Thornton Central Village

Development Application 1
Transport Impact Assessment

Prepared by: Stantec Australia Pty Ltd for Thornton Operations Pty Ltd
on 24/11/2021
Reference: 301400273
Issue #: A

GTAconsultants now Stantec

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Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	24/11/2021	Final	Connor Hoang Mackenzie Brinums	Tim De Young	Tim De Young	

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1. INTRODUCTION

01

1.1. Background

This Transport Impact Assessment has been prepared to support a development application (DA) which seeks consent for the following development at 184 Lord Sheffield Circuit Penrith (Lot 3003 in DP1184498):

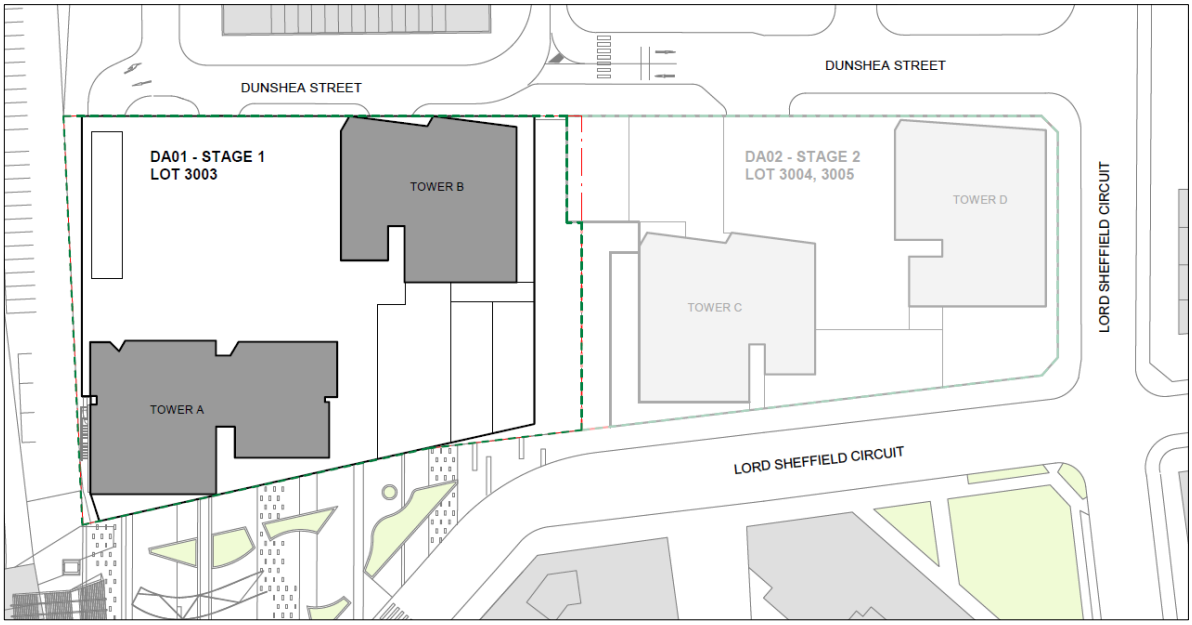
- Demolition of all existing site features and improvements.
- Construction and operation of a new mixed-use development, comprising:
    - One storey basement, containing a total of 85 x retail car parking spaces, a click-and-collect facility, waste rooms, a retail lobby entry, plant rooms, and other ancillary back-of-house areas.
    - Five-storey podium comprising:
        - retail tenancies, a mainline supermarket, residential and commercial lobby entries, a loading dock, vehicle access, and back-of-house areas at Ground Level
        - a childcare centre and medical facility at Level 01
        - shared car parking at Levels 01 – 04 (providing a total of 333 x residential car parking spaces, 35 x retail car parking spaces, and 2 x car wash bays).
    - A residential building (referred to as Tower A), with a maximum rise of 27 storeys (Level 05 – Level 31) containing a total of 241 x residential apartments.
    - A residential building (referred to as Tower B), with a maximum rise of 9 storeys (Level 05 – Level 13) containing a total of 75 x residential apartments.
- Creation of new east-west publicly accessible through-site link for pedestrians.
- New landscaping works and other public domain works.
- Ancillary works, including site services and connections and stormwater infrastructure.

The proposed development represents the first stage of the overall development to be known as Penrith Central Village, with the site plan shown in Figure 1.1.

The overall land parcel will have frontages to Lord Sheffield Circuit to the east and north, Dunshea Street to the west and the rail reserve to the south. The staging of the development of this land parcel is summarised as follows:

- Lot 3003: retail, childcare, medical and residential development with basement and above ground car parking – **the current DA1 (herein referred to as Stage 1) and subject of this report.**
- Part Lot 3003, Lot 3004 and Lot 3005: retail, commercial and residential development with basement and above ground car parking – **forms part of a separate DA2 (herein referred to Stage 2) and is not subject of this report other than discussion relating to parking, traffic generation and impact.**

Figure 1.1: Site plan



Base image source: Crone Architects, Drawing Number DA-01-10001, dated 17 November 2021

Further discussion regarding the development yield is noted as follows:

- Stage 1 comprises 316 apartments and approx. 1,600sqm gross floor area (GFA) of supermarket, 1,100sqm GFA of general retail and 1,400sqm GFA of medical and childcare floor area. Car parking for the development is proposed in above ground and basement car parks, with a total of 436 car spaces to be provided. Loading for the development is proposed to occur in a loading dock on the southern boundary of the site on the ground floor level. All vehicle access is to be provided via Dunshea Street.
- The overall development comprises 553 apartments and approx. 1,700sqm GFA of supermarket, 1,800sqm GFA of general retail and 2,000sqm GFA of commercial, medical and childcare floor area. Additional car parking and loading is also provided, which is summarised in the separate report prepared to accompany the Stage 2 development DA.

It is understood that a DA Consent (DA17/0334) was issued in 2017 for a development on Lot 3003 that contained ground floor retail tenancies and a supermarket, commercial floor space, a childcare and 62 residential apartments. This DA was supported by a Transport Impact Assessment[1] prepared by GTA Consultants dated 21 April 2017.

In June 2021, Thornton Operations Pty Ltd engaged GTA, now Stantec (GTA) to complete a transport assessment to accompany the DA.

[1] Lot 3003 on DP1184498 - Thornton, North Penrith, Development Application, Transport Impact Assessment prepared by GTA dated 21 April 2017

1.2. Purpose of this Report

This report sets out an assessment of the anticipated transport implications of the proposed development, including consideration of the following:

- pedestrian and bicycle requirements
- existing transport conditions surrounding the site
- suitability of the proposed parking in terms of supply (quantum) and layout
- service vehicle requirements
- the traffic generating characteristics of the proposed development
- suitability of the proposed access arrangements for the site
- the transport impact of the development proposal on the surrounding road network.

1.3. References

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

- Penrith City Council Development Control Plan (DCP) 2014
- Australian Standard/ New Zealand Standard, Parking Facilities, Part 1: Off-Street Car Parking AS/NZS 2890.1:2004
- Australian Standard, Parking Facilities, Part 2: Off-Street Commercial Vehicle Facilities AS 2890.2:2002
- Australian Standard / New Zealand Standard, Parking Facilities, Part 6: Off-Street Parking for People with Disabilities AS/NZS 2890.6:2009
- plans for the proposed development prepared by Crone Architects, Project Number CA3759, dated 8 September 2021
- other documents and data as referenced in this report.

2. EXISTING CONDITIONS

02

2.1. Site Context

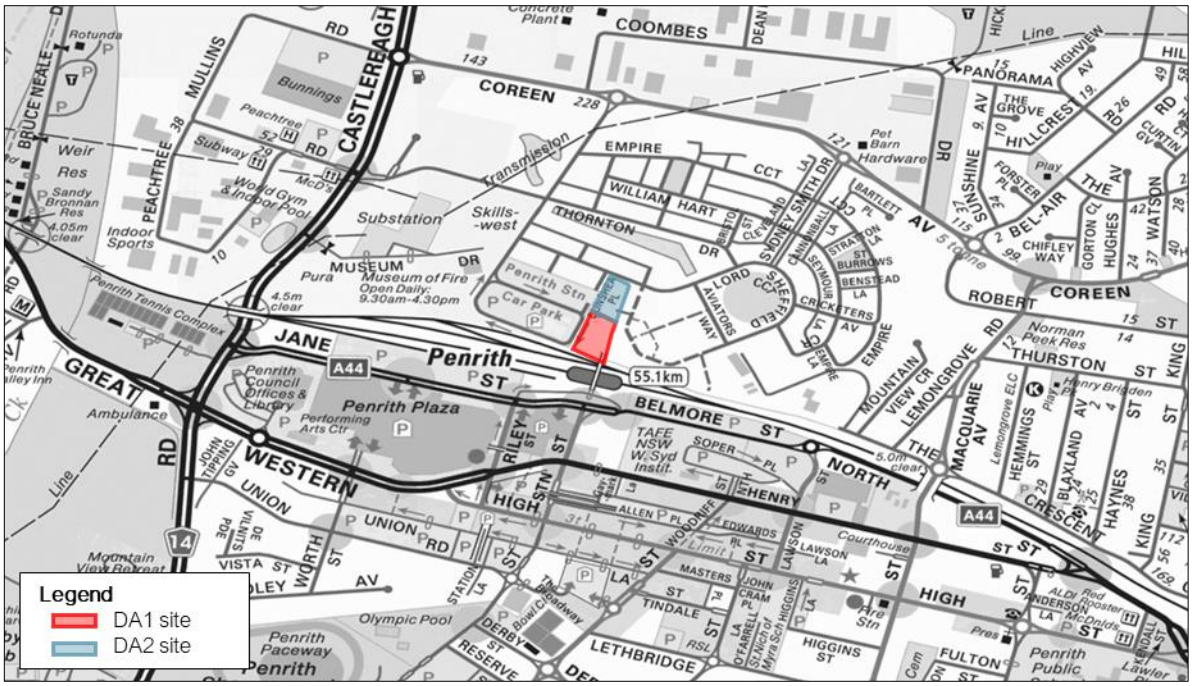
The subject site (the site) is located within the broader North Penrith precinct and forms part of the Thornton development.

The site fronts Lord Sheffield Circuit to the north and east, Dunshea Street to the west and Penrith Railway Station and the heavy rail line to the south. The surrounding land uses are predominantly residential to the north and east, and transport infrastructure related to the west and south. The commercial core for Penrith is also located close to the site to the south of the rail line.

The site is currently vacant and accommodates a temporary pedestrian pathway linking the commuter car park to Penrith Station through the site. It is understood that the commuter car park accommodates around 1,500 car parking spaces.

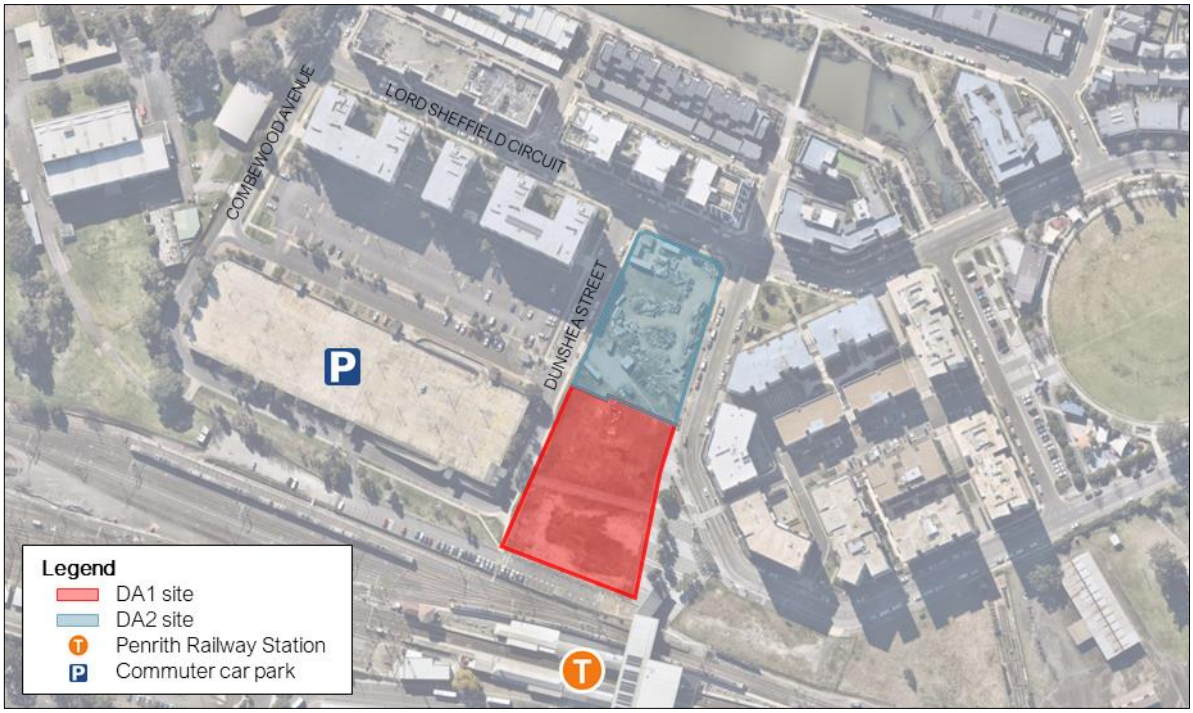
The location of the site and the surrounding environs is shown in Figure 2.1.

Figure 2.1: Subject site and surrounding environs



Base image source: http://www.street-directory.com.au/

Figure 2.2: Aerial view of subject site



Base image source: Nearmap

2.2. Road Network

2.2.1. Overview

Roads are classified according to the functions they perform. The main purpose of defining a road's functional class is to provide a basis for establishing the policies which guide the management of the road according to their intended service or qualities.

In terms of functional road classification, State roads are strategically important as they form the primary network used for the movement of people and goods between regions, and throughout the State. Transport for NSW (TfNSW) is responsible for funding, prioritising and carrying out works on State roads. State roads generally include roads classified as freeways, state highways, and main roads under the Roads Act 1993, and the regulation to manage the road system is stated in the Australian Road Rules.

TfNSW defines four levels in a typical functional road hierarchy as follows:

- Arterial Roads – Controlled by TfNSW, typically no limit in flow and designed to carry vehicles long distance between regional centres.
- Sub-Arterial Roads – Managed by either Council or TfNSW under a joint agreement. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub region or provide connectivity from arterial road routes,
- Collector Roads – Provide connectivity between local sites and the sub-arterial road network, and typically carry between 2,000 and 10,000 vehicles per day.
- Local Roads – Provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

2.2.2. Surrounding Road Network

Lord Sheffield Circuit

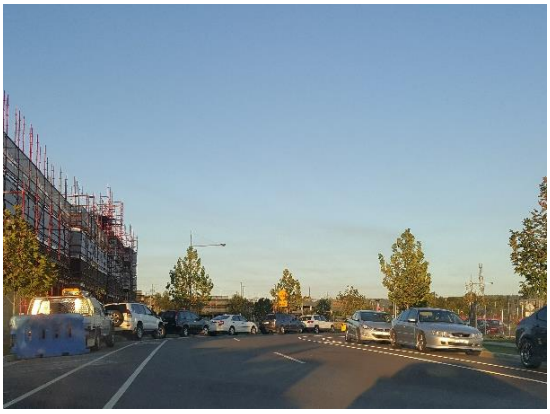
Lord Sheffield Circuit functions as a collector road and is aligned runs along the northern and eastern boundaries of the site.

It is a two-way road configured with one lane in each direction with around an 11 to 12 metre wide carriageway. Restricted kerbside parking is generally permitted on both sides of the road near the site, with on-road bicycle lanes also provided on Lord Sheffield Circuit to the east of the site.

Lord Sheffield Circuit is shown in Figure 2.3 and Figure 2.4.

Figure 2.3: Lord Sheffield Circuit (looking west) at the southern end of Aviators Way

Figure 2.4: Lord Sheffield Circuit (looking west) at the northern end of Aviators Way



Dunshea Street

Dunshea Street functions as a local road and is aligned in a north-south direction along the western boundary of the site.

North of the commuter car park, Dunshea Street is a two-way road with one lane in each direction over an approximately 11.5 metre wide carriageway. Along the southern section of the road, Dunshea Street is one-way with one southbound lane and an approximate carriageway width of around 7.5 metres.

The road currently primarily services the commuter car park to the west of the site.

Combewood Avenue

Combewood Avenue functions as a collector road and is aligned in a north-south direction to the west of the site, providing connection from Lord Sheffield Circuit and the commuter car park to Thornton Drive, Coreen Avenue and the broader road network. North of the commuter car park, it is a two-way road with one lane in each direction. Along the western side of the commuter car park, it is a one-way road with two northbound lanes.

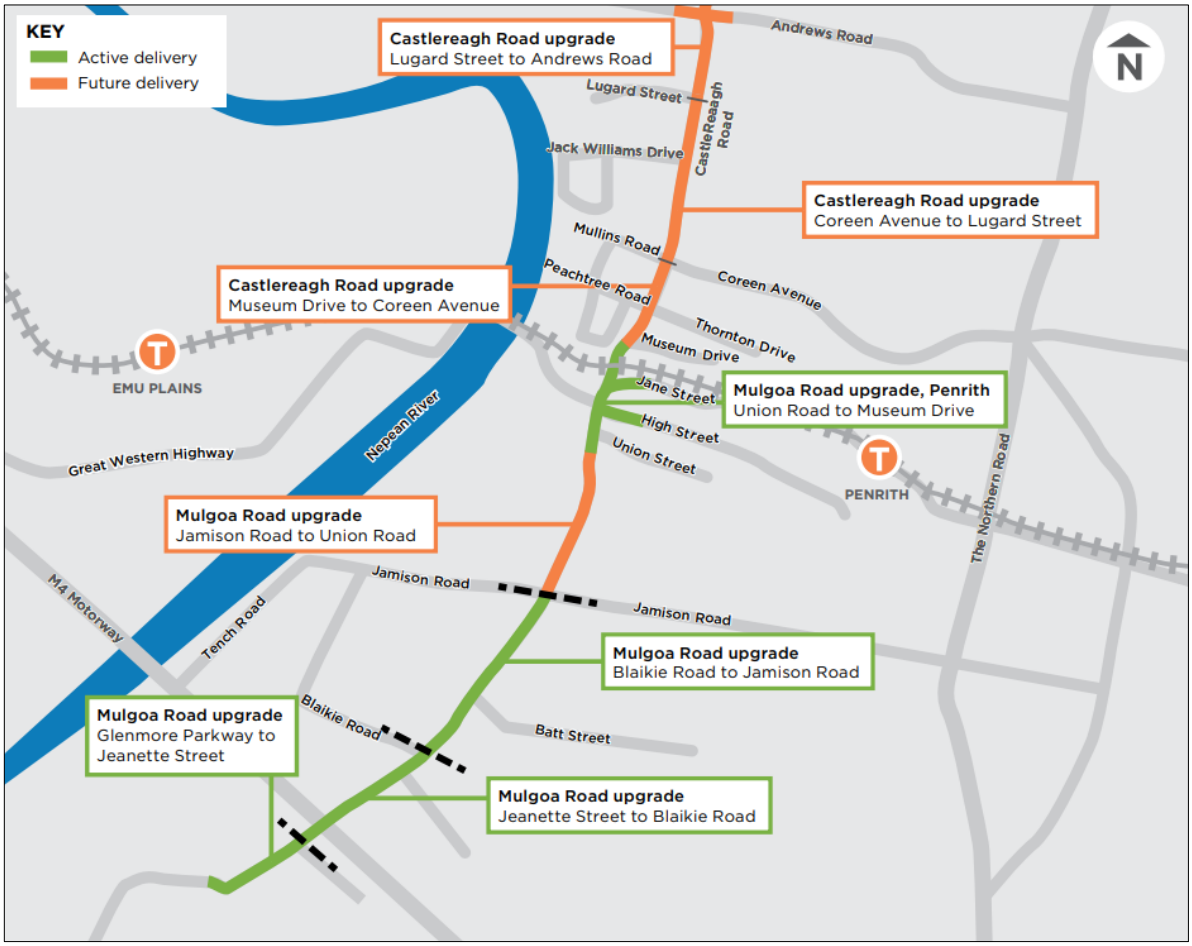
2.2.3. Road Upgrades

TfNSW is upgrading 6.5 kilometres of the Mulgoa Road/ Castlereagh Road corridor between Glenmore Parkway, Glenmore Park and Andrews Road, Penrith. Mulgoa Road is a main access route from Penrith to the M4 Motorway. The upgraded road would improve road safety, reduce congestion and improve travel times.

Upgrades between Union Road and Museum Drive have already been completed. Future upgrades would be delivered in stages, subject to available funding and priorities. This includes the proposed upgrades to the Thornton Drive/ Castlereagh Road intersection, which will be upgraded to accommodate three through lanes in each direction on Castlereagh Road along with slip lanes into Peachtree Road and Thornton Drive, while buses along Castlereagh Road will also be given priority at the intersection.

The active/ already delivered stages and future proposed upgrades are shown in Figure 2.5, while the proposed upgrades to the Castlereagh Road/ Thornton Drive intersection are shown in Figure 2.6.

Figure 2.5: Mulgoa Road/ Castlereagh Road corridor upgrade



Source: https://roads-waterways.transport.nsw.gov.au/projects/01documents/mulgoa-rd-castlereagh-rd/mulgoa-rd-castlereagh-rd-community-update-mar-2020.pdf dated March 2020

Figure 2.6: Proposed Thornton Drive/ Castlereagh Road intersection upgrade

Source: https://caportal.com.au/rms/mulgoa#id=undefined&ct=15&pj=24 accessed 15 September 2021

2.3. Traffic Volumes

Given ongoing global events related to COVID-19, it is acknowledged that current traffic conditions may still not be considered 'normal' and as such traffic surveys completed at this time may not be considered representative of typical conditions.

In this regard, GTA has obtained historical traffic survey data for key intersections surrounding the site. The key intersections that Council has indicated require assessment include:

1. Castlereagh Road/ Thornton Drive
2. Combewood Avenue/ Thornton Drive
3. Coreen Avenue/ Combewood Avenue
4. Coreen Avenue/ Sydney Smith Drive
5. The Crescent/ Evan Street/ Macquarie Avenue.

The data obtained for the Castlereagh Road/ Thornton Drive. Thornton Drive/ Combewood Avenue and The Crescent/ Evan Street/ Macquarie Avenue intersections relate to traffic surveys completed on Tuesday 22 October 2019, while the data for the Coreen Avenue/ Combewood Avenue and Coreen Avenue/ Sydney Smith Drive intersections relate to traffic surveys completed on Thursday 20 February 2020.

The AM and PM peak hours were found to occur from 8:00am to 9:00am and 5:00pm to 6:00pm respectively, with traffic volumes summarised in Appendix B.

2.4. Intersection Operation

The operation of the key intersections within the study area have been assessed using SIDRA INTERSECTION[2] (SIDRA), a computer-based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by the TfNSW, is vehicle delay. SIDRA determines the average delay that vehicles encounter and provides a measure of the level of service. Table 2.1 shows the criteria that SIDRA adopts in assessing the level of service.

Table 2.1: SIDRA level of service criteria

Level of service (LOS)	Average delay per vehicle (secs/veh)	Traffic signals, roundabout	Give way & stop sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

All intersections except The Crescent/ Evan Street/ Macquarie Avenue intersection have been modelled as a network model. The Crescent/ Evan Street/ Macquarie Avenue intersection has been modelled as an isolated intersection given the distance between this intersection and the other modelled intersections. It is noted that historical SCATS phasing data for the Castlereagh Road/ Thornton Drive has also been obtained from TfNSW for the same day as the survey data to assist with calibrating the traffic model.

Table 2.2 presents a summary of the existing operation of the key intersections based on the historical survey data, with full results presented in Appendix C of this report. The table indicate:

- The Castlereagh Road/ Thornton Drive intersection is currently operating at capacity in the weekday PM peak hour, with a DOS of 0.98 and the average delay on the borderline of a LOS D and E overall. The intersection operates better in the AM peak hour at a LOS C overall, however still has a relatively high DOS of 0.82. These results are not surprising, noting this intersection has been flagged for future upgrades as discussed in Section 2.2.3.
- All other intersections currently operate well at a LOS B or better in any peak hour.

[2] Program used under license from Akcelik & Associates Pty Ltd.

Table 2.2: Existing operating conditions

Intersection	Peak	Degree of saturation (DOS)	Average delay (sec)	Queue (m)	Level of service (LOS)
Castlereagh Road/ Thornton Drive	AM	0.82	33	199	C
	PM	0.98	56	362	D
Combewood Avenue/ Thornton Drive	AM	0.14	10	1	A
	PM	0.33	14	4	A
Coreen Avenue/ Combewood Avenue	AM	0.10	10	2	A
	PM	0.44	11	8	A
Coreen Avenue/ Sydney Smith Drive	AM	0.22	12	4	A
	PM	0.25	11	4	A
The Crescent/ Evan Street/ Macquarie Avenue	AM	0.44	17	25	B
	PM	0.26	12	12	A

Note: Average queues reported for networked intersections while 95th percentile queues are reported for isolated intersections.

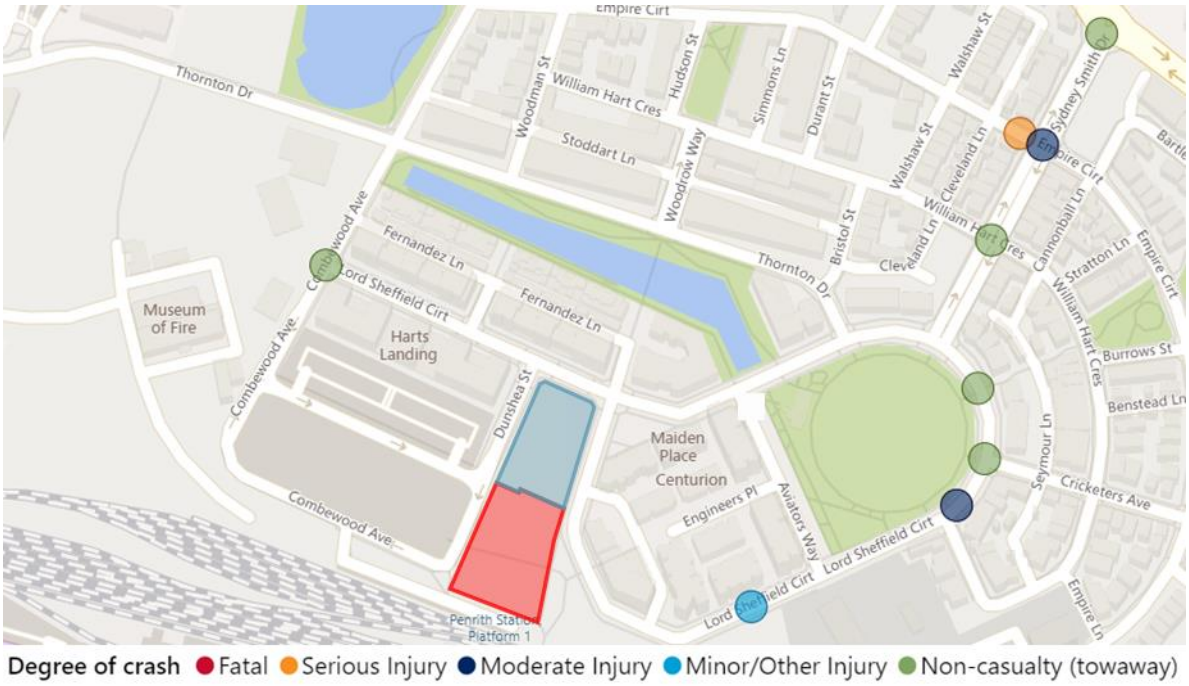
2.5. Crash History

GTA, now Stantec has reviewed available crash data sourced from TfNSW Centre for Road Safety for roads surrounding the site. The crash history data provided is for the most recent five years of complete data from 2016 to 2020. The data indicates:

- Three crashes have been recorded along Sydney Smith Drive in the five-year period and five crashes along Lord Sheffield Circuit, with most crashes recorded to the east of the site.
- One crash was recorded at the Combewood Avenue/ Lord Sheffield Circuit which was classified as a non-casualty crash between two vehicles travelling in adjacent directions and was likely as a result of a vehicle on Lord Sheffield Circuit not giving way to a vehicle on Combewood Avenue.
- No crashes were recorded at the Thornton Drive/ Combewood Avenue intersection during the study period.

The location of the reported crashes during the study period is shown in Figure 2.7.

Figure 2.7: Crash history in vicinity of the site

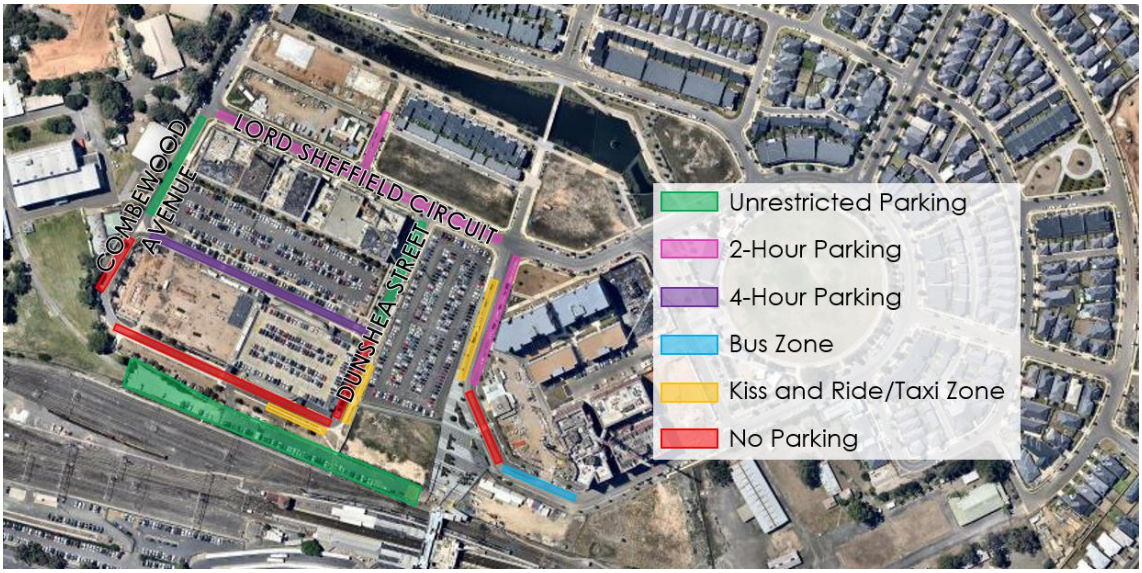


2.6. Car Parking

2.6.1. On-Street

As part of the previous Transport Impact Assessment prepared for the existing development approval for the site, GTA compiled an inventory of available on-street car parking in the vicinity of the site. The inventory identified that car parking on the frontage of the site is generally unrestricted, subject to 2-hour parking restrictions or is used for kiss and ride car parking. These restrictions are shown in Figure 2.8.

Figure 2.8: Car parking restrictions



2.6.2. Commuter Car Park

The upgraded multi-storey commuter car park west of the site was completed in August 2017, delivering an additional 450 car parking spaces, providing a total of 1,511 free unlimited spaces including 30 accessible spaces. Improved facilities included a new lift and stairs, lighting, and CCTV upgrades.

2.7. Public Transport Network

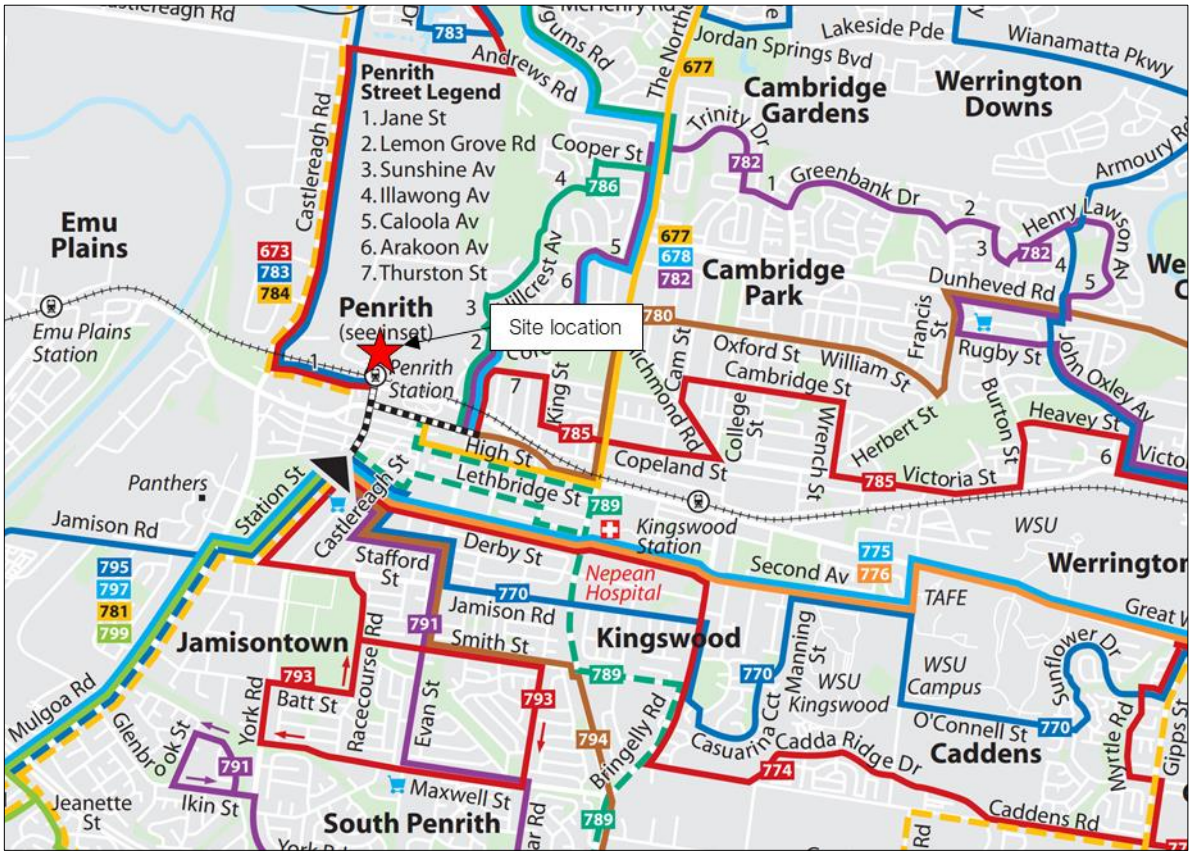
The site is well serviced by high frequency public transport services and is located immediately north of Penrith Railway Station and Penrith Bus Interchange.

The Penrith Railway Station currently services three major rail links, being:

- T1 North Shore & Western Line: between Emu Plains and Central via Penrith
- Blue Mountains Line: between Bathurst and Central via Penrith
- Regional Trains & Coaches: between Dubbo/ Broken Hill and Central via Penrith.

In addition, a number of bus services operate at the Penrith Bus Interchange providing connectivity between the station and surrounding suburbs. It is understood there are a total of 24 local bus services provided at the interchange and that these services typically operate at 30 or 60 minute frequencies during the peak and off peak periods respectively. Additionally, a number of school bus services are available for local schools south and west of Penrith. The local bus network is shown in Figure 2.9.

Figure 2.9: Surrounding bus network



Base image source: https://www.busways.com.au/sites/default/files/network-maps/2021-05-31/R1NetworkMap180421.pdf, accessed 4/9/21

2.8. Walking and Cycling Infrastructure

Well established pedestrian paths are generally provided on both sides of most surrounding roads. In the immediate vicinity of the site, existing pedestrian paths are detailed as follows:

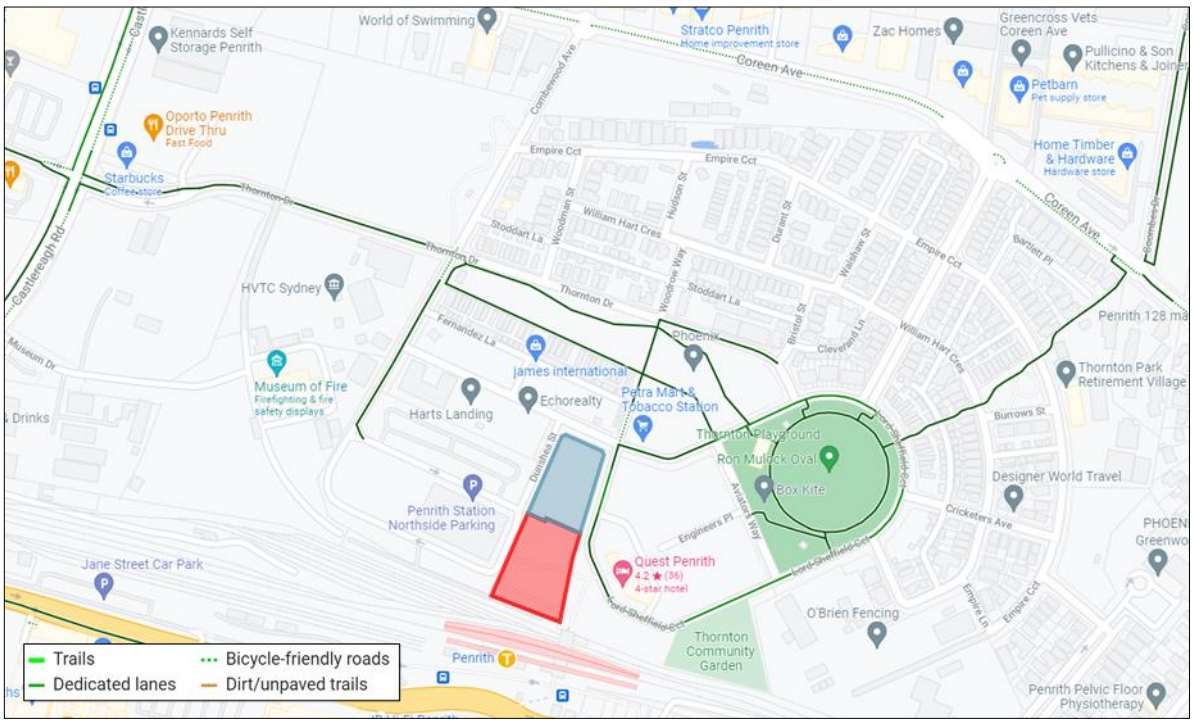
- Dunshea Street (both sides) – 1.5 metre wide paths providing access to the Penrith railway station, bus interchange and commuter parking lot.
- Lord Sheffield Circuit (both sides) - 1.5 metre wide paths connecting the site to the Smiths Paddock and other residential dwellings to the east.

In addition, a pedestrian overbridge to the Penrith Railway Station and Bus Interchange is provided to the south of the site. This overbridge, and abutting wide pedestrian pathway adjacent the site, provide excellent access to the public transport services.

The site is also well supported by cycling infrastructure, with shared paths provided along Combewood Avenue and Thornton Drive, allowing connection with the broader cycling network along Castlereagh Road and Mulgoa Road. The shared paths along Castlereagh Road and Mulgoa Road have recently been upgraded as part of the Mulgoa Road/ Castlereagh Road corridor upgrade. Marked bicycle lanes are also provided along sections of Lord Sheffield Circuit east of the site, connecting to Penrith Railway Station. Bicycle racks are available at Penrith Station on Belmore Street and in the commuter car park on Dunshea Street.

The surrounding cycling routes near the site are shown indicatively in Figure 2.10.

Figure 2.10:Surrounding cycling routes



Base image source: Google Maps

3. PROPOSED DEVELOPMENT

03

3.1. Land Uses

Stage 1 comprises a mixed-use development on Lot 3003 of DP1184498 in Penrith.

The development involves construction of two towers (Tower A and B) which will have an east-west pedestrian through site link along its northern boundary providing connection between the commuter car park to the west and the Penrith Station entrance on the eastern side of the site.

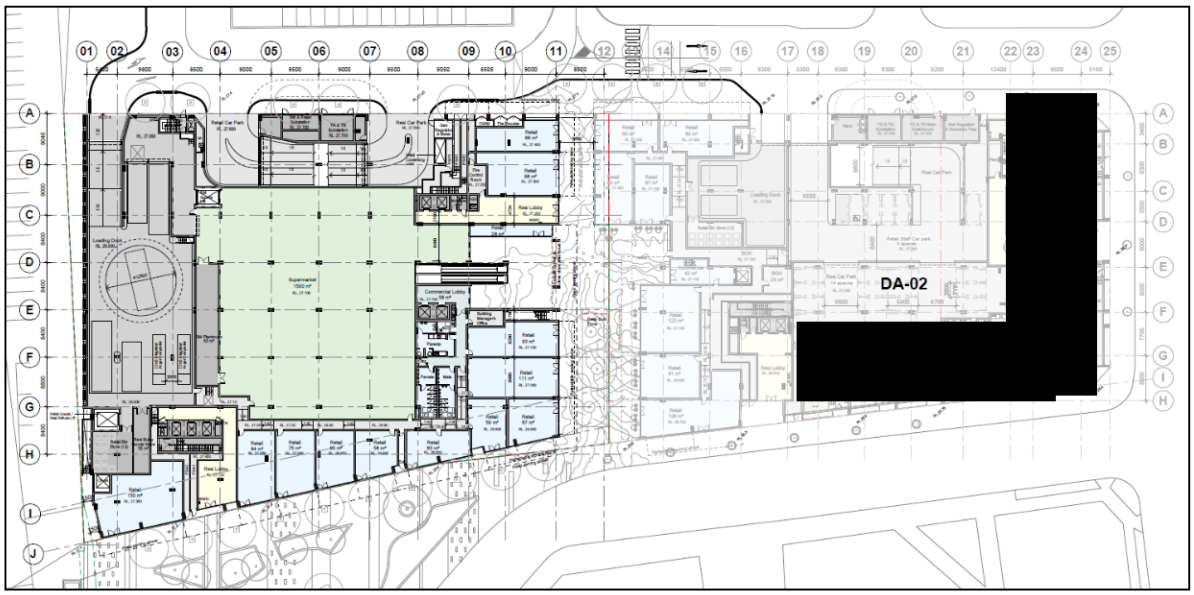
The proposed Stage 1 development will accommodate 316 residential apartments, along with a supermarket, general ground floor retail and medical floor space, a childcare and minor commercial area. A detailed breakdown of the proposed uses is provided in Table 3.1, which also includes the development yields for the proposed development on Lots 3004 and 3005 as part of Stage 2 for completeness.

The ground floor plan is shown in Figure 3.1.

Table 3.1: Development schedule

Use	Description	Size (Apartments/ m² GFA)		
		Stage 1	Stage 2	Total
High-density residential apartments	Studio	21	4	**25**
	1-bedroom	102	43	**145**
	2-bedroom	166	169	**335**
	3-bedroom	27	21	**48**
	Subtotal	*316*	*237*	***553***
Retail	Supermarket	1,627	0	**1,627**
	General	1,116	637	**1,753**
Commercial		87	489	**576**
Childcare		761 (100 children 17 staff)	0	**761 (100 children 17 staff)**
Medical		631	0	**631**

Figure 3.1: Stage 1 ground floor plan



Base image source: Crone Architects, Drawing Number DA-01-10510, dated 17 November 2021

3.2. Bicycle Parking

End of trip facilities will be provided within the basement, accommodating eight bicycle parking spaces for staff and 34 bicycle parking spaces for visitors. A total of five showers (two male, two female and one accessible) will also be provided within the basement level along with lockers.

In addition to the above, 262 storage cages will be provided in Stage 1 and a further 237 storage cages will be provided in Stage 2 for residents, with these storage cages suitable for accommodating bicycles.

3.3. Car Parking

The proposed development will provide a total of 453 car parking spaces across the basement level and Levels 1 to 4 for Stage 1, with a breakdown of the provision by use detailed in Table 3.2. For completeness, the proposed car parking provision for Stage 2 has also been shown.

Table 3.2: Car parking provision

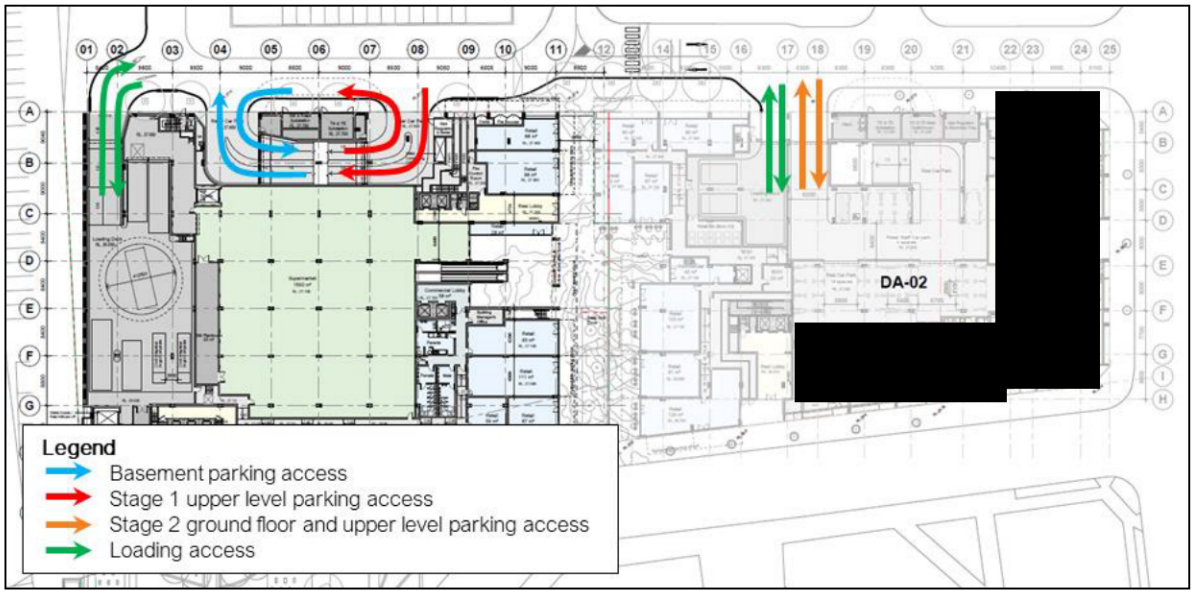
Use	Stage 1 car parking spaces	Stage 2 car parking spaces
Residential	333	256
Retail/ commercial	120	22
Total	**453**	**278**

3.4. Vehicle Access

Vehicle access to the on-site car parking is proposed via Dunshea Street, with three crossovers proposed. The vehicle access arrangements are shown in Figure 3.1 and described as follows:

- Northernmost crossover (shown in red) – This crossover will provide access to residential and retail/ commercial car parking on the upper levels.
- Central crossover (shown in blue) – This crossover will provide access to residential and retail car parking within the consolidated basement level.
- Southernmost crossover (shown in green) – This crossover will provide access to the Stage 1 loading dock.

Figure 3.2: Vehicle access arrangements



Base image source: Crone Architects, Drawing Number DA-01-10510, dated 17 November 2021

3.5. Loading Areas

A loading dock is proposed along the southern boundary of the site at ground level.

The loading dock will accommodate four loading bays. Two bays will accommodate vehicles up to and including 12.5 metre heavy rigid vehicles (HRVs), while the other two bays will accommodate vehicles up to and including 8.8 metre medium rigid vehicles (MRVs). Two compactors will also be located on the eastern side of the loading dock.

A turntable is proposed within the loading dock to provide access to the loading bays.

4. PARKING ASSESSMENT

04

4.1. Provision

The car parking provision requirements for the proposed development are set out in Penrith Development Control Plan 2014 (DCP).

It is noted that the site is located within the North Penrith Precinct which has specific maximum car parking requirements. Moreover, whilst the site is located within 800 metres of a railway station and hence the SEPP 65 parking requirements would also normally apply, the DCP rates in this instance are maximums. As such, only the DCP rates have been utilised.

The parking requirement for the proposed development using the DCP rates is shown in Table 4.1, noting that the table includes the parking requirements and proposed provision for Stage 2 as it relates to the traffic impact assessment discussed in Section 7.

Table 4.1: Car parking requirements

Stage	Use	Description	Size	DCP Rate (Max)	Requirement (Max)	Provision
Stage 1	Residential flat buildings	Studio	21 apartments	0.5 spaces / dwelling	11	-
		1-bedroom	102 apartments	1 space / dwelling	102	
		2-bedroom	166 apartments	1 space / dwelling	166	
		3-bedroom	27 apartments	2 spaces / dwelling	54	
				Subtotal	333	333
	Retail	Supermarket	1,627 m² GFA	1 space / 26 m² GFA	63	63
		General	1,116 m² GFA	1 space / 50 m² GFA [1]	22	22
	Commercial	-	87 m² GFA	1 space / 50 m² GFA [1]	2	0
	Childcare	-	761 m² GFA (100 children 17 staff)	1 space / 10 children plus 1 space / employee	27 (17 for staff and 10 for visitors)	27
	Medical	-	631 m² GFA	3 spaces / health care professional plus 1 space / receptionist/ support staff	30	8
				Subtotal	*144*	*120*
				Stage 1 total	**477**	**453**
Stage 2	Residential flat buildings	Studio	4 apartments	0.5 spaces / dwelling	*2*	
		1-bedroom	43 apartments	1 space / dwelling	*43*	
		2-bedroom	169 apartments	1 space / dwelling	*169*	
		3-bedroom	21 apartments	2 spaces / dwelling	*42*	
				Subtotal	*256*	*256*
	Retail	General	637 m² GFA	1 space / 50 m² GFA [1]	*13*	*12*

Stage	Use	Description	Size	DCP Rate (Max)	Requirement (Max)	Provision
	Commercial	-	489 m² GFA	1 space / 50 m² GFA [1]	*10*	*10*
				Subtotal	*23*	*22*
				Stage 2 total	**279**	**278**

[1] A minimum of 1 space per 75 square metres GFA is required for all commercial/ retail uses.
[2] No parking provision is proposed for the minor commercial floor area for Stage 1 as this largely relates to lobby floor area which does not generate any parking demand.
[3] Assumes 6 doctors and 12 support staff.

Table 4.1 indicates the proposed development that forms Stage 1 presents a maximum DCP requirement of 477 car parking spaces, including 333 spaces for residents and 144 spaces for the retail/ commercial uses. The proposed provision of 453 car parking spaces, including 333 spaces for residents and 120 spaces for the retail/ commercial uses, meets this requirement.

4.2. Design

4.2.1. Overview

The car park and loading dock layout has been reviewed against the requirements of the DCP and the Australian Standard for Off Street Car Parking (AS/NZS2890.1:2004 and AS/NZS2890.6:2009). This assessment included a review of the following:

- bay and aisle width
- adjacent structures
- turnaround facilities
- circulation roads and ramps
- ramp grades
- height clearances
- internal queuing
- parking for persons with disabilities.

Details of this assessment are discussed below with key swept paths included in Appendix A of this report.

4.2.2. Vehicle Access

The crossovers proposed to Dunshea Street will provide separate access for basement, upper-level parking, and loading respectively.

The basement and upper-level parking crossovers have been designed to simultaneously accommodate two 99th percentile cars travelling in opposite directions; which exceeds Australian Standard requirements (which calls for an ability for a 99th percentile car to pass an 85th percentile car). The crossovers have also been set back into the site, away from Dunshea Street, to ensure that exiting vehicles are positioned perpendicularly when exiting and thus have clear sight lines to oncoming cars and pedestrians. Sight line triangles are also provided at these crossovers to further enhance pedestrian safety in this area.

Boom gates will be provided at the entrances to the car park for all car parking areas. This includes at the top of the ramp to Level 1 and at the bottom of the ramp to the basement. A queuing assessment has been completed based on the anticipated peak traffic volumes estimated in Section 7.1, confirming that the 95th percentile inbound queue expected at these boom gates is less than two vehicles long for the basement car park access and less than one vehicle long for the above ground car park access. As such, there is adequate storage capacity on approach to these boom gates to accommodate the expected 95th percentile queue.

4.2.3. Car Park Layout

The proposed car parking layout generally complies with AS/NZS2890.1:2004 and AS/NZS2890.6:2009 and Penrith DCP 2014 requirements, with the car park areas meeting the following minimum requirements:

- Residential: 2.5m x 5.4m (with a 5.8m wide aisle)
- Retail: 2.6m x 5.4m (with a 6.2m wide aisle)
- Childcare: 2.6m x 5.4m (with a 5.8m wide aisle).

Blind aisles have been designed with aisle extensions and a formal turnaround area to allow cars to enter and exit each aisle in a forward direction where required.

Ramps have generally been designed with grades which accord with Australian Standard requirements. Specifically, the ramp to the retail basement car park has been designed with a maximum grade of 1:6, whereas the residential ramp has been designed with a maximum grade of 1:4. Both ramps have also been designed with appropriate transitions to avoid vehicle scraping/ bottoming-out.

The internal intersections have been designed to allow two vehicles to pass as far as practicable. In some situations, however, this design standard cannot be achieved, and one vehicle may accordingly need to prop to allow another to pass. This arrangement is acceptable and not uncommon.

5. LOADING AND WASTE COLLECTION

05

5.1. Loading Provision

5.1.1. DCP Requirements

The Transport, Access and Parking Section of the Penrith DCP requires that for a site of 1,500 to 4,000 square metres, the site must accommodate an HRV.

In this instance, a loading dock is proposed on the ground floor facilitating four loading bays. Two of these bays will be able to accommodate vehicles up to and including a 12.5 metre HRV. As such, the DCP requirement is met. The other two bays within the loading dock will be able to accommodate trucks up to 8.8 metre MRVs.

5.1.2. Adequacy of Loading Provision

In estimating the anticipated loading demand of the proposed retail/ commercial uses, reference has been made to GTA's database of loading demand.

It is understood that there are a few ground floor tenancies that are anticipated to function as event spaces. It is expected that there would be limited loading activity associated with these uses on a day-to-day basis and has been excluded for the purposes of this assessment.

The average residential apartment turnover rate is around 0.7 per cent of all apartments in any given week[3]. Considering 316 apartments, this equates to around two apartments moving in or out in any given week. Waste collection for the residential apartments is expected to equate to one or two vehicles a week. Waste collection would typically occur during the week while removalist activity would likely occur on the weekend.

In this context, Table 5.1 has been prepared to summarise the anticipated loading demand for each use.

Table 5.1: Anticipated loading demand

Use	Size/ tenancies	Loading demand rate (service vehicles per tenancy per day)	Loading demand (service vehicles per day)
Residential	316	-	2
Supermarket (Metro size)	1	3.1	3
Retail	7	0.5	4
Food and beverage	5	1.1	5
Commercial (including childcare and medical)	3	0.7	2
		Total	**16**

Table 5.1 indicates the proposed development could be expected to generate up to 16 service vehicle deliveries per day.

The loading dock is expected to be open for a minimum 10 hours per day. Based on the provision of four loading bays and a duration of stay of less than 20 minutes per vehicle as is typical for delivery vehicles and waste collection vehicles, this equates to a theoretical capacity of 120 short-stay deliveries per day. Any removalist vehicle activity on the weekends would naturally reduce this capacity slightly as a result of the need

[3] Rental Report December quarter 2019 accessed from https://www.dhhs.vic.gov.au/past-rental-reports

for a longer duration of stay for these vehicles, however even considering this, it is clear that the anticipated demand of up to 16 service vehicles per day could be easily accommodated within the available loading dock provision.

Overall, the minor loading activity associated with the proposed uses would be able to be managed by the proposed loading dock. Implementation of a loading and servicing management plan would also be key to ensuring appropriate use of the loading dock across the day and week. This would include scheduling of deliveries through a booking system. Such fundamental management measures are common for new mixed-use developments across Sydney to ensure loading demand is appropriately managed with demand to not exceed loading supply at any given time.

5.2. Loading Dock Layout

The loading dock crossover has also been designed to accommodate the largest truck requiring access to the site; being a 12.5 metre HRV. The proposed supermarket tenancy has confirmed that this is the largest vehicle required to service the supermarket.

The loading dock has been designed to facilitate independent vehicle access to each loading bay. A truck turntable in the centre of the loading dock is proposed which will provide adequate room for vehicle manoeuvres. As such, the loading dock will allow for vehicles to enter/ exit in a forward direction as confirmed in the swept path assessment provided in Appendix A.

5.3. Waste Collection

Waste collection is proposed to occur within the loading dock via Council collection for the residential land uses and private contractor collection for the commercial and retail land uses. It is understood that rubbish chutes will be provided to transfer waste direct to a processing room within the basement, with a service lift provided to transport this waste to the collection area on ground level when required.

5.4. Loading Dock and Waste Collection Management

To minimise potential conflicts at the entrance to the loading dock, the following measures are recommended:

- Introduce an electronic booking system to prevent overdemand at peak times.
- Install “dock full” signage at the entrance to the site to prevent loading vehicles from entering the site when there is not capacity to facilitate them. To facilitate this, sensors would be installed under each loading dock, and the sign activated when there are no available spaces.
- As far as practical, work with Council to arrange for the collection of waste from the proposed compactors outside of peak times for the retail and residential car parks, and the loading dock.

It is noted that the introduction of an electronic booking system (such as Bestrane’s MobileDOCK) would allow for the following:

- Deliveries to be scheduled to minimise the chance of demand exceeding the capacity of the loading dock.
- Providing a permanent booking at an agreed time each week for regular services such as waste collection.
- Restrict bookings during certain times such as when waste collection is occurring which will prevent other vehicles from being able to manoeuvre within the loading dock.
- Restrictions on the size of vehicles servicing the site to be enforced in advance of a vehicle arriving at the site.

Further information on how an electronic booking system for the loading dock could be used for the site and some of the associated benefits is included in Appendix D.

6. SUSTAINABLE TRANSPORT

06

6.1. Bicycle Parking

Bicycle parking provisions are not specifically outlined in the Penrith DCP, with this document instead deferring to the recommended rates in the 'Planning Guidelines for Walking and Cycling' (NSW Government 2004).

An assessment of the recommended bicycle provision based on the rates outlined in this Guideline is presented in Table 6.1 and indicates that the proposed Stage 1 development should provide in the order of 67-101 resident/ staff bicycle parking spaces and 22-44 customer/visitor bicycle parking spaces.

Table 6.1: Bicycle parking recommendation

Stage	Use	Size	Bicycle parking rate		Bicycle parking requirement	
			Resident/Staff	Customer/Visitor	Resident/Staff	Customer/Visitor
Stage 1	Residential	316 apartments	20-30% of number of units	5-10% of number of units	63-95 spaces	16-32 spaces
	Supermarket	1,627 m² GFA 47 employees[4]	3-5% of number of staff	5-10% of number of staff	1-2 spaces	2-5 spaces
	Retail	1,116 m² GFA 32 employees[4]	3-5% of number of staff	5-10% of number of staff	1-2 spaces	2-3 spaces
	Commercial	87m² GFA 0 staff[5]	3-5% of number of staff	5-10% of number of staff	0 spaces	0 spaces
	Childcare	761 m² GFA 17 staff	3-5% of number of staff	5-10% of number of staff	1 space	1-2 spaces
	Medical	631 m² GFA 18 staff	3-5% of number of staff	5-10% of number of staff	1 space	1-2 spaces
Stage 1 total					**67-101 spaces**	**22-44 spaces**
Stage 2	Residential	237 apartments	20-30% of number of units	5-10% of number of units	47-71 spaces	12-24 spaces
	Retail	637 m² GFA 18 employees[3]	3-5% of number of staff	5-10% of number of staff	1 space	1-2 spaces
	Commercial	489 m² GFA 24 staff[4]	3-5% of number of staff	5-10% of number of staff	1 space	1-2 spaces
Stage 2 total					**49-73 spaces**	**14-28 spaces**
Grand total					**116-174 spaces**	**36-72 spaces**

[4] Based on a density of one employee per 35m² GFA.
[5] Assumes no staff as commercial area in Stage 1 largely relates to lobby floor area.
[6] Based on a density of one employee per 20m² GFA.

End of trip facilities will be provided within the southwest corner of the basement, accommodating 34 bicycle parking spaces for use by staff and visitors which generally aligns with the recommended provision for the whole development. A total of four showers (two male and two female) will also be provided within the basement level along with lockers.

It is understood that 262 storage cages will be provided in Stage 1 and a further 237 storage cages will be provided in Stage 2 for residents, with these storage cages suitable for accommodating bicycles. This provision therefore exceeds the minimum recommendations outlined above.

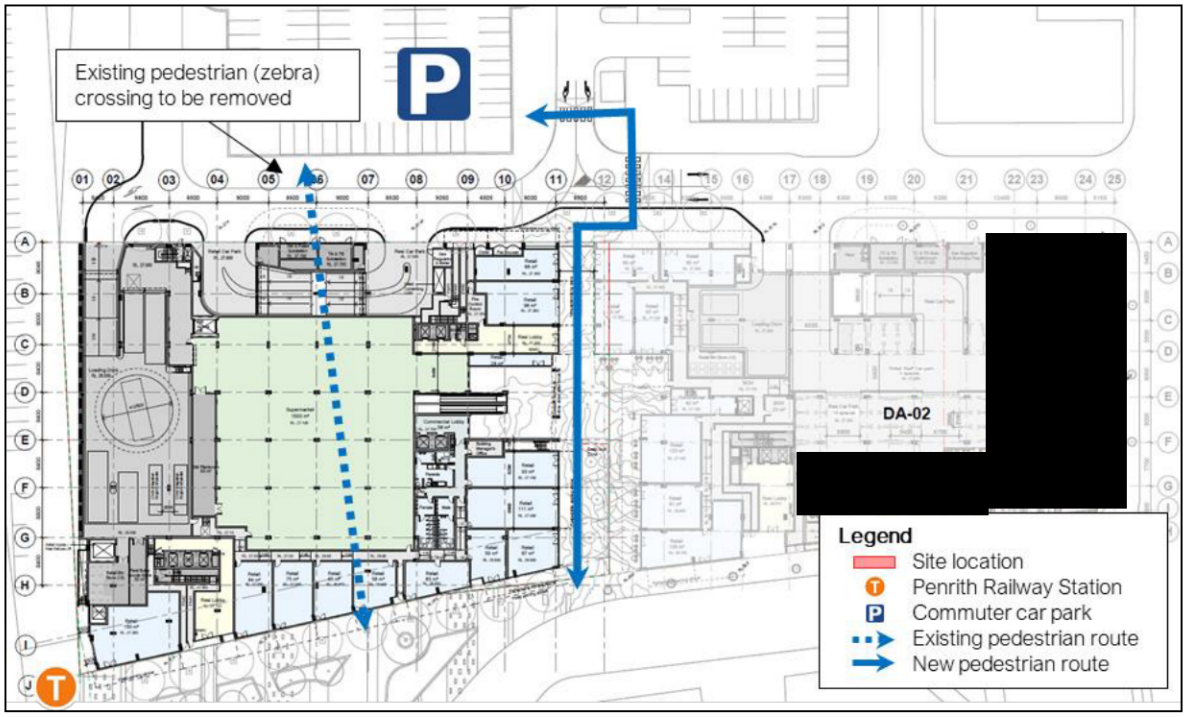
6.2. Pedestrian Access

As outlined earlier, existing pedestrian access between the commuter car park and the Penrith Railway Station will be altered by the proposed development.

Currently, commuters can utilise a pedestrian crossing on the eastern side of the carpark and directly cross the site to access the station. As part of this proposal, this pedestrian crossing will be removed, with pedestrians to be directed to use the existing pedestrian crossing across Dunshea Street that connects with the proposed pedestrian link through the site between Lot 3003 and Lot 3004. Active retail frontages have been considered along this through site link to encourage use. Kerb adjustments are proposed adjacent to the pedestrian crossing to effectively narrow the road and increase the footpath width on the eastern side of the road to reduce the length of the pedestrian crossing and better facilitate pedestrian movement between the commuter car park and Penrith Station. This arrangement is indicated in Figure 6.1.

While it is noted that this rerouting of pedestrians will lengthen the walking distance for some commuters, many commuters will be unaffected by the change. In addition, the pedestrian amenity will be vastly improved for all pedestrians. In this regard, the benefits of the change to existing pedestrian arrangements are considered to outweigh the increased distance for some commuters.

Figure 6.1: Pedestrian access through the site



Base image source: Nearmap

7. TRAFFIC IMPACT ASSESSMENT

07

7.1. Overview

In assessing the likely traffic impact of the development on the surrounding road network, traffic modelling has been completed in SIDRA for the following scenarios:

- Scenario 1: 2025 Future Year with no development.
- Scenario 2: 2025 Future Year with full development (both Stage 1 and Stage 2).
- Scenario 3: Scenario 2 with planned intersection upgrades to surrounding intersections.

It is important to note that the local intersection upgrades assessed in this scenario are not proposed as "mitigation works" of the development as they are understood to be upgrades proposed by Council to improve the precinct accessibility. Moreover, the analysis presented in following sections indicates that the works are not "required" to accommodate the development generated traffic. Notwithstanding this, it is understood that discussions have been held between Council and the developer for contributions towards the roundabout works at the Combewood Avenue / Thornton Drive intersection.

7.2. Traffic Generation

7.2.1. Traffic Generation Rates

Traffic generation estimates for the proposed development have been calculated based on the Transport for NSW (TfNSW) Guide to Traffic Generating Developments, Update Traffic Surveys (TDT 2013/04a), and other empirical data sources.

Given the location of the site adjacent to Penrith Station and restrictions on permissible car parking provision as per the DCP maximum requirements, traffic generation is best estimated based on car parking provision rather than floor area. As such, a vehicle trip per car space rate has been applied where possible for the various land uses.[4]

It is noted that this approach is consistent with the traffic impact assessment presented in the GTA TIA report for the approved DA Consent (DA17/0334) issued in 2017 for a development on Lot 3003.

Residential

For the residential uses, the standard traffic generation rates in the TDT 2013/04a for high density residential apartments of 0.15 and 0.12 vehicle trips per car space in the respective AM and PM peak hours have been applied. The TDT 2013/ 04a indicates these rates are appropriate for residential apartment buildings that are over six storeys high and have good access to public transport, which the proposed development meets.

Supermarket

Reference has been made to the NSW Small Suburban Shopping Centres Data Report[5] prepared by Bitzios Consulting for TfNSW which has analysed the traffic generation of several shopping centres around NSW that have anchor supermarket tenancies similar to the proposed development. A summary of the traffic generation for the surveyed shopping centres on a Thursday is provided in Table 7.1.

[4] It is noted that the application of the typical rates per 100sqm would be inappropriate for the retail land uses given car parking is proposed at rates far lower than recorded at the RMS surveyed sites.

[5] Roads And Maritime Trip Generation Surveys NSW Small Suburban Shopping Centres Data Report prepared by Bitzios Consulting for Roads and Maritime NSW dated 7 November 2018

Table 7.1: Traffic generation rates for shopping centres on a Wednesday/ Thursday

Site	GLFA	Anchor tenant	Development AM peak	Development PM peak	AM peak hour vehicle trips per parking space	PM peak hour vehicle trips per parking space
1	5,142	Woolworths	9:00 AM	3:15 PM	2.14	2.63
2	3,445	SupaIGA	9:45 AM	3:15 PM	1.74	2.09
3	3,182	Woolworths	8:30 AM	5:30 PM	2.61	3.86
4	4,976	Woolworths	8:45 AM	4:45 PM	1.5	3.13
5	991	ALDI	10:00 AM	5:00 PM	2.15	2.22
6	991	ALDI	10:15 AM	12:30 PM	2.43	2.63
7	6,394	Woolworths	11:00 AM	6:30 PM	1.33	1.72
8	4,740	Coles	12:00 PM	12:30 PM	1.18	1.22
9	9,700	Woolworths and ALDI	11:45 AM	4:45 PM	1.36	1.94
10	1,452	Coles	10:30 AM	5:00 PM	2.07	3.28
11	4,027	Woolworths	12:00 PM	5:45 PM	2.04	2.95
12	991	ALDI	10:30 AM	1:15 PM	2.12	2.63
13	4,831	Coles	11:45 AM	4:15 PM	1.97	2.5
14	5,028	Coles	10:30 AM	12:30 PM	1.57	1.48
15	991	ALDI	10:30 AM	3:30 PM	1.37	2.05
16	4,933	Coles	10:45 AM	4:30 PM	2.08	3.41
17	5,000	Coles	11:30 AM	5:00 PM	2.26	3.5
18	9,505	Woolworths	9:45 AM	12:00 PM	1.5	1.44
19	1,411	ALDI	11:15 AM	4:45 PM	2.51	3.32
20	660	IGA	10:00 AM	4:00 PM	0.93	1.2
				Average	**1.8**	**2.5**

Table 7.1 indicates that the average traffic generation rates across the 20 shopping centres that were surveyed were around 1.8 and 2.5 vehicle trips per car parking space in the AM and PM peak hours respectively.

However, it is important to note that these average traffic generation rates relate to the AM and PM peak hours of the shopping centres, with many of the shopping centres experiencing their AM peak hour later than the assessed AM road network peak hour and experiencing their PM peak hour earlier than the assessed PM road network peak hour. As such, a 20 per cent reduction factor has been applied to the above average rates to better reflect traffic generation during road network peak periods, resulting in rates of 1.5 and 2.0 vehicle trips per car space during the assessed AM and PM peak hours.

These rates are generally consistent with the rates that were adopted for the TIA that supported the existing approval for the site.

General Retail

For the purposes of this assessment, it has been assumed that the traffic generation of the general retail will be 50 per cent of the supermarket rate, or 0.75 and 1 vehicle trip(s) per car space in the AM and PM peak hours respectively.

This is considered conservative, noting the Thursday PM specialty retail traffic generation rates specified in the TfNSW Guide 2002 represent around 29.7 per cent of the corresponding supermarket traffic generation rates. Further to this, given the location of the site between Penrith Station and the commuter car park, it is expected that much of the demand for the general retail shops will be walk-by trips associated with commuters at the station rather than destination-based vehicle trips.

Again, these rates are generally consistent with the rates that were adopted for the TIA that supported the existing approval for the site.

Commercial

A review of the traffic generation rates for commercial developments in Sydney referenced in the TDT 2013/ 04a results in an average traffic generation rate 0.47 and 0.29 trips per car space during the AM and PM peak hours respectively. The surveyed data for these sites is provided in Table 7.2.

Table 7.2: Peak hour vehicle trip generation per parking space for similar commercial sites

Survey location	North Sydney	Chatswood	Macquarie Park	Parramatta	Average
Parking spaces	136	142	269	252	-
AM peak hour trips	51	47	119	185	-
PM peak hour trips	44	36	72	75	-
AM trip rate	0.38	0.33	0.44	0.73	**0.47**
PM trip rate	0.32	0.25	0.27	0.30	**0.29**

For the purposes of this assessment, it has conservatively been assumed that the commercial uses will generate around 0.5 vehicle trips per car space in both the AM and PM peak hours.

These rates are generally consistent with the rates that were adopted for the TIA that supported the existing approval for the site.

Childcare

For the childcare uses, staff are required to be on-site prior to children being dropped off and therefore it has been assumed that all staff would arrive and depart outside of the assessed peak hours.

Childcare spaces for parents are generally subject to 15 minute parking restrictions, which corresponds to each childcare space for parent/ carer use turning over four times in an hour. As such, a rate of 4 vehicle trips per parent/ carer car space has been assumed for both the AM and PM peak hours.

These rates are generally consistent with the rates that were adopted for the TIA that supported the existing approval for the site.

Medical Centre

Given the lack of available data associated with traffic generation rates based on car parking spaces for medical centres, the standard rates from the TfNSW Guide 2002 of 10.4 and 8.8 vehicle trips per 100 square metres GFA for the AM and PM peak hours respectively have been adopted for this assessment.

7.2.2. Traffic Generation Estimates

This assessment considers the traffic impact of the full site development associated with both Stage 1 and Stage 2 in order to provide a complete assessment. Using these rates, the expected traffic generation of the Thornton Central Village project is summarised in Table 7.3.

Table 7.3: Traffic generation estimates

Stage	Land Use	Size (GFA/ number of car spaces)	Traffic generation rate (vehicle trips per hour)		Traffic generation estimate (vehicle trips per hour)	
			AM	PM	AM	PM
Stage 1	Residential	333 spaces	0.15 / space	0.12 / space	50	40
	Supermarket	63 spaces	1.50 / space	2.00 / space	95	126
	Retail	22 spaces	0.75 / space	1.0 / space	17	22
	Childcare	10 visitor spaces	4.0 / visitor space	4.0 / visitor space	40	40
	Medical	631m^2 GFA	10.4 / 100m^2 GFA	8.8 / 100m^2 GFA	66	56
				Stage 1 total	**268**	**284**
Stage 2	Residential	256 spaces	0.15 / space	0.12 / space	38	31
	Retail	12 spaces	0.75 / space	1.0 / space	9	12
	Commercial	10 spaces	0.5 / space	0.5 / space	5	5
				Stage 2 total	**52**	**48**
				Total	**320**	**332**

Table 7.3 indicates that the proposed Stage 1 development is expected to generate around 268 and 284 vehicle trips during the weekday AM and PM peak hours respectively, with the full development of the site expected to generate up to 332 vehicle trips in any weekday peak hour.

As mentioned previously, a DA Consent (DA17/0334) was issued in 2017 for a development on the site that contained ground floor retail tenancies and a supermarket, commercial floor space, a childcare and 62 residential apartments. The Transport Impact Assessment (GTA, 2017) that supported the DA estimated that the development would generate around 114 and 249 vehicle trips in the AM and PM peak hours respectively. As such, the current proposal for the site represents an increase of around 206 and 83 vehicle trips in the AM and PM peak hours respectively from the existing approval for the site.

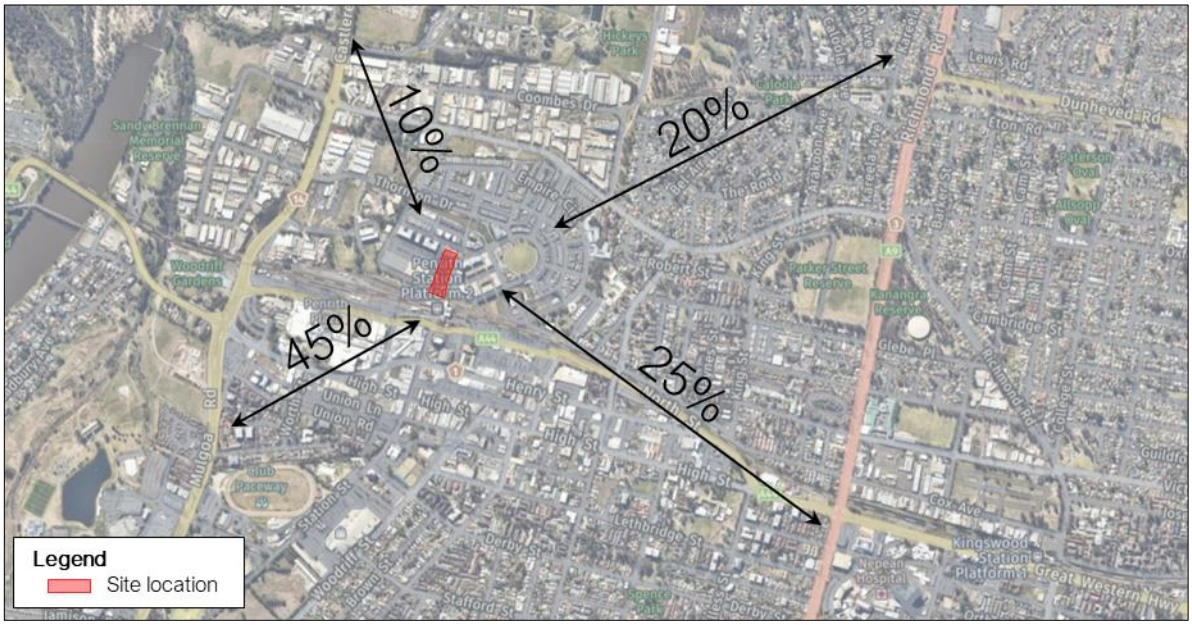
7.3. Distribution and Assignment

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

- configuration of the arterial road network in the immediate vicinity of the site
- existing operation of intersections providing access between the local and arterial road network
- surrounding employment centres, retail centres and schools in relation to the site
- configuration of access points to the precinct

For the purposes of estimating vehicle movements, the directional distributions shown in Figure 7.1 have been assumed. These distributions are generally consistent with those estimated in the Transport Mobility and Accessibility Plan[6] prepared by Parsons Brinckerhoff for the North Penrith Development.

Figure 7.1: Assumed traffic distributions



Base image source: Nearmap

In addition, the following directional splits (i.e., the ratio between the inbound and outbound traffic movements) have been assumed:

- Residential trips: 20 per cent inbound and 80 per cent outbound in the AM peak hour and vice versa in the PM peak hour.
- Commercial trips: 80 per cent inbound and 20 per cent outbound in the AM peak hour and vice versa in the PM peak hour.
- Retail, childcare and medical trips: 50 per cent inbound and 50 per cent outbound both peak hours.

Base 2025 traffic volumes through the key surveyed intersections have been estimated by applying a two per cent per annum growth rate to the 2019 and 2020 turning movement counts outlined in Section 2.3 as recommended by Council.

Based on the above assumptions, the figures in Appendix B have been prepared to show the estimated increase in turning movements at the key intersections near the subject site following full site development.

[6] North Penrith Development, Transport Mobility and Accessibility Plan[6] prepared by Parsons Brinckerhoff dated October 2010

7.4. Traffic Impact

7.4.1. Scenario 1: 2025 without Development

The key intersections near the site have been modelled with the anticipated 2025 base traffic volumes without any proposed development traffic. Table 7.4 provides a summary of the SIDRA modelling results.

Table 7.4: Scenario 1: 2025 future year intersection operation without development

Intersection	Peak	Degree of saturation (DOS)	Average delay (sec)	Queue (m)	Level of service (LOS)
Castlereagh Road/ Thornton Drive	AM	0.91	46	279	D
	PM	1.13	100	569	F
Combewood Avenue/ Thornton Drive	AM	0.17	11	2	A
	PM	0.38	16	4	B
Coreen Avenue/ Combewood Avenue	AM	0.11	11	2	A
	PM	0.50	12	11	A
Coreen Avenue/ Sydney Smith Drive	AM	0.26	12	4	A
	PM	0.29	11	5	A
The Crescent/ Evan Street/ Macquarie Avenue	AM	0.60	24	43	B
	PM	0.32	13	15	A

Note: Average queues reported for networked intersections while 95th percentile queues are reported for isolated intersections.

Table 7.4 indicates all intersections with the exception of the Castlereagh Road/ Thornton Drive intersection are expected to operate satisfactorily at a LOS A or B in both weekday peak hours in 2025.

The Castlereagh Road/ Thornton Drive intersection is expected to be over capacity in the PM peak hour as indicated by the DOS of 1.13. This results high delay overall for the intersection and an associated LOS F. The operation of this intersection in the AM peak hour is expected to be better at a LOS D, however it is still expected to be close to capacity as indicated by the DOS of 0.91. However, as outlined earlier in this report, it is expected that works will have been completed by TFNSW at this intersection by 2025 to improve its operation.

It is noted that at the Combewood Avenue/ Thornton Drive intersection, the analysis indicates that the existing unsignalised cross-intersection is expected to operate with Level of Service of A and B, with degrees of saturation of 0.17 and 0.38, during the AM and PM peak hours respectively.

7.4.2. Scenario 2: 2025 with Development

The key intersections near the site have been modelled with the anticipated additional traffic from the proposed development. Table 7.5 provides a summary of the SIDRA modelling results.

Table 7.5: Scenario 2: 2025 future year intersection operation with development

Intersection	Peak	Degree of saturation (DOS)	Average delay (sec)	Queue (m)	Level of service (LOS)
Castlereagh Road/ Thornton Drive	AM	0.97	63	344	E
	PM	1.20	133	669	F
Combewood Avenue/ Thornton Drive	AM	0.32	13	4	A
	PM	0.63	20	10	B
Coreen Avenue/ Combewood Avenue	AM	0.13	11	2	A
	PM	0.52	13	12	A
Coreen Avenue/ Sydney Smith Drive	AM	0.37	13	7	A
	PM	0.78	14	33	A
The Crescent/ Evan Street/ Macquarie Avenue	AM	0.60	24	43	B
	PM	0.32	13	15	A

Note: Average queues reported for networked intersections while 95th percentile queues are reported for isolated intersections.

Similar to Scenario 1, Table 7.5 indicates all intersections with the exception of the Castlereagh Road/ Thornton Drive intersection are expected to operate satisfactorily at a LOS A or B in both weekday peak hours in 2025 with additional traffic generated by the proposed development.

Delay and queues are expected to increase at the Castlereagh Road/ Thornton Drive intersection as expected, with the intersection expected to operate at a LOS E and F in the AM and PM peak hours respectively. Again, it is noted that this intersection is required to be upgraded regardless of whether the proposed development proceeds or not.

At the Combewood Avenue/ Thornton Drive intersection, the analysis indicates that the existing unsignalised cross-intersection is expected to continue to operate with Level of Service of A and B, albeit with slightly higher degrees of saturation of 0.32 and 0.63 (up from 0.17 and 0.38 in Scenario 1) during the AM and PM peak hours respectively. This analysis indicates that the provision of a roundabout is not "required" as a result of the development on capacity grounds (noting there is also no accident history at the intersection), although it is accepted that an unsignalised cross-intersection is atypical for this location.

7.4.3. Scenario 3: 2025 with Development and Planned Intersection Upgrades

As mentioned, the Castlereagh Road/ Thornton Drive intersection is expected to be over capacity in 2025 even without the proposed development. As such, modelling for Scenario 3 considers the planned upgrades to this intersection as discussed in Section 2.2.3.

Council has also advised it is investigating potentially upgrading the Coreen Avenue/ Combewood Avenue and Coreen Avenue/ Sydney Smith Drive intersection. The proposed upgrades involve changing the Coreen Avenue/ Combewood Avenue intersection to be a give-way intersection and restricting movements to left-in and left-out of Combewood Avenue, while the Coreen Avenue/ Sydney Smith Drive intersection is proposed to be upgraded to traffic signals. In addition, Council has indicated its preference for the Thornton Drive/ Combewood Avenue intersection to be upgraded to a roundabout.

It is noted that the Coreen Avenue and Combewood Avenue intersections are expected to operate satisfactorily in 2025 with full development of the site as indicated by the SIDRA modelling results for Scenario 2.

The assumed Scenario 3 layouts for the above intersections are shown in Figure 7.2 to Figure 7.5.

Figure 7.2: Assumed Scenario 3 Castlereagh Road/ Thornton Drive intersection layout

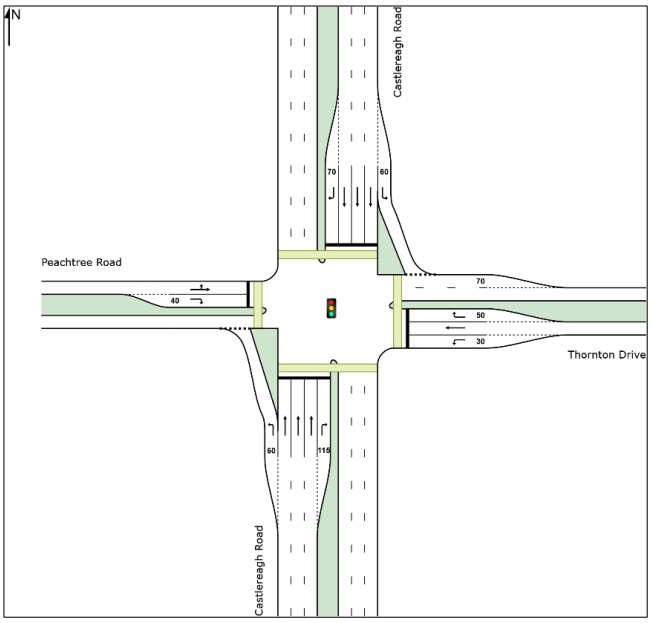


Figure 7.3: Assumed Scenario 3 Thornton Drive/ Combewood Avenue intersection layout

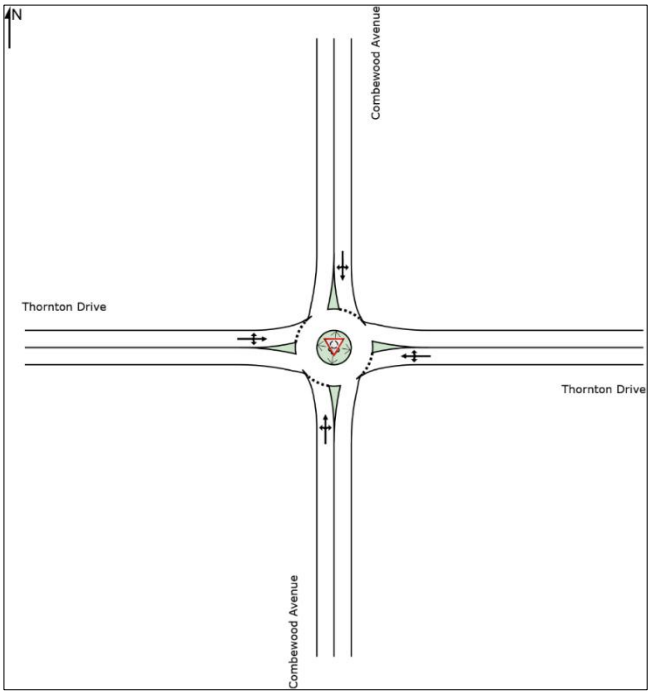


Figure 7.4: Assumed Scenario 3 Coreen Avenue/ Combewood Avenue intersection layout

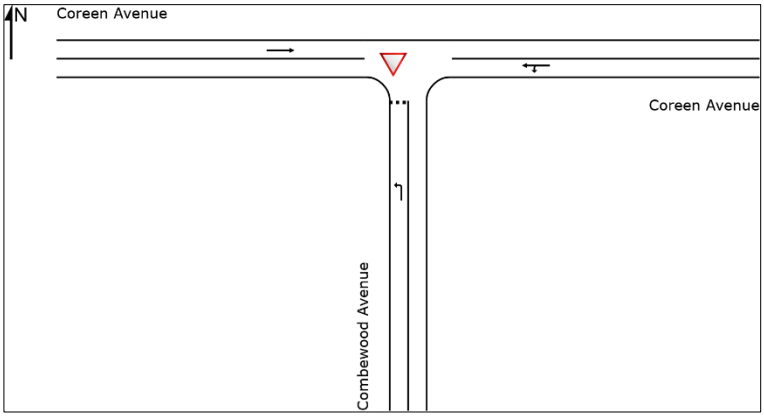


Figure 7.5: Assumed Scenario 3 Coreen Avenue/ Sydney Smith Drive intersection layout

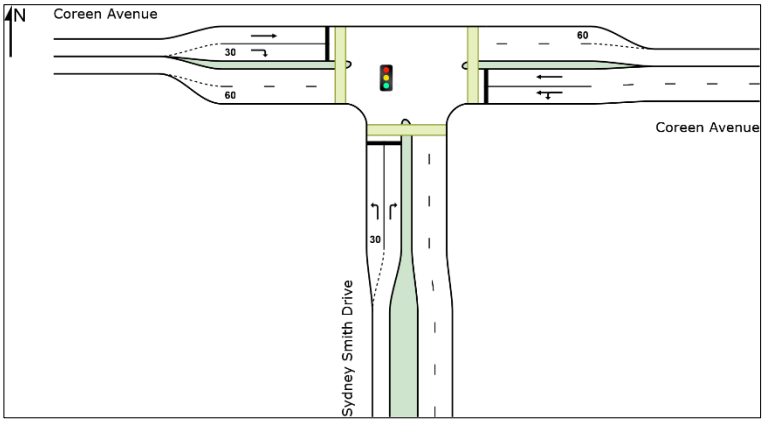


Table 7.6 provides a summary of the SIDRA modelling results for Scenario 3, with modelling considering a slight redistribution of existing traffic associated with Coreen Avenue/ Combewood Avenue being restricted to left-in left-out.

The table indicates that the planned upgrades to the Castlereagh Road/ Thornton Drive intersection would result in the intersection operating at a satisfactory LOS C or D in the weekday peak hours in 2025 with the proposed development. Similarly, the other key intersections are also expected to operate satisfactorily with the potential upgrades to the Combewood Avenue/ Thornton Drive, Coreen Avenue/ Combewood Avenue and Coreen Avenue/ Sydney Smith Drive intersections at a LOS A or B. This is not dissimilar to the expected operation of these intersections in their current configuration.

As outlined earlier, however, it is important to note that the local intersection upgrades assessed in this scenario are not proposed as “mitigation works” of the development as they are understood to be upgrades proposed by Council to improve the precinct accessibility. Moreover, the analysis presented in following sections indicates that the works are not “required” to accommodate the development generated traffic. Notwithstanding this, it is understood that discussions have been held between Council and the developer for contributions towards the roundabout works at the Combewood Avenue/ Thornton Drive intersection.

Table 7.6: Scenario 3: 2025 future year intersection operation with development and potential road upgrades

Intersection	Peak	Degree of saturation (DOS)	Average delay (sec)	Queue (m)	Level of service (LOS)
Castlereagh Road/ Thornton Drive	AM	0.79	35	164	C
	PM	0.92	50	233	D
Combewood Avenue/ Thornton Drive	AM	0.04	10	1	A
	PM	0.05	10	1	A
Coreen Avenue/ Combewood Avenue	AM	0.06	7	1	A
	PM	0.18	8	2	A
Coreen Avenue/ Sydney Smith Drive	AM	0.53	19	67	B
	PM	0.73	25	82	B
The Crescent/ Evan Street/ Macquarie Avenue	AM	0.60	24	43	B
	PM	0.32	13	15	A

Note: Average queues reported for networked intersections while 95th percentile queues are reported for isolated intersections.

8. CONCLUSION

08

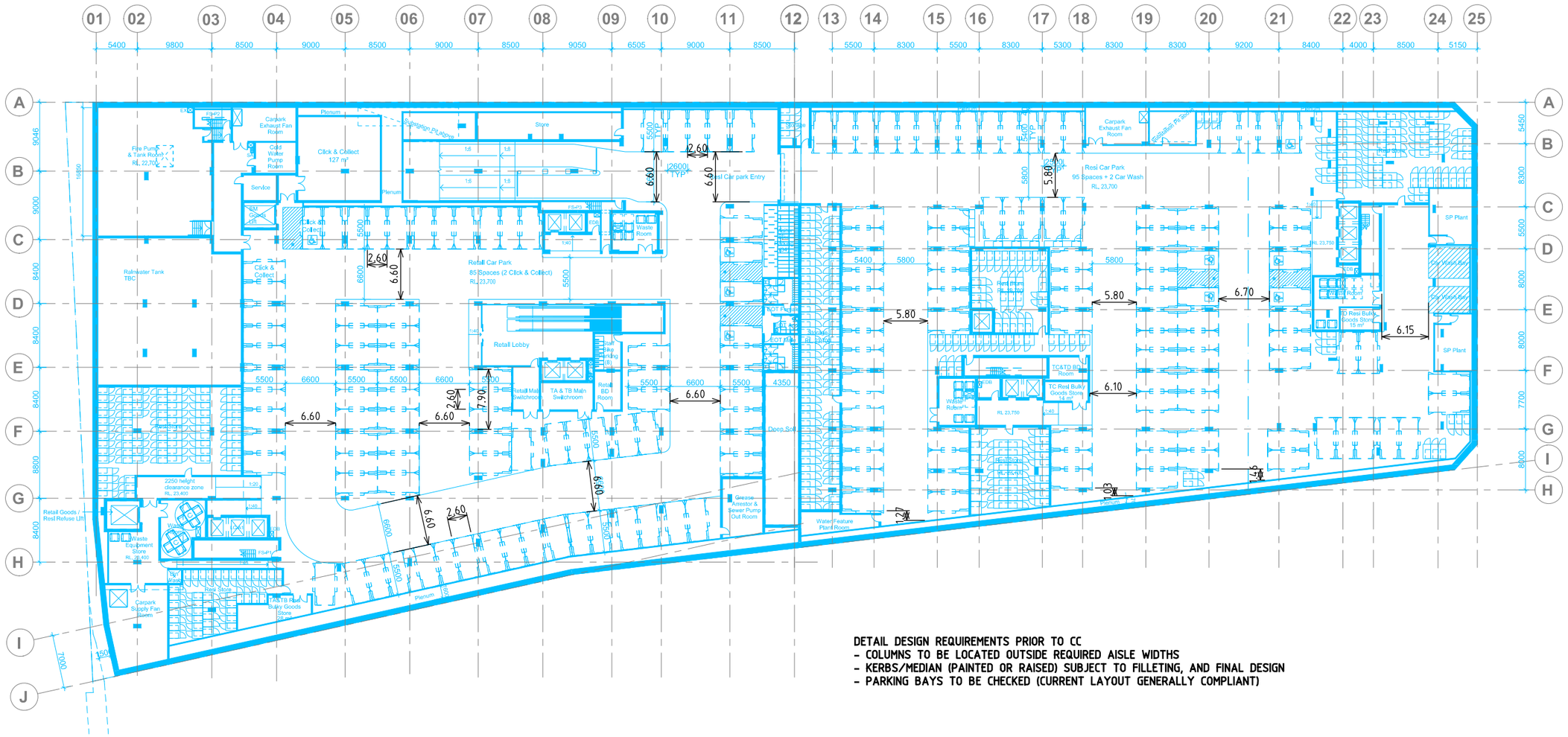
CONCLUSION

Based on the analysis and discussions presented within this report, the following conclusions are made:

1. A mixed-use development is proposed on Lot 3003 of DP1184498 in Penrith comprising 316 apartments and approximately 1,600sqm GFA of supermarket, 1,100sqm GFA of general retail and 1,400sqm GFA of medical and childcare floor area.
2. The proposed development the first stage of the overall development to be known as Penrith Central Village which will comprise 553 apartments and approximately 1,700sqm GFA of supermarket, 1,800sqm GFA of general retail and 2,000sqm GFA of commercial, medical and childcare floor area.
3. The proposed development generates a maximum DCP requirement of 477 car parking spaces, including 333 spaces for residents and 144 spaces for the retail/ commercial uses.
4. The proposed provision of 453 car parking spaces, including 333 spaces for residents and 120 spaces for the retail/ commercial uses therefore meets this maximum requirement.
5. The provision of a loading docks with capacity for up to four vehicles is considered suitable for meeting the servicing needs of the development.
6. It is recommended that an electronic booking system and loading dock occupancy signage be installed at the loading dock entrances to minimise the chance of service vehicles arriving when the dock is full.
7. The proposed parking and loading dock areas are generally consistent with the dimensional requirements as set out in the Australian/New Zealand Standard for Off Street Car Parking (AS/NZS2890.1:2004 and AS/NZS2890.6:2009) and Off-Street Commercial Vehicle Facilities (AS2890.2-2018).
8. Full development of the site (Stage 1 and Stage 2) is expected to generate an increase of around 320 and 332 vehicle trips in the weekday AM and PM peak hours respectively from existing conditions (268 and 284 of which are associated with Stage 1).
9. This represents an increase of around 204 and 83 vehicle trips in the AM and PM peak hours respectively from the existing approval for the site.
10. Traffic modelling indicates that the anticipated additional traffic generated by full development of the site is not expected to materially change the operation of the key surveyed intersections near the site in their current configuration when compared to base traffic conditions without the proposed development.
11. An additional modelling scenario was completed at the request of Council to consider potential future upgrades to several intersections near the site. The modelling results also confirm that these intersections are expected to continue operating well with the additional traffic generated by full development of the site once upgraded.
12. Overall, the proposed development can be supported from a transport and parking perspective.

A.SWEPT PATH ASSESSMENT

A



DETAIL DESIGN REQUIREMENTS PRIOR TO CC
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- KERBS/MEDIAN (PAINTED OR RAISED) SUBJECT TO FILLETING, AND FINAL DESIGN
- PARKING BAYS TO BE CHECKED (CURRENT LAYOUT GENERALLY COMPLIANT)

NOTES:
- MAXIMUM CHANGE IN GRADE FOR CARS SHOULD BE 1:8 OVER 2m
- A MINIMUM HEIGHT CLEARANCE OF 2.2m (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE CIRCULATION AISLES AND PARKING SPACES.
- A MINIMUM HEIGHT CLEARANCE OF 2.5m (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE DISABLED PARKING SPACES
- A MINIMUM HEIGHT CLEARANCE OF 4.5m (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE SERVICE VEHICLE ACCESS ROADWAYS AND LOADING DOCKS
- HEIGHT CLEARANCE ABOVE A SAG CHANGE IN GRADES SHOULD BE MEASURED IN ACCORDANCE WITH FIGURE 5.3 AS2890.1-2004.

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THORNTON VILLAGE CENTRE

BASEMENT 01
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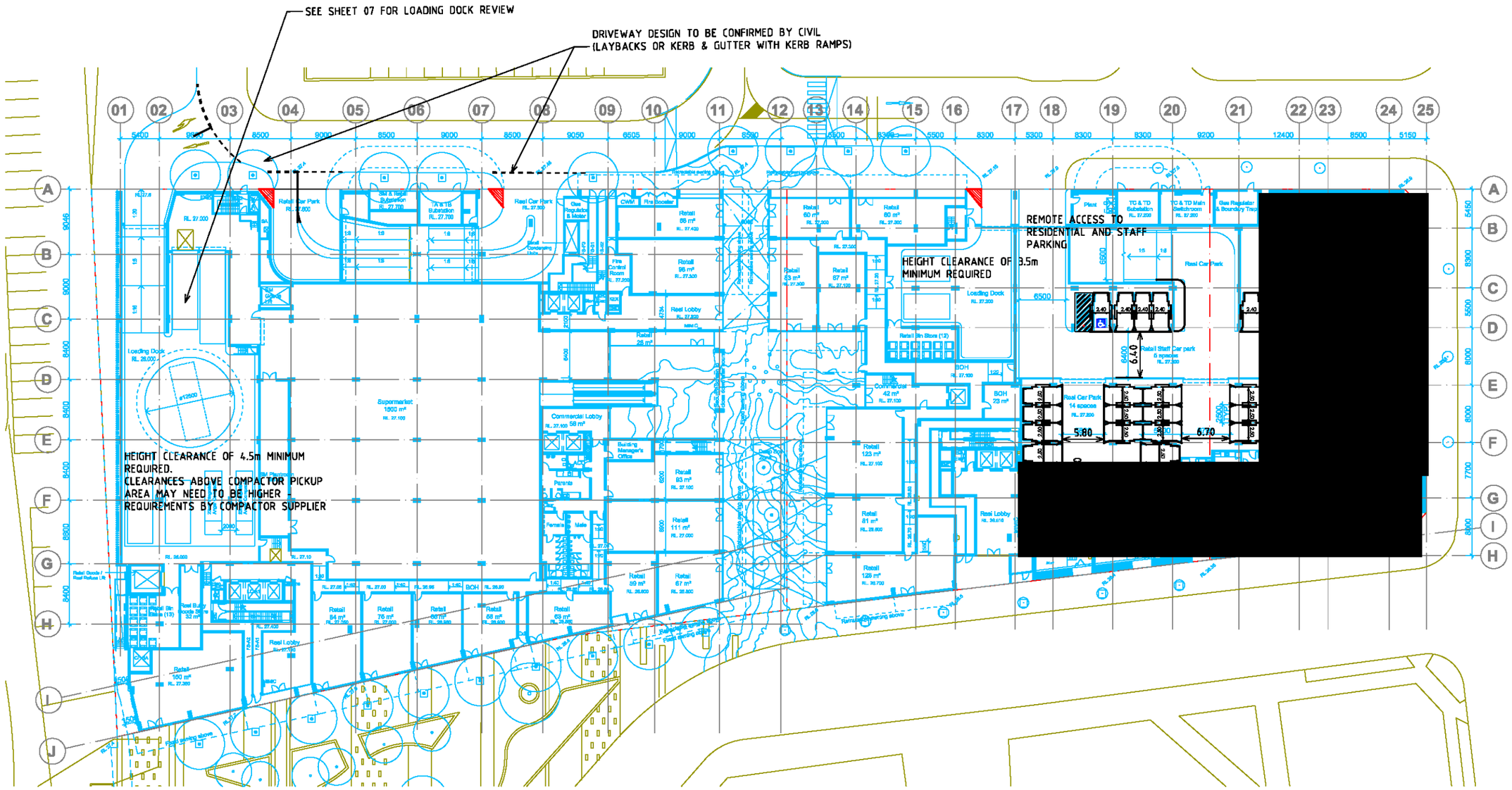

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  - SRV LOADING DOCK IN STAGE 2 - A MINIMUM HEIGHT CLEARANCE OF 3.5m (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE SERVICE VEHICLE ACCESS ROADWAYS AND LOADING DOCKS.
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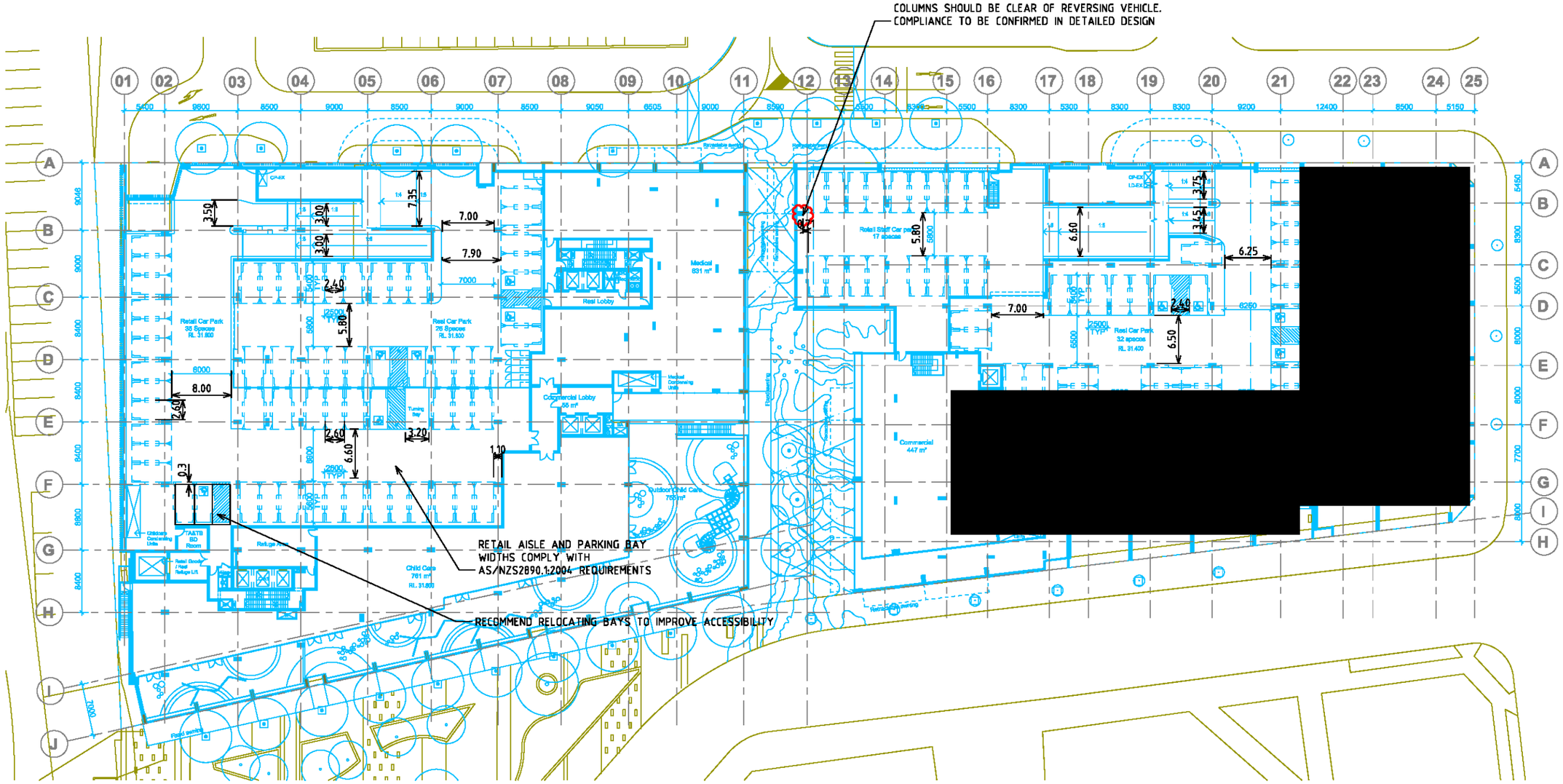

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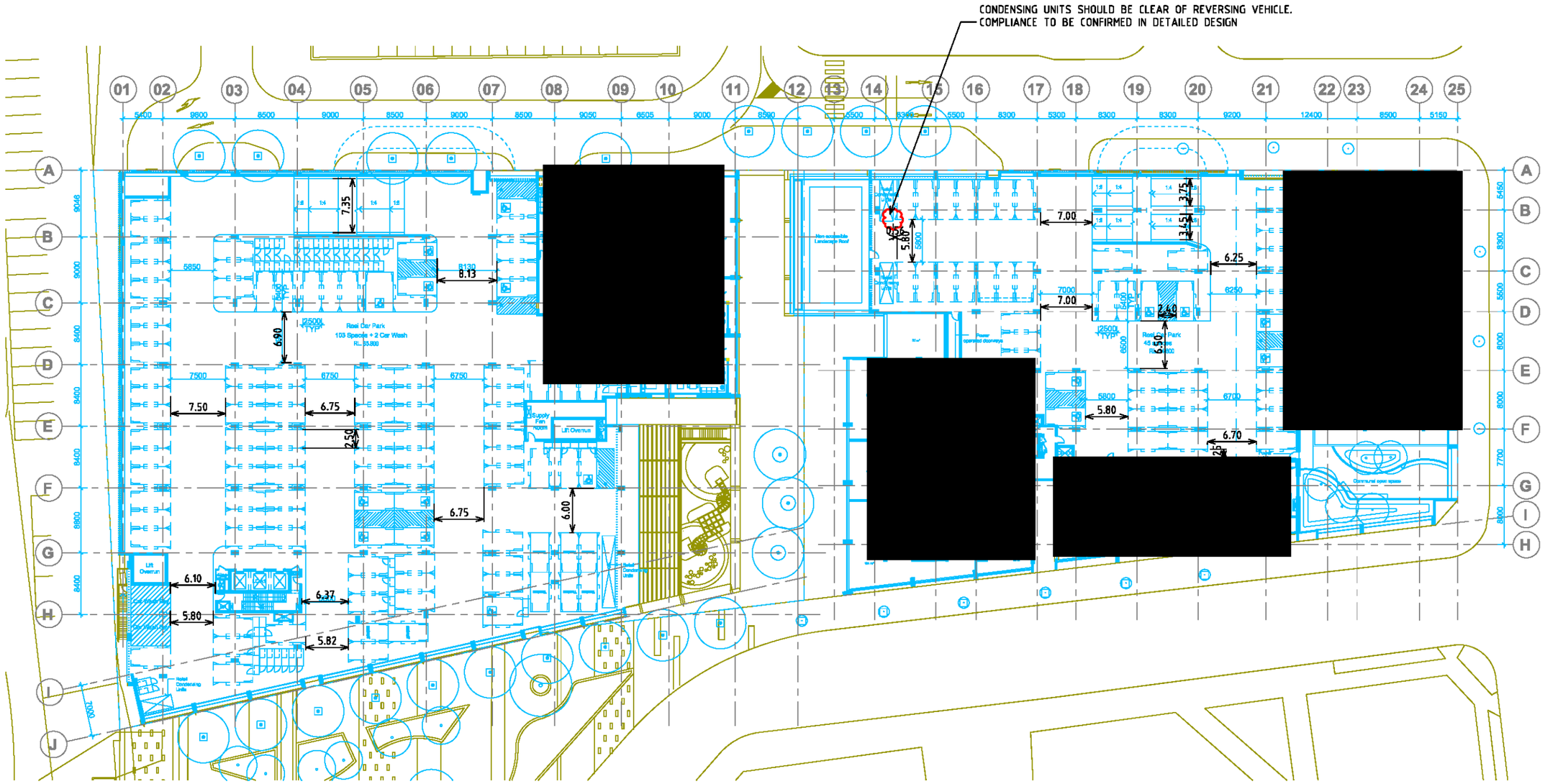

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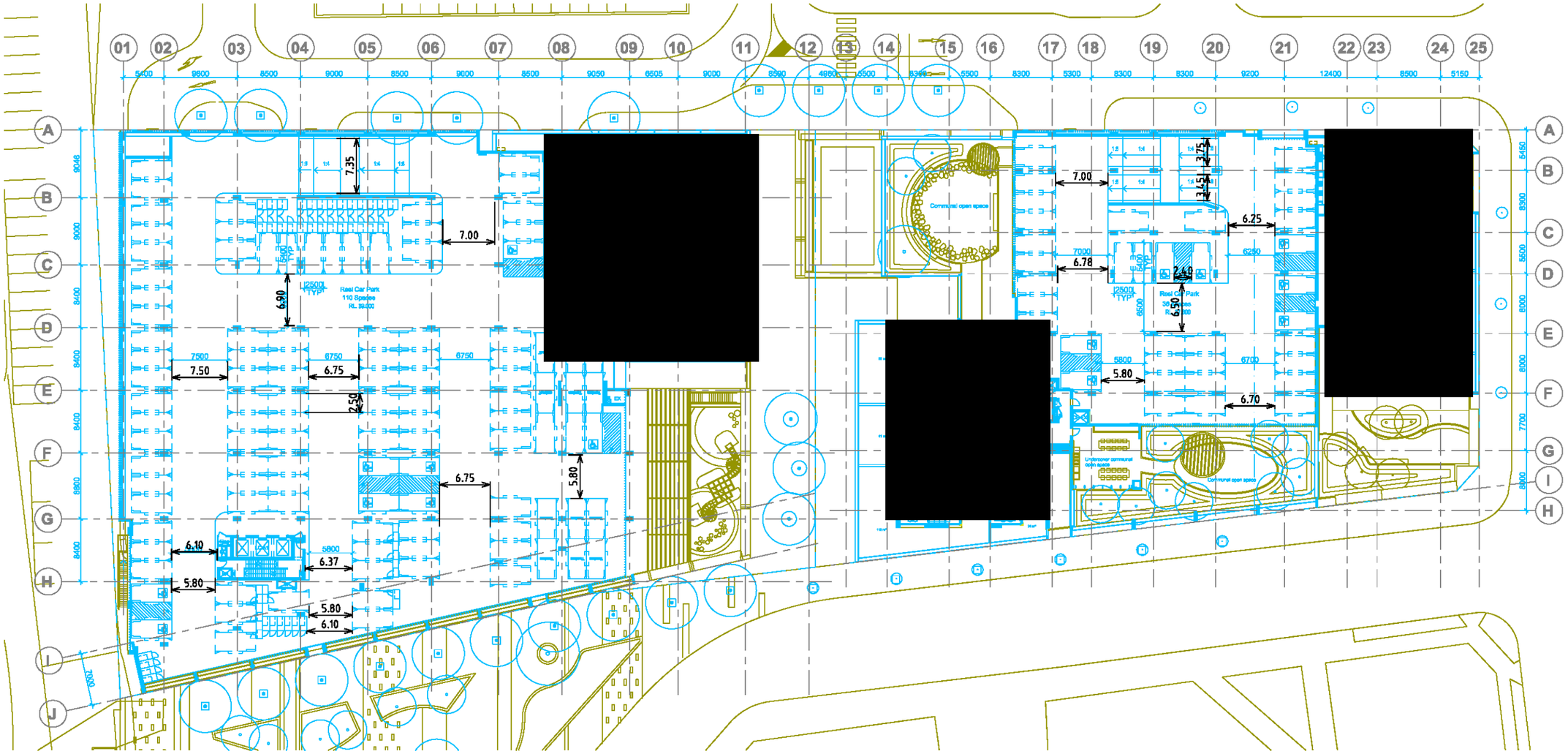

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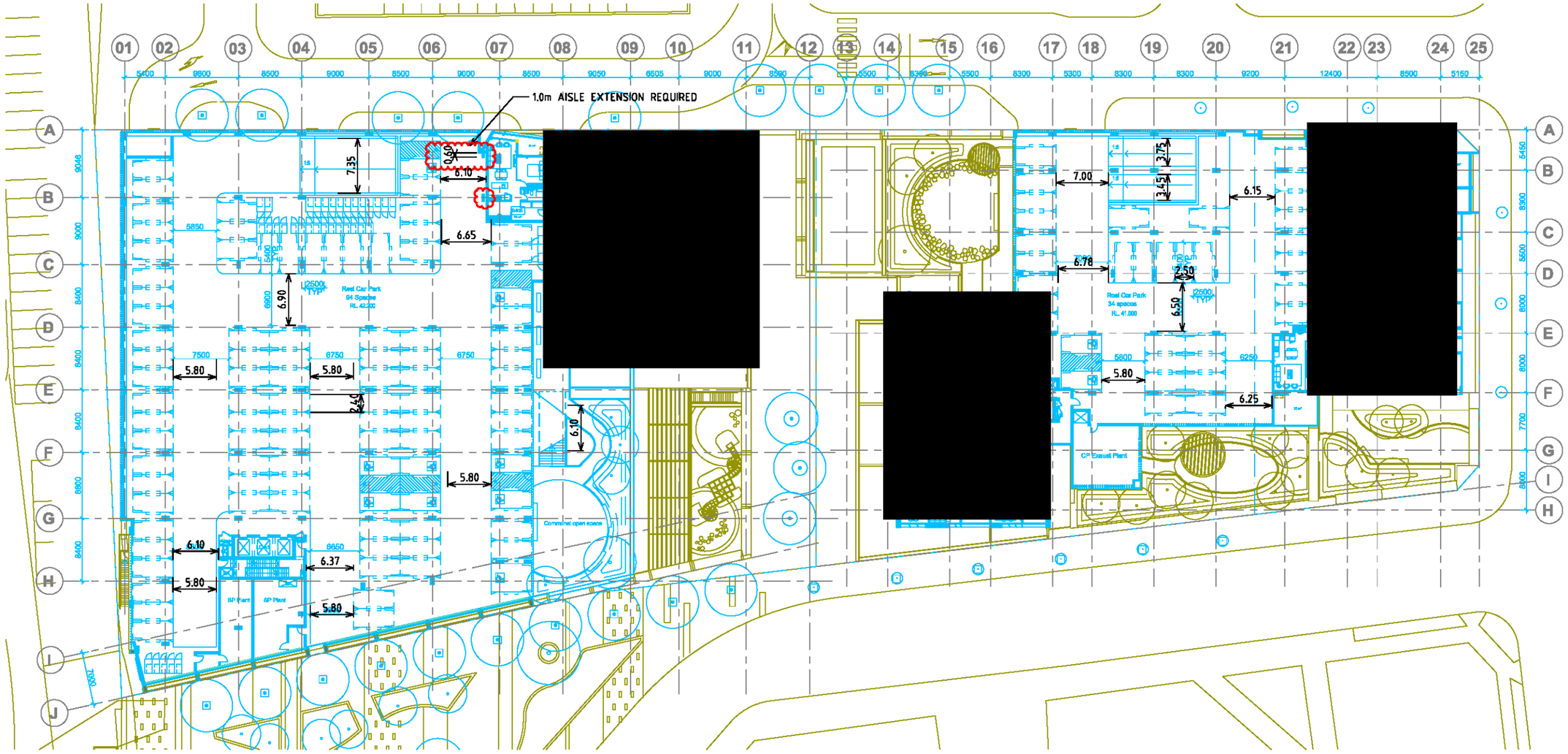

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THORNTON VILLAGE CENTRE

LEVEL 04
CAR PARK COMPLIANCE REVIEW

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RECOMMNED SIGNALS / WARNING LIGHTS AND SIGNAGE TO WARN OF EXITING VEHICLES.
DRIVEWAY SUITABLE FOR ONE-WAY OPERATION OF LARGE VEHICLES, SEE SWEPT PATHS.

CONFIRMATION OF GRADES AND RLs

HEIGHT CLEARANCE OF 4.5m MINIMUM REQUIRED.
CLEARANCES ABOVE COMPACTOR PICKUP AREA MAY NEED TO BE HIGHER - REQUIREMENTS BY COMPACTOR SUPPLIER

Retail Car Park RL. 27.600
SM & Retail Substation RL. 27.700
TA & TB Substation RL. 27.700
Resi Car Park RL. 27.500
Gas Regulator & Meter
CWM
Fire Booster
Retail 68 m² RL. 27.400
Retail Condensing Units
Fire Control Room RL. 27.200
Retail 98 m² RL. 27.300
Resi Lobby RL. 27.200
MIMIC
Retail 28 m²
SM Goods Lift
Loading Dock RL. 26,000
RL. 27.000
Supermarket 1500 m² RL. 27.100
SM Plantroom 83 m²
23m3 Integrated Anger Compactor
Commercial Lobby RL. 27.100 58 m²
Building Manager's Office
ACC
Parents
Chgr
Female
Male
Retail 93 m² RL. 27.100
Retail 111 m² RL. 27.000
Retail 59 m² RL. 26.800
Retail 67 m² RL. 26.800
Retail Goods / Resi Refuse Lift
Resi Bulky
Elec
LC-A1
BOH
RL. 26.000
RL. 27.10
RL. 27.05
RL. 27.00
RL. 26.95
RL. 26.90
RL. 26.85
RL. 26.80
RL. 27.45
Retractable awning ab

01 02 03 04 05 06 07 08 09 10

5400 9800 8500 9000 8500 9000 8500 9050 6505 9000

A B C D E F G

9046 9000 8400 8400 8800 8400

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THORNTON VILLAGE CENTRE
BUILDING TATB
GROUND LEVEL
LOADING DOCK COMMENTS
DRAWING NO. N208910-01-07 SHEET 07 OF 25 ISSUE P5

PLOTTED BY : hobermaier ON 19/11/2021 AT 7:55:41 PM

ENTRY MANOEUVRE

EXIT MANOEUVRE

01 02 03 04 05 06

5400 9000 8500 9000 8500 900

A B C D E F G

9046 9000 8400 8400 8400 8400 8800 3400

HRV STANDARDS 2018 (AU)

HRV STANDARDS 2002 (AU)

R 27.4

R 27.5

1:20

1:8

1:6

1:40

Retail Car Park
RL. 27.600

SM & Retail Substation
RL. 27.700

TA & TB Substatio
RL. 27.70(

RL. 27.000

EXISTING 2

SA

SM Goods Lift

Loading Dock
RL. 26.000

ø12500

Supermarket
1500 m²
RL. 27.100

SM Plantroom
83 m²

23m3 Integrated Anger Compactor

2000

RL. 26.000

RL. 27.10

RL. 27.05

RL. 27.00

RL. 26.95

Retail Goods / Resi Refuse Lift

Elec

LCA1

Toilets

SWEPT PATH KEY

VEHICLE CENTRE LINE

VEHICLE TYRE PATH

VEHICLE BODY PATH

600mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

12.50

2.40 6.60

HRV AS2890.2 meters

Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 35.3

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THORNTON VILLAGE CENTRE
BUILDING TATB
GROUND LEVEL
VEHICLE SWEPT PATH ASSESSMENT

DRAWING NO. N208910-01-08 SHEET 08 OF 25 ISSUE P5

ENTRY MANOEUVRE

EXIT MANOEUVRE

01 02 03 04 05 06

5400 9000 8500 9000 8500 900

A B C D E F G

9046 9000 8400 8400 8400 8800 3400

HRV STANDARDS 2018 (AU)

HRV STANDARDS 2002 (AU)

Retail Car Park
RL. 27.600

SM & Retail Substation
RL. 27.700

TA & TB Substatio
RL. 27.70(

RL. 27.000

EXISTING

SA

SM Goods Lift

Loading Dock
RL. 26.000

Supermarket
1500 m²
RL. 27.100

SM Plantroom
83 m²

23m3 Integrated Anger Compactor

2000

RL. 26.000

RL. 27.10

Retail Goods / Resi Refuse Lift

Elec

Comms

LCA1

1:40

RL. 27.05

RL. 27.00

RL. 26.95

1:8

1:6

1:20

ø12500

RL. 27.4

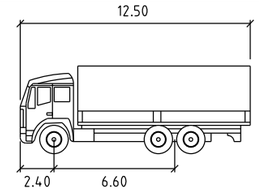
RL. 27.6

STAN(

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 600mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h



HRV AS2890.2 meters

Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 35.3

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PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

DESIGNED H.OBERMAIER
DESIGN CHECK -
APPROVED BY T.DE YOUNG
DATE ISSUED 19 NOVEMBER 2021

SCALE A3 0 3 6 1:300
CAD FILE NO. N208910-01-P5.dgn

THORNTON VILLAGE CENTRE
BUILDING TATB
GROUND LEVEL
VEHICLE SWEPT PATH ASSESSMENT

DRAWING NO. N208910-01-09 SHEET 09 OF 25 ISSUE P5

ENTRY MANOEUVRE

EXIT MANOEUVRE

01 02 03 04 05 06

5400 9800 8500 9000 8500 900

A B C D E F G

9046 9000 8400 8400 8400 8800 3400

MRV STANDARDS 2002 (AU)

RL 27.6

EX

FSR2

SA

RL. 27.000

Retail Car Park
RL. 27.600

SM & Retail Substation
RL. 27.700

TA & TB Substatio
RL. 27.70(

1:8 1:6 1:6 1:8 1:6 1:6

SM Goods Lift

Loading Dock
RL. 26.000

Supermarket
1500 m²
RL. 27.100

SM Plantroom
83 m²

23m3 integrated Anger Compactor

2000

RL. 26.000

RL. 27.10

Retail Goods / Resi Refuse Lift

Elec.

LCA1

Cabins

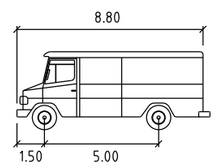
RL. 27.05 1:40 RL. 27.00 1:40 RL. 26.95

TO EXIT A MRV VEHICLE WILL BE ABLE TO EITHER;
- USE TURNTABLE
- PERFORM A THREE POINT TURN.

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 600mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h



MRV AS2890.2 metres

Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 34.0

PLOTTED BY : hobermaier ON 19/11/2021 AT 7:55:45 PM

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DESIGN CHECK -
APPROVED BY T.DE YOUNG
DATE ISSUED 19 NOVEMBER 2021

SCALE A3 0 3 6 1:300
CAD FILE NO. N208910-01-P5.dgn

THORNTON VILLAGE CENTRE
BUILDING TATB
GROUND LEVEL
VEHICLE SWEPT PATH ASSESSMENT

DRAWING NO. N208910-01-10 SHEET 10 OF 25 ISSUE P5

ENTRY MANOEUVRE

EXIT MANOEUVRE

01 02 03 04 05 06

5400 9800 8500 9000 8500 900

A B C D E F G

9046 9000 8400 8400 8400 8800 3400

MRV STANDARDS 2002 (AU)

RL. 27.4

RL. 27.6

1:20

1:8

1:16

EXIT

FHSD2

SA

RL. 27.000

Retail Car Park
RL. 27.600

SM & Retail Substation
RL. 27.700

TA & TB Substatio
RL. 27.70(

1:8 1:6 1:6

1:8 1:6 1:6

SM Goods Lift

Loading Dock
RL. 26.000

ø12500

Supermarket
1500 m²
RL. 27.100

SM Plantroom
83 m²

23m3 integrated Anger Compactor

2000

RL. 26.000

RL. 27.10

Retail Goods / Resi Refuse Lift

Elec.

LC-A1

23lms

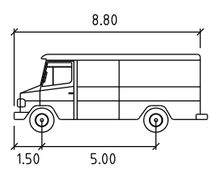
1:40

RL. 27.05 1:40 RL. 27.00 1:40 RL. 26.95

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 600mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h



MRV AS2890.2 metres

Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 34.0

PLOTTED BY : hobermaier ON 19/11/2021 AT 7:55:46 PM

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PRELIMINARY PLAN
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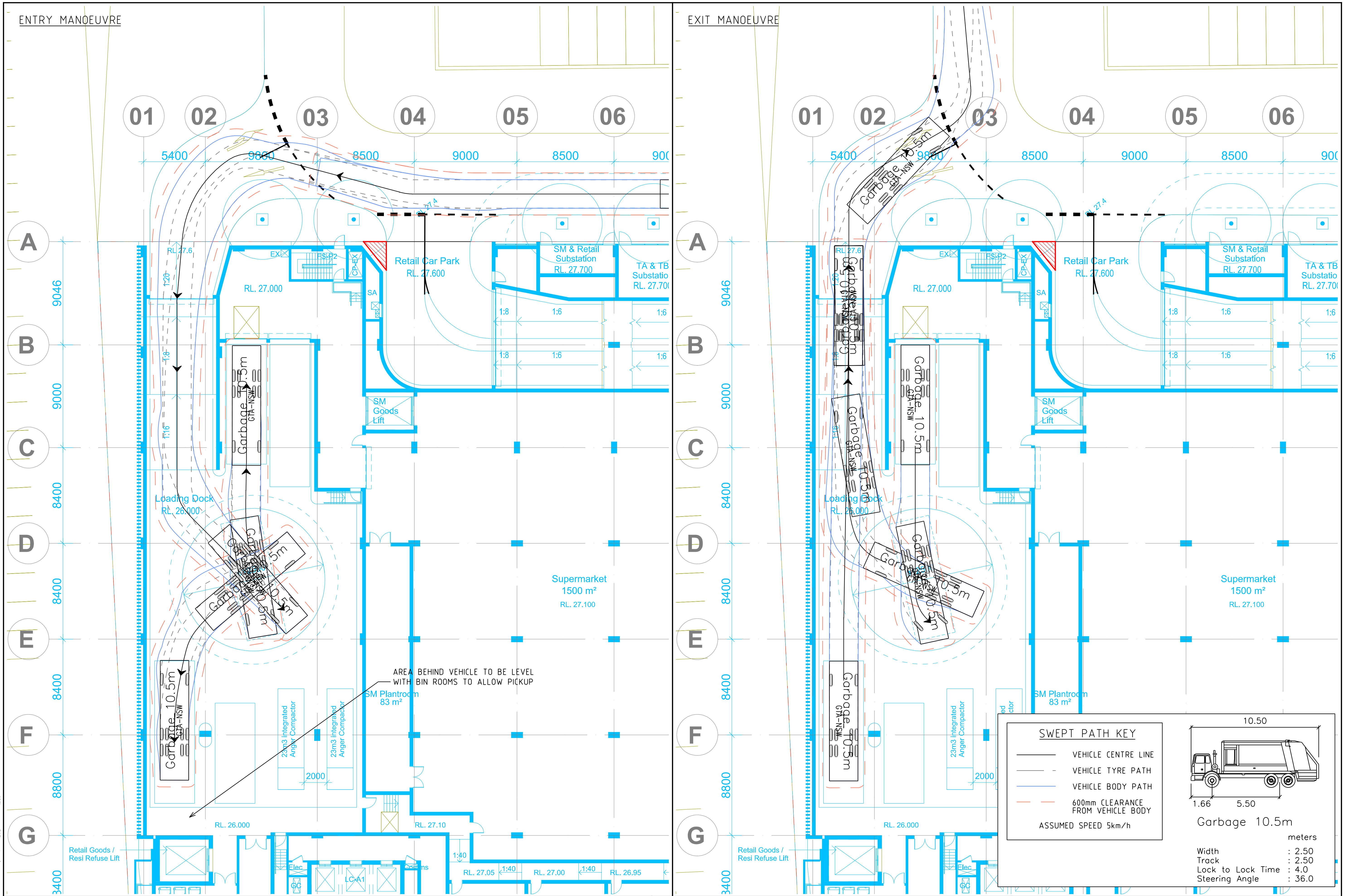
DESIGNED H.OBERMAIER
DESIGN CHECK -
APPROVED BY T.DE YOUNG
DATE ISSUED 19 NOVEMBER 2021

SCALE A3 0 3 6 1:300
CAD FILE NO. N208910-01-P5.dgn

THORNTON VILLAGE CENTRE
BUILDING TATB
GROUND LEVEL
VEHICLE SWEPT PATH ASSESSMENT

DRAWING NO. N208910-01-11 SHEET 11 OF 25 ISSUE P5



PLOTTED BY : hobermaier ON 19/11/2021 AT 7:55:47 PM

GTA consultants

NOW Stantec

PRELIMINARY PLAN

FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING

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DESIGNED H.OBERMAIER	DESIGN CHECK -	SCALE A3	1:300
APPROVED BY T.DE YOUNG	DATE ISSUED 19 NOVEMBER 2021	CAD FILE NO. N208910-01-P5.dgn	

THORNTON VILLAGE CENTRE
BUILDING TATB
GROUND LEVEL
VEHICLE SWEPT PATH ASSESSMENT

DRAWING NO. N208910-01-12 SHEET 12 OF 25 ISSUE P5

ENTRY MANOEUVRE

EXIT MANOEUVRE

01 02 03 04 05 06

5400 9800 8500 9000 8500 900

A B C D E F G

9046 9000 8400 8400 8400 8800 3400

Hooklift – Scania GTA-NSW

R9.4

R27.4

RL. 27.6

EX

FSR2

SA

1:20

1:16

1:8

1:6

RL. 27.000

Retail Car Park
RL. 27.600

SM & Retail Substation
RL. 27.700

TA & TB Substatio
RL. 27.70(

SM Goods Lift

Loading Dock
RL. 26.000

R9500

Supermarket
1500 m²
RL. 27.100

SM Plantroom
83 m²

23m3 Integrated Anger Compactor

2000

RL. 26.000

RL. 27.10

RL. 27.05

RL. 27.00

RL. 26.95

1:40

Retail Goods / Resi Refuse Lift

Elec

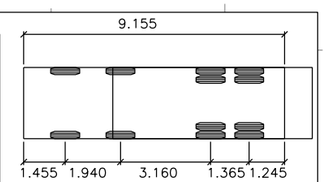
Comms

LCA1

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 600mm CLEARANCE FROM VEHICLE BODY
- VEHICLE LOAD
- 600mm CLEARANCE FROM VEHICLE LOAD

ASSUMED SPEED 5km/h



9.15m Hooklift – Scania
meters

Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 32.8

PLOTTED BY : habermaier ON 19/11/2021 AT 7:55:48 PM

GTA consultants NOW Stantec

PRELIMINARY PLAN
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DESIGNED	H.OBERMAIER
DESIGN CHECK	-
APPROVED BY	T.DE YOUNG
DATE ISSUED	19 NOVEMBER 2021
SCALE	A3
CAD FILE NO.	N208910-01-P5.dgn

0 3 6 1:300

THORNTON VILLAGE CENTRE
BUILDING TATB
GROUND LEVEL
VEHICLE SWEPT PATH ASSESSMENT

DRAWING NO. N208910-01-13 SHEET 13 OF 25 ISSUE P5

ENTRY MANOEUVRE

EXIT MANOEUVRE

12 13 14 15 16 17 18 19 20

5500 8300 5500 8300 5300 8300 8300

Retractable awning above

Retail
60 m²
RL. 27.300

Retail
80 m²
RL. 27.300

Retail
83 m²
RL. 27.300

Retail
67 m²
RL. 27.100

Retail
123 m²
RL. 27.100

Commercial
42 m²
RL. 27.100

Retail Bin Store (12)

BOH
RL. 27.100

BOH
23 m²

Plant

TC & TD
Substation
RL. 27.200

Loading Dock
RL. 27.200

Resi Car Park
14 spaces
RL. 27.200

Retail Staff
5 spaces
RL. 27.2

Deep Soil Zone

Retractable awning above

RL. 27.300

RL. 27.100

RL. 27.0

RL. 27.20

RL. 26.80

1:20

1:5

1:8

6600

6500

6400

5800

5400

SRV
STANDARDS 2002 (AU)

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

6.40

1.05 3.80

SRV AS2890.2 metres

Width	: 2.30
Track	: 2.30
Lock to Lock Time	: 6.0
Steering Angle	: 38.0

ON 19/11/2021 AT 7:55:49 PM

PLOTTED BY : hobermaier

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DESIGN CHECK -
APPROVED BY T.DE YOUNG
DATE ISSUED 19 NOVEMBER 2021

SCALE A3 0 3 6 1:300
CAD FILE NO. N208910-01-P5.dgn

THORNTON VILLAGE CENTRE
BUILDING TCTD
GROUND LEVEL
VEHICLE SWEPT PATH ASSESSMENT

DRAWING NO. N208910-01-14 SHEET 14 OF 25 ISSUE P5

03 04 05 06 07 08 09 10

800 8500 9000 8500 9000 8500 9050 6505 900

RL 27.4 RL 27.45

Retail Car Park
RL. 27.600

SM & Retail Substation
RL. 27.700

TA & TB Substation
RL. 27.700

Resi Car Park
RL. 27.500

Gas Regulator & Meter

CWM

Fire Booster

Retail 68 m²
RL. 27.

Retail, Condensing Units

Fire Control Room
RL. 27.200

Retail 98 m²
RL. 27.3

Resi Lobby
RL. 27.

Retail 28 m²

SM Goods Lift

Store Elec

KEX

GC

FS-P2

FS-P3

FS-B1

FS-B2

EX

CP-EX

SA

. 27.000

Retractal

B99 STANDARDS 2004 (AU_NZ)

1:6

1:8

2100

4734

6400

ROLLER SHUTTER RETAIL & RESIDENTIAL.
CLOSED DURING OUT-OF-HOURS.
REMOTE ACCESS FOR RESIDENTIAL

ROLLER SHUTTER - RETAIL
CLOSED DURING OUT-OF-HOURS

5.20

0.95 3.05

B99 AS2890.1 metres

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

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

PLOTTED BY : hobermaier ON 19/11/2021 AT 7:55:51 PM

GTA consultants NOW Stantec

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

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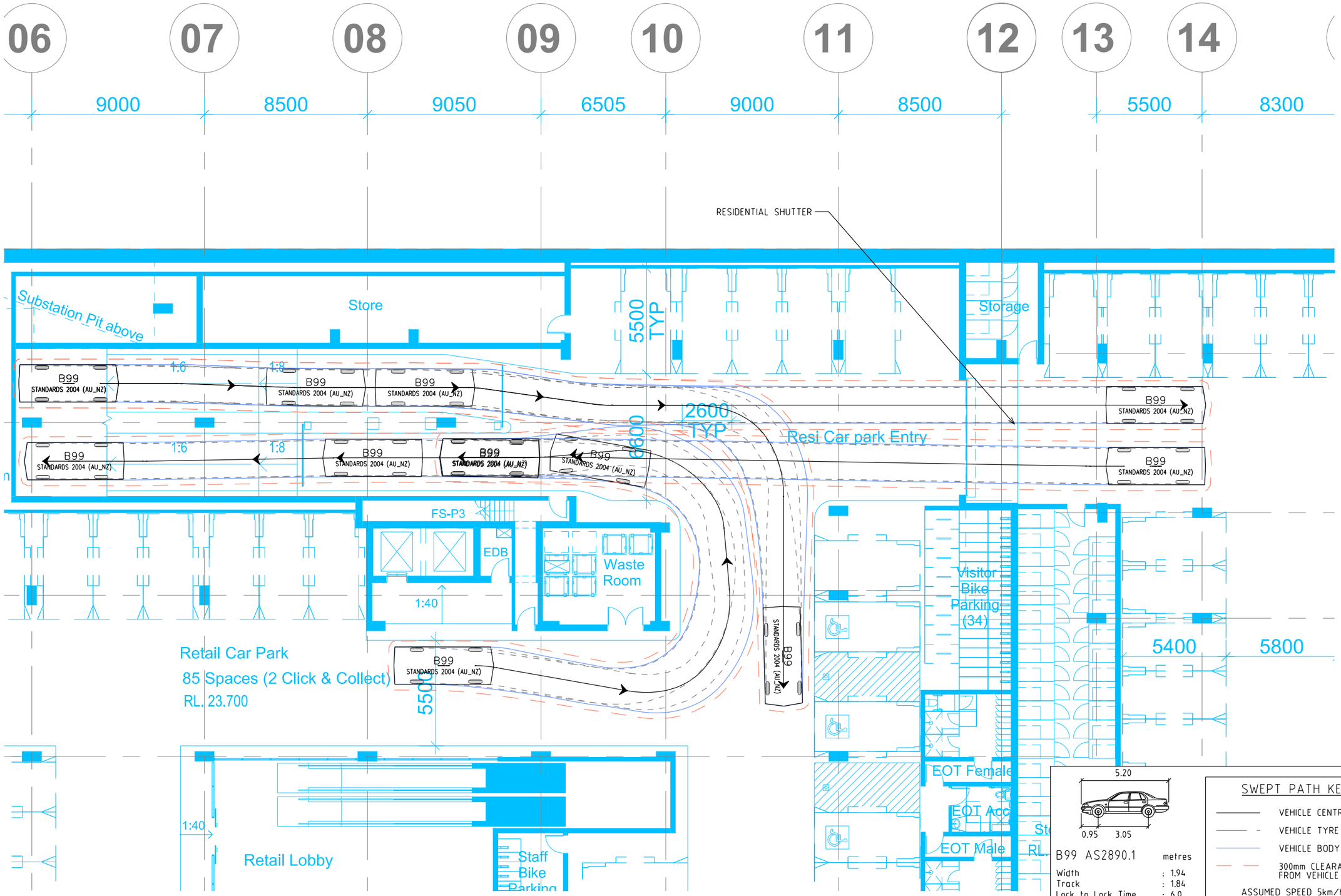
DESIGNED	H.OBERMAIER
DESIGN CHECK	-
APPROVED BY	T.DE YOUNG
DATE ISSUED	19 NOVEMBER 2021
SCALE	A3
	0 2 4 1:200
CAD FILE NO.	N208910-01-P5.dgn

THORNTON VILLAGE CENTRE
BUILDING TATB
GROUND LEVEL
VEHICLE SWEPT PATH ASSESSMENT

DRAWING NO. N208910-01-15 SHEET 15 OF 25 ISSUE P5



ON 19/11/2021 AT 7:55:51 PM

PLOTTED BY : habermaier

GTA consultants

NOW Stantec

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

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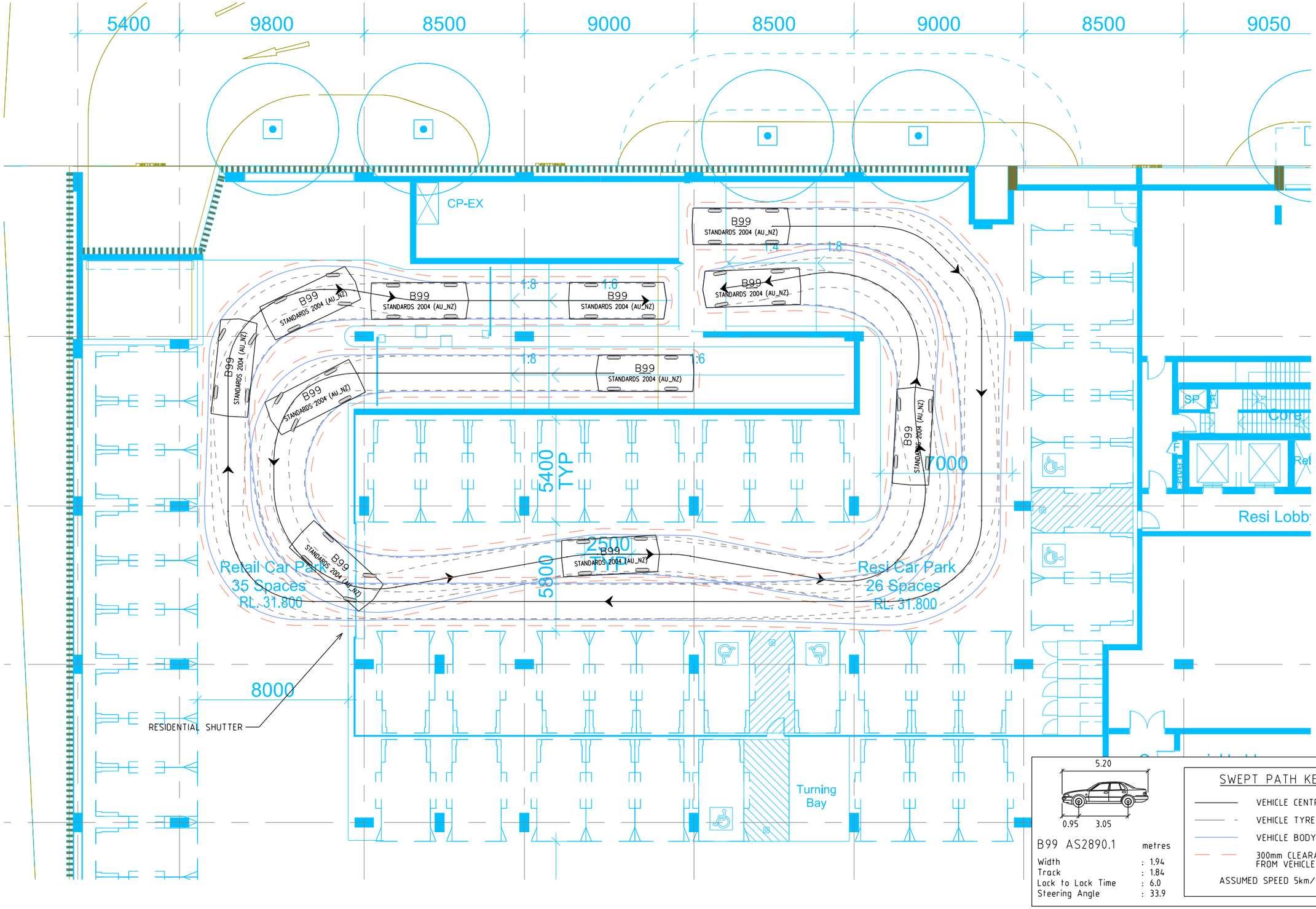
DESIGN CHECK -
APPROVED BY T.DE YOUNG
DATE ISSUED 19 NOVEMBER 2021
SCALE A3 0 2 4 1:200
CAD FILE NO. N208910-01-P5.dgn

THORNTON VILLAGE CENTRE
BUILDING TATB
BASEMENT 01
VEHICLE SWEPT PATH ASSESSMENT

DRAWING NO. N208910-01-16 SHEET 16 OF 25 ISSUE P5



ON 19/11/2021 AT 7:55:52 PM

PLOTTED BY : hobermaier

GTAconsultants

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PRELIMINARY PLAN
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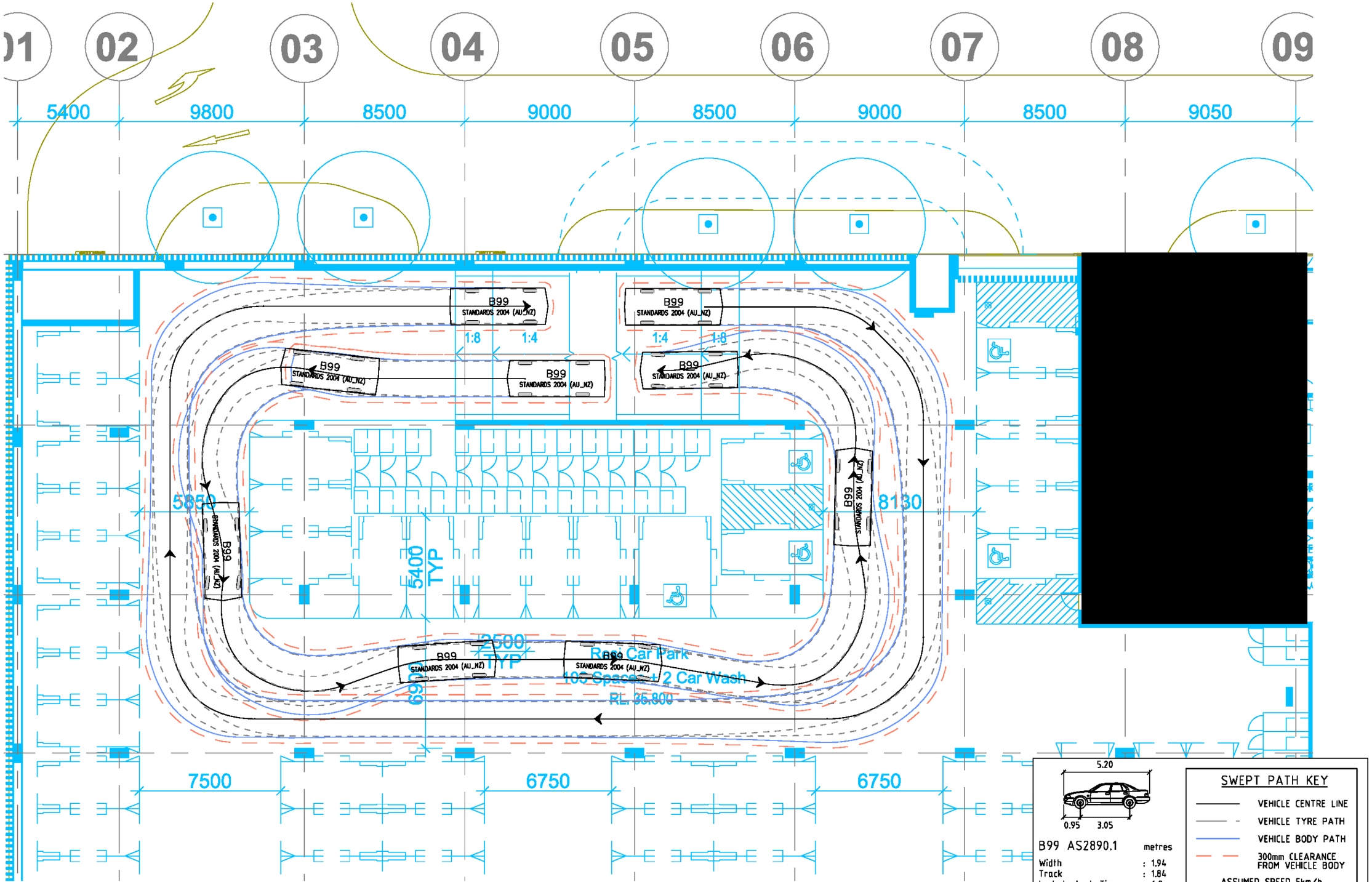
DESIGN CHECK -
APPROVED BY T.DE YOUNG
DATE ISSUED 19 NOVEMBER 2021

SCALE A3 0 2 4 1:200
CAD FILE NO. N208910-01-P5.dgn

THORNTON VILLAGE CENTRE
BUILDING TATB
LEVEL 01
VEHICLE SWEPT PATH ASSESSMENT

DRAWING NO. N208910-01-17 SHEET 17 OF 25 ISSUE P5



PLOTTED BY : hobermaier ON 19/11/2021 AT 15:53 PM

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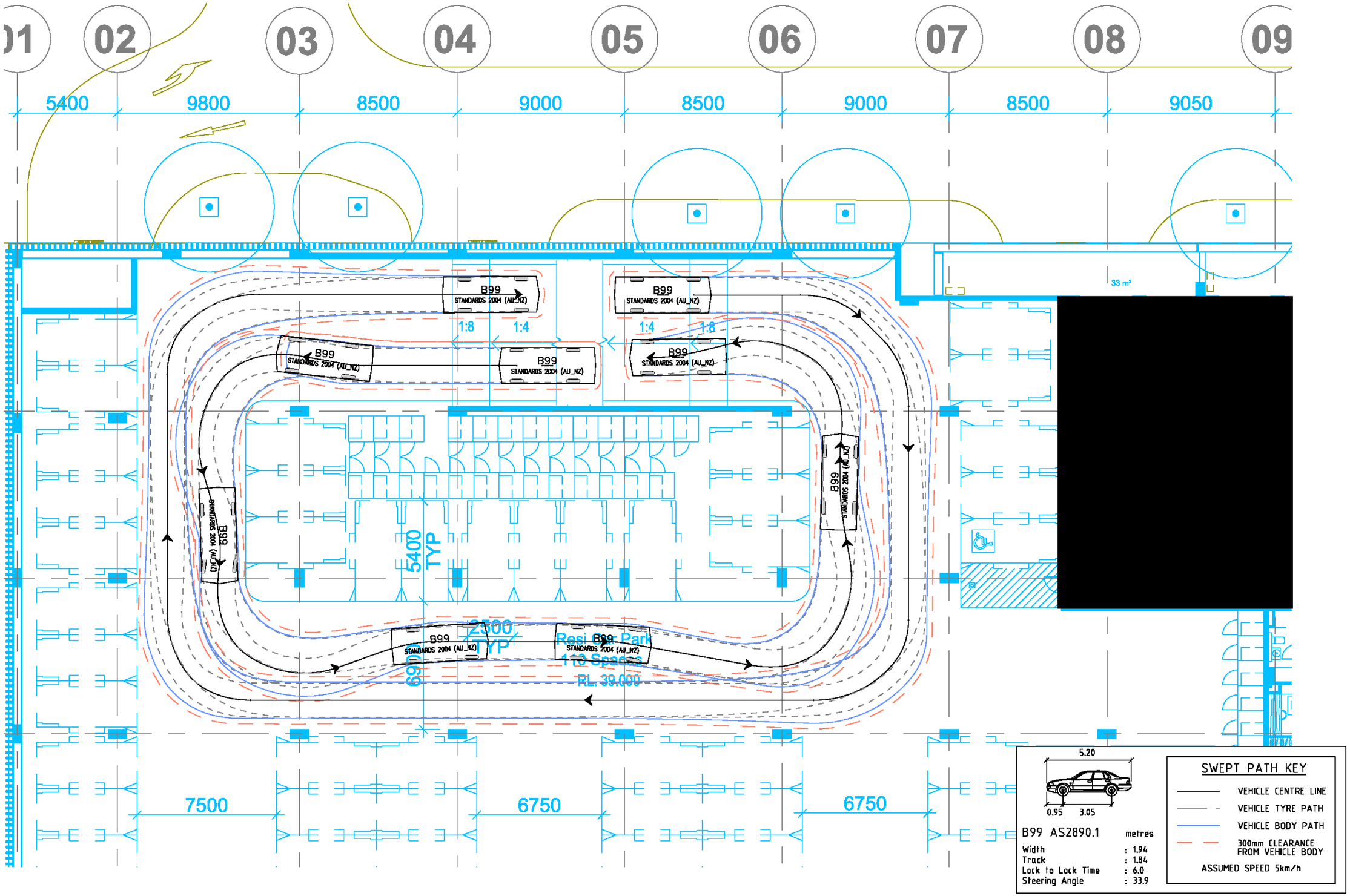
APPROVED BY T.DE YOUNG	DATE ISSUED 19 NOVEMBER 2021

SCALE A3 0 2 4 1:200
CAD FILE NO. N208910-01-P5.dgn

THORNTON VILLAGE CENTRE
BUILDING TATB
LEVEL 02
VEHICLE SWEPT PATH ASSESSMENT
DRAWING NO. N208910-01-18 SHEET 18 OF 25 ISSUE P5



ON 19/11/2021 AT 7:55:54 PM

PLOTTED BY : hobermaier

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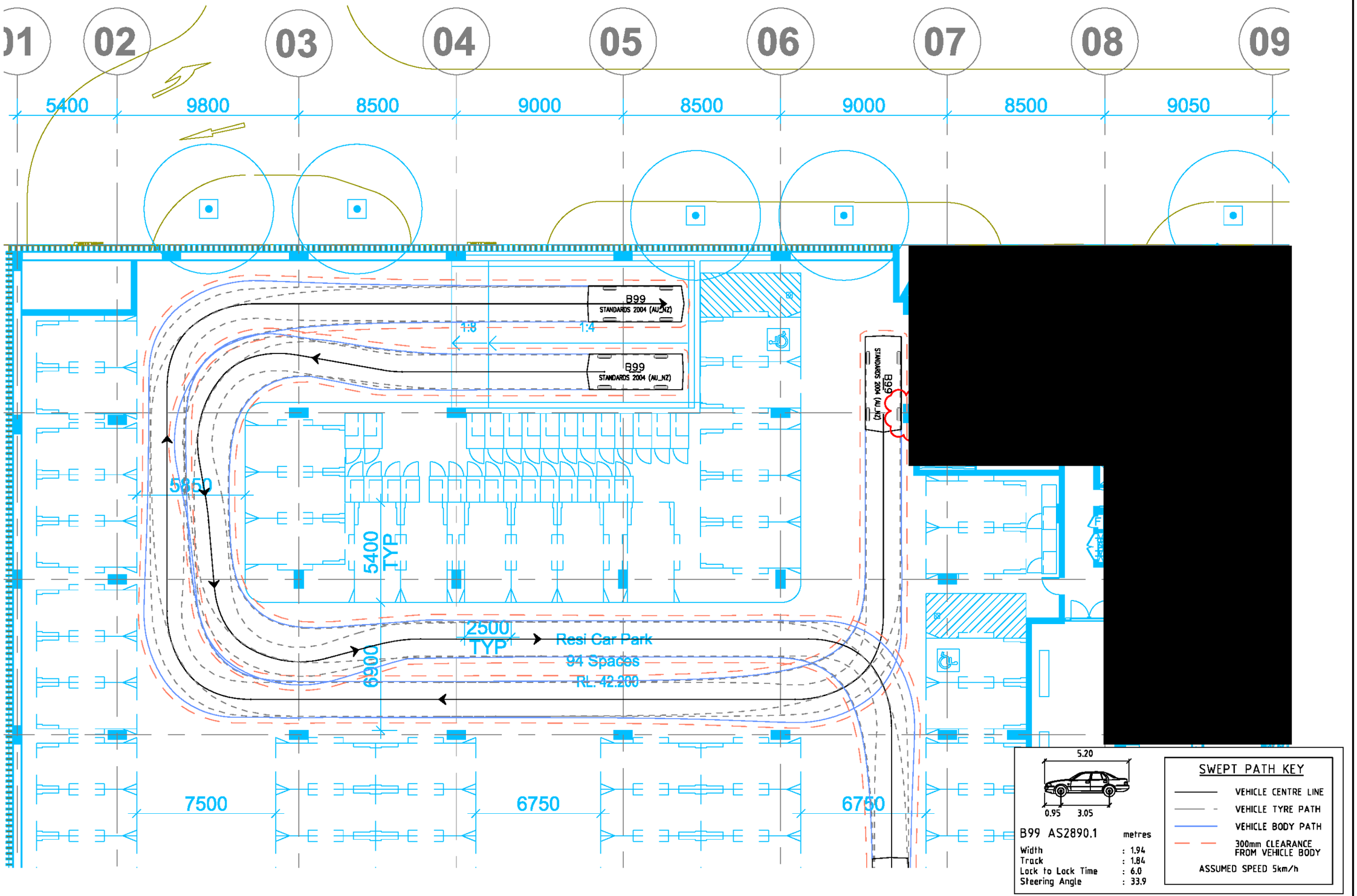
DESIGN CHECK -
APPROVED BY T.DE YOUNG
DATE ISSUED 19 NOVEMBER 2021

SCALE A3 0 2 4 1:200
CAD FILE NO. N208910-01-P5.dgn

THORNTON VILLAGE CENTRE
BUILDING TATB
LEVEL 03
VEHICLE SWEPT PATH ASSESSMENT

DRAWING NO. N208910-01-19 SHEET 19 OF 25 ISSUE P5



ON 19/11/2021 AT 7:55:55 PM

PLOTTED BY : hobermaier

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PRELIMINARY PLAN
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DESIGN CHECK	-
APPROVED BY	T.DE YOUNG
DATE ISSUED	19 NOVEMBER 2021
SCALE	A3 — 0 2 4 — 1:200
CAD FILE NO.	N208910-01-P5.dgn

THORNTON VILLAGE CENTRE
BUILDING TATB
LEVEL 04
VEHICLE SWEPT PATH ASSESSMENT

DRAWING NO. N208910-01-20 SHEET 20 OF 25 ISSUE P5

15 16 17 18 19 20 21 22 23 24

9500 8300 5300 8300 8300 920± 12400 8500

B99 STANDARDS 2004 (AU_NZ)

ACCESS VIA REMOTE CONTROL

RL 27.15

RL 27.0

Plant

CP-E

LD-E

TC & TD Substation
RL. 27.200

TC & TD Main Switchroom
RL. 27.200

Gas Regulator & Boundary Trap

[redacted]

6600

1:6

1:6

Resi Car Park

6500

RESIDENTIAL SHUTTER LOCATION TO BE CONFIRMED

6400

Retail Staff Car Park
5 Spaces
RL. 27.200

Loading Dock
RL. 27.200

Retail Bin Store (12)

BOH
RL. 27.100

1:20

BOH
23 m²

Resi Car Park
14 spaces
RL. 27.200

2500 TYP

ENSURE 1.0m (MINIMUM) EXTENTION IS RETAINED AT END OF BLIND AISLES

5.20

0.95 3.05

B99 AS2890.1 metres

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

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

ON 19/11/2021 AT 13:56:56 PM

PLOTTED BY : hobermaier

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PRELIMINARY PLAN
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DESIGN CHECK -
APPROVED BY T.DE YOUNG
DATE ISSUED 19 NOVEMBER 2021

SCALE A3 0 2 4 1:200
CAD FILE NO. N208910-01-P5.dgn

THORNTON VILLAGE CENTRE
BUILDING TCTD
GROUND LEVEL
VEHICLE SWEPT PATH ASSESSMENT

DRAWING NO. N208910-01-21 SHEET 21 OF 25 ISSUE P5

15 16 17 18 19 20 21 22 23 24

5500 8300 5300 8300 8300 9200 12400 8500

CP-EX
LD-EX

B99 STANDARDS 2004 (AU_NZ)

1:8

5400 TYP

6250

3500 TYP

Resi Carpark
32 spaces
RL 31.400

6500

5800 6700

[redacted]

5.20
0.95 3.05

B99 AS2890.1 metres

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

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

ON 19/11/2021 AT 7:55:57 PM
PLOTTED BY : hobermaier

GTAconsultants NOW Stantec

PRELIMINARY PLAN
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APPROVED BY T.DE YOUNG	DATE ISSUED 19 NOVEMBER 2021
SCALE A3	0 2 4 1:200
CAD FILE NO. N208910-01-P5.dgn	

THORNTON VILLAGE CENTRE
BUILDING TCTD
LEVEL 01
VEHICLE SWEPT PATH ASSESSMENT

DRAWING NO. N208910-01-22 SHEET 22 OF 25 ISSUE P5

15 16 17 18 19 20 21 22 23 24

5500 8300 5300 8300 8300 9200 12400 8500

B99 STANDARDS 2004 (AU_NZ)

1:8 1:4

5400 TYP

7000

2500

Power operated doorways

Lift Overrun

Retic Pit

45 Spaces

RL. 34.600

5800 6700

[redacted]

5.20

0.95 3.05

B99 AS2890.1 metres

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

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

PLOTTED BY : hobermaier ON 19/11/2021 AT 7:55:57 PM

GTAconsultants NOW Stantec

PRELIMINARY PLAN
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DESIGNED H.OBERMAIER	DESIGN CHECK -
APPROVED BY T.DE YOUNG	DATE ISSUED 19 NOVEMBER 2021

SCALE A3 0 2 4 1:200

CAD FILE NO. N208910-01-P5.dgn

THORNTON VILLAGE CENTRE
BUILDING TCTD
LEVEL 02
VEHICLE SWEPT PATH ASSESSMENT

DRAWING NO. N208910-01-23 SHEET 23 OF 25 ISSUE P5

15 16 17 18 19 20 21 22 23 24

5500 8300 5300 8300 8300 9200 12400 8500

ommunal open space

Plantroom

1:8 1:4 B99 STANDARDS 2004 (AU_NZ)

7000

5400 TYP

2500 TYP

Resi Car Park
36 spaces
RL. 37.800

5800 6700

[redacted]

5.20
0.95 3.05

B99 AS2890.1 metres

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

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

PLOTTED BY : hobermaier ON 19/11/2021 AT 15558 PM

GTAconsultants NOW Stantec

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

DESIGNED	H.OBERMAIER
DESIGN CHECK	-
APPROVED BY	T.DE YOUNG
DATE ISSUED	19 NOVEMBER 2021
SCALE A3	0 2 4 1:200
CAD FILE NO.	N208910-01-P5.dgn

THORNTON VILLAGE CENTRE
BUILDING TCTD
LEVEL 03
VEHICLE SWEPT PATH ASSESSMENT

DRAWING NO. N208910-01-24 SHEET 24 OF 25 ISSUE P5

15 16 17 18 19 20 21 22 23 2

0 5500 8300 5300 8300 8300 9200 12400 8500

[redacted]

1.8 1.4 B99 STANDARDS 2004 (AU_NZ)

1.8 1.4 B99 STANDARDS 2004 (AU_NZ)

B99 STANDARDS 2004 (AU_NZ)

B99 STANDARDS 2004 (AU_NZ)

5400 TYP

Resi Car Park
34 spaces
RL. 41.000

2500 TYP

6500

5800

6250

[redacted]

[redacted]

5.20

0.95 3.05

B99 AS2890.1 metres

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

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

PLOTTED BY : hobermaier ON 19/11/2021 AT 7:55:59 PM

GTAconsultants NOW Stantec

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

DESIGNED	H.OBERMAIER
DESIGN CHECK	-
APPROVED BY	T.DE YOUNG
DATE ISSUED	19 NOVEMBER 2021

SCALE A3 0 2 4 1:200

CAD FILE NO. N208910-01-P5.dgn

THORNTON VILLAGE CENTRE
BUILDING TCTD
LEVEL 04
VEHICLE SWEPT PATH ASSESSMENT

DRAWING NO. N208910-01-25 SHEET 25 OF 25 ISSUE P5

B.TRAFFIC VOLUMES

B

APPENDIX: TRAFFIC VOLUMES

Figure B.1: AM existing traffic volumes

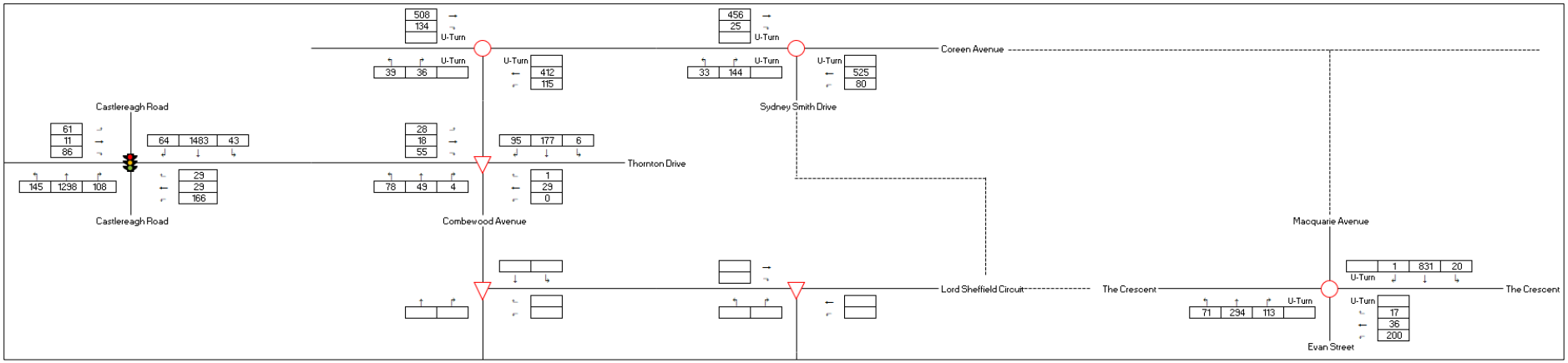


Figure B.2: AM existing traffic volumes

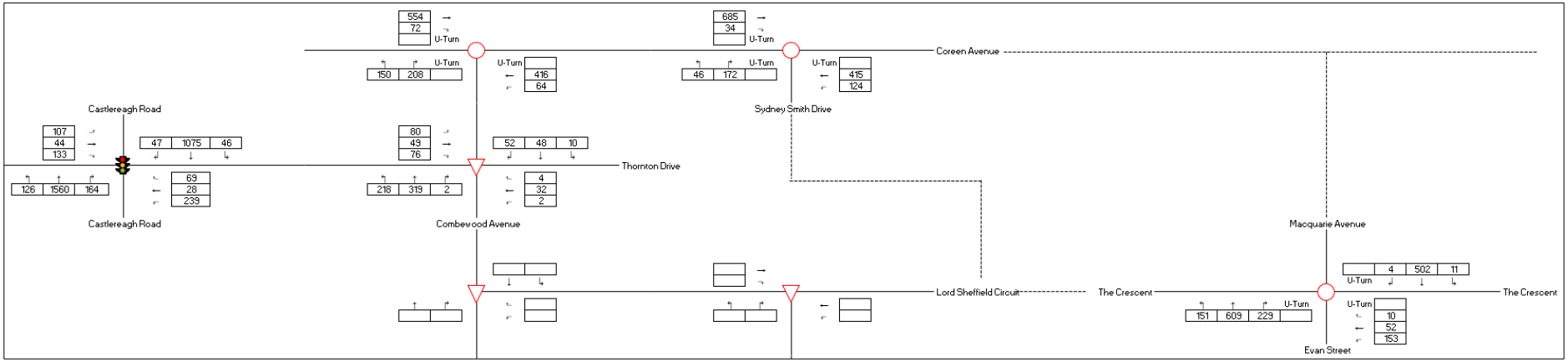


Figure B.3: AM development traffic volumes

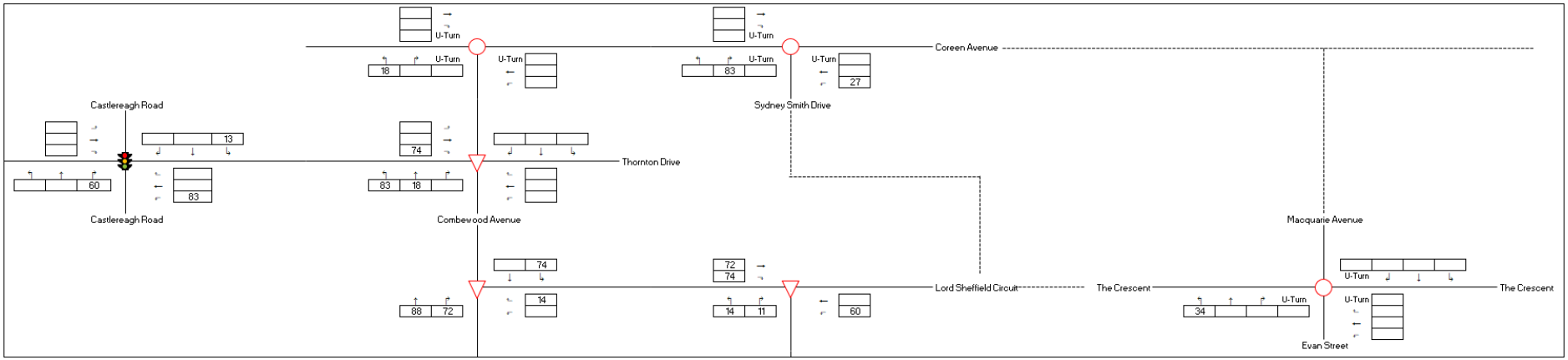
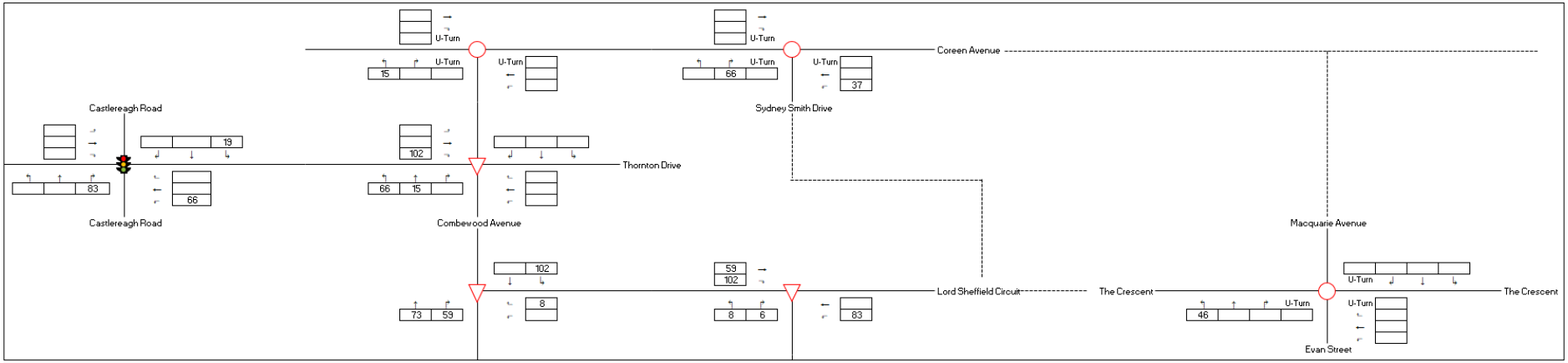


Figure B.4: PM development traffic volumes



C. SIDRA MODELLING RESULTS

C

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 210920-N208910 Thornton SIDRA

Template: Default Site User Report

Site: [1 Castlereagh/ Thornton Ex AM (Site Folder: General)]

Network: 1 [AM Ex (Network Folder: General)]

Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase D
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road														
1	L2	153	12.4	153	12.4	0.803	32.6	LOS C	26.1	198.8	0.87	0.82	0.87	34.1
2	T1	1366	9.9	1366	9.9	0.803	26.3	LOS B	26.1	198.8	0.85	0.79	0.85	28.3
3	R2	114	1.9	114	1.9	*0.789	80.3	LOS F	5.1	36.0	1.00	0.88	1.21	6.5
Approach		1633	9.5	1633	9.5	0.803	30.7	LOS C	26.1	198.8	0.86	0.80	0.88	26.5
East: Thornton Drive														
4	L2	175	1.2	175	1.2	0.423	54.2	LOS D	6.2	43.7	0.89	0.80	0.89	22.0
5	T1	31	3.4	31	3.4	0.118	57.6	LOS E	1.1	8.1	0.91	0.67	0.91	29.1
6	R2	31	0.0	31	0.0	0.230	74.1	LOS F	1.3	8.8	0.98	0.72	0.98	20.2
Approach		236	1.3	236	1.3	0.423	57.2	LOS E	6.2	43.7	0.91	0.77	0.91	22.8
North: Castlereagh Road														
7	L2	45	4.7	45	4.7	0.040	15.5	LOS B	0.7	5.0	0.39	0.65	0.39	29.6
8	T1	1561	7.6	1561	7.6	*0.815	26.7	LOS B	25.9	192.9	0.86	0.79	0.86	28.4
9	R2	67	1.6	67	1.6	0.467	74.7	LOS F	2.8	19.9	1.00	0.76	1.00	22.2
Approach		1674	7.3	1674	7.3	0.815	28.3	LOS B	25.9	192.9	0.85	0.78	0.85	27.8
West: Peachtree Road														
10	L2	64	4.9	64	4.9	0.237	58.2	LOS E	2.7	19.7	0.89	0.75	0.89	25.8
11	T1	12	0.0	12	0.0	*0.237	52.8	LOS D	2.7	19.7	0.89	0.75	0.89	21.1
12	R2	91	19.8	91	19.8	*0.779	81.8	LOS F	4.1	33.4	1.00	0.87	1.23	19.1
Approach		166	12.7	166	12.7	0.779	70.7	LOS F	4.1	33.4	0.95	0.82	1.07	21.6
All Vehicles		3708	8.1	3708	8.1	0.815	33.1	LOS C	26.1	198.8	0.86	0.79	0.87	26.3

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

* Critical Movement (Signal Timing)

Site: [2 Combewood/ Thornton Ex AM (Site Folder: General)] Network: 1 [AM Ex (Network Folder: General)]

Site Category: -
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Combewood Ave														
1	L2	82	0.0	82	0.0	0.073	5.6	LOS A	0.0	0.1	0.03	0.36	0.03	46.9
2	T1	52	0.0	52	0.0	0.073	0.1	LOS A	0.0	0.1	0.03	0.36	0.03	46.9
3	R2	4	0.0	4	0.0	0.073	6.1	LOS A	0.0	0.1	0.03	0.36	0.03	51.5
Approach		138	0.0	138	0.0	0.073	3.5	NA	0.0	0.1	0.03	0.36	0.03	47.2
East: Thornton Drive														
4	L2	1	0.0	1	0.0	0.044	8.7	LOS A	0.1	0.4	0.44	0.95	0.44	46.3
5	T1	31	0.0	31	0.0	0.044	10.1	LOS A	0.1	0.4	0.44	0.95	0.44	43.6
6	R2	1	0.0	1	0.0	0.044	10.1	LOS A	0.1	0.4	0.44	0.95	0.44	43.6
Approach		33	0.0	33	0.0	0.044	10.0	LOS A	0.1	0.4	0.44	0.95	0.44	43.8
North: Combewood Ave														
7	L2	6	0.0	6	0.0	0.164	6.0	LOS A	0.3	1.8	0.19	0.21	0.19	53.9
8	T1	186	0.0	186	0.0	0.164	0.2	LOS A	0.3	1.8	0.19	0.21	0.19	54.6
9	R2	100	1.1	100	1.1	0.164	5.9	LOS A	0.3	1.8	0.19	0.21	0.19	51.0
Approach		293	0.4	293	0.4	0.164	2.3	NA	0.3	1.8	0.19	0.21	0.19	53.7
West: Thornton Drive														
10	L2	29	7.1	29	7.1	0.140	8.5	LOS A	0.2	1.2	0.19	0.97	0.19	42.7
11	T1	19	0.0	19	0.0	0.140	10.1	LOS A	0.2	1.2	0.19	0.97	0.19	48.1
12	R2	58	1.8	58	1.8	0.140	10.8	LOS A	0.2	1.2	0.19	0.97	0.19	44.7
Approach		106	3.0	106	3.0	0.140	10.0	LOS A	0.2	1.2	0.19	0.97	0.19	45.1
All Vehicles		569	0.7	569	0.7	0.164	4.5	NA	0.3	1.8	0.16	0.43	0.16	49.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [3 Coreen/ Combewood Ex AM (Site Folder: General)]

Network: 1 [AM Ex (Network Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Combewood Avenue														
1	L2	41	0.0	41	0.0	0.095	7.5	LOS A	0.2	1.5	0.58	0.70	0.58	47.3
3	R2	38	2.8	38	2.8	0.095	10.4	LOS A	0.2	1.5	0.58	0.70	0.58	38.7
Approach		79	1.3	79	1.3	0.095	8.9	LOS A	0.2	1.5	0.58	0.70	0.58	44.6
East: Coreen Avenue														
4	L2	121	0.0	121	0.0	0.473	6.0	LOS A	1.4	10.4	0.46	0.56	0.46	47.8
5	T1	434	6.3	434	6.3	0.473	6.0	LOS A	1.4	10.4	0.46	0.56	0.46	51.8
Approach		555	4.9	555	4.9	0.473	6.0	LOS A	1.4	10.4	0.46	0.56	0.46	51.3
West: Coreen Avenue														
11	T1	535	3.9	535	3.9	0.471	5.1	LOS A	1.7	12.1	0.25	0.51	0.25	47.9
12	R2	141	1.5	141	1.5	0.471	8.0	LOS A	1.7	12.1	0.25	0.51	0.25	47.9
Approach		676	3.4	676	3.4	0.471	5.7	LOS A	1.7	12.1	0.25	0.51	0.25	47.9
All Vehicles		1309	3.9	1309	3.9	0.473	6.0	LOS A	1.7	12.1	0.36	0.54	0.36	49.6

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

Site: [4 Coreen/ Sydney Smith Ex AM (Site Folder: General)]

Network: 1 [AM Ex (Network Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sydney Smith Drive														
1	L2	35	3.0	35	3.0	0.224	7.9	LOS A	0.5	3.6	0.65	0.78	0.65	36.8
3	R2	152	0.0	152	0.0	0.224	11.8	LOS A	0.5	3.6	0.65	0.78	0.65	45.3
Approach		186	0.6	186	0.6	0.224	11.1	LOS A	0.5	3.6	0.65	0.78	0.65	44.2
East: Coreen Avenue														
4	L2	84	0.0	84	0.0	0.417	4.3	LOS A	1.4	9.7	0.18	0.44	0.18	50.2
5	T1	553	2.3	553	2.3	0.417	4.6	LOS A	1.4	9.7	0.18	0.44	0.18	47.2
Approach		637	2.0	637	2.0	0.417	4.6	LOS A	1.4	9.7	0.18	0.44	0.18	47.8
West: Coreen Avenue														
11	T1	480	5.9	480	5.9	0.433	5.6	LOS A	1.3	9.9	0.48	0.54	0.48	51.5
12	R2	26	0.0	26	0.0	0.433	9.3	LOS A	1.3	9.9	0.48	0.54	0.48	51.0
Approach		506	5.6	506	5.6	0.433	5.8	LOS A	1.3	9.9	0.48	0.54	0.48	51.5
All Vehicles		1329	3.2	1329	3.2	0.433	5.9	LOS A	1.4	9.9	0.36	0.52	0.36	49.1

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

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 210920-N208910 Thornton SIDRA

Template: Default Site User Report

Site: [1 Castlereagh/ Thornton Ex PM (Site Folder: General)]

Network: 2 [PM Ex (Network Folder: General)]

Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase D
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road														
1	L2	133	1.6	133	1.6	*0.969	73.0	LOS F	49.6	362.1	1.00	1.12	1.26	21.8
2	T1	1642	5.5	1642	5.5	0.969	67.4	LOS E	49.6	362.1	0.98	1.11	1.25	15.7
3	R2	173	1.2	173	1.2	*0.938	93.9	LOS F	8.6	61.1	1.00	1.02	1.47	5.7
Approach		1947	4.9	1947	4.9	0.969	70.1	LOS E	49.6	362.1	0.98	1.10	1.27	15.2
East: Thornton Drive														
4	L2	252	0.0	252	0.0	0.559	53.6	LOS D	9.0	63.3	0.91	0.82	0.91	22.2
5	T1	29	3.6	29	3.6	0.114	57.5	LOS E	1.1	7.9	0.91	0.67	0.91	29.1
6	R2	73	0.0	73	0.0	0.498	75.0	LOS F	3.0	21.3	1.00	0.77	1.00	20.1
Approach		354	0.3	354	0.3	0.559	58.3	LOS E	9.0	63.3	0.93	0.80	0.93	22.3
North: Castlereagh Road														
7	L2	48	0.0	48	0.0	0.042	16.7	LOS B	0.8	5.4	0.42	0.66	0.42	28.5
8	T1	1132	2.6	1132	2.6	0.605	24.8	LOS B	16.3	116.8	0.74	0.67	0.74	29.5
9	R2	49	2.1	49	2.1	0.270	69.9	LOS E	2.0	14.0	0.96	0.75	0.96	23.1
Approach		1229	2.5	1229	2.5	0.605	26.3	LOS B	16.3	116.8	0.74	0.67	0.74	28.9
West: Peachtree Road														
10	L2	113	1.9	113	1.9	0.572	65.3	LOS E	6.3	44.3	0.98	0.81	0.98	24.5
11	T1	46	0.0	46	0.0	*0.572	60.1	LOS E	6.3	44.3	0.98	0.81	0.98	19.7
12	R2	140	2.3	140	2.3	0.975	106.4	LOS F	7.5	53.2	1.00	1.06	1.63	16.1
Approach		299	1.8	299	1.8	0.975	83.7	LOS F	7.5	53.2	0.99	0.92	1.28	19.3
All Vehicles		3829	3.4	3829	3.4	0.975	56.0	LOS D	49.6	362.1	0.90	0.92	1.07	19.1

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

* Critical Movement (Signal Timing)

Site: [2 Combewood/ Thornton Ex PM (Site Folder: General)]

Network: 2 [PM Ex (Network Folder: General)]

Site Category: -
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Combewood Ave														
1	L2	229	0.0	229	0.0	0.297	5.5	LOS A	0.0	0.1	0.00	0.24	0.00	50.9
2	T1	336	0.0	336	0.0	0.297	0.0	LOS A	0.0	0.1	0.00	0.24	0.00	50.9
3	R2	2	0.0	2	0.0	0.297	5.7	LOS A	0.0	0.1	0.00	0.24	0.00	53.2
Approach		567	0.0	567	0.0	0.297	2.3	NA	0.0	0.1	0.00	0.24	0.00	50.9
East: Thornton Drive														
4	L2	2	0.0	2	0.0	0.075	8.2	LOS A	0.1	0.7	0.46	1.02	0.46	44.0
5	T1	34	0.0	34	0.0	0.075	12.8	LOS A	0.1	0.7	0.46	1.02	0.46	40.7
6	R2	4	0.0	4	0.0	0.075	11.8	LOS A	0.1	0.7	0.46	1.02	0.46	40.7
Approach		40	0.0	40	0.0	0.075	12.5	LOS A	0.1	0.7	0.46	1.02	0.46	40.9
North: Combewood Ave														
7	L2	11	0.0	11	0.0	0.088	8.0	LOS A	0.2	1.3	0.50	0.37	0.50	50.8
8	T1	51	0.0	51	0.0	0.088	2.1	LOS A	0.2	1.3	0.50	0.37	0.50	50.3
9	R2	55	1.9	55	1.9	0.088	8.0	LOS A	0.2	1.3	0.50	0.37	0.50	44.7
Approach		116	0.9	116	0.9	0.088	5.4	NA	0.2	1.3	0.50	0.37	0.50	48.4
West: Thornton Drive														
10	L2	84	1.3	84	1.3	0.333	10.3	LOS A	0.5	3.6	0.52	1.01	0.60	40.7
11	T1	52	0.0	52	0.0	0.333	12.8	LOS A	0.5	3.6	0.52	1.01	0.60	46.8
12	R2	80	0.0	80	0.0	0.333	14.0	LOS A	0.5	3.6	0.52	1.01	0.60	43.5
Approach		216	0.5	216	0.5	0.333	12.3	LOS A	0.5	3.6	0.52	1.01	0.60	43.7
All Vehicles		939	0.2	939	0.2	0.333	5.4	NA	0.5	3.6	0.20	0.47	0.22	46.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [3 Coreen/ Combewood Ex PM (Site Folder: General)]

Network: 2 [PM Ex (Network Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Combewood Avenue														
1	L2	158	0.0	158	0.0	0.441	8.4	LOS A	1.2	8.3	0.70	0.80	0.70	46.3
3	R2	219	0.5	219	0.5	0.441	11.2	LOS A	1.2	8.3	0.70	0.80	0.70	37.0
Approach		377	0.3	377	0.3	0.441	10.0	LOS A	1.2	8.3	0.70	0.80	0.70	42.5
East: Coreen Avenue														
4	L2	67	0.0	67	0.0	0.388	5.4	LOS A	1.2	8.6	0.34	0.50	0.34	48.6
5	T1	438	1.2	438	1.2	0.388	5.3	LOS A	1.2	8.6	0.34	0.50	0.34	52.5
Approach		505	1.0	505	1.0	0.388	5.3	LOS A	1.2	8.6	0.34	0.50	0.34	52.2
West: Coreen Avenue														
11	T1	583	2.0	583	2.0	0.619	7.0	LOS A	2.3	16.7	0.70	0.67	0.71	45.3
12	R2	76	4.2	76	4.2	0.619	10.0	LOS A	2.3	16.7	0.70	0.67	0.71	45.3
Approach		659	2.2	659	2.2	0.619	7.3	LOS A	2.3	16.7	0.70	0.67	0.71	45.3
All Vehicles		1541	1.4	1541	1.4	0.619	7.3	LOS A	2.3	16.7	0.58	0.65	0.58	47.7

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

Site: [4 Coreen/ Sydney Smith Ex PM (Site Folder: General)]

Network: 2 [PM Ex (Network Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sydney Smith Drive														
1	L2	48	0.0	48	0.0	0.252	6.9	LOS A	0.6	4.1	0.60	0.75	0.60	38.0
3	R2	181	0.6	181	0.6	0.252	11.0	LOS A	0.6	4.1	0.60	0.75	0.60	46.1
Approach		229	0.5	229	0.5	0.252	10.1	LOS A	0.6	4.1	0.60	0.75	0.60	45.0
East: Coreen Avenue														
4	L2	131	0.0	131	0.0	0.382	4.4	LOS A	1.2	8.7	0.21	0.44	0.21	50.0
5	T1	437	0.2	437	0.2	0.382	4.6	LOS A	1.2	8.7	0.21	0.44	0.21	46.8
Approach		567	0.2	567	0.2	0.382	4.6	LOS A	1.2	8.7	0.21	0.44	0.21	47.9
West: Coreen Avenue														
11	T1	721	1.3	721	1.3	0.641	6.1	LOS A	2.6	18.1	0.66	0.60	0.66	50.8
12	R2	36	2.9	36	2.9	0.641	10.0	LOS A	2.6	18.1	0.66	0.60	0.66	49.7
Approach		757	1.4	757	1.4	0.641	6.3	LOS A	2.6	18.1	0.66	0.60	0.66	50.8
All Vehicles		1554	0.8	1554	0.8	0.641	6.2	LOS A	2.6	18.1	0.49	0.57	0.49	49.2

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

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 210920-N208910 Thornton SIDRA

Template: Default Site User Report

Site: [1 Castlereagh/ Thornton 2025 AM (Site Folder: General)]

Network: 3 [AM 2025 (Network Folder: General)]

Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase D
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road														
1	L2	171	12.4	171	12.4	0.899	45.2	LOS D	36.6	279.0	0.97	0.96	1.05	28.9
2	T1	1531	9.9	1531	9.9	0.899	39.4	LOS C	36.6	279.0	0.93	0.93	1.02	22.5
3	R2	127	1.9	127	1.9	*0.884	86.6	LOS F	6.0	42.6	1.00	0.96	1.38	6.1
Approach		1828	9.5	1828	9.5	0.899	43.2	LOS D	36.6	279.0	0.94	0.94	1.05	21.6
East: Thornton Drive														
4	L2	196	1.2	196	1.2	0.480	54.9	LOS D	7.0	49.6	0.91	0.81	0.91	21.8
5	T1	34	3.4	34	3.4	0.130	57.7	LOS E	1.2	9.0	0.91	0.68	0.91	29.1
6	R2	34	0.0	34	0.0	0.254	74.3	LOS F	1.4	9.7	0.98	0.73	0.98	20.2
Approach		263	1.3	263	1.3	0.480	57.7	LOS E	7.0	49.6	0.92	0.78	0.92	22.7
North: Castlereagh Road														
7	L2	51	4.7	51	4.7	0.044	15.6	LOS B	0.8	5.6	0.39	0.66	0.39	29.5
8	T1	1748	7.6	1748	7.6	*0.914	43.0	LOS D	37.5	279.3	0.94	0.96	1.06	21.5
9	R2	76	1.6	76	1.6	0.525	75.2	LOS F	3.2	22.6	1.00	0.77	1.00	22.2
Approach		1875	7.3	1875	7.3	0.914	43.6	LOS D	37.5	279.3	0.93	0.95	1.04	21.6
West: Peachtree Road														
10	L2	72	4.9	72	4.9	0.262	58.5	LOS E	3.0	22.0	0.90	0.76	0.90	25.8
11	T1	13	0.0	13	0.0	*0.262	53.2	LOS D	3.0	22.0	0.90	0.76	0.90	21.0
12	R2	101	19.8	101	19.8	*0.869	87.0	LOS F	4.8	38.9	1.00	0.95	1.39	18.4
Approach		185	12.7	185	12.7	0.869	73.7	LOS F	4.8	38.9	0.95	0.86	1.17	21.1
All Vehicles		4152	8.1	4152	8.1	0.914	45.7	LOS D	37.5	279.3	0.93	0.93	1.04	21.7

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

* Critical Movement (Signal Timing)

Site: [2 Combewood/ Thornton 2025 AM (Site Folder: General)]

Network: 3 [AM 2025 (Network Folder: General)]

Site Category: -
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Combewood Ave														
1	L2	92	0.0	92	0.0	0.082	5.6	LOS A	0.0	0.1	0.03	0.36	0.03	46.9
2	T1	58	0.0	58	0.0	0.082	0.1	LOS A	0.0	0.1	0.03	0.36	0.03	46.9
3	R2	4	0.0	4	0.0	0.082	6.2	LOS A	0.0	0.1	0.03	0.36	0.03	51.5
Approach		154	0.0	154	0.0	0.082	3.5	NA	0.0	0.1	0.03	0.36	0.03	47.2
East: Thornton Drive														
4	L2	1	0.0	1	0.0	0.051	8.8	LOS A	0.1	0.5	0.47	0.96	0.47	45.9
5	T1	34	0.0	34	0.0	0.051	10.5	LOS A	0.1	0.5	0.47	0.96	0.47	43.2
6	R2	1	0.0	1	0.0	0.051	10.5	LOS A	0.1	0.5	0.47	0.96	0.47	43.2
Approach		36	0.0	36	0.0	0.051	10.5	LOS A	0.1	0.5	0.47	0.96	0.47	43.3
North: Combewood Ave														
7	L2	7	0.0	7	0.0	0.184	6.1	LOS A	0.3	2.1	0.20	0.21	0.20	53.8
8	T1	208	0.0	208	0.0	0.184	0.3	LOS A	0.3	2.1	0.20	0.21	0.20	54.5
9	R2	112	1.1	112	1.1	0.184	6.0	LOS A	0.3	2.1	0.20	0.21	0.20	50.9
Approach		327	0.4	327	0.4	0.184	2.4	NA	0.3	2.1	0.20	0.21	0.20	53.6
West: Thornton Drive														
10	L2	33	7.1	33	7.1	0.166	8.6	LOS A	0.2	1.5	0.22	0.97	0.22	42.3
11	T1	21	0.0	21	0.0	0.166	10.5	LOS A	0.2	1.5	0.22	0.97	0.22	47.8
12	R2	65	1.8	65	1.8	0.166	11.3	LOS A	0.2	1.5	0.22	0.97	0.22	44.4
Approach		119	3.0	119	3.0	0.166	10.4	LOS A	0.2	1.5	0.22	0.97	0.22	44.7
All Vehicles		636	0.7	636	0.7	0.184	4.6	NA	0.3	2.1	0.18	0.43	0.18	49.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [3 Coreen/ Combewood 2025 AM (Site Folder: General)]

Network: 3 [AM 2025 (Network Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Combewood Avenue														
1	L2	45	0.0	45	0.0	0.111	7.8	LOS A	0.2	1.8	0.61	0.72	0.61	47.0
3	R2	42	2.8	42	2.8	0.111	10.7	LOS A	0.2	1.8	0.61	0.72	0.61	38.1
Approach		87	1.3	87	1.3	0.111	9.2	LOS A	0.2	1.8	0.61	0.72	0.61	44.2
East: Coreen Avenue														
4	L2	134	0.0	134	0.0	0.528	6.2	LOS A	1.7	12.4	0.51	0.58	0.51	47.5
5	T1	477	6.3	477	6.3	0.528	6.3	LOS A	1.7	12.4	0.51	0.58	0.51	51.6
Approach		611	4.9	611	4.9	0.528	6.3	LOS A	1.7	12.4	0.51	0.58	0.51	51.0
West: Coreen Avenue														
11	T1	588	3.9	588	3.9	0.521	5.2	LOS A	2.0	14.6	0.28	0.50	0.28	47.7
12	R2	155	1.5	155	1.5	0.521	8.1	LOS A	2.0	14.6	0.28	0.50	0.28	47.7
Approach		743	3.4	743	3.4	0.521	5.8	LOS A	2.0	14.6	0.28	0.50	0.28	47.7
All Vehicles		1441	3.9	1441	3.9	0.528	6.2	LOS A	2.0	14.6	0.40	0.55	0.40	49.3

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

Site: [4 Coreen/ Sydney Smith 2025 AM (Site Folder: General)]

Network: 3 [AM 2025 (Network Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sydney Smith Drive														
1	L2	38	3.0	38	3.0	0.259	8.4	LOS A	0.6	4.3	0.69	0.81	0.69	36.0
3	R2	166	0.0	166	0.0	0.259	12.4	LOS A	0.6	4.3	0.69	0.81	0.69	44.7
Approach		204	0.6	204	0.6	0.259	11.6	LOS A	0.6	4.3	0.69	0.81	0.69	43.7
East: Coreen Avenue														
4	L2	93	0.0	93	0.0	0.461	4.4	LOS A	1.6	11.6	0.20	0.44	0.20	50.1
5	T1	608	2.3	608	2.3	0.461	4.6	LOS A	1.6	11.6	0.20	0.44	0.20	46.9
Approach		701	2.0	701	2.0	0.461	4.6	LOS A	1.6	11.6	0.20	0.44	0.20	47.5
West: Coreen Avenue														
11	T1	528	5.9	528	5.9	0.485	5.8	LOS A	1.6	11.7	0.54	0.56	0.54	51.3
12	R2	29	0.0	29	0.0	0.485	9.5	LOS A	1.6	11.7	0.54	0.56	0.54	50.8
Approach		558	5.6	558	5.6	0.485	6.0	LOS A	1.6	11.7	0.54	0.56	0.54	51.2
All Vehicles		1463	3.2	1463	3.2	0.485	6.1	LOS A	1.6	11.7	0.40	0.54	0.40	48.8

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

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 210920-N208910 Thornton SIDRA

Template: Default Site User Report

Site: [1 Castlereagh/ Thornton 2025 PM (Site Folder: General)]

Network: 4 [PM 2025 (Network Folder: General)]

Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase D
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road														
1	L2	148	1.6	148	1.6	* 1.085	151.0	LOS F	77.9	568.6	1.00	1.49	1.74	12.5
2	T1	1839	5.5	1839	5.5	1.085	146.8	LOS F	77.9	568.6	1.00	1.51	1.75	8.3
3	R2	194	1.2	194	1.2	* 1.133	206.2	LOS F	15.2	107.8	1.00	1.32	2.17	2.6
Approach		2181	4.9	2181	4.9	1.133	152.3	LOS F	77.9	568.6	1.00	1.49	1.79	8.0
East: Thornton Drive														
4	L2	282	0.0	282	0.0	0.649	55.6	LOS D	10.5	73.2	0.94	0.83	0.94	21.7
5	T1	33	3.6	33	3.6	0.126	57.7	LOS E	1.2	8.7	0.91	0.67	0.91	29.1
6	R2	81	0.0	81	0.0	0.509	74.0	LOS F	3.4	23.6	1.00	0.77	1.00	20.2
Approach		396	0.3	396	0.3	0.649	59.5	LOS E	10.5	73.2	0.95	0.81	0.95	22.0
North: Castlereagh Road														
7	L2	55	0.0	55	0.0	0.047	16.3	LOS B	0.9	6.1	0.41	0.66	0.41	28.8
8	T1	1267	2.6	1267	2.6	0.680	26.1	LOS B	19.2	137.2	0.78	0.71	0.78	28.7
9	R2	56	2.1	56	2.1	0.328	71.5	LOS F	2.3	16.1	0.98	0.75	0.98	22.8
Approach		1378	2.5	1378	2.5	0.680	27.5	LOS B	19.2	137.2	0.78	0.71	0.78	28.2
West: Peachtree Road														
10	L2	126	1.9	126	1.9	0.733	68.0	LOS E	7.3	51.5	0.99	0.86	1.07	23.9
11	T1	52	0.0	52	0.0	* 0.733	62.8	LOS E	7.3	51.5	0.99	0.86	1.07	19.1
12	R2	157	2.3	157	2.3	1.046	143.4	LOS F	10.0	71.2	1.00	1.16	1.87	12.7
Approach		335	1.8	335	1.8	1.046	102.5	LOS F	10.0	71.2	0.99	1.00	1.45	16.6
All Vehicles		4289	3.4	4289	3.4	1.133	99.8	LOS F	77.9	568.6	0.92	1.14	1.36	12.3

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

* Critical Movement (Signal Timing)

Site: [2 Combewood/ Thornton 2025 PM (Site Folder: General)]

Network: 4 [PM 2025 (Network Folder: General)]

Site Category: -
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Combewood Ave														
1	L2	257	0.0	257	0.0	0.332	5.5	LOS A	0.0	0.1	0.00	0.24	0.00	50.9
2	T1	376	0.0	376	0.0	0.332	0.0	LOS A	0.0	0.1	0.00	0.24	0.00	50.9
3	R2	2	0.0	2	0.0	0.332	5.7	LOS A	0.0	0.1	0.00	0.24	0.00	53.2
Approach		635	0.0	635	0.0	0.332	2.3	NA	0.0	0.1	0.00	0.24	0.00	50.9
East: Thornton Drive														
4	L2	2	0.0	2	0.0	0.095	8.2	LOS A	0.1	0.9	0.53	1.02	0.53	43.1
5	T1	38	0.0	38	0.0	0.095	14.0	LOS A	0.1	0.9	0.53	1.02	0.53	39.6
6	R2	4	0.0	4	0.0	0.095	12.6	LOS A	0.1	0.9	0.53	1.02	0.53	39.6
Approach		44	0.0	44	0.0	0.095	13.6	LOS A	0.1	0.9	0.53	1.02	0.53	39.8
North: Combewood Ave														
7	L2	12	0.0	12	0.0	0.105	8.5	LOS A	0.2	1.6	0.54	0.38	0.54	50.3
8	T1	57	0.0	57	0.0	0.105	2.5	LOS A	0.2	1.6	0.54	0.38	0.54	49.5
9	R2	61	1.9	61	1.9	0.105	8.5	LOS A	0.2	1.6	0.54	0.38	0.54	43.7
Approach		129	0.9	129	0.9	0.105	5.9	NA	0.2	1.6	0.54	0.38	0.54	47.6
West: Thornton Drive														
10	L2	95	1.3	88	1.2	0.379	10.9	LOS A	0.6	4.3	0.58	1.03	0.72	39.5
11	T1	58	0.0	54	0.0	0.379	14.1	LOS A	0.6	4.3	0.58	1.03	0.72	46.0
12	R2	89	0.0	83	0.0	0.379	15.6	LOS B	0.6	4.3	0.58	1.03	0.72	42.6
Approach		242	0.5	224 N1	0.5	0.379	13.4	LOS A	0.6	4.3	0.58	1.03	0.72	42.7
All Vehicles		1051	0.2	1032 N1	0.2	0.379	5.6	NA	0.6	4.3	0.22	0.46	0.25	46.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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

Site: [3 Coreen/ Combewood 2025 PM (Site Folder: General)]

Network: 4 [PM 2025 (Network Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Combewood Avenue														
1	L2	174	0.0	171	0.0	0.499	9.6	LOS A	1.5	10.8	0.76	0.87	0.83	45.2
3	R2	241	0.5	237	0.4	0.499	12.4	LOS A	1.5	10.8	0.76	0.87	0.83	35.4
Approach		415	0.3	408 N1	0.3	0.499	11.2	LOS A	1.5	10.8	0.76	0.87	0.83	41.2
East: Coreen Avenue														
4	L2	74	0.0	74	0.0	0.431	5.5	LOS A	1.5	10.3	0.38	0.50	0.38	48.3
5	T1	482	1.2	482	1.2	0.431	5.4	LOS A	1.5	10.3	0.38	0.50	0.38	52.3
Approach		556	1.0	556	1.0	0.431	5.4	LOS A	1.5	10.3	0.38	0.50	0.38	52.0
West: Coreen Avenue														
11	T1	641	2.0	641	2.0	0.694	8.3	LOS A	3.3	23.3	0.80	0.74	0.86	44.6
12	R2	83	4.2	83	4.2	0.694	11.3	LOS A	3.3	23.3	0.80	0.74	0.86	44.6
Approach		724	2.2	724	2.2	0.694	8.7	LOS A	3.3	23.3	0.80	0.74	0.86	44.6
All Vehicles		1695	1.4	1688 N 1	1.4	0.694	8.2	LOS A	3.3	23.3	0.65	0.69	0.70	47.0

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

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

Site: [4 Coreen/ Sydney Smith 2025 PM (Site Folder: General)]

Network: 4 [PM 2025 (Network Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sydney Smith Drive														
1	L2	54	0.0	54	0.0	0.288	7.3	LOS A	0.7	4.9	0.64	0.77	0.64	37.4
3	R2	199	0.6	199	0.6	0.288	11.4	LOS A	0.7	4.9	0.64	0.77	0.64	45.7
Approach		253	0.5	253	0.5	0.288	10.6	LOS A	0.7	4.9	0.64	0.77	0.64	44.5
East: Coreen Avenue														
4	L2	143	0.0	143	0.0	0.422	4.4	LOS A	1.5	10.4	0.24	0.44	0.24	49.9
5	T1	481	0.2	481	0.2	0.422	4.6	LOS A	1.5	10.4	0.24	0.44	0.24	46.6
Approach		624	0.2	624	0.2	0.422	4.6	LOS A	1.5	10.4	0.24	0.44	0.24	47.7
West: Coreen Avenue														
11	T1	794	1.3	790	1.3	0.716	7.1	LOS A	3.4	24.3	0.76	0.66	0.79	50.3
12	R2	39	2.9	39	2.9	0.716	11.0	LOS A	3.4	24.3	0.76	0.66	0.79	49.2
Approach		833	1.4	829[N1]	1.4	0.716	7.2	LOS A	3.4	24.3	0.76	0.66	0.79	50.3
All Vehicles		1709	0.8	1706[N1]	0.8	0.716	6.8	LOS A	3.4	24.3	0.55	0.60	0.57	48.8

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

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

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 210920-N208910 Thornton SIDRA

Template: Default Site User Report

Site: [1 Castlereagh/ Thornton 2025 AM w Dev (Site Folder: General)]

Network: 5 [AM 2025 w Dev (Network Folder: General)]

Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase D
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road														
1	L2	171	12.4	171	12.4	0.952	65.4	LOS E	45.1	344.0	1.00	1.08	1.21	23.2
2	T1	1531	9.9	1531	9.9	0.952	59.6	LOS E	45.1	344.0	0.96	1.06	1.19	17.1
3	R2	191	1.9	191	1.9	*0.970	103.8	LOS F	10.1	72.2	1.00	1.06	1.56	5.2
Approach		1892	9.3	1892	9.3	0.970	64.6	LOS E	45.1	344.0	0.97	1.06	1.23	16.2
East: Thornton Drive														
4	L2	283	1.2	283	1.2	0.623	53.7	LOS D	10.3	72.9	0.93	0.83	0.93	22.1
5	T1	34	3.4	34	3.4	0.130	57.7	LOS E	1.2	9.0	0.91	0.68	0.91	29.1
6	R2	34	0.0	34	0.0	0.282	75.8	LOS F	1.4	9.8	0.99	0.73	0.99	19.9
Approach		351	1.3	351	1.3	0.623	56.2	LOS D	10.3	72.9	0.93	0.81	0.93	22.7
North: Castlereagh Road														
7	L2	65	4.7	65	4.7	0.060	17.3	LOS B	1.1	7.9	0.43	0.67	0.43	28.0
8	T1	1748	7.6	1748	7.6	*0.958	61.7	LOS E	43.5	324.7	0.98	1.10	1.22	16.8
9	R2	76	1.6	76	1.6	0.385	69.9	LOS E	3.0	21.5	0.97	0.77	0.97	23.2
Approach		1889	7.3	1889	7.3	0.958	60.5	LOS E	43.5	324.7	0.96	1.07	1.18	17.3
West: Peachtree Road														
10	L2	72	4.9	72	4.9	0.254	57.5	LOS E	3.0	21.8	0.89	0.76	0.89	26.0
11	T1	13	0.0	13	0.0	*0.254	52.3	LOS D	3.0	21.8	0.89	0.76	0.89	21.2
12	R2	101	19.8	101	19.8	*0.966	105.0	LOS F	5.3	43.5	1.00	1.06	1.66	16.1
Approach		185	12.7	185	12.7	0.966	83.1	LOS F	5.3	43.5	0.95	0.92	1.31	19.5
All Vehicles		4317	7.9	4317	7.9	0.970	62.9	LOS E	45.1	344.0	0.96	1.04	1.19	17.4

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

* Critical Movement (Signal Timing)

Site: [2 Combewood/ Thornton 2025 AM w Dev (Site Folder: General)]

Network: 5 [AM 2025 w Dev (Network Folder: General)]

Site Category: -
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Combewood Ave														
1	L2	179	0.0	179	0.0	0.139	5.6	LOS A	0.0	0.1	0.02	0.41	0.02	45.8
2	T1	77	0.0	77	0.0	0.139	0.0	LOS A	0.0	0.1	0.02	0.41	0.02	45.8
3	R2	4	0.0	4	0.0	0.139	6.2	LOS A	0.0	0.1	0.02	0.41	0.02	51.0
Approach		260	0.0	260	0.0	0.139	3.9	NA	0.0	0.1	0.02	0.41	0.02	46.0
East: Thornton Drive														
4	L2	1	0.0	1	0.0	0.058	8.8	LOS A	0.1	0.6	0.51	0.98	0.51	45.2
5	T1	34	0.0	34	0.0	0.058	11.4	LOS A	0.1	0.6	0.51	0.98	0.51	42.2
6	R2	1	0.0	1	0.0	0.058	10.7	LOS A	0.1	0.6	0.51	0.98	0.51	42.2
Approach		36	0.0	36	0.0	0.058	11.3	LOS A	0.1	0.6	0.51	0.98	0.51	42.3
North: Combewood Ave														
7	L2	7	0.0	7	0.0	0.192	6.5	LOS A	0.3	2.3	0.28	0.22	0.28	53.4
8	T1	208	0.0	208	0.0	0.192	0.6	LOS A	0.3	2.3	0.28	0.22	0.28	53.9
9	R2	112	1.1	112	1.1	0.192	6.5	LOS A	0.3	2.3	0.28	0.22	0.28	50.0
Approach		327	0.4	327	0.4	0.192	2.7	NA	0.3	2.3	0.28	0.22	0.28	53.0
West: Thornton Drive														
10	L2	33	7.1	33	7.1	0.324	9.0	LOS A	0.5	3.5	0.38	1.00	0.43	40.5
11	T1	21	0.0	21	0.0	0.324	11.8	LOS A	0.5	3.5	0.38	1.00	0.43	46.7
12	R2	143	1.8	143	1.8	0.324	12.9	LOS A	0.5	3.5	0.38	1.00	0.43	43.1
Approach		197	2.5	197	2.5	0.324	12.2	LOS A	0.5	3.5	0.38	1.00	0.43	43.2
All Vehicles		820	0.7	820	0.7	0.324	5.7	NA	0.5	3.5	0.23	0.50	0.24	47.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [3 Coreen/ Combewood 2025 AM w Dev (Site Folder: General)]

Network: 5 [AM 2025 w Dev (Network Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Combewood Avenue														
1	L2	64	0.0	64	0.0	0.134	7.9	LOS A	0.3	2.2	0.62	0.73	0.62	47.1
3	R2	42	2.8	42	2.8	0.134	10.8	LOS A	0.3	2.2	0.62	0.73	0.62	38.3
Approach		106	1.1	106	1.1	0.134	9.0	LOS A	0.3	2.2	0.62	0.73	0.62	45.0
East: Coreen Avenue														
4	L2	134	0.0	134	0.0	0.528	6.2	LOS A	1.7	12.4	0.51	0.58	0.51	47.5
5	T1	477	6.3	477	6.3	0.528	6.3	LOS A	1.7	12.4	0.51	0.58	0.51	51.6
Approach		611	4.9	611	4.9	0.528	6.3	LOS A	1.7	12.4	0.51	0.58	0.51	51.0
West: Coreen Avenue														
11	T1	588	3.9	588	3.9	0.521	5.2	LOS A	2.0	14.6	0.29	0.50	0.29	47.7
12	R2	155	1.5	155	1.5	0.521	8.1	LOS A	2.0	14.6	0.29	0.50	0.29	47.7
Approach		743	3.4	743	3.4	0.521	5.8	LOS A	2.0	14.6	0.29	0.50	0.29	47.7
All Vehicles		1460	3.9	1460	3.9	0.528	6.2	LOS A	2.0	14.6	0.40	0.55	0.40	49.3

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

Site: [4 Coreen/ Sydney Smith 2025 AM w Dev (Site Folder: General)]

Network: 5 [AM 2025 w Dev (Network Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sydney Smith Drive														
1	L2	38	3.0	38	3.0	0.369	8.8	LOS A	0.9	6.6	0.74	0.85	0.74	35.4
3	R2	254	0.0	254	0.0	0.369	12.7	LOS A	0.9	6.6	0.74	0.85	0.74	44.2
Approach		292	0.4	292	0.4	0.369	12.2	LOS A	0.9	6.6	0.74	0.85	0.74	43.5
East: Coreen Avenue														
4	L2	121	0.0	121	0.0	0.480	4.4	LOS A	1.8	12.9	0.22	0.44	0.22	50.0
5	T1	608	2.3	608	2.3	0.480	4.6	LOS A	1.8	12.9	0.22	0.44	0.22	46.8
Approach		729	1.9	729	1.9	0.480	4.6	LOS A	1.8	12.9	0.22	0.44	0.22	47.6
West: Coreen Avenue														
11	T1	528	5.9	528	5.9	0.543	6.6	LOS A	1.8	13.4	0.68	0.66	0.68	50.6
12	R2	29	0.0	29	0.0	0.543	10.3	LOS A	1.8	13.4	0.68	0.66	0.68	50.0
Approach		558	5.6	558	5.6	0.543	6.8	LOS A	1.8	13.4	0.68	0.66	0.68	50.5
All Vehicles		1579	2.9	1579	2.9	0.543	6.8	LOS A	1.8	13.4	0.47	0.59	0.47	48.1

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

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 210920-N208910 Thornton SIDRA — **Template: Default Site User Report**

Site: [1 Castlereagh/ Thornton 2025 PM w Dev (Site Folder: General)] — **Network: 6 [PM 2025 w Dev (Network Folder: General)]**

Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase D
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road														
1	L2	148	1.6	148	1.6	* 1.152	206.7	LOS F	91.6	668.7	1.00	1.71	2.05	9.6
2	T1	1839	5.5	1839	5.5	1.152	202.5	LOS F	91.6	668.7	1.00	1.74	2.06	6.2
3	R2	281	1.2	281	1.2	* 1.187	249.4	LOS F	24.8	175.5	1.00	1.41	2.34	2.2
Approach		2268	4.7	2268	4.7	1.187	208.6	LOS F	91.6	668.7	1.00	1.70	2.09	5.9
East: Thornton Drive														
4	L2	351	0.0	351	0.0	0.703	52.8	LOS D	12.9	90.3	0.94	0.85	0.94	22.4
5	T1	33	3.6	33	3.6	0.126	57.7	LOS E	1.2	8.7	0.91	0.67	0.91	29.1
6	R2	81	0.0	81	0.0	0.611	77.2	LOS F	3.5	24.3	1.00	0.79	1.04	19.7
Approach		464	0.3	464	0.3	0.703	57.4	LOS E	12.9	90.3	0.95	0.82	0.96	22.4
North: Castlereagh Road														
7	L2	74	0.0	74	0.0	0.068	18.6	LOS B	1.3	9.0	0.45	0.68	0.45	26.8
8	T1	1267	2.6	1267	2.6	0.716	28.5	LOS B	19.8	141.7	0.82	0.74	0.82	27.4
9	R2	56	2.1	56	2.1	0.237	65.5	LOS E	2.1	15.2	0.94	0.75	0.94	24.0
Approach		1397	2.4	1397	2.4	0.716	29.4	LOS C	19.8	141.7	0.80	0.74	0.80	27.1
West: Peachtree Road														
10	L2	126	1.9	126	1.9	0.743	68.3	LOS E	7.3	51.7	0.99	0.86	1.08	23.8
11	T1	52	0.0	52	0.0	* 0.743	63.3	LOS E	7.3	51.7	0.99	0.86	1.08	19.1
12	R2	157	2.3	157	2.3	1.201	261.5	LOS F	14.1	100.6	1.00	1.40	2.46	7.6
Approach		335	1.8	335	1.8	1.201	158.1	LOS F	14.1	100.6	0.99	1.12	1.73	11.8
All Vehicles		4464	3.3	4464	3.3	1.201	133.0	LOS F	91.6	668.7	0.93	1.26	1.54	9.6

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

* Critical Movement (Signal Timing)

Site: [2 Combewood/ Thornton 2025 PM w Dev (Site Folder: General)]

Network: 6 [PM 2025 w Dev (Network Folder: General)]

Site Category: -
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Combewood Ave														
1	L2	326	0.0	326	0.0	0.378	5.5	LOS A	0.0	0.1	0.00	0.27	0.00	50.0
2	T1	392	0.0	392	0.0	0.378	0.0	LOS A	0.0	0.1	0.00	0.27	0.00	50.0
3	R2	2	0.0	2	0.0	0.378	5.8	LOS A	0.0	0.1	0.00	0.27	0.00	52.8
Approach		720	0.0	720	0.0	0.378	2.5	NA	0.0	0.1	0.00	0.27	0.00	50.1
East: Thornton Drive														
4	L2	2	0.0	2	0.0	0.109	8.2	LOS A	0.1	1.0	0.57	1.02	0.57	42.1
5	T1	38	0.0	38	0.0	0.109	15.6	LOS B	0.1	1.0	0.57	1.02	0.57	38.3
6	R2	4	0.0	4	0.0	0.109	12.8	LOS A	0.1	1.0	0.57	1.02	0.57	38.3
Approach		44	0.0	44	0.0	0.109	15.0	LOS B	0.1	1.0	0.57	1.02	0.57	38.5
North: Combewood Ave														
7	L2	12	0.0	12	0.0	0.114	9.2	LOS A	0.2	1.8	0.58	0.40	0.58	49.5
8	T1	57	0.0	57	0.0	0.114	3.2	LOS A	0.2	1.8	0.58	0.40	0.58	48.5
9	R2	61	1.9	61	1.9	0.114	9.3	LOS A	0.2	1.8	0.58	0.40	0.58	42.2
Approach		129	0.9	129	0.9	0.114	6.6	NA	0.2	1.8	0.58	0.40	0.58	46.4
West: Thornton Drive														
10	L2	95	1.3	84	1.2	0.632	13.5	LOS A	1.4	9.7	0.74	1.15	1.24	35.3
11	T1	58	0.0	52	0.0	0.632	17.9	LOS B	1.4	9.7	0.74	1.15	1.24	43.1
12	R2	197	0.0	175	0.0	0.632	20.0	LOS B	1.4	9.7	0.74	1.15	1.24	39.2
Approach		349	0.3	311 N1	0.3	0.632	17.9	LOS B	1.4	9.7	0.74	1.15	1.24	39.2
All Vehicles		1243	0.2	1205 N1	0.2	0.632	7.4	NA	1.4	9.7	0.28	0.54	0.40	43.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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

Site: [3 Coreen/ Combewood 2025 PM w Dev (Site Folder: General)]

Network: 6 [PM 2025 w Dev (Network Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Combewood Avenue														
1	L2	189	0.0	186	0.0	0.515	9.8	LOS A	1.6	11.5	0.77	0.88	0.85	45.1
3	R2	241	0.5	236	0.4	0.515	12.7	LOS A	1.6	11.5	0.77	0.88	0.85	35.1
Approach		431	0.3	421 N1	0.2	0.515	11.4	LOS A	1.6	11.5	0.77	0.88	0.85	41.2
East: Coreen Avenue														
4	L2	74	0.0	74	0.0	0.431	5.5	LOS A	1.5	10.3	0.38	0.50	0.38	48.3
5	T1	482	1.2	482	1.2	0.431	5.4	LOS A	1.5	10.3	0.38	0.50	0.38	52.3
Approach		556	1.0	556	1.0	0.431	5.4	LOS A	1.5	10.3	0.38	0.50	0.38	52.0
West: Coreen Avenue														
11	T1	641	2.0	641	2.0	0.694	8.3	LOS A	3.3	23.3	0.80	0.74	0.86	44.6
12	R2	83	4.2	83	4.2	0.694	11.3	LOS A	3.3	23.3	0.80	0.74	0.86	44.6
Approach		724	2.2	724	2.2	0.694	8.6	LOS A	3.3	23.3	0.80	0.74	0.86	44.6
All Vehicles		1711	1.4	1701 N 1	1.4	0.694	8.3	LOS A	3.3	23.3	0.65	0.69	0.70	47.0

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

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

Site: [4 Coreen/ Sydney Smith 2025 PM w Dev (Site Folder: General)]

Network: 6 [PM 2025 w Dev (Network Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sydney Smith Drive														
1	L2	54	0.0	54	0.0	0.368	7.6	LOS A	0.9	6.6	0.67	0.80	0.67	36.9
3	R2	268	0.6	268	0.6	0.368	11.6	LOS A	0.9	6.6	0.67	0.80	0.67	45.3
Approach		322	0.5	322	0.5	0.368	11.0	LOS A	0.9	6.6	0.67	0.80	0.67	44.4
East: Coreen Avenue														
4	L2	182	0.0	182	0.0	0.448	4.4	LOS A	1.7	11.9	0.26	0.45	0.26	49.8
5	T1	481	0.2	481	0.2	0.448	4.7	LOS A	1.7	11.9	0.26	0.45	0.26	46.5
Approach		663	0.2	663	0.2	0.448	4.6	LOS A	1.7	11.9	0.26	0.45	0.26	47.8
West: Coreen Avenue														
11	T1	794	1.3	789	1.3	0.778	10.0	LOS A	4.7	33.0	0.90	0.84	1.07	48.9
12	R2	39	2.9	39	2.9	0.778	13.9	LOS A	4.7	33.0	0.90	0.84	1.07	47.7
Approach		833	1.4	828 N1	1.4	0.778	10.2	LOS A	4.7	33.0	0.90	0.84	1.07	48.8
All Vehicles		1818	0.8	1813 N1	0.8	0.778	8.3	LOS A	4.7	33.0	0.63	0.69	0.70	47.8

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

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

Organisation: STANTEC NEW ZEALAND | Licence: NETWORK / Enterprise | Created: Tuesday, 9 November 2021 12:52:46 PM
Project: P:\N20800-20899\N208910 Thornton, Penrith - Lots 3003, 3004 & 3005\Modelling\210920-N208910 Thornton SIDRA.sip9

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 210920-N208910 Thornton SIDRA

Template: Default Site User Report

Site: [1 Castlereagh/ Thornton 2025 AM w Dev Mit (Site Folder: General)]

Network: 7 [AM 2025 w Dev Mit (Network Folder: General)]

Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase D
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road														
1	L2	171	12.4	171	12.4	0.120	6.6	LOS A	0.7	5.8	0.16	0.59	0.16	50.0
2	T1	1531	9.9	1531	9.9	0.647	30.4	LOS C	17.2	130.9	0.81	0.73	0.81	26.4
3	R2	191	1.9	191	1.9	*0.766	72.6	LOS F	8.1	57.8	1.00	0.87	1.11	7.2
Approach		1892	9.3	1892	9.3	0.766	32.5	LOS C	17.2	130.9	0.77	0.73	0.78	25.4
East: Thornton Drive														
4	L2	283	1.2	283	1.2	0.522	47.2	LOS D	9.5	67.5	0.86	0.82	0.86	23.9
5	T1	34	3.4	34	3.4	0.112	54.6	LOS D	1.2	8.7	0.89	0.66	0.89	30.0
6	R2	34	0.0	34	0.0	0.231	72.9	LOS F	1.4	9.6	0.97	0.73	0.97	20.5
Approach		351	1.3	351	1.3	0.522	50.4	LOS D	9.5	67.5	0.88	0.79	0.88	24.2
North: Castlereagh Road														
7	L2	220	4.7	220	4.7	0.157	7.0	LOS A	1.3	9.2	0.20	0.61	0.20	41.3
8	T1	1748	7.6	1748	7.6	*0.754	32.1	LOS C	21.9	163.6	0.86	0.77	0.86	25.7
9	R2	76	1.6	76	1.6	0.304	65.2	LOS E	2.9	20.6	0.94	0.77	0.94	24.2
Approach		2044	7.1	2044	7.1	0.754	30.6	LOS C	21.9	163.6	0.79	0.75	0.79	26.3
West: Peachtree Road														
10	L2	72	4.9	72	4.9	0.223	54.5	LOS D	2.9	21.1	0.87	0.75	0.87	26.8
11	T1	13	0.0	13	0.0	*0.223	49.6	LOS D	2.9	21.1	0.87	0.75	0.87	22.0
12	R2	101	19.8	101	19.8	*0.790	81.4	LOS F	4.5	37.2	1.00	0.89	1.23	19.5
Approach		185	12.7	185	12.7	0.790	68.8	LOS E	4.5	37.2	0.94	0.83	1.06	22.1
All Vehicles		4472	7.8	4472	7.8	0.790	34.5	LOS C	21.9	163.6	0.80	0.75	0.81	25.4

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

* Critical Movement (Signal Timing)

Site: [2 Combewood/ Thornton 2025 AM w Dev Mit (Site Folder: General)]

Network: 7 [AM 2025 w Dev Mit (Network Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Combewood Avenue														
1	L2	179	0.0	179	0.0	0.190	5.4	LOS A	0.4	3.0	0.28	0.54	0.28	40.7
2	T1	48	0.0	48	0.0	0.190	5.3	LOS A	0.4	3.0	0.28	0.54	0.28	40.7
3	R2	4	0.0	4	0.0	0.190	8.3	LOS A	0.4	3.0	0.28	0.54	0.28	49.6
Approach		232	0.0	232	0.0	0.190	5.5	LOS A	0.4	3.0	0.28	0.54	0.28	41.1
East: Thornton Drive														
4	L2	1	0.0	1	0.0	0.040	7.2	LOS A	0.1	0.6	0.52	0.59	0.52	47.7
5	T1	34	0.0	34	0.0	0.040	7.1	LOS A	0.1	0.6	0.52	0.59	0.52	46.1
6	R2	1	0.0	1	0.0	0.040	10.0	LOS A	0.1	0.6	0.52	0.59	0.52	46.1
Approach		36	0.0	36	0.0	0.040	7.2	LOS A	0.1	0.6	0.52	0.59	0.52	46.2
North: Combewood Avenue														
7	L2	7	0.0	7	0.0	0.173	6.6	LOS A	0.4	2.8	0.47	0.62	0.47	48.0
8	T1	107	0.0	107	0.0	0.173	6.5	LOS A	0.4	2.8	0.47	0.62	0.47	45.7
9	R2	58	1.1	58	1.1	0.173	9.5	LOS A	0.4	2.8	0.47	0.62	0.47	40.4
Approach		173	0.4	173	0.4	0.173	7.5	LOS A	0.4	2.8	0.47	0.62	0.47	44.6
West: Thornton Drive														
10	L2	20	7.1	20	7.1	0.224	5.3	LOS A	0.5	3.4	0.18	0.62	0.18	45.1
11	T1	21	0.0	21	0.0	0.224	5.1	LOS A	0.5	3.4	0.18	0.62	0.18	50.5
12	R2	256	1.8	256	1.8	0.224	8.0	LOS A	0.5	3.4	0.18	0.62	0.18	47.3
Approach		297	2.0	297	2.0	0.224	7.6	LOS A	0.5	3.4	0.18	0.62	0.18	47.5
All Vehicles		737	0.9	737	0.9	0.224	6.9	LOS A	0.5	3.4	0.30	0.59	0.30	45.6

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

Site: [3 Coreen/ Combewood 2025 AM w Dev Mit (Site Folder: General)]

Network: 7 [AM 2025 w Dev Mit (Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Combewood Avenue														
1	L2	64	0.0	64	0.0	0.062	7.4	LOS A	0.1	0.7	0.47	0.66	0.47	48.9
Approach		64	0.0	64	0.0	0.062	7.4	LOS A	0.1	0.7	0.47	0.66	0.47	48.9
East: Coreen Avenue														
4	L2	134	0.0	134	0.0	0.327	5.6	LOS A	0.0	0.0	0.00	0.13	0.00	57.1
5	T1	477	6.3	477	6.3	0.327	0.1	LOS A	0.0	0.0	0.00	0.13	0.00	58.4
Approach		611	4.9	611	4.9	0.327	1.3	NA	0.0	0.0	0.00	0.13	0.00	58.2
West: Coreen Avenue														
11	T1	588	3.9	588	3.9	0.309	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		588	3.9	588	3.9	0.309	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.8
All Vehicles		1263	4.2	1263	4.2	0.327	1.0	NA	0.1	0.7	0.02	0.10	0.02	58.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [4 Coreen/ Sydney Smith 2025 AM w Dev Mit (Site Folder: General)]

Network: 7 [AM 2025 w Dev Mit (Network Folder: General)]

Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sydney Smith Drive														
1	L2	38	3.0	38	3.0	0.067	30.1	LOS C	0.7	5.1	0.73	0.71	0.73	21.8
3	R2	296	0.0	296	0.0	* 0.532	33.2	LOS C	6.6	46.1	0.87	0.81	0.87	31.3
Approach		334	0.3	334	0.3	0.532	32.8	LOS C	6.6	46.1	0.86	0.80	0.86	30.6
East: Coreen Avenue														
4	L2	121	0.0	121	0.0	0.194	17.7	LOS B	2.7	18.9	0.56	0.64	0.56	41.2
5	T1	608	2.3	608	2.3	* 0.527	14.4	LOS A	9.4	66.9	0.68	0.62	0.68	36.3
Approach		729	1.9	729	1.9	0.527	15.0	LOS B	9.4	66.9	0.66	0.62	0.66	37.4
West: Coreen Avenue														
11	T1	486	5.9	486	5.9	0.524	14.9	LOS B	8.2	60.2	0.68	0.60	0.68	46.5
12	R2	29	0.0	29	0.0	0.106	27.1	LOS B	0.5	3.8	0.70	0.71	0.70	35.8
Approach		516	5.6	516	5.6	0.524	15.6	LOS B	8.2	60.2	0.68	0.60	0.68	45.8
All Vehicles		1579	2.8	1579	2.8	0.532	18.9	LOS B	9.4	66.9	0.71	0.66	0.71	38.8

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

* Critical Movement (Signal Timing)

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 210920-N208910 Thornton SIDRA

Template: Default Site User Report

Site: [1 Castlereagh/ Thornton 2025 PM w Dev Mit (Site Folder: General)]

Network: 8 [PM 2025 w Dev Mit (Network Folder: General)]

Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase D
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Castlereagh Road														
1	L2	148	1.6	148	1.6	0.097	6.3	LOS A	0.5	3.8	0.14	0.59	0.14	50.8
2	T1	1839	5.5	1839	5.5	*0.918	59.2	LOS E	31.8	233.3	0.97	1.02	1.16	17.3
3	R2	281	1.2	281	1.2	*0.890	79.5	LOS F	13.1	93.0	1.00	0.96	1.27	6.7
Approach		2268	4.7	2268	4.7	0.918	58.2	LOS E	31.8	233.3	0.92	0.99	1.11	17.1
East: Thornton Drive														
4	L2	351	0.0	351	0.0	0.573	44.5	LOS D	11.7	81.6	0.86	0.83	0.86	24.8
5	T1	33	3.6	33	3.6	0.109	54.5	LOS D	1.2	8.5	0.89	0.66	0.89	30.0
6	R2	81	0.0	81	0.0	0.407	70.1	LOS E	3.3	22.8	0.98	0.77	0.98	21.1
Approach		464	0.3	464	0.3	0.573	49.6	LOS D	11.7	81.6	0.88	0.80	0.88	24.4
North: Castlereagh Road														
7	L2	157	0.0	157	0.0	0.118	9.6	LOS A	1.6	11.1	0.30	0.63	0.30	36.9
8	T1	1267	2.6	1267	2.6	0.598	35.2	LOS C	14.8	105.8	0.84	0.73	0.84	24.3
9	R2	56	2.1	56	2.1	0.178	59.2	LOS E	2.0	14.3	0.89	0.75	0.89	25.6
Approach		1480	2.3	1480	2.3	0.598	33.4	LOS C	14.8	105.8	0.78	0.72	0.78	25.0
West: Peachtree Road														
10	L2	126	1.9	126	1.9	0.622	62.6	LOS E	6.9	48.6	0.96	0.81	0.96	25.1
11	T1	52	0.0	52	0.0	*0.622	57.9	LOS E	6.9	48.6	0.96	0.81	0.96	20.3
12	R2	157	2.3	157	2.3	*0.886	84.3	LOS F	7.3	52.2	1.00	0.97	1.36	19.2
Approach		335	1.8	335	1.8	0.886	72.0	LOS F	7.3	52.2	0.98	0.88	1.15	21.5
All Vehicles		4547	3.3	4547	3.3	0.918	50.3	LOS D	31.8	233.3	0.87	0.88	0.98	20.4

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

* Critical Movement (Signal Timing)

Site: [2 Combewood/ Thornton 2025 PM w Dev Mit (Site Folder: General)]

Network: 8 [PM 2025 w Dev Mit (Network Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Combewood Avenue														
1	L2	326	0.0	326	0.0	0.384	5.3	LOS A	1.1	7.8	0.26	0.51	0.26	40.9
2	T1	197	0.0	197	0.0	0.384	5.2	LOS A	1.1	7.8	0.26	0.51	0.26	40.9
3	R2	2	0.0	2	0.0	0.384	8.1	LOS A	1.1	7.8	0.26	0.51	0.26	49.7
Approach		525	0.0	525	0.0	0.384	5.3	LOS A	1.1	7.8	0.26	0.51	0.26	41.0
East: Thornton Drive														
4	L2	2	0.0	2	0.0	0.046	6.6	LOS A	0.1	0.7	0.47	0.56	0.47	47.8
5	T1	38	0.0	38	0.0	0.046	6.5	LOS A	0.1	0.7	0.47	0.56	0.47	46.3
6	R2	4	0.0	4	0.0	0.046	9.4	LOS A	0.1	0.7	0.47	0.56	0.47	46.3
Approach		44	0.0	44	0.0	0.046	6.8	LOS A	0.1	0.7	0.47	0.56	0.47	46.4
North: Combewood Avenue														
7	L2	12	0.0	12	0.0	0.049	6.8	LOS A	0.1	0.8	0.50	0.61	0.50	47.8
8	T1	17	0.0	17	0.0	0.049	6.7	LOS A	0.1	0.8	0.50	0.61	0.50	45.5
9	R2	18	1.9	18	1.9	0.049	9.6	LOS A	0.1	0.8	0.50	0.61	0.50	40.1
Approach		46	0.7	46	0.7	0.049	7.8	LOS A	0.1	0.8	0.50	0.61	0.50	44.9
West: Thornton Drive														
10	L2	47	1.3	47	1.3	0.358	6.4	LOS A	0.8	5.6	0.39	0.66	0.39	44.4
11	T1	58	0.0	58	0.0	0.358	6.2	LOS A	0.8	5.6	0.39	0.66	0.39	50.1
12	R2	283	0.0	283	0.0	0.358	9.2	LOS A	0.8	5.6	0.39	0.66	0.39	47.0
Approach		388	0.2	388	0.2	0.358	8.4	LOS A	0.8	5.6	0.39	0.66	0.39	47.4
All Vehicles		1004	0.1	1004	0.1	0.384	6.7	LOS A	1.1	7.8	0.33	0.58	0.33	45.1

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

Site: [3 Coreen/ Combewood 2025 PM w Dev Mit (Site Folder: General)]

Network: 8 [PM 2025 w Dev Mit (Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Combewood Avenue														
1	L2	189	0.0	189	0.0	0.180	7.6	LOS A	0.3	2.3	0.50	0.70	0.50	48.8
Approach		189	0.0	189	0.0	0.180	7.6	LOS A	0.3	2.3	0.50	0.70	0.50	48.8
East: Coreen Avenue														
4	L2	74	0.0	74	0.0	0.289	5.6	LOS A	0.0	0.0	0.00	0.08	0.00	58.2
5	T1	482	1.2	482	1.2	0.289	0.1	LOS A	0.0	0.0	0.00	0.08	0.00	59.0
Approach		556	1.0	556	1.0	0.289	0.8	NA	0.0	0.0	0.00	0.08	0.00	58.9
West: Coreen Avenue														
11	T1	641	2.0	641	2.0	0.333	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		641	2.0	641	2.0	0.333	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.8
All Vehicles		1386	1.3	1386	1.3	0.333	1.4	NA	0.3	2.3	0.07	0.13	0.07	57.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [4 Coreen/ Sydney Smith 2025 PM w Dev Mit (Site Folder: General)]

Network: 8 [PM 2025 w Dev Mit (Network Folder: General)]

Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sydney Smith Drive														
1	L2	54	0.0	54	0.0	0.072	24.2	LOS B	0.9	6.2	0.65	0.70	0.65	24.9
3	R2	509	0.6	509	0.6	* 0.732	30.4	LOS C	11.6	81.6	0.89	0.86	0.91	32.6
Approach		563	0.5	563	0.5	0.732	29.8	LOS C	11.6	81.6	0.87	0.84	0.88	32.1
East: Coreen Avenue														
4	L2	182	0.0	182	0.0	0.232	23.4	LOS B	3.1	21.9	0.68	0.75	0.68	36.2
5	T1	481	0.2	481	0.2	0.556	19.8	LOS B	9.5	66.9	0.79	0.70	0.79	32.0
Approach		663	0.2	663	0.2	0.556	20.8	LOS B	9.5	66.9	0.76	0.71	0.76	33.5
West: Coreen Avenue														
11	T1	553	1.3	553	1.3	* 0.713	22.8	LOS B	11.6	81.9	0.84	0.74	0.84	42.0
12	R2	39	2.9	39	2.9	0.165	33.9	LOS C	0.8	6.0	0.80	0.73	0.80	32.5
Approach		592	1.4	592	1.4	0.713	23.5	LOS B	11.6	81.9	0.83	0.74	0.83	41.3
All Vehicles		1818	0.7	1818	0.7	0.732	24.5	LOS B	11.6	81.9	0.82	0.76	0.82	35.9

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

* Critical Movement (Signal Timing)

Organisation: STANTEC NEW ZEALAND | Licence: NETWORK / Enterprise | Created: Tuesday, 9 November 2021 12:53:12 PM
Project: P:\N20800-20899\N208910 Thornton, Penrith - Lots 3003, 3004 & 3005\Modelling\210920-N208910 Thornton SIDRA.sip9

USER REPORT FOR SITE

All Movement Classes

Project: 210920-N208910 Thornton SIDRA

Template: Default Site User Report

Site: [5 Macquarie/ Evan Ex AM (Site Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Evan Street														
1	L2	71	0	75	0.0	0.349	4.2	LOS A	2.8	20.3	0.28	0.47	0.28	53.6
2	T1	294	6	309	2.0	0.349	4.4	LOS A	2.8	20.3	0.28	0.47	0.28	54.9
3	R2	113	6	119	5.3	0.349	9.1	LOS A	2.8	20.3	0.28	0.47	0.28	54.6
Approach		478	12	503	2.5	0.349	5.5	LOS A	2.8	20.3	0.28	0.47	0.28	54.6
East: The Crescent														
4	L2	200	0	211	0.0	0.440	12.0	LOS A	3.5	24.7	0.92	0.98	1.02	49.3
5	T1	36	1	38	2.8	0.440	12.4	LOS A	3.5	24.7	0.92	0.98	1.02	50.4
6	R2	17	0	18	0.0	0.440	16.9	LOS B	3.5	24.7	0.92	0.98	1.02	50.4
Approach		253	1	266	0.4	0.440	12.4	LOS A	3.5	24.7	0.92	0.98	1.02	49.5
North: Macquarie Street														
7	L2	20	0	21	0.0	0.654	5.0	LOS A	6.7	47.4	0.53	0.49	0.53	53.1
8	T1	831	12	875	1.4	0.654	5.2	LOS A	6.7	47.4	0.53	0.49	0.53	54.3
9	R2	1	1	1	100.0	0.654	12.3	LOS A	6.7	47.4	0.53	0.49	0.53	50.5
Approach		852	13	897	1.5	0.654	5.2	LOS A	6.7	47.4	0.53	0.49	0.53	54.3
All Vehicles		1583	26	1666	1.6	0.654	6.5	LOS A	6.7	47.4	0.52	0.56	0.53	53.6

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

Site: [5 Macquarie/ Evan Ex PM (Site Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Evan Street														
1	L2	151	2	159	1.3	0.705	4.6	LOS A	9.4	66.8	0.49	0.48	0.49	52.8
2	T1	609	14	641	2.3	0.705	4.8	LOS A	9.4	66.8	0.49	0.48	0.49	54.0
3	R2	229	1	241	0.4	0.705	9.4	LOS A	9.4	66.8	0.49	0.48	0.49	54.0
Approach		989	17	1041	1.7	0.705	5.9	LOS A	9.4	66.8	0.49	0.48	0.49	53.8
East: The Crescent														
4	L2	153	0	161	0.0	0.262	7.0	LOS A	1.7	11.9	0.70	0.73	0.70	52.7
5	T1	52	1	55	1.9	0.262	7.3	LOS A	1.7	11.9	0.70	0.73	0.70	54.0
6	R2	10	0	11	0.0	0.262	11.9	LOS A	1.7	11.9	0.70	0.73	0.70	54.0
Approach		215	1	226	0.5	0.262	7.3	LOS A	1.7	11.9	0.70	0.73	0.70	53.1
North: Macquarie Street														
7	L2	11	0	12	0.0	0.472	5.5	LOS A	3.6	25.5	0.58	0.57	0.58	52.8
8	T1	502	9	528	1.8	0.472	5.8	LOS A	3.6	25.5	0.58	0.57	0.58	54.0
9	R2	4	0	4	0.0	0.472	10.4	LOS A	3.6	25.5	0.58	0.57	0.58	54.1
Approach		517	9	544	1.7	0.472	5.8	LOS A	3.6	25.5	0.58	0.57	0.58	54.0
All Vehicles		1721	27	1812	1.6	0.705	6.0	LOS A	9.4	66.8	0.54	0.54	0.54	53.8

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

Site: [5 Macquarie/ Evan 2025 AM (Site Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Evan Street														
1	L2	80	0.0	84	0.0	0.395	4.2	LOS A	3.4	24.6	0.32	0.48	0.32	53.5
2	T1	329	2.0	346	2.0	0.395	4.5	LOS A	3.4	24.6	0.32	0.48	0.32	54.7
3	R2	127	5.3	134	5.3	0.395	9.2	LOS A	3.4	24.6	0.32	0.48	0.32	54.5
Approach		536	2.5	564	2.5	0.395	5.6	LOS A	3.4	24.6	0.32	0.48	0.32	54.5
East: The Crescent														
4	L2	224	0.0	236	0.0	0.596	19.1	LOS B	6.0	42.5	1.00	1.14	1.37	45.0
5	T1	40	2.8	42	2.8	0.596	19.5	LOS B	6.0	42.5	1.00	1.14	1.37	45.9
6	R2	19	0.0	20	0.0	0.596	24.0	LOS B	6.0	42.5	1.00	1.14	1.37	45.9
Approach		283	0.4	298	0.4	0.596	19.5	LOS B	6.0	42.5	1.00	1.14	1.37	45.2
North: Macquarie Street														
7	L2	22	0.0	23	0.0	0.743	5.4	LOS A	8.9	63.4	0.66	0.54	0.66	52.5
8	T1	931	1.4	980	1.4	0.743	5.6	LOS A	8.9	63.4	0.66	0.54	0.66	53.7
9	R2	1	100.0	1	100.0	0.743	13.1	LOS A	8.9	63.4	0.66	0.54	0.66	50.0
Approach		954	1.5	1004	1.5	0.743	5.6	LOS A	8.9	63.4	0.66	0.54	0.66	53.7
All Vehicles		1773	1.6	1866	1.6	0.743	7.8	LOS A	8.9	63.4	0.61	0.61	0.67	52.4

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

Site: [5 Macquarie/ Evan 2025 PM (Site Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Evan Street														
1	L2	169	1.3	178	1.3	0.796	4.9	LOS A	13.5	96.2	0.65	0.49	0.65	52.2
2	T1	682	2.3	718	2.3	0.796	5.2	LOS A	13.5	96.2	0.65	0.49	0.65	53.4
3	R2	256	0.4	269	0.4	0.796	9.7	LOS A	13.5	96.2	0.65	0.49	0.65	53.4
Approach		1107	1.7	1165	1.7	0.796	6.2	LOS A	13.5	96.2	0.65	0.49	0.65	53.2
East: The Crescent														
4	L2	171	0.0	180	0.0	0.315	7.6	LOS A	2.2	15.3	0.77	0.78	0.77	52.3
5	T1	58	1.9	61	1.9	0.315	7.9	LOS A	2.2	15.3	0.77	0.78	0.77	53.5
6	R2	11	0.0	12	0.0	0.315	12.5	LOS A	2.2	15.3	0.77	0.78	0.77	53.5
Approach		240	0.5	253	0.5	0.315	7.9	LOS A	2.2	15.3	0.77	0.78	0.77	52.7
North: Macquarie Street														
7	L2	12	0.0	13	0.0	0.545	5.9	LOS A	4.6	32.5	0.67	0.61	0.67	52.4
8	T1	562	1.8	592	1.8	0.545	6.1	LOS A	4.6	32.5	0.67	0.61	0.67	53.6
9	R2	4	0.0	4	0.0	0.545	10.7	LOS A	4.6	32.5	0.67	0.61	0.67	53.6
Approach		578	1.7	608	1.7	0.545	6.2	LOS A	4.6	32.5	0.67	0.61	0.67	53.6
All Vehicles		1925	1.6	2026	1.6	0.796	6.4	LOS A	13.5	96.2	0.67	0.56	0.67	53.3

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

Site: [5 Macquarie/ Evan 2025 AM w Dev (Site Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Evan Street														
1	L2	113	0.0	119	0.0	0.418	4.2	LOS A	3.7	26.7	0.33	0.48	0.33	53.5
2	T1	329	2.0	346	2.0	0.418	4.5	LOS A	3.7	26.7	0.33	0.48	0.33	54.7
3	R2	127	5.3	134	5.3	0.418	9.2	LOS A	3.7	26.7	0.33	0.48	0.33	54.5
Approach		569	2.4	599	2.4	0.418	5.5	LOS A	3.7	26.7	0.33	0.48	0.33	54.4
East: The Crescent														
4	L2	224	0.0	236	0.0	0.597	19.1	LOS B	6.1	42.5	1.00	1.14	1.37	45.0
5	T1	40	2.8	42	2.8	0.597	19.5	LOS B	6.1	42.5	1.00	1.14	1.37	45.9
6	R2	19	0.0	20	0.0	0.597	24.0	LOS B	6.1	42.5	1.00	1.14	1.37	45.9
Approach		283	0.4	298	0.4	0.597	19.5	LOS B	6.1	42.5	1.00	1.14	1.37	45.2
North: Macquarie Street														
7	L2	22	0.0	23	0.0	0.743	5.4	LOS A	9.0	63.6	0.66	0.54	0.66	52.5
8	T1	931	1.4	980	1.4	0.743	5.6	LOS A	9.0	63.6	0.66	0.54	0.66	53.7
9	R2	1	100.0	1	100.0	0.743	13.1	LOS A	9.0	63.6	0.66	0.54	0.66	50.0
Approach		954	1.5	1004	1.5	0.743	5.6	LOS A	9.0	63.6	0.66	0.54	0.66	53.7
All Vehicles		1806	1.6	1901	1.6	0.743	7.8	LOS A	9.0	63.6	0.61	0.61	0.67	52.4

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

Site: [5 Macquarie/ Evan 2025 PM w Dev (Site Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Evan Street														
1	L2	215	1.3	226	1.3	0.827	5.0	LOS A	15.8	111.9	0.71	0.49	0.71	52.0
2	T1	682	2.3	718	2.3	0.827	5.3	LOS A	15.8	111.9	0.71	0.49	0.71	53.2
3	R2	256	0.4	269	0.4	0.827	9.9	LOS A	15.8	111.9	0.71	0.49	0.71	53.2
Approach		1153	1.7	1214	1.7	0.827	6.3	LOS A	15.8	111.9	0.71	0.49	0.71	53.0
East: The Crescent														
4	L2	171	0.0	180	0.0	0.316	7.6	LOS A	2.2	15.3	0.77	0.78	0.77	52.3
5	T1	58	1.9	61	1.9	0.316	7.9	LOS A	2.2	15.3	0.77	0.78	0.77	53.5
6	R2	11	0.0	12	0.0	0.316	12.5	LOS A	2.2	15.3	0.77	0.78	0.77	53.5
Approach		240	0.5	253	0.5	0.316	7.9	LOS A	2.2	15.3	0.77	0.78	0.77	52.7
North: Macquarie Street														
7	L2	12	0.0	13	0.0	0.547	5.9	LOS A	4.7	33.1	0.68	0.61	0.68	52.4
8	T1	562	1.8	592	1.8	0.547	6.1	LOS A	4.7	33.1	0.68	0.61	0.68	53.6
9	R2	4	0.0	4	0.0	0.547	10.7	LOS A	4.7	33.1	0.68	0.61	0.68	53.6
Approach		578	1.7	608	1.7	0.547	6.2	LOS A	4.7	33.1	0.68	0.61	0.68	53.6
All Vehicles		1971	1.6	2075	1.6	0.827	6.4	LOS A	15.8	111.9	0.71	0.56	0.71	53.1

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

D. LOADING DOCK MANAGEMENT INFORMATION

D

MobileDOCK by BESTRANE

MobileDOCK

- Observations and recommendations for Thornton Penrith

Prepared for St. Hilliers

26 October 2021 | Confidential

Increased Security

Increased Safety

Increased Amenity

Frank Katsanevas
Group Design Manager
St Hilliers

Via email: fkatsanevas@sthilliers.com.au

26 October 2021

Thank you for giving us the opportunity to advise on how MobileDOCK can be best used to help manage commercial deliveries into the Thornton Penrith development.

This report outlines our understanding of some of the key challenges at the site, and how we envisage using MobileDOCK to mitigate these issues for the benefit of the development and its community of users.

We look forward to discussing our recommendations with you.

Chris Mason
Chief Operating Officer
Bestrane, MobileDOCK

cmason@bestrane.com.au
+61 408 130 943

About Thornton Penrith

We understand from our discussions that Thornton Penrith is a mixed-use development north of Penrith Station featuring a mixture of residential, commercial and retail land uses.

It contains approx. 530 apartments and 1,700sqm supermarket, 2,000sqm other retail and food & beverage, and 3,000sqm of office, childcare and gym.

There will be two loading docks located on the site.

The Southern dock (via Dunshea Street) will service the majority of users, and will contain approx. four loading docks and two garbage compactors.

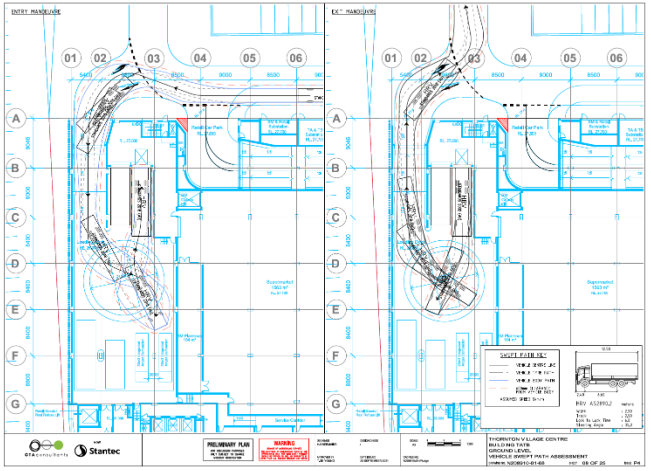
The largest vehicle using the dock will be a 12.5m long Heavy Rigid Vehicle.

The dock includes a truck turntable, noting that garbage trucks will be positioned partially on this turntable when servicing the compactors. As such, the turntable will not be able to be used when the compactors are emptied. Council has advised that the compactor collection should be possible early in the morning / overnight.

The vehicle access between the loading dock and Dunshea Street is also restricted in width

The adoption of loading dock management (of some form) will be required to ensure its efficient and safe operation and minimise the potential for truck queuing on Dunshea Street.

The Northern Dock is a smaller, and also accessed via Dunshea Street.



Managing the demands of Multi Use Developments

Site challenge

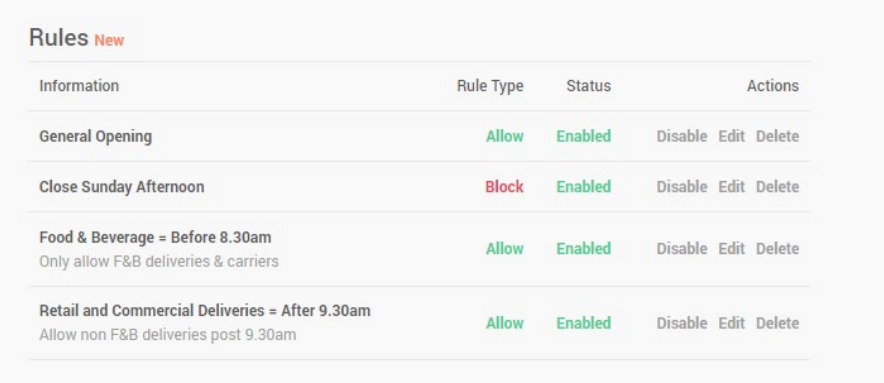
One of the key challenges of multi-use developments is the need to best prioritise the scheduling of commercial deliveries at times that allow for the efficient operation of the site, and amenity to all users.

Proposed Approach using MobileDOCK

MobileDOCK provides the ability to schedule and shape the arrival of commercial deliveries to suit the specific requirements of the site.

The MobileDOCK rules engine can be easily configured to allow access for specific deliveries at different intervals during the day, for example

- Allowing deliveries for the supermarket and food & beverage outlets only before 8.30am and
- Allowing deliveries for retail, and commercial tenants after 9.30am avoiding congestion for parents utilising the childcare facilities.



Rules New

Information	Rule Type	Status	Actions
General Opening	Allow	Enabled	Disable Edit Delete
Close Sunday Afternoon	Block	Enabled	Disable Edit Delete
Food & Beverage = Before 8.30am Only allow F&B deliveries & carriers	Allow	Enabled	Disable Edit Delete
Retail and Commercial Deliveries = After 9.30am Allow non F&B deliveries post 9.30am	Allow	Enabled	Disable Edit Delete

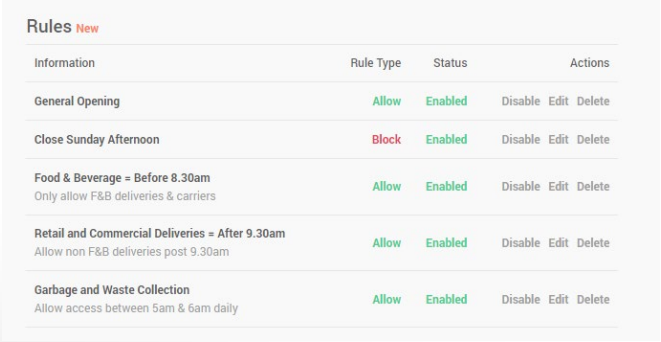
MobileDOCK rules engine enables shaping of deliveries to suit the sites requirements

Garbage and Waste Collections

Site challenge
The sites garbage and waste will be collected from the two compactors positioned in the Southern Dock.

Given the size of these vehicles, and the location of the compactors - the vehicles will be partially positioned on the truck turntable for the duration of the pick up

The practical impact being that the turntable will not be able to be used during the period of these collections.



Proposed Approach using MobileDOCK
MobileDOCK provides the ability to schedule and shape the arrival of commercial deliveries to suit the specific requirements of the site.

The MobileDOCK rules engine can be easily configured to allow and or block access for specific deliveries types

To manage the arrival of the garbage vehicles we would recommend

- Establishing rules within MobileDOCK that allowing access to the garbage vehicles between an agreed time (perhaps early morning, or end of day).
- Providing the council with a 'permanent booking' for the that agreed time – removing the need for them to manually rebook)
- Placing a 'block' rule on the loading docks at that time which would prevent any other carriers being able to schedule deliveries for that time

← MobileDOCK rules to specifically manage garbage collections

Preventing Queuing in Dunshea St

Site challenge

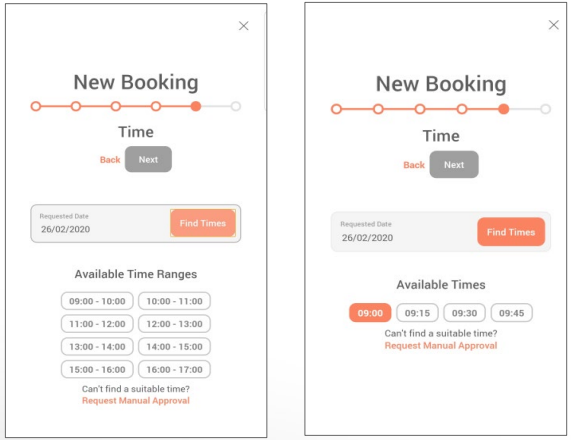
In order to protect the amenity of the site for all users, its important that commercial vehicles do not queue while waiting to make their deliveries in Dunshea or the surrounding streets.

Proposed Approach using MobileDOCK

MobileDOCK's core capability is the ability to efficiently schedule the arrival of commercial deliveries, and prevent the incidence of trucks queuing to gain access to your site.

The carriers/drivers select via the booking wizard their preferred delivery date and time.

Our experience with a wide range of sites is that drivers arrive promptly at the designated times – in order to take advantage of their confirmed space.



MobileDOCK booking wizard allows carriers/drivers to quickly select from times when spaces are available for their delivery

Restricting Vehicle Size

Site challenge

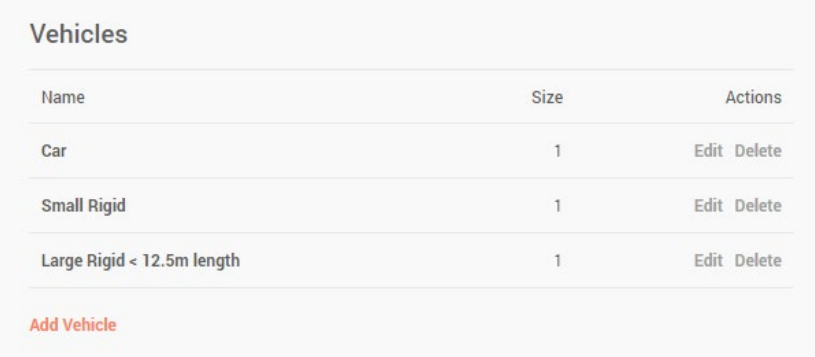
The physical size of the loading dock, and the requirements of the truck turntable impose logical limits on the size of delivery vehicles that are able to access the site.

We understand that the docks will allow large rigids of up to 12.5m length

Proposed Approach using MobileDOCK

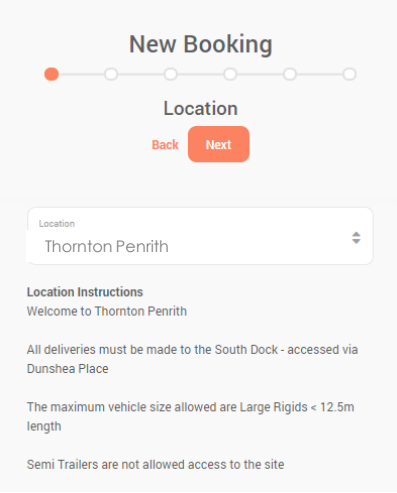
MobileDOCK can be used to dictate to carriers the size and other dimensions of the vehicles that are able to access the site.

This information is presented to carriers/drivers when making a booking, and can also be highlighted on the 'site instructions' which are included with each booking confirmation.



MobileDOCK vehicle types can specify vehicle dimensions

MobileDOCK location instructions provide specific guidance



MOBILEDOCK – Typical Benefits

REDUCED CONGESTION

Reduced site congestion

Flatten site demand access peak

Control & restrict site access as required

IMPROVED SAFETY

Limit access to site to those who need to be there

Emergency announcements

Control the number and type of vehicles by time of day

IMPROVED SITE AMENITY

Commercial traffic movements controlled and restricted

No traffic congestion on site

Improved site security

GREATER SECURITY

Access for inbound deliveries, contractors, service agents, pre-approved by site

Unique barcoded appointment numbers & pin codes

Integration with access control capabilities - license plate recognition, boom gates etc

IMPROVED VISIBILITY

Visibility of arrivals, types & quantities of inbound goods

Driver prompted ETA's advising docks of their arrival

Dock resourcing planned to meet known demand

PROVEN TECHNOLOGY

Delivering benefits across thousands of carriers and suppliers, with over 4 million appointments executed

Over 95% of appointments auto-approved

Contact Us:

Level 1 | 150 Albert Road | South Melbourne
Victoria | 3205 | Australia

www.bestrane.com.au

P: + 61 3 9001 1565

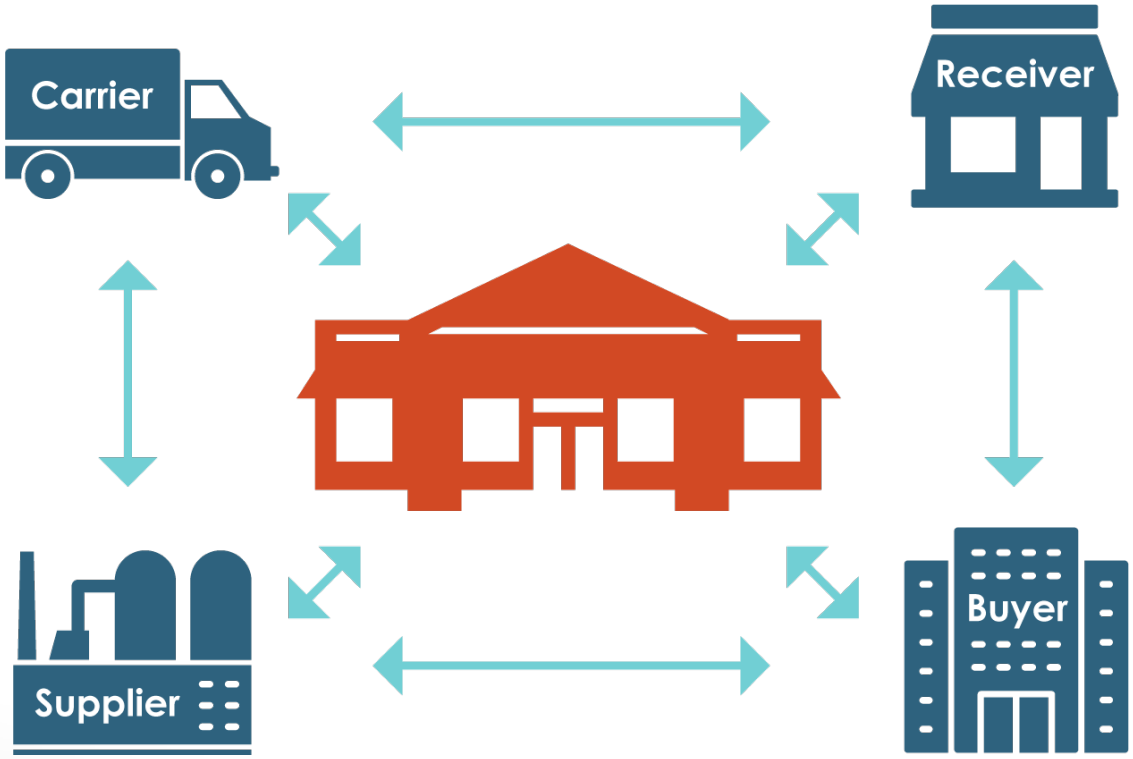
David Sanders
Group Managing Director
dsanders@bestrane.com.au
0409 200 786

Chris Mason
Chief Operating Officer
cmason@bestrane.com.au
0408 130 943

Appendix

- ABOUT MOBILEDOCK

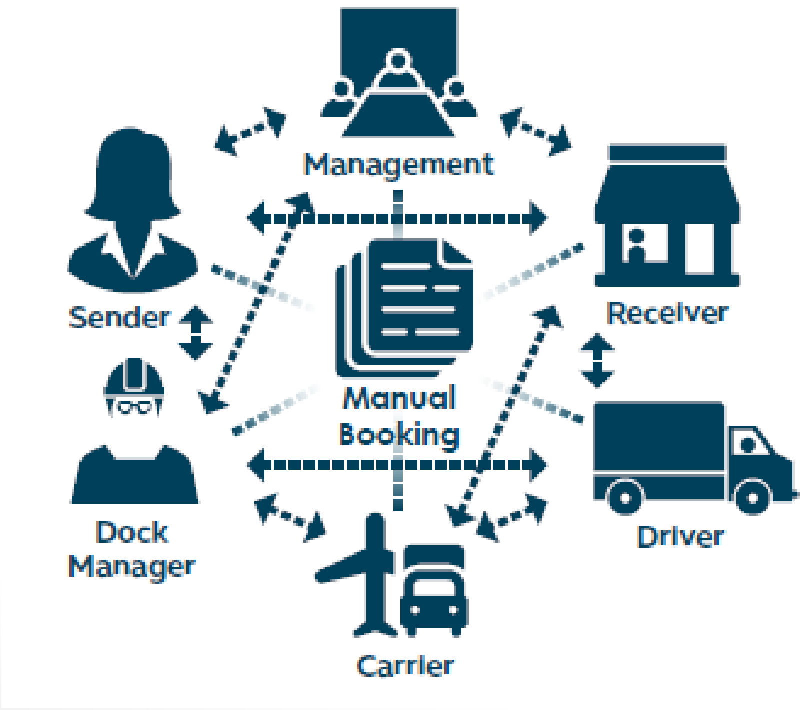
LOCATIONS HAVE COMPLEX SUPPLY CHAINS



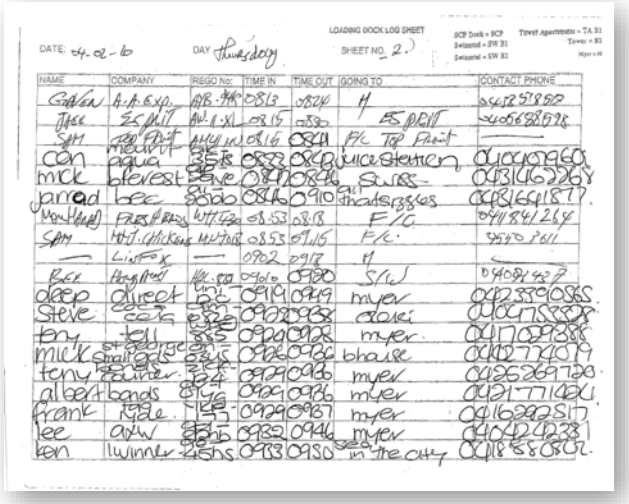
..WHICH ARE USUALLY MANUALLY PLANNED AND EXECUTED

MobileDOCK BY BESTRANE

Manual Planning



Manual Execution



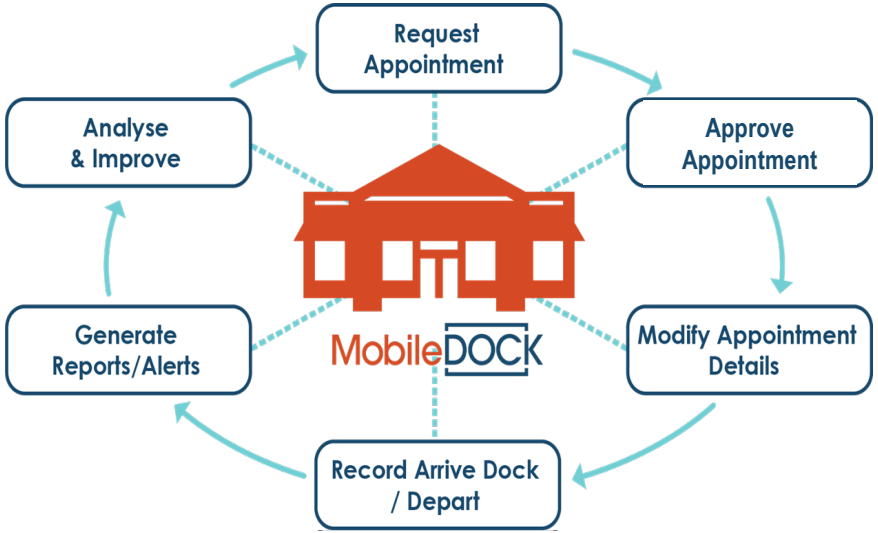
INEFFICIENT AND HIGH COST, AND HIGH RISK

MOBILEDOCK – MANAGES THE PROCESS

MobileDOCK enables dock delivery management from first request for a delivery slot, through confirmation of delivery completion; notifying all concerned parties along the way.
Self-service web portal; 95% of requests are scheduled and automated approved in real time.

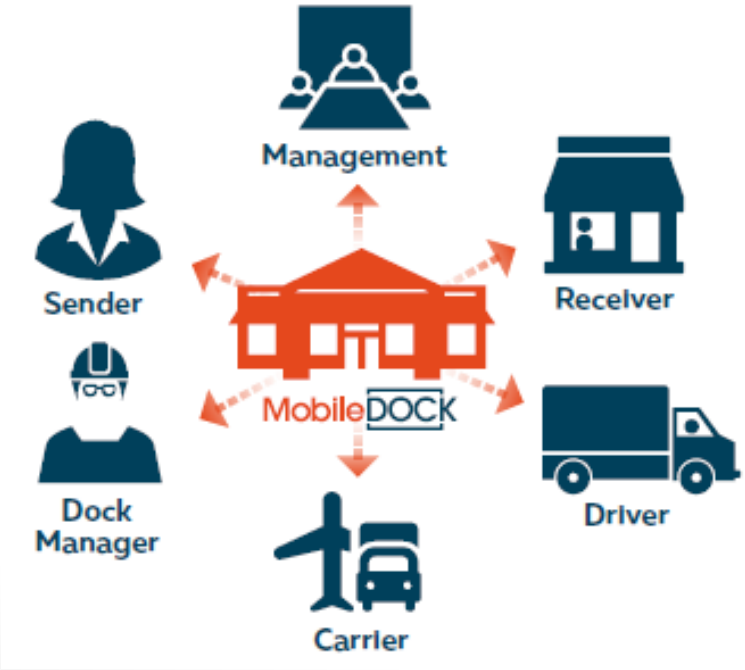
Requests allocated to loading dock space appropriate for the tenant receiving the goods, reduces delivery time.
Notification of planned deliveries are sent to the carrier/supplier and the tenant/receiver through email.

Drivers have options to access the site
- Present copy of their booking confirmation email
- QR code on their smartphone validated by dock personnel scanning
- MobileDOCK's PIN technology via automated boom gates

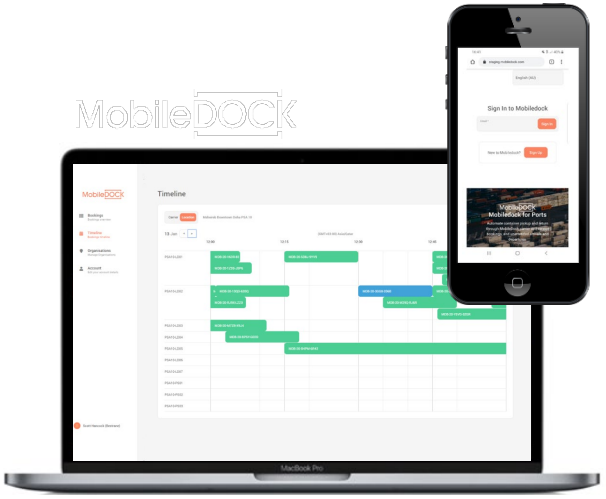


..AND DRIVES BEST PRACTICE

Automated & Coordinated



Electronic Execution



AUTOMATED, EFFICIENT, PLANNED, AND CONTROLLED

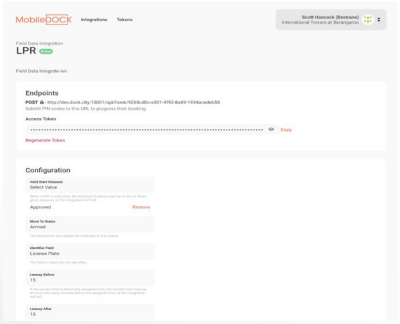
MOBILEDOCK – ENABLES CONNECTIONS

MobileDOCK's open APIs allow connectivity with a range of third party solutions enabling automation of processes and enhanced productivity

Hardware Integrations

Active Signage

Access Control
- Boom Gates
- Pin Pads
- License Plate Recognition



People & Process Integrations

Contractor Compliance
Maintenance Mgt
Work Order Mgt
Safety Compliance

Carrier Integrations

Web based Access
3rd Party Driver Apps
QR Codes

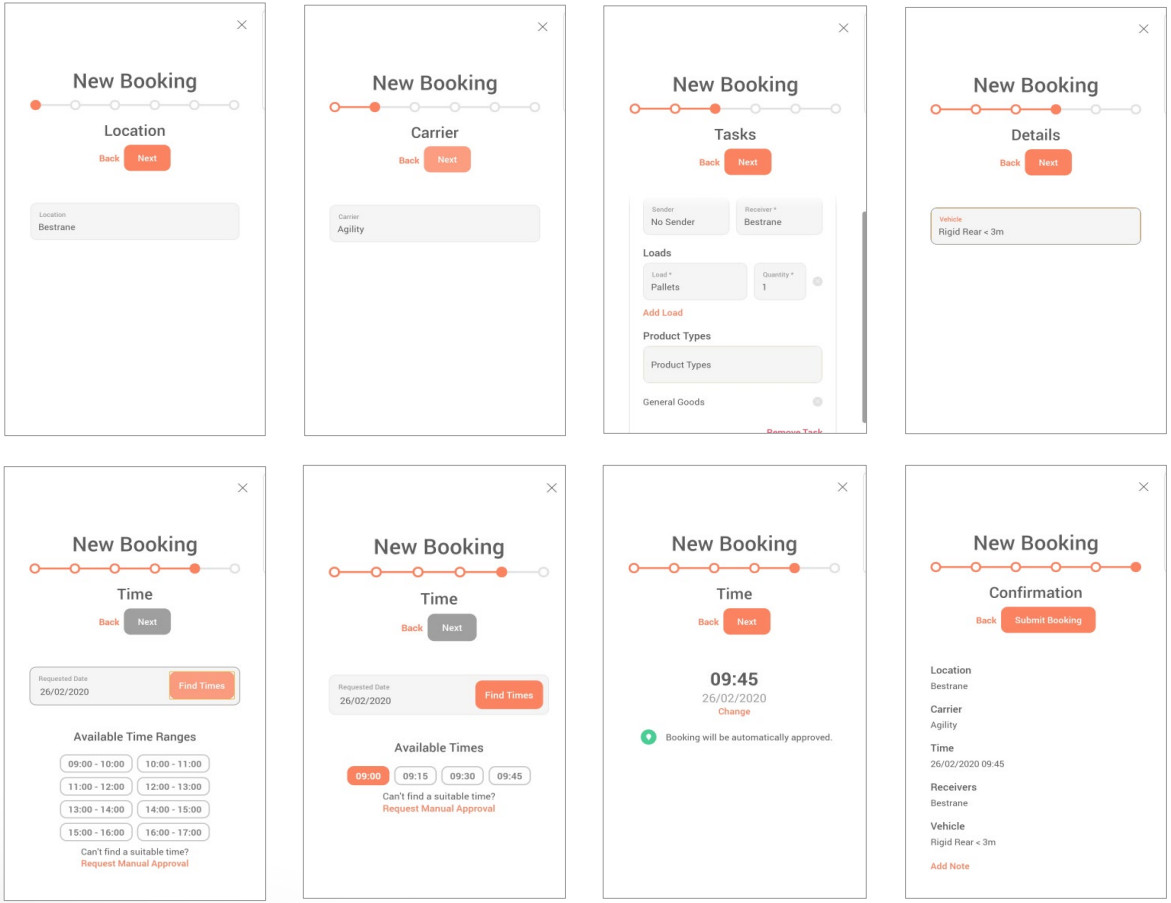
Building Mgt Integrations

Building Mgt & Automation Systems
Concierge Apps

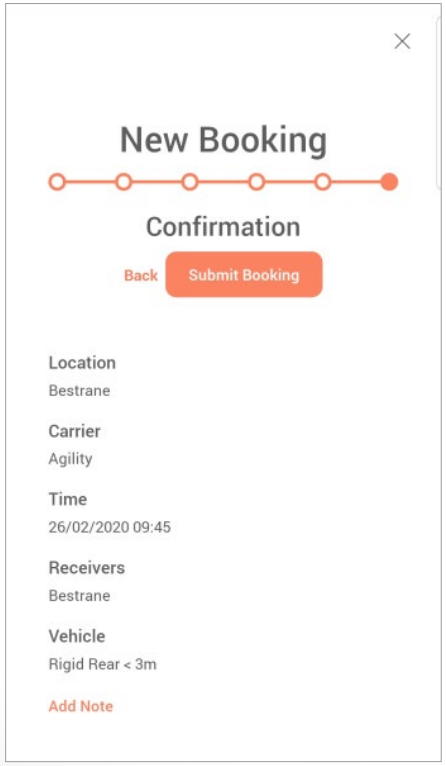
MOBILEDOCK – BOOKINGS MADE EASY

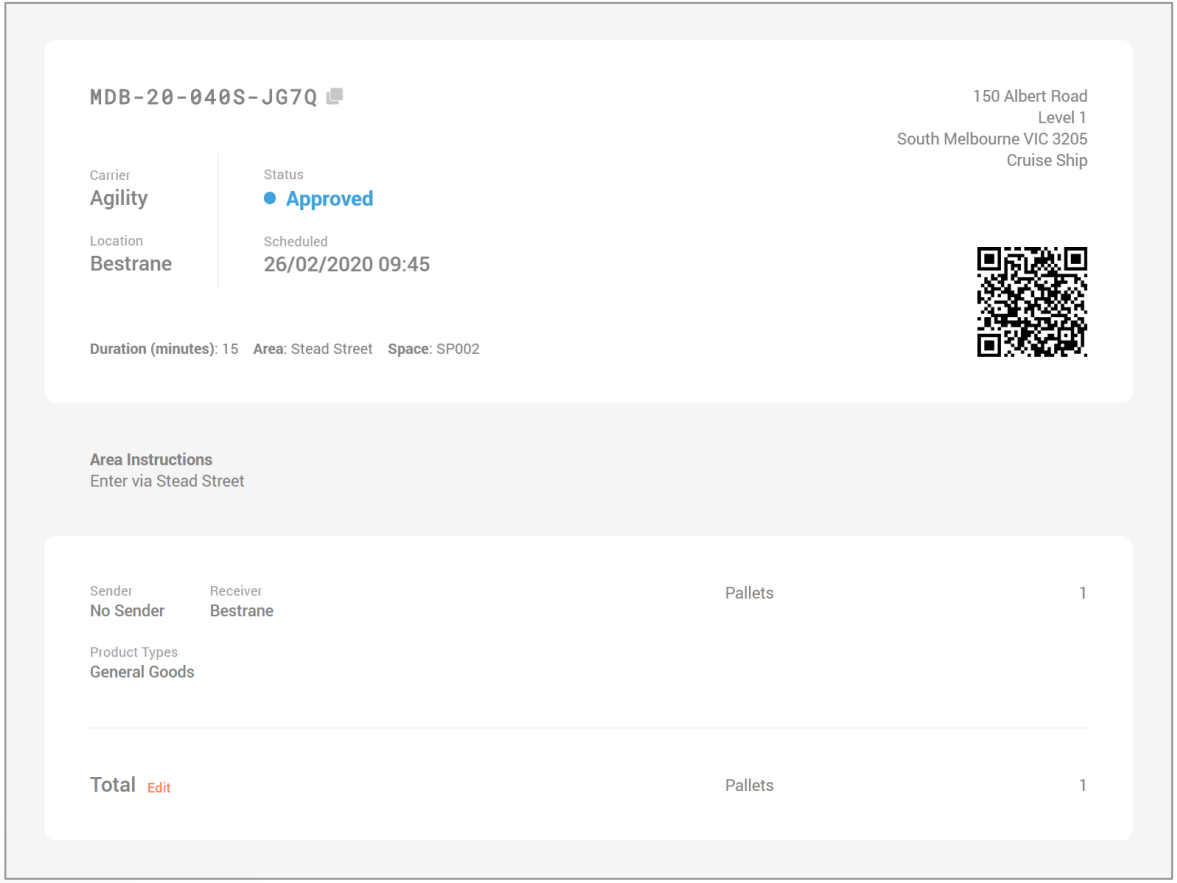
Booking Engine

The booking process is controlled by a wizard

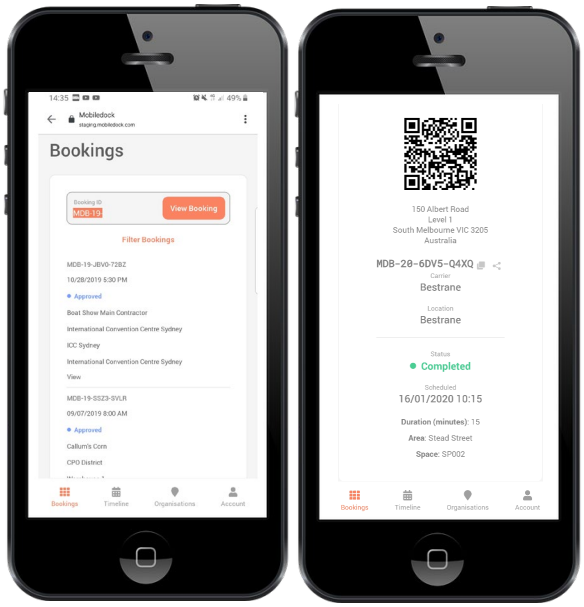


MOBILEDOCK – MADE EASY FOR CARRIERS

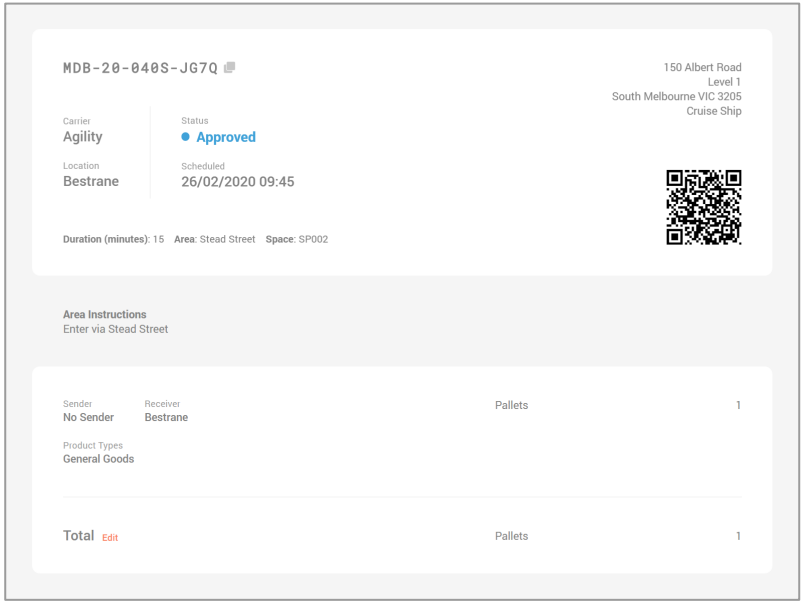




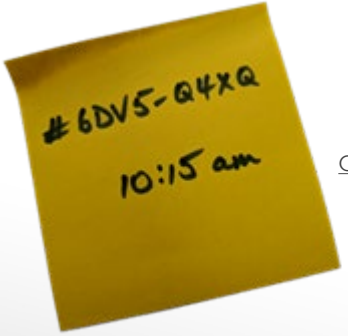
MOBILEDOCK – MADE EASY FOR DRIVERS



Option: Mobile based execution

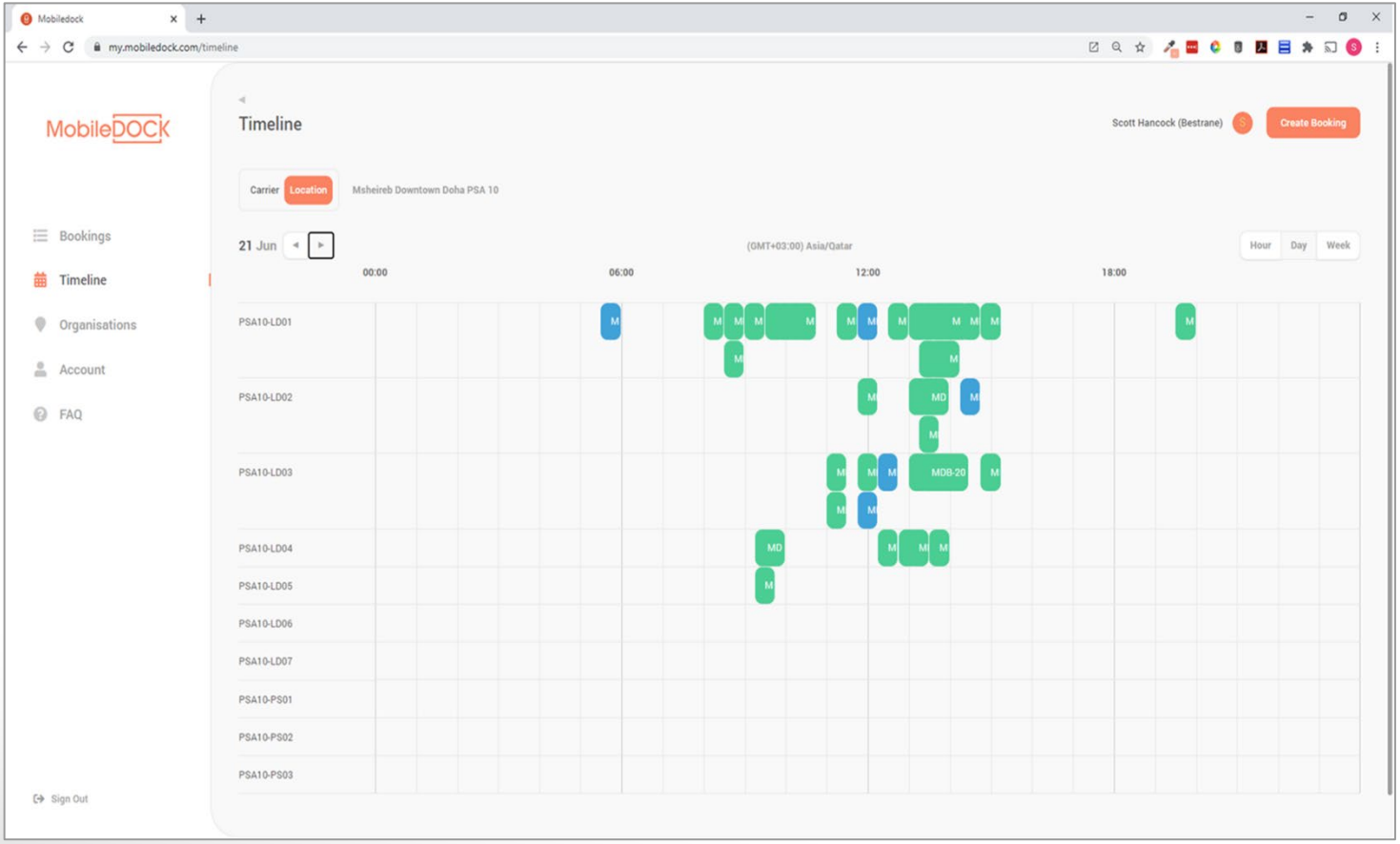


Option: paper based execution



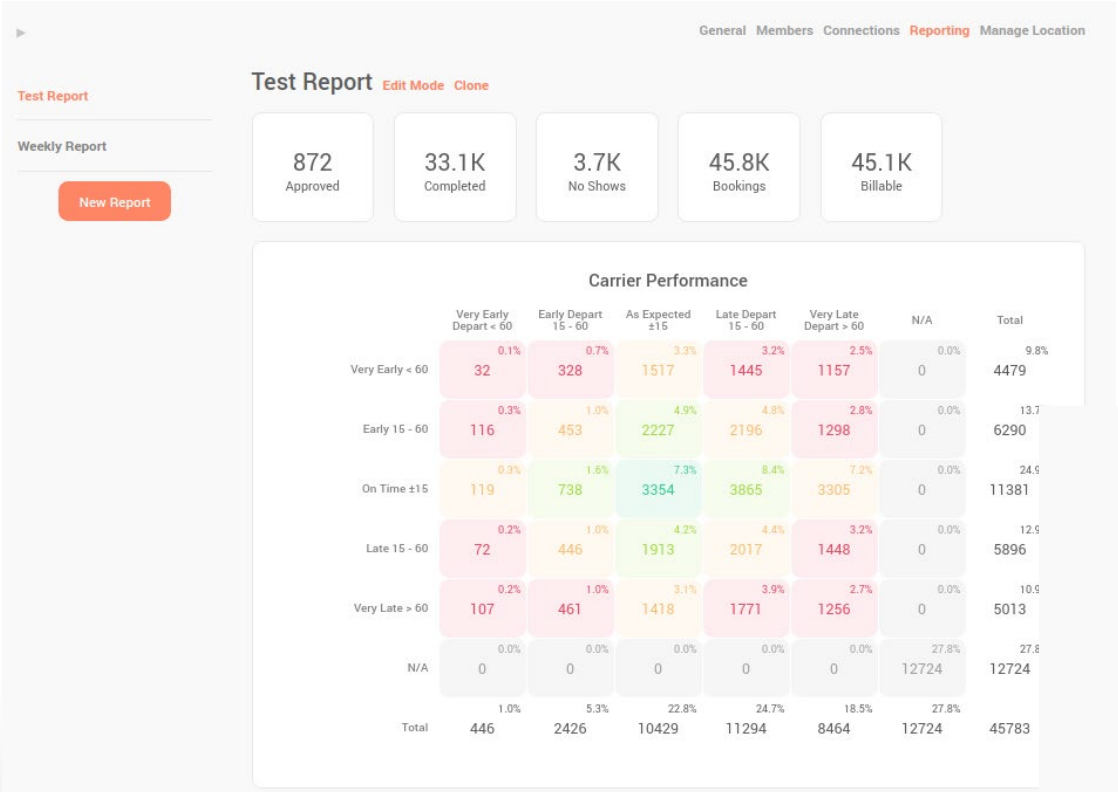
Option: old school !

MOBILEDOCK – MADE EASY FOR DOCK MASTERS

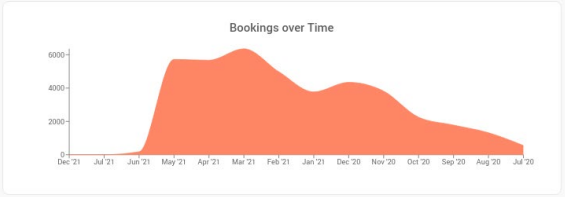


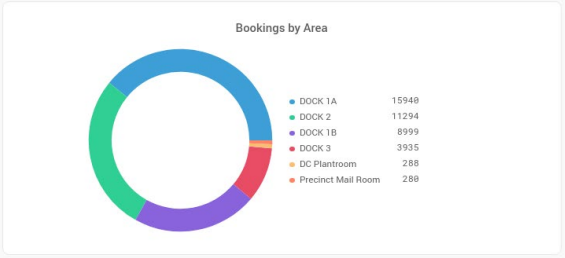
Visibility of future appointments puts the dock master in control of the site

MOBILEDOCK – MADE EASY FOR DOCK MASTERS



Advanced Dashboards & Reporting capability





MOBILEDOCK – OUR DIFFERENCE

MobileDOCK by BESTRANE

Company Overview

Bestrane have been operating in the Australian market for over 14 years.

We continue to develop the MobileDOCK solution locally

We directly provide support to our customers, and their transporters engaging with the solution.

Our experience, and local presence reduces your implementation risk

Proven Technology

MobileDOCK is used by increasing range of customers, and transporters in the Australian market

The MobileDOCK platform has

- Managed over 4.5 million appointments
- Over 3,000 supplier/carrier relationships established

GTA Consultants now Stantec

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