	M
On-site transport movements and parking analysis, including swept path diagrams	Chapter 7, Chapter 8	Vehicle movements on-site	M	Y	-
Construction impacts on the surrounding transport network					
Haul routes and the type of heavy vehicles used	Chapter 3, Section 3.4.4	Significant construction impacts on road network	-	M	M
Public transport access, service or route disruptions	Chapter 3, Section 3.4.4	Construction impacts on public transport network/services	-	M	M
Pedestrian and cyclist access	Chapter 3, Section 3.4.4	Construction impacts on active transport network	-	M	M

Appendix E – Scoping checklist (continued)

Y = Generally Required. **M** = May be Required depending on Development Circumstances.

Deliverables and Actions Checklist	GTIA Cross Reference	Conditions where this may be required	TIS	TIA	Subdivision
Mitigations					
Improvements, such as design changes and infrastructure upgrades	Chapter 6, Section 6.4	If mitigations are necessary for the final design	M	M	M
Construction impact mitigations	Chapter 6, Section 6.4	If mitigations are necessary during construction	M	M	M
Funding arrangements and developer contributions	Chapter 6, Section 6.5	If mitigations are necessary	M	M	M
Issue specific considerations					
Signage complies with the Transport Corridor Outdoor Advertising and Signage Guidelines	Chapter 6, Section 6.2.3	Roadside signage or advertising	M	M	M
Strategic design complying with Transport's Strategic Design requirements for DAs	Chapter 3, Section 3.3.4	Works on State roads and traffic signals on any road	M	M	M
Development near rail corridors and busy roads, as per Transport and Infrastructure SEPP	Chapter 6, Section 6.2.4	Development near rail or busy road corridors	M	M	M
Development involving access via level crossings, as per Transport and Infrastructure SEPP	Chapter 6, Section 6.2.3	Development involving access via level crossings	M	M	M
Site permeability and access to local networks	Chapter 6, Section 6.2.4	Design proposes an internal street network	M	M	Y
Traffic analysis using modelling software	Chapter 6, Section 6.3	Significant road network demand and/or limited road capacity	M	M	M
Pedestrian analysis using modelling software	Chapter 6, Section 6.3	Significant pedestrian demands	M	M	M
Impact of freight traffic on road safety and capacity, including at key intersections	Chapter 6, Section 6.2.3	Significant and/or complex freight	M	M	M
Heavy vehicle driver facilities, including truck and trailer parking and rest facilities	Chapter 6, Section 6.2.3	Significant freight	M	M	M

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