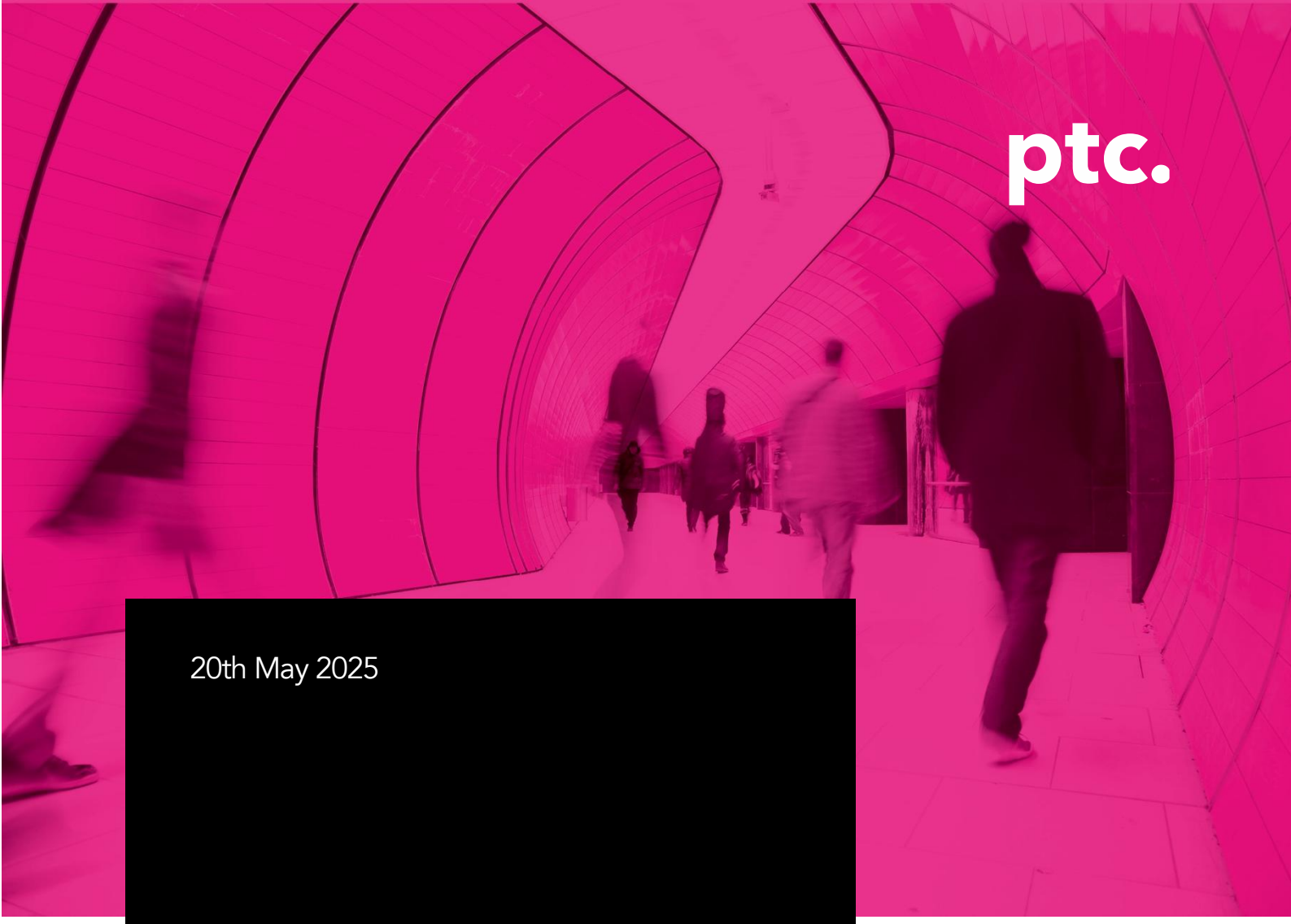

20th May 2025

Precinct Entry Works Built
Traffic Impact Assessment

For: **Built**

Document reference number: **22-0563**

contents;

Issue:	Date	Issue details	Author	Reviewed
1	05/07/2024	Draft	OL	JAJ/SW
2	24/07/2024	Final	OL	JAJ/SW
3	11/09/2024	Final Update	OL/CP/JJ	HL/SW
4	20/05/2025	Response to TfNSW Comments	JJ	SW

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1. Introduction

1.1. Overview

Built has engaged a ptc. consultant on behalf of BAE Systems Australia (the Applicant) to undertake a Transport Impact Assessment (TIA) for a Development Application to be lodged with Port Stephens Council. The site is located adjacent to Newcastle Airport.

The development is for demolition of a building, construction of site access and a car park with associated security building, gates and fencing and landscaping including:

- A new access road (Jeffries Circuit) connecting the proposed carpark to 55 and 55C Slades Road (to the North of the site)
- A secure site entrance point, including an exit loop for rejected vehicles
- New road pavement, line marking and signage
- Car parking facilities
- Building pad and demountable office
- Heavy vehicle access
- Site security works
- Civil work (infrastructure installation).

1.2. Purpose of this report

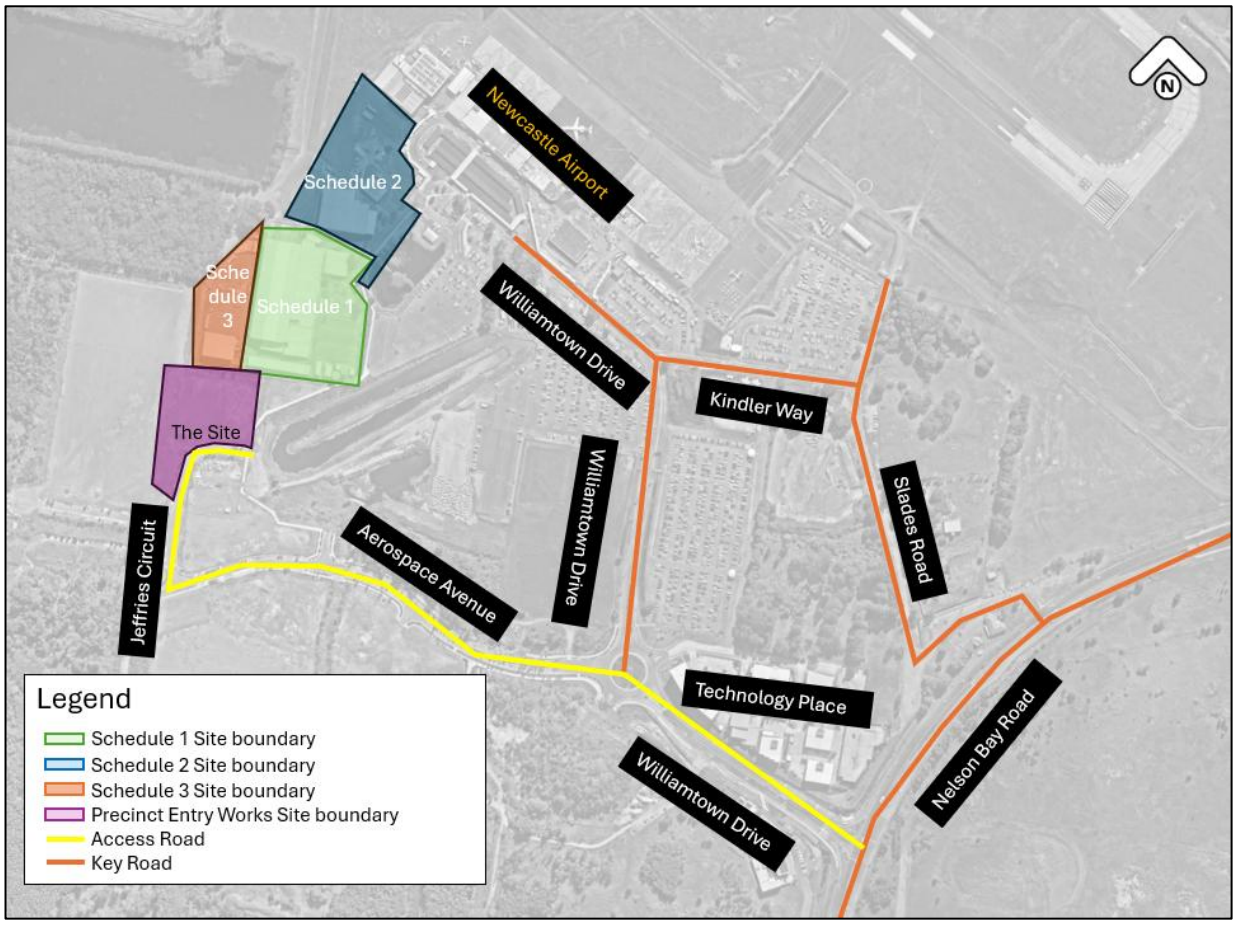
This report addresses the relevant Council requirements and criteria, and assesses the potential traffic and transport-related impacts associated with the development, construction and operation of the project, including:

- Describing the existing traffic and transport environment around the project
- Quantifying the vehicle trips associated with the overall BAESA Williamtown site
- Distributing the vehicle trips by using Jeffries Circuit
- Undertaking SIDRA 9.1 intersection modelling for intersections of interest based on current traffic volumes and proposed development to assess the impact at Nelson Bay Road and Williamtown Drive intersections, as well as the Williamtown Drive and Jeffries Circuit Roundabout
- Reviewing the construction works of the project and its access arrangement
- Determining suitable mitigation measures to minimise the construction impacts
- Determining heavy vehicle routes to and from the construction sites.
- Undertaking swept path analysis of truck accessing, egressing, and manoeuvring through the construction sites based on aerial imagery

1.2.1. Site Context

The BAESA Williamtown Precinct Entry Works site (refer to Figure 1) is approximately 16 kilometres from Newcastle CBD, adjacent to Newcastle Airport on the northwest side of Nelson Bay Road.

The site comprises part of proposed Lot 100, and proposed Lot 101, and 102 in Lot 11, DP 1036501, 38 Cabbage Tree Road, and part Lot 43, DP 1045602 and part Lot 103, DP 873512, Williamtown Drive, Williamtown. The site is accessed via Jeffries Circuit.

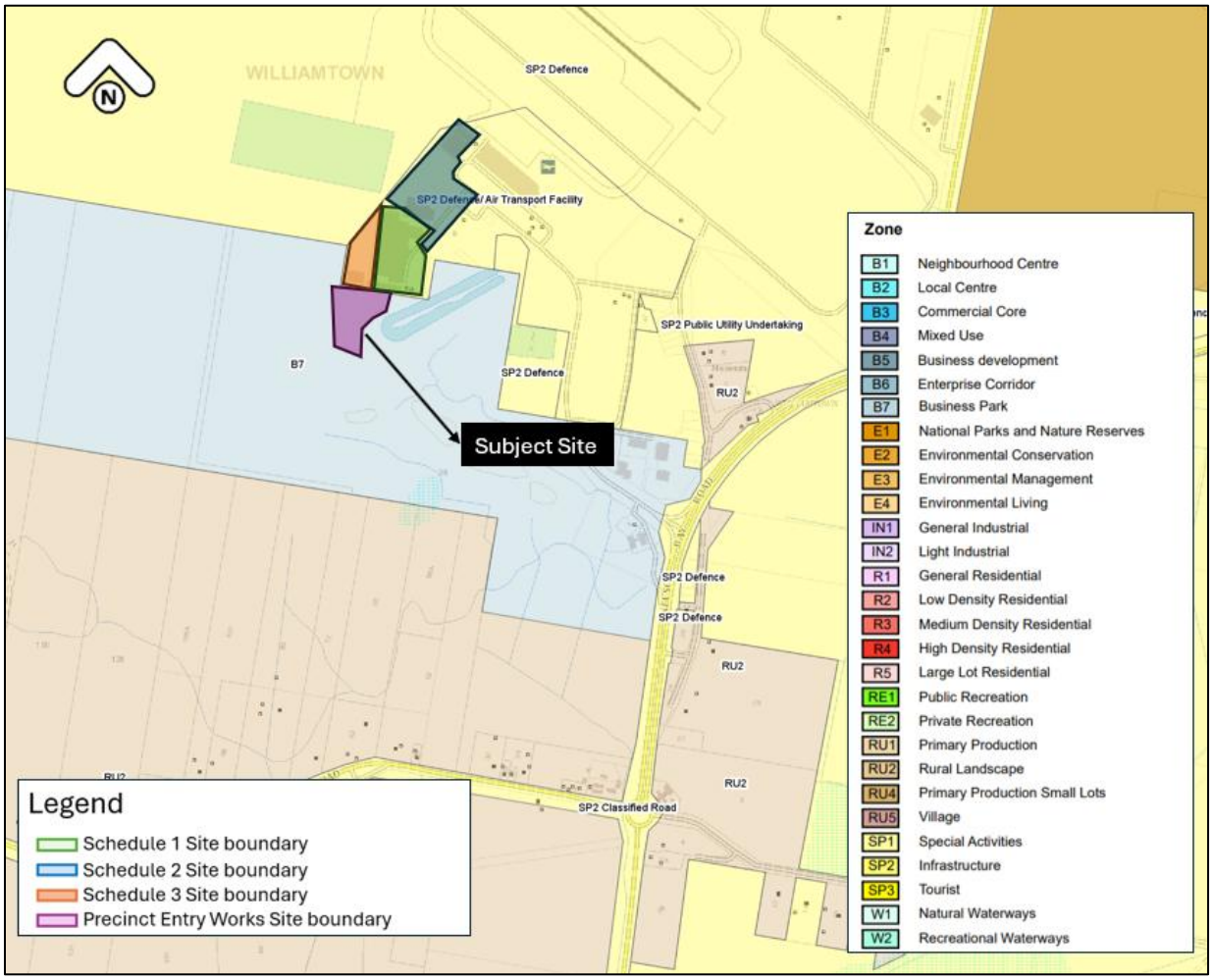


Source: Nearmap, 2024, modified by PTC consultant

Figure 1 - Aerial View of Subject Site & Surrounds

1.2.2. Planning and Land Use Context

The Precinct Entry Works site is situated within the B7 Business Park zone. The surrounding area adjacent to the site is RU2 Rural Landscape zones to the south and SP2 Defence/ Airport Facility zones to the north. The existing land use can be found in Figure 2.



Source: NSW ePlanning Spatial Viewer, 2022, modified by PTC consultant

Figure 2 – Local Land Use Map

1.3. Proposed development

The proposed development relates to the Precinct Entry Work, Williamtown NSW which is illustrated in Figure 3.

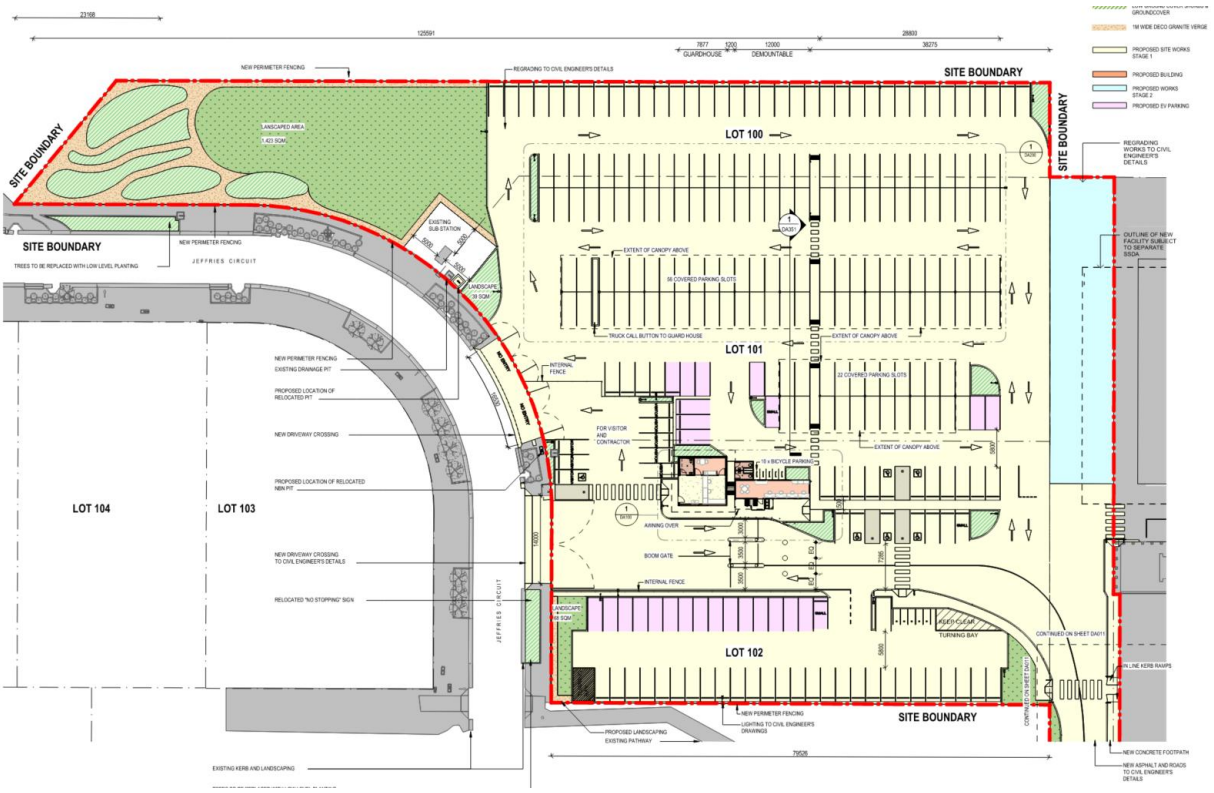


Figure 3 – Proposed development of Precinct Entry Works

1.4. Previous submission

The proposed intersection layout was previously based on DA 16-2008-940-5. The traffic forecast and other overarching assumptions made in traffic modelling are generally consistent between BAESA Williamtown Schedule 1 (Sep 2022), Williamtown Schedule 2 (March 2024), Williamtown Schedule 3 (June 2024) and this additional traffic study (this document).

An overview of the project history for BAESA Williamtown Precinct is presented in Figure 4.

Figure 4 - Summary of the project history

1.5. Assumption and limitations

The preparation of this assessment has relied on the following data sources:

- The following traffic turning count surveys were undertaken for this TIA
    - Intersection counts of Nelson Bay Road/ Williamtown Drive on Thursday, 18th August 2022, between 6 am – 9 am and 4 pm – 7 pm.
- The conditions of the surrounding network are based on a desktop review utilising the following data sources:
    - Aerial photography is done using Google Maps/Near Maps.
    - Street View Images by Google Maps
    - Public transport routes and schedules from TfNSW Trip Planner

The following assumptions have been applied to the TIA, including:

- The trip generation rates generated for the proposed BAESA have been adopted and are consistent with the Williamtown area.
- 100 per cent of the vehicles generated by the BAESA development will access/egress the car park through Jeffries Circuit as agreed with the Council.
- Future trip generation for the Proposal has been adopted from the Roads and Maritime's Guide to Traffic Generating Developments (2013).

1.6. Report structure

This report presents the following considerations in relation to the Transport Impact Assessment (TIA) (Refer to Table 1).

Table 1 – Report Structure

Section No.	Description
Section 2	A description of the existing transport characteristics of the locality serving the development property
Section 3	Assessment of the proposed parking provision in the context of the relevant planning control requirements
Section 4	Determination of the potential traffic activity associated with the development proposal and the adequacy of the surrounding road network
Section 5	Detailed Modelling Results
Section 6	A description of the access and car parking arrangement
Section 7	Preliminary Construction Traffic Management Plan
Section 8	Summary and Conclusion

2. Existing Transport Facilities

2.1. Road Hierarchy

Roads within New South Wales are categorised in the following two ways:

- By classification (ownership)
- By the function that they perform

Road Classification

Roads are classified (as defined by the *NSW Roads Act 1993*) based on their importance to the movement of people and goods within NSW.

The classification of a road allows TfNSW to exercise authority of all or part of the road. Classified roads include Main Roads, State Highways, Tourist Roads, Secondary Roads, Tollways, Freeways, and Transitways. For management purposes, TfNSW has three administrative classes of roads:

- State Roads – Major arterial links through NSW and within major urban areas. They are the principal traffic-carrying roads and are fully controlled and maintained by TfNSW. State Roads include all Tollways, Freeways and Transitways; and all or part of a Main Road, Tourist Road or State Highway.
- Regional Roads – Roads of secondary importance between State Roads and Local Roads, which, along with State Roads, provide the main connections to and between smaller towns and perform a sub-arterial function in major urban areas. Regional roads are the responsibility of councils for maintenance funding, through TfNSW funds some maintenance based on traffic and infrastructure. Traffic management on Regional Roads is controlled under the delegations to local government from TfNSW. Regional Roads may own all or part of a Main Road, Secondary Road, Tourist Road, State Highway, or other roads as determined by TfNSW.
- Local Roads – The remainder of the council-controlled roads, Local Roads, are the responsibility of councils for maintenance funding. TfNSW may fund some maintenance and improvements based on specific programs (e.g. urban bus routes road safety programs). Traffic management on Local Roads is controlled under the delegations to local government from TfNSW.

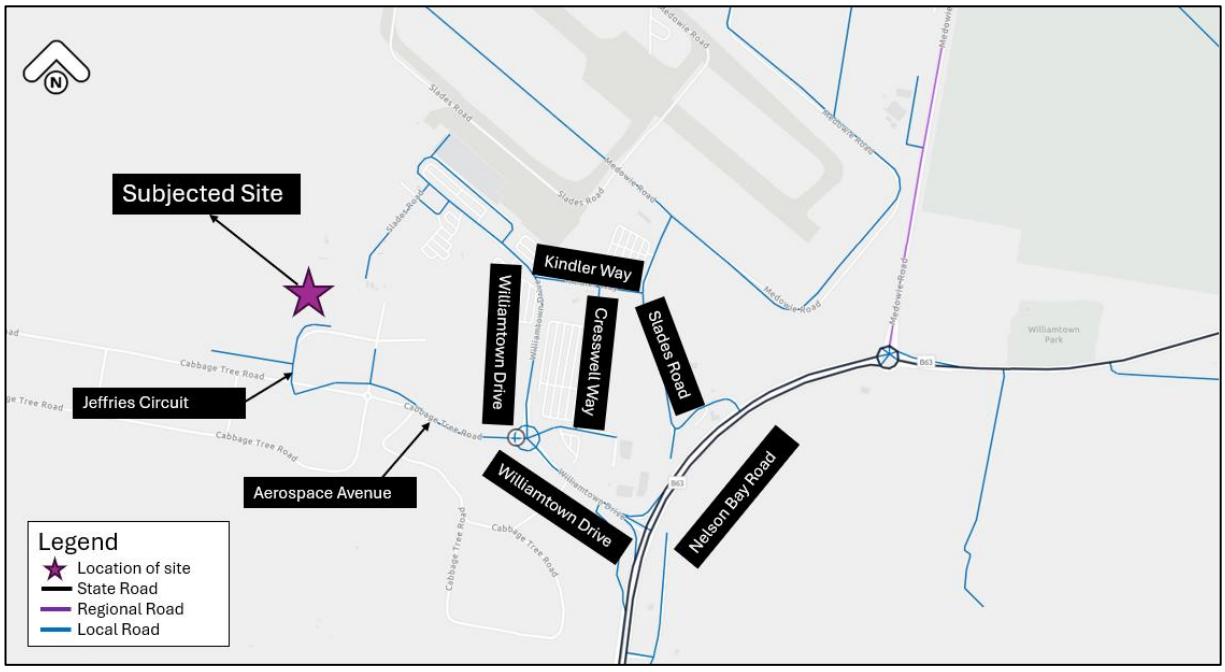
Functional hierarchy

Functional road classification involves the relative balance of the mobility and access functions. TfNSW defines four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility to high accessibility and low mobility. These classes are:

- Arterial Roads – generally controlled by TfNSW, typically have no limit in flow and are designed to carry vehicles long distances between regional centres.
- Sub-Arterial Roads – can be managed by either TfNSW or the local council. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and they aim to carry through traffic between specific areas in a sub-region or provide connectivity from arterial road routes (regional links)

- **Collector Roads** – provide connectivity between local roads and the arterial road network and typically carry 2,000 and 10,000 vehicles daily.
- **Local Roads** – provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles daily.

This section will examine and detail the current condition and administrative and functional classification of the roads in general proximity to the subject site, as shown in Figure 5.



Source: NSW Road Network Classification, modified by PTC consultant

Figure 5 – Road Hierarchy

2.1.1. Existing Road Network

The following sections describe the roads in proximity to the subject site, which are listed below.

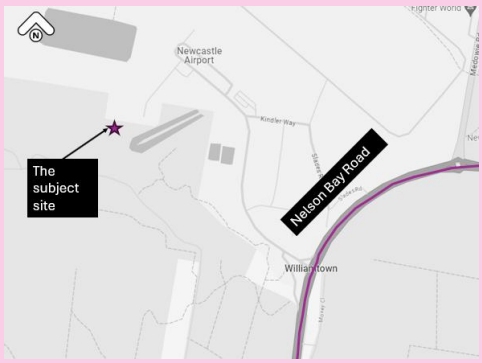
- Nelson Bay Road (B63)
- Williamtown Drive

2.1.2. Nelson Bay Road

Nelson Bay Road is a state road located south of the subject site. The key features of Nelson Bay Road are summarised in Table 2 and Figure 6.

Table 2 – Nelson Bay Road Key features

Nelson Bay Road	
Road Classification	State Road
Alignment	North-south
Number of Lanes	Varies, typically two lanes in each direction
Carriageway Type	Undivided
Carriageway Width	Varies
Speed Limit	80km/hr
School Zone	No
Parking	No designated parking facilities are provided
Pedestrian Facilities	No footpaths are provided on the road; however, pedestrian crossings were provided at the intersection of Nelson Bay Road and Williamtown Drive.
Bicycle Facilities	No dedicated cycling facilities
Public Transport	Bus stops are located on either side of the Nelson Bay Road carriageway. Section 2.3 provides further details on public transport services.
Forms Site Frontage	No



Source: Google Maps Street View 2023, Northbound

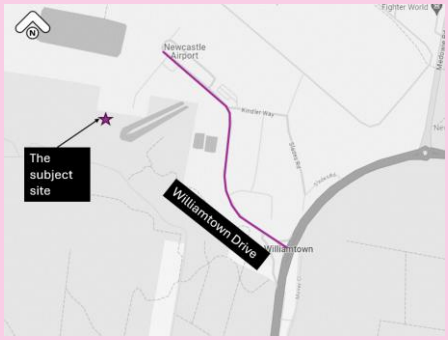
Figure 6 – Nelson Bay Road

2.1.3. Williamtown Drive

Williamtown Drive is a local Road on the east side of the subject site. Table 3 and Figure 7 summarise the key features of Williamtown Drive.

Table 3 – Williamtown Drive Key features

Williamtown Drive	
Road Classification	Local Road
Alignment	East-west
Number of Lanes	two lanes in each direction
Carriageway Type	Undivided
Carriageway Width	Varies, approximately 15 meters within the vicinity of site entry
Speed Limit	50km/hr
School Zone	No
Parking	No designated parking facilities are provided
Pedestrian Facilities	Footpath provided on south side of the road
Bicycle Facilities	No dedicated cycling facilities
Public Transport	Bus stop is located on Williamtown Drive at Airport Terminal.
Forms Site Frontage	No



Source: Google Maps Street View 2021, Eastbound

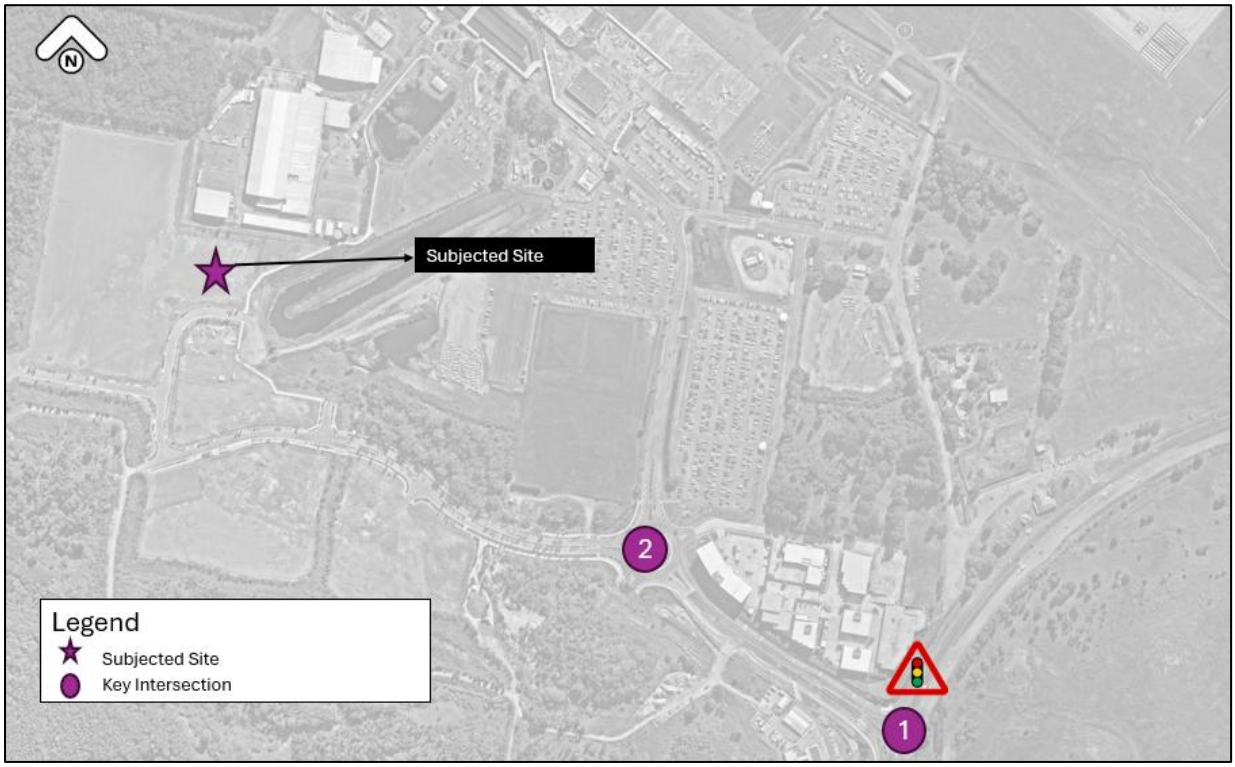
Figure 7 – Williamtown Drive

2.2. Key Intersections

The assessed intersections are summarised in Table 4 and Figure 8.

Table 4 – Assessed Intersections

No.	Intersection	Control Type
1	Nelson Bay Road/ Williamtown Drive	Traffic Signals
2	Williamtown Drive/ Aerospace Avenue	Roundabout



Source: Nearmap 2023, modified by PTC consultant

Figure 8 - Key Intersections location

2.3. Public Transport

A review of the public bus services operating in proximity to the project has been undertaken. Table 5 summarises the schedule and frequency of trips from the bus stops around the site.

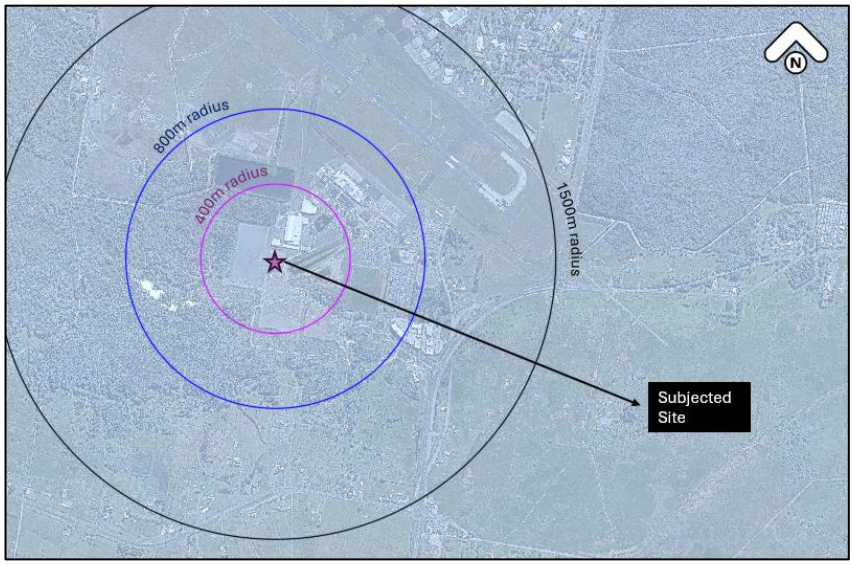
Table 5 – Bus Services

Bus Route	Route Description (from/to)	Bus Service Frequency		
		Monday to Friday	Saturday	Sunday and Public Holidays
130	Fingal Bay to Newcastle via Gan Gan Road	Every 20-30 minutes during the AM peak Every 60 minutes during PM peak Every 60 minutes off-peak	Every 1-2 hours	Every 1-2 hours
131	Fingal Bay to Newcastle (Express Service)	Only one AM service and one PM service throughout the day	No services	No services
136	Stockton to Raymond Terrace via Medowie	Every 60 minutes	No services	No services
138	Newcastle Interchange to Lemon Tree Passage via Airport	Only two AM services and two PM services throughout the day	No services	No services
145	Newcastle Airport to Green Hills Shopping Centre via Raymond Terrace	Every 60 minutes	Every 60 minutes	Every 2 hours

Source: Bus Route Timetables, Transport for NSW

When considering accessibility, the *NSW Planning Guidelines for Walking & Cycling (2004)* suggests that 400m-800m is a comfortable walking distance and 1500m is a suitable cycling catchment.

Figure 9 illustrates the walking and cycling catchment area for the site.



Source: Nearmap 2023, modified by PTC consultant

Figure 9 – Walking and Cycling Catchment

The nearest bus stops to the site are approximately 300 meters from the access point, well within the comfortable walking distance of 800 metres (about 3 minutes of walking) (Refer to Figure 10)

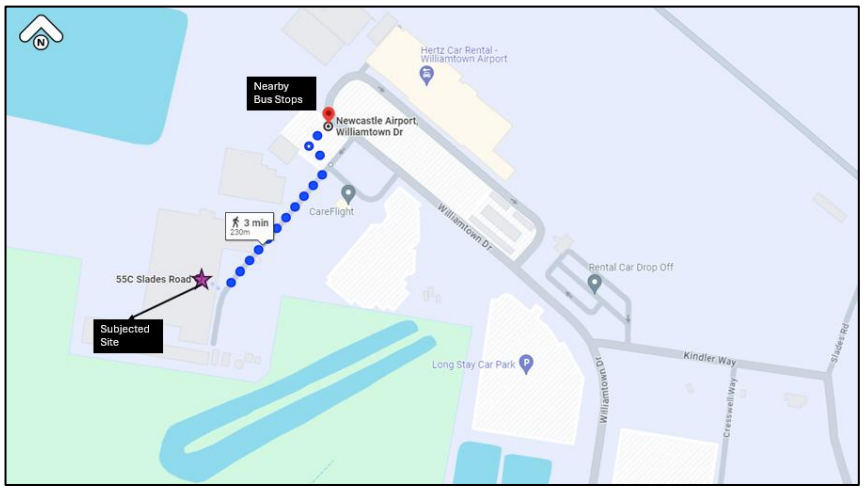
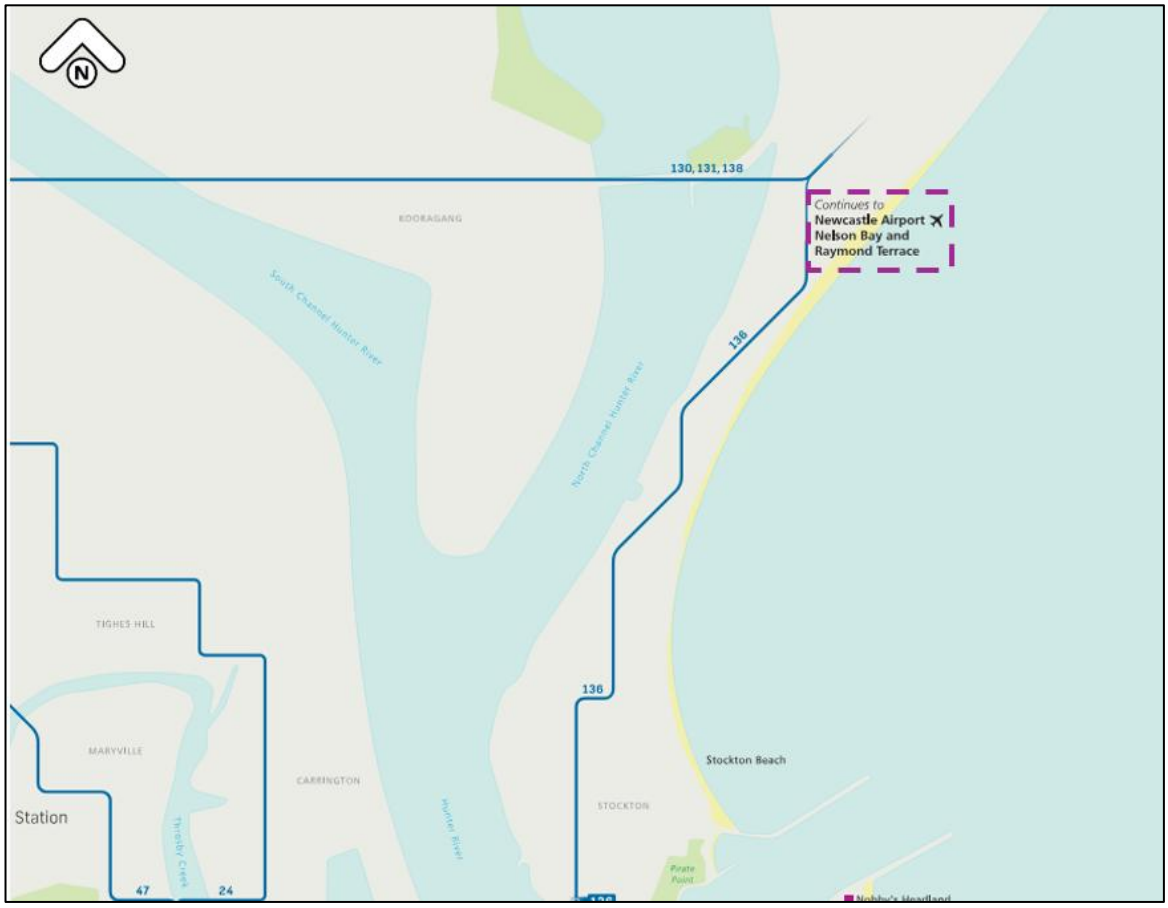


Figure 10 – Walking distance

Source: Google Map 2024, modified by PTC consultant

The wider bus network in the Williamtown area is displayed in Figure 11. However, there are no nearby railway or metro stations or services.



Source: TfNSW, modified by PTC consultant

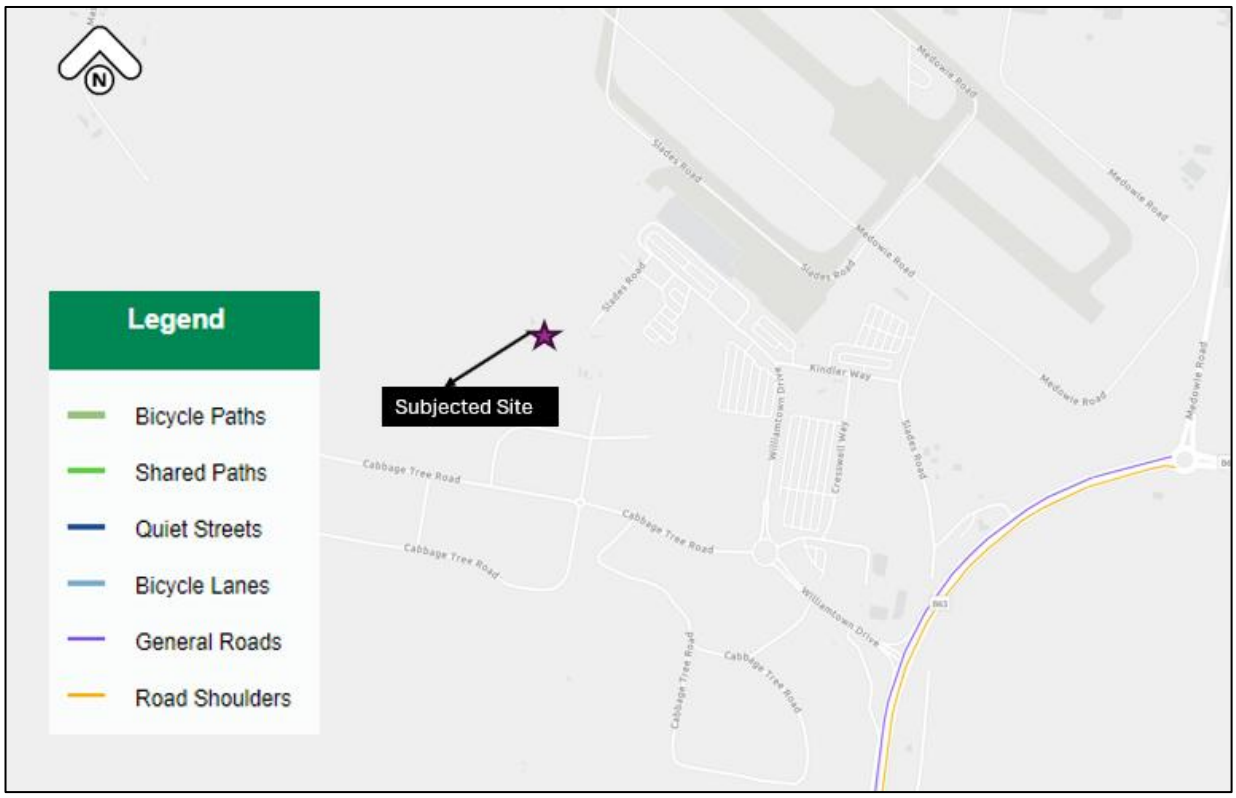
Figure 11 – Walking distance

In summary, although there are public transport options near the site, they are limited. The bus services operate infrequently, with only a few runs scheduled throughout the day.

2.4. Active Transport

2.4.1. Cycling

The cycling network in the streets surrounding the subject site is presented in Figure 12.



Source: TfNSW Cycleway Finder, modified by PTC consultant

Figure 12 – Surrounding Cycling Network

According to the *NSW Planning Guidelines for Walking and Cycling (2004)*, a typical catchment area of 1500 meters is considered suitable for cycling. As depicted in Figure 14, the development area lacks dedicated cycle lanes, and Nelson Bay Road experiences high traffic volumes, making it unsuitable for cycling.

However, Transport for NSW plans to collaborate with local councils to enhance cycleways to support the Greater Newcastle Regional Bicycle Network. Proposed regional cycleways aim to connect the subject site with nearby suburbs such as Newcastle and Raymond Terrace (See Figure 12).

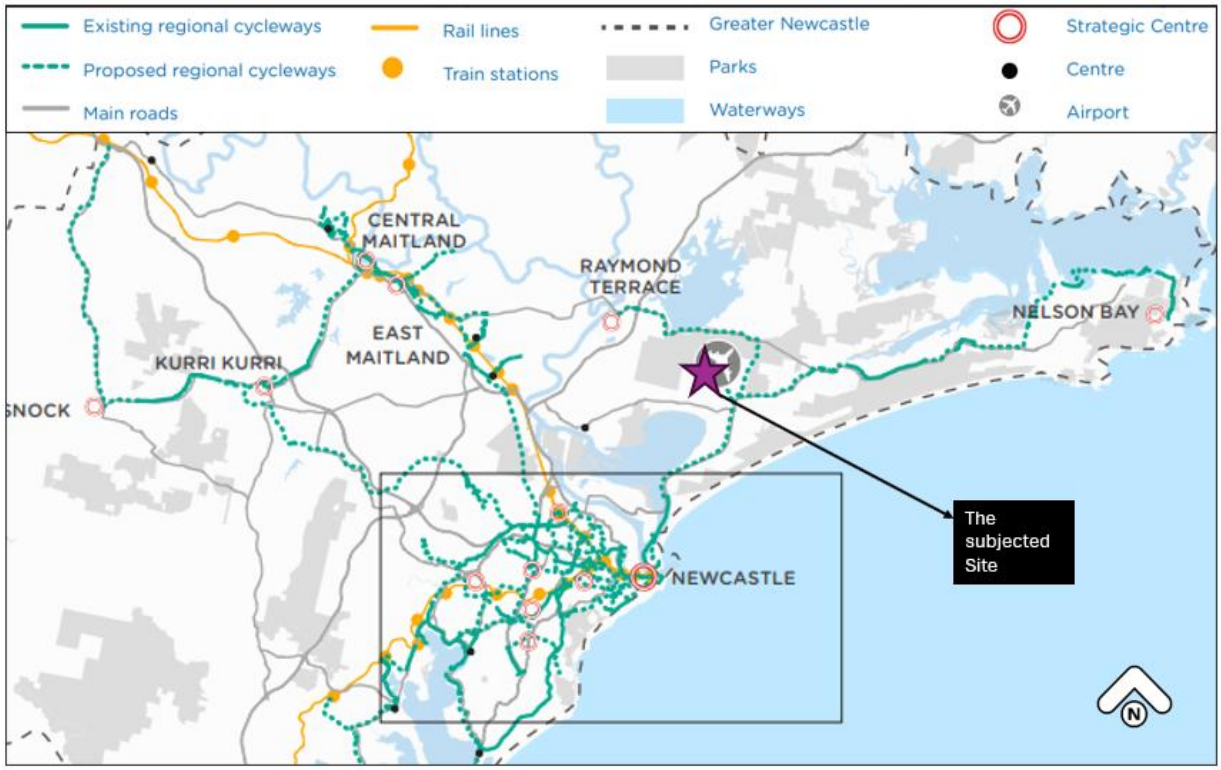
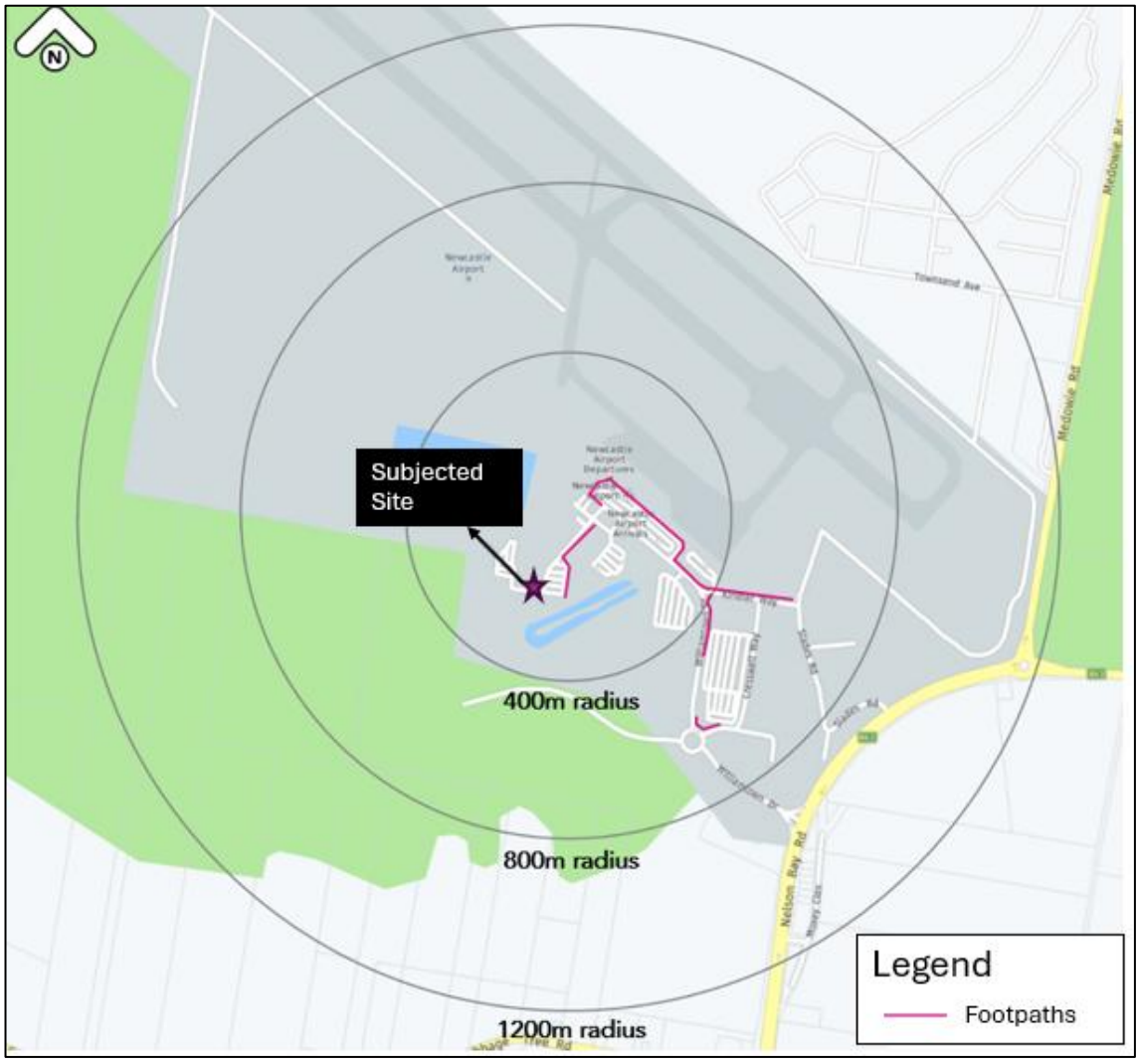


Figure 13 – Greater Newcastle Regional Bicycle Network

2.4.2. Walking

Walking is a practical transportation choice for distances under one kilometre (approximately 15-20 minutes) and often proves faster for short door-to-door trips. It is also the most space-efficient mode of transport for short distances and offers numerous benefits. When walking replaces a motorised trip, it improves individual health, reduces congestion on road networks, and decreases noise and emission pollution.

An assessment of the current pedestrian infrastructure (see Figure 14) reveals significant deficiencies in the network, particularly evident with footpaths provided only along one side of Williamtown Drive near the Airport Terminal. Given that staff and visitors reside outside the airport, walking is not perceived as an attractive mode of transport for them.



Source: Google Map 2024, modified by PTC consultant

Figure 14 – Existing Pedestrian Infrastructure

2.5. Heavy Vehicle Routes

Heavy Vehicle access on both state and council roads is regulated by the National Heavy Vehicle Regulator in accordance with the *NSW Heavy Vehicle Access Policy Framework (TfNSW, 2018).* The framework outlines the strategy for heavy vehicle access in NSW with the aim of achieving safe and efficient freight movement. The framework also addresses local amenity issues, network impacts and infrastructure constraints.

A description of the heavy vehicle types relevant to the modification works is provided in the following sub-sections. These descriptions were sourced from the TfNSW website.

General access heavy vehicles

Under the national mass and loading arrangements, these are vehicles with unrestricted access to the road system, except where a road is signposted otherwise.

Provided these vehicles have current registration appropriate to the vehicle configuration, no specific access restrictions apply, and no additional permits are required. Vehicles that fall within the limits

described in Table 6 and Table 7 do not exceed prescribed mass and dimension limits and are, therefore, considered as general access heavy vehicles.

Table 6 – General access vehicles – prescribed dimension limits

Vehicle Type	Dimension limits (metres)		
	Length	Height	Width
Truck	12.5	4.3 (all vehicles)	2.5 (all vehicles)
Bus	12.5		
Truck and trailer	19.0		
Articulated Vehicle	19.0		

	Description	Maximum Length (metres)	Maximum Regulatory Mass under GML (tonnes)	Maximum Regulatory Mass under CML (tonnes)	Maximum Regulatory Mass under HML (tonnes)
1. COMMON RIGID TRUCKS - GENERAL ACCESS					
(a)	2 Axle Rigid Truck	≤ 12.5	15.0	CML does not apply	-
(b)	3 Axle Rigid Truck	≤ 12.5	22.5	23.0	-
(c)	4 Axle Rigid Truck	≤ 12.5	26.0	27.0	-
(d)	4 Axle Twinsteer Rigid Truck	≤ 12.5	26.5	27.0	-
(e)	5 Axle Twinsteer Rigid Truck	≤ 12.5	30.0	31.0	-
2. COMMON SEMITRAILER COMBINATIONS - GENERAL ACCESS					
(a)	3 Axle Semitrailer	≤ 19.0	24.0	-	-
(b)	4 Axle Semitrailer	≤ 19.0	31.5	32.0	32.0
(c)	5 Axle Semitrailer	≤ 19.0	35.0	36.0	37.5
(d)	5 Axle Semitrailer	≤ 19.0	39.0	40.0	40.0
(e)	6 Axle Semitrailer	≤ 19.0	42.5	43.5	45.5
3. COMMON RIGID TRUCK AND TRAILER COMBINATIONS (General access when complying with prescribed mass and dimension requirements)					
(a)	2 Axle Truck and 2 Axle Dog Trailer	≤ 19.0	30.0	-	-
(b)	2 Axle Truck and 2 Axle Pig Trailer	≤ 19.0	30.0	CML does not apply	-
(c)	3 Axle Truck and 2 Axle Dog Trailer	≤ 19.0	40.5	41.0	-
(d)	3 Axle Truck and 2 Axle Pig Trailer	≤ 19.0	37.5	CML does not apply	-
(e)	3 Axle Truck and 3 Axle Dog Trailer	≤ 19.0	42.5	43.5	-
(f)	3 Axle Truck and 3 Axle Pig Trailer	≤ 19.0	40.5	CML does not apply	-
(g)	3 Axle Truck and 4 Axle Dog Trailer	≤ 19.0	42.5	43.5	-
(h)	4 Axle Truck and 3 Axle Dog Trailer	≤ 19.0	42.5	43.5	-
(i)	4 Axle Truck and 4 Axle Dog Trailer	≤ 19.0	42.5	43.5	-

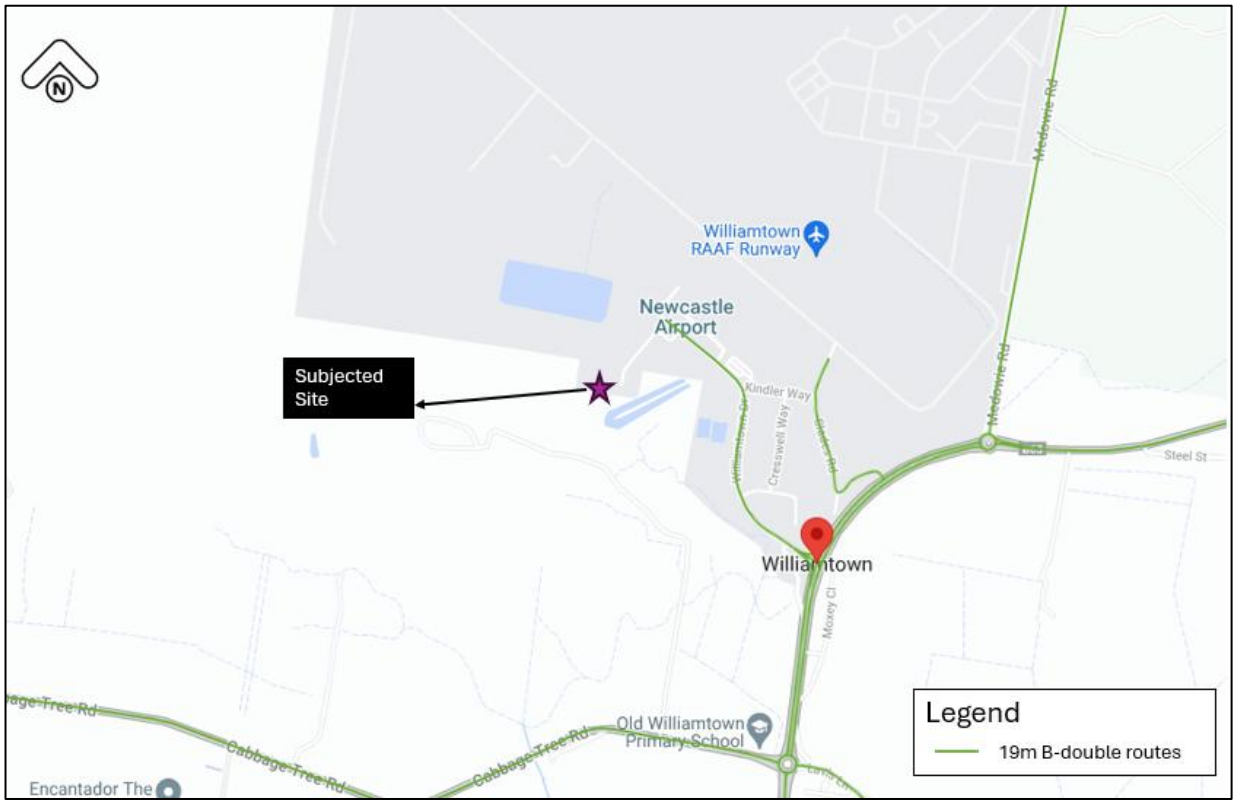
Source: Excerpt from the National Heavy Vehicle Regulator, Common Heavy Freight Vehicle Configurations Chart (NHVR, 2017)

Table 7 – General access vehicles – prescribed mass limits

Restricted access heavy vehicles

Any single motor vehicle or combination with a combined load that exceeds the general access overall dimensions defined in the Heavy Vehicle National Regulation is considered an RAV. Transport's interactive RAV map identifies the network of roads that are approved for heavy vehicles of various sizes.

Figure 15 provides the RAV map for 19m B-double routes in proximity to the subject site.



Source: TfNSW NHVR, modified by PTC consultant

Figure 15 – Approved heavy vehicle routes for 19m B-doubles

According to the Figure 15, Nelson Bay Road, and Williamtown Drive are designated routes approved for heavy vehicles carrying up to 50 tonnes. However, Jeffries Circuit will require authorisation for 19m B-double vehicles.

2.6. Annual Average Daily Traffic

With reference to TfNSW Volume Viewer, traffic count is available near the proposed development site to help understand Annual Average Daily Traffic (AADT) volume conditions. The available traffic counters are "Permanent Counters" and cannot classify light or heavy vehicles. The most recent available year of data before the COVID-19 period has been summarised in Table 8.

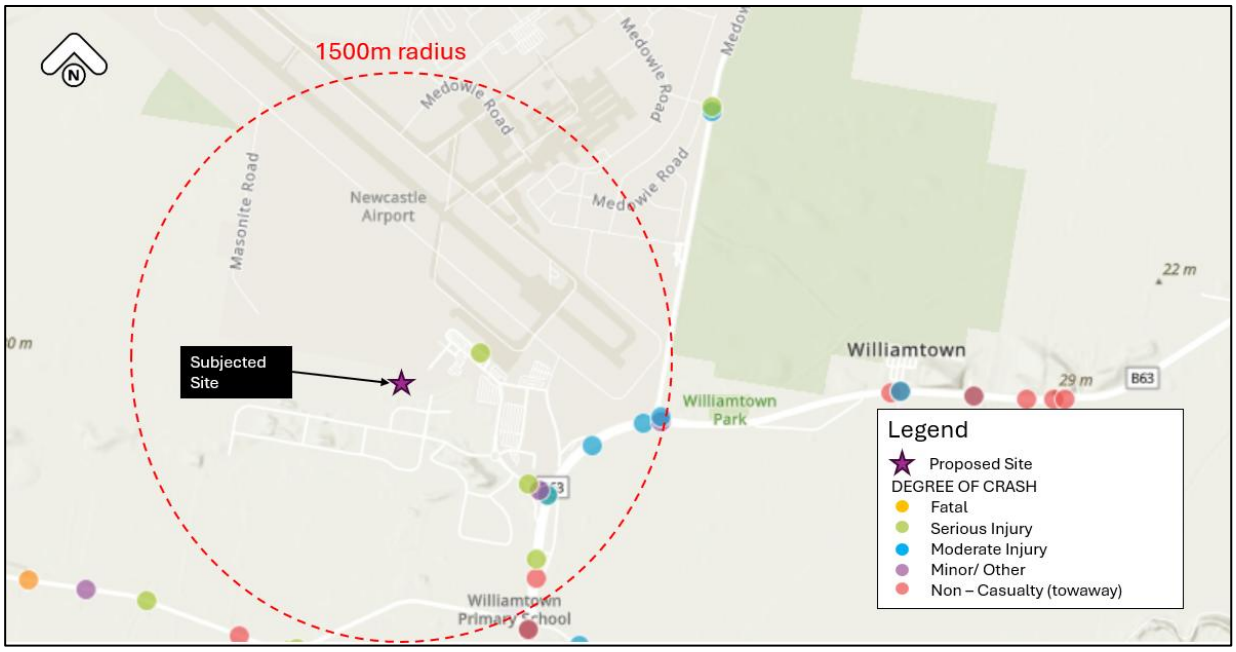
Table 8 -AADT Volumes around the Development Site

Number	Station ID	Traffic Counter	AADT Volumes	Year to Data (Most recent)
1	05191	Nelson Bay Road	18098	2008
2			19521	2009
3			16761	2010
4			14258	2011
5			20579	2012
6			20023	2013
7			11196	2014
8			24046	2015
9			24933	2016
10			25909	2017
11			26340	2018
12			26329	2019

Source: TfNSW traffic volume viewer

2.7. Crash Data

The Transport for New South Wales Centre for Road Safety provides a history of recorded crashes for the five years from 2018 to 2022. A total of 16 road crashes were recorded within a 1500-meter radius of the subject site, as presented in Table 9 by crash severity, with crash locations shown in Figure 16. From Figure 16, the intersection of Nelson Bay Road and Williamtown Drive exhibited one serious Injury, one Moderate Injury and one Minor/ Other Injury.



Source: TfNSW Crashs Map for Port Stephens, modified by PTC consultant

Figure 16 – Road crash incidents within a 1.5m radius

Table 9 – Crash Severity

Year	Degree of Crash					Total per year
	Minor/Other Injury	Moderate Injury	Serious Injury	Fatal	Non-casualty	
2018	1	2	1	0	4	8
2019	1	0	1	0	0	2
2020	0	2	2	0	0	4
2021	0	1	0	0	1	2
2022	0	0	0	0	0	0
Total	2	5	4	0	5	16

The safe system approach adopted by NSW Future Transport 2056 (See Figure 17) has been followed for further assessment of road safety in the locality. A safe system approach aims to improve the safety of all parts of the system so that if one part fails, the other parts will protect people from being killed or seriously injured. This approach is underpinned by the following principles:

- People sometimes make mistakes – a simple mistake shouldn't cost anyone their life.
- Roads, roadsides and vehicles need to be designed to minimise crashes or reduce forces if a crash happens.
- Road safety is a shared responsibility – everyone needs to make safe decisions on and around the road to prioritise safety.

Source: NSW Transport 2056

Figure 17 - The safe system approach

Considering the safe system approach principles and crash data obtained, the development proposal is not expected to increase risks to road design and speed factors, as the proposal does not involve any changes to the existing public road designs. For the people and vehicle factors, the construction traffic and pedestrian management and operation need to be considered for road safety; the relevant safety considerations are set by the Construction Traffic Management Plan.

3. Parking Provision

The following sections provide an assessment of the minimum and proposed car parking provisions for the development listed in Schedule 1-4. It is noted that this section has been provided for background information and reference only.

3.1. DCP requirements

According to the *Port Stephens Council Development Control Plan 2022 (DCP),* the minimum car and bicycle parking rates based on the proposed land use (Heavy industrial storage and Office Premises) are detailed in Table 10 and Table 11.

Table 10 – DCP requirements – for heavy industrial storage, establishments, heavy industrial and general industry

Parking Type	Rate
Car Parking	One car space per 100 m^2floor area or four spaces per work bay
Accessible Car Parking	One car space per 30 car spaces
Bicycle Parking	One bike space per 20 employees

Table 11 – DCP requirements – for office premises and business premises

Parking Type	Rate
Car Parking	One car space per 40m^2 floor area
Accessible Car Parking	One car space per 30 car spaces
Bicycle Parking	One bike space per 200 m^2 floor area

3.2. Proposed Car Parking

The minimum and the proposed car parking provisions are detailed in Table 12. It is noted that the proposed development is for a car park and does not itself generate parking demand. This assessment has been provided for information only, noting that the parking requirements for BAE Facility and Schedule 1-3 works will be assessed under the respective applications.

Table 12 – Summary of Minimum Required and Proposed Parking Provision

Land Use Type	Proposed GFA (m^2)	Min DCP Car Parking Rate	Minimum Car Parking Requirement	Proposed Car Parking Provision
Schedule 1: Reuse of the South Hanger				
Heavy industrial storage, establishments, heavy industry and general industry	5,582m^2	one car space per 100m^2 floor area, or four spaces per work bay	56	N/A
Office Premises	4,451m^2	one car space per 40 m^2 floor area	112	
		Total	168	N/A
Schedule 2: North Hangar Extension				
Heavy industrial storage, establishments,	6,561m^2	one car space per 100m^2 floor area, or four spaces per work bay	66	N/A

heavy industry and general industry				
Office Premises	1,577m^2	one car space per 40 m^2 floor area	40	
		Total	106	N/A
Schedule 3 – Construction of Aircraft Coating Facility				
Heavy industrial storage, establishments, heavy industry and general industry	3,355m^2	one car space per 100m^2 floor area, or four spaces per work bay	34	N/A
Office Premises	345m^2	one car space per 40 m^2 floor area	9	N/A
		Total	43	N/A
Schedule 4 – Precinct Entry Work				
Car park				261
		Site-Wide Total	317	354*

* *The total site wide provision of 354 car spaces comprises 261 in Precinct Entry Works car park plus 93 spaces in the eastern car park.*

As outlined in Table 12, the proposed yield results in a minimum car parking requirement of 317 car spaces over the entire site. The development proposes to provide a total of 354 car parking spaces for the site-wide development.

3.3. Proposed Accessible Parking

The minimum and the proposed accessible parking provisions are detailed in Table 13.

Table 13 – Summary of Minimum Required and Proposed Accessible Parking Provision

Land Use Type	Proposed Car Parking Spaces	Min DCP Accessible Car Parking Rate	Minimum Accessible Car Parking Requirement	Proposed Accessible Car Parking Provision
Heavy industrial storage, establishments, heavy industry and general industry	354 (site wide)	one car space per 30 car spaces	12	13
Office Premises				
		Total	11	13

As indicated in Table 13, the site requires 12 accessible parking spaces, while the proposed number of accessible parking spaces is 13. Thus, the proposed provision of accessible car parking exceeds the minimum requirement specified in the DCP.

3.4. Motorcycle parking

As per the Development Control Plan (DCP), although no specific requirement is outlined, the site must accommodate motorcycle parking. The site proposes 4 designated motorcycle parking spaces.

3.5. Bicycle parking

To improve future bike usage by employees and visitors, the development will include the following bicycle parking provisions (See Table 14).

Table 14 – Summary of Minimum Required and Proposed Bicycle Parking Provision

Land Use Type	User	Proposed Employees	Min Bicycle Parking Rate (no. of spaces)	Minimum Bicycle Spaces Requirement	Proposed Bicycle Spaces Provision
Schedule 1: Reuse of the South Hanger					
General Industry	Staff	No change	3-5% of staff member		N/A*
	Visitor		5-10% of staff member		
			Total		
Schedule 2: North Hanger Extension					
General Industry	Staff	148 Staff FTE	3-5% of staff member	4 - 7	10
	Visitor		5-10% of staff member	7-15	
			Total	11-22	
Schedule 3 – Construction of Aircraft Coating Facility					
General Industry	Staff	29 Staff FTE	3-5% of staff member	1-2	N/A*
	Visitor		5-10% of staff member	2-3	
			Total	3-5	
Schedule 4 – Precinct Entry Work					
Car Park					10
Site Wide Total					
				14-27	**20**

*The Schedule 1 reuse of the South Hanger did not propose additional bicycle parking.

*The Schedule 3 site does not propose vehicle parking. However, the required car parking spaces shall be within the Precinct Entry Worksite.

3.6. End of trip Facilities

In addition to the bicycle parking space, the End of Trip Facilities (EOTF), which will be provided for staff use, are summarised in Table 15 and Table 16.

Table 15 – Minimum locker, shower and change room provision

Staff	Lockers	Showers	Change rooms
0-12	1 per 3 racks	1	-
13-49	1 per 3 racks	2 (1 male and 1 female)	2 (1 male and 1 female)
50-149	1 per 3 racks	4 (2 male and 2 female)	2 (1 male and 1 female)
150-299	1 per 3 racks	6 (3 male and 3 female)	2 (1 male and 1 female)
300-500	1 per 3 racks	8 (4 male and 4 female)	2 (1 male and 1 female)

Table 16 – Summary of Minimum Required and Proposed EOTF Provision

Schedule 1: Reuse of the South Hanger			
EOTF Type	*Minimum EOTF Rate*	*Minimum EOTF Provision*	*Proposed EOTF Provision*
Personal Lockers	1 per 3 bicycle racks	-	
Showers	6 (3 male and 3 female)	-	-
Change Rooms	2 (1 male and 1 female)	-	
Schedule 2: North Hanger Extension			
EOTF Type	*Minimum EOTF Rate*	*Minimum EOTF Provision*	*Proposed EOTF Provision*
Personal Lockers	1 per 3 bicycle racks	-	-
Showers	6 (3 male and 3 female)	-	-
Change Rooms	2 (1 male and 1 female)	-	
Schedule 3 – Construction of Aircraft Coating Facility			
EOTF Type	*Minimum EOTF Rate*	*Minimum EOTF Provision*	*Proposed EOTF Provision*
Personal Lockers	1 per 3 bicycle racks	-	-
Showers	6 (3 male and 3 female)	-	-
Change Rooms	2 (1 male and 1 female)	-	
Site-wide Total *			
EOTF Type	*Minimum EOTF Rate*	*Minimum EOTF Provision*	*Proposed EOTF Provision*
Personal Lockers	1 per 3 bicycle racks	7	20
Showers	6 (3 male and 3 female)	6	19 shower and change (11 male, 8 female)
Change Rooms	2 (1 male and 1 female)	2	

Source: NSW Planning Guidelines for Walking and Cycling (2004)

*Based on site wide staffing estimated to be between 200-300, as supplied by Built and Design Inc.

The assessment of bicycle parking and end of trip facilities has been undertaken on a site-wide perspective. The site in its entirety provides sufficient facilities as recommended by the NSW Guideline for Walking and Cycling.

4. Construction and Operational Traffic Impact Assessment

4.1. Construction Phase

4.1.1. Construction Traffic Impact

To be consistent with the assumptions outlined in Schedule 2 - the North Hanger SSDA traffic impact assessment report, it is estimated that during Precinct Entry Work, there will be a maximum of 20 construction vehicles daily, or approximately 2 construction vehicles per hour, distributed throughout the day.

Based on the low traffic volumes and travel patterns for the construction vehicles, they are not expected to have a noticeable impact on the existing road network operation; thus, no traffic modelling is carried out in regard to this.

4.1.2. Road Safety

Construction activity will have the potential to have the following impacts on road safety:

- Increased risk of loss of traction or control on temporary pavement surfaces
- Increased risk of driver distraction around construction activities
- Reduced lane widths and increased proximity to barriers, increasing the risk of crashes.
- Decreased visibility of temporary line marking and other traffic control measures.

The potential for road safety impacts during construction will be addressed in Section 7.

4.2. Operational Phase

4.2.1. Assessed Scenarios

This report documents the evaluation of the Precinct Entry Works Options from the traffic impact perspective, acknowledging the options to assess the difference in traffic performance (Refer Table 17).

Table 17 – Summary of Assessed Scenarios

Scenario	Intersection Layout	Demand	Period
Scenario 1 (Base Model) *Based on Schedule 2 SIDRA Model & Applying growth rate*	Approved Intersection Layout	Existing Traffic Volume	2024 AM & PM
Scenario 2 (Future Base)	Approved Intersection Layout	Forecast Traffic Volume without proposed development trips	2034 AM & PM
Scenario 3 (Future Post-development Scenario)	Approved Intersection Layout	Forecast Traffic Volume with proposed development trips	2034 AM & PM

4.2.2. Traffic Survey

To identify the existing traffic conditions in general proximity to the subject site, turning movement counts were undertaken on 18th August 2022 between 6 am and 9 am and 4 pm and 7 pm at the Nelson Bay and Williamtown Drive intersection.

The traffic counts were undertaken in 15-minute intervals for the following time to coincide with peak periods of activity.

The peak hours for the assessment were determined by taking the overall traffic volumes for each survey period. The following peak hours were determined from the results of the survey:

- Weekday AM Peak hour: 7:15 to 8:15 (2022)
- Weekday PM Peak hour: 16:00 to 17:00 (2022)

Traffic detail survey data is provided in Appendix A.

4.2.3. Background Traffic Growth

For forecasting the background traffic growth, reference has been made to TfNSW Traffic Volume Viewer for the traffic volumes collected for a 10-year period before the COVID-19 pandemic. The Average growth can be found in Table 18.

Table 18 – Traffic Counter Volumes and Growth Rate

Year	Nelson Bay Road Traffic Counter	
	Total Volumes (all days)	Growth Rate
2008	18098	N/A
2009	19521	7.86%
2010	16761	-14.14%
2011	14258	-14.93%
2012	20579	44.33%
2013	20023	-2.70%
2014	11196	-44.08%
2015	24046	114.77%
2016	24933	3.69%
2017	25909	3.91%
2018	26340	1.66%
2019	26329	-0.04%
Average	23,321	2.40%

Based on the calculation, an average growth rate of 2.40% will be used for forecasting the future background traffic growth and modelling the future scenarios. Years that are deemed outliers with

traffic growth likely impacted by external factors have been excluded from the average yearly calculation, and are shown in red above.

4.2.4. Traffic Generation Rate Review and Revised Rate

The Roads and Maritime Services (RMS) Guide to Traffic Generating Development (2013) outlines a methodology for predicting traffic volumes across various types of developments, such as residential dwellings, offices, business parks, and shopping centres. For this assessment, traffic generation rates specific to business parks and industrial estates were applied, aligning with existing industrial areas adjacent to the proposed site. The regional average and range of trip generation rates for this development are detailed in Table 19. These rates were chosen based on their proximity to the proposed site, ensuring a geographic similarity between the survey locations used to establish these rates and the location of the proposed development. Trip generation rates are presented as the number of vehicle trips per peak hour period per hundred square meters of gross floor area (GFA).

Table 19 – Peak hour trip generation rates – RMS Guide to Traffic Generating Development 2013

Peak Period	Guide to Traffic Generating Developments 2013 (RMS) Regional average	Guide to Traffic Generating Developments 2013 (RMS) Regional range
AM peak (trips/ 100m^2GFA)	0.7	0.32-1.2
PM peak (trips/ 100m^2GFA)	0.78	0.39-1.3
Daily (trips/ 100m^2GFA)	7.83	3.78-11.99

A review of the trip generation rates was undertaken to ensure that the adopted traffic generation rate for the site best reflected the expected number of vehicle trips that would be generated for the proposed development site, including its expected land uses.

Three different trip generation rates were calculated and compared to calculate an accurate rate compared to the expected generation. The two selected rates were:

- *Guide to Traffic Generating Developments 2013 (RMS) Regional average*
- *Site 10 Port Stephens Industrial Estate, Taylors (2013 RMS guide)*

Table 20 – Comparison of trip generation rates from the review

Peak period	Guide to Traffic Generating Developments 2013 (RMS) Regional Average	Guide to Traffic Generating Developments 2013 (RMS) Regional Range	Site 10 – Port Stephens Industrial Estate, Taylors
AM peak (trips/ 100m^2GFA)	0.7	0.32-1.2	0.392
PM peak (trips/ 100m^2GFA)	0.78	0.39-1.3	0.392

After comparing the rates (Refer to Table 20) derived from each analysis method, we took a conservative approach and opted for the average regional rates for future scenario modelling at the proposed site. It is assumed that these proportions would remain consistent across all periods.

4.2.5. Existing Traffic Volume (2024)

Using the adopted trip generation rate discussed in Section 4.2.3, Figure 18 and Figure 19 show the number of vehicle trips in 2024 without development during the peak hour.

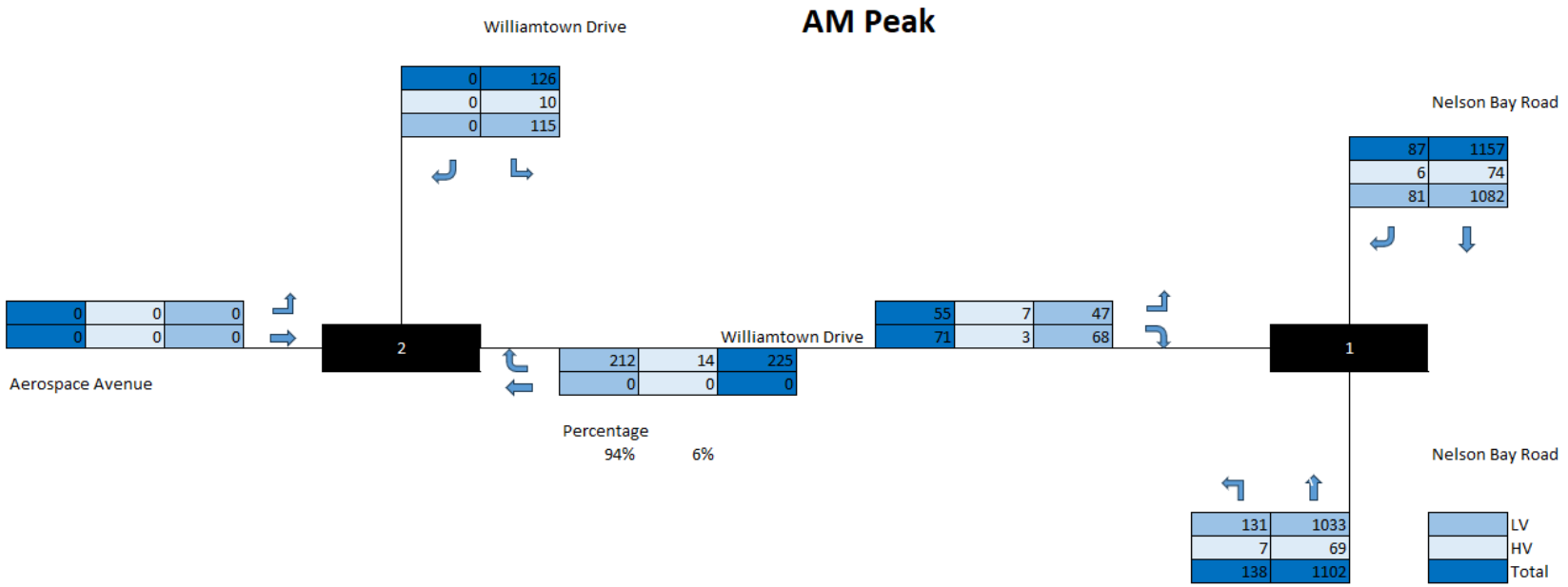


Figure 18 – 2024 AM Peak Hour Volume

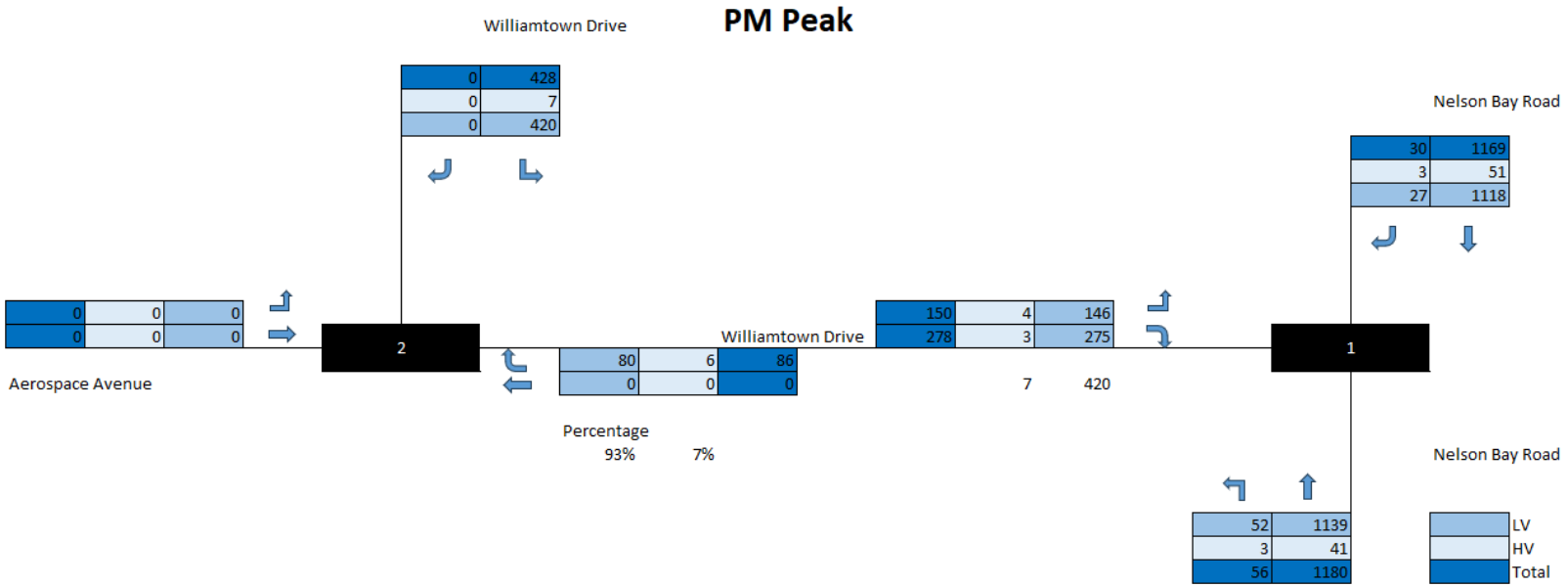


Figure 19 – 2024 PM Peak Hour Volume

4.2.6. Development traffic distribution

The *ITE Trip Generation Guide (2018)* was used to provide the inbound and outbound trip proportions for the Proposed site. ITE number 110 (general light industrial) was chosen for this assessment as this best represented the proposed industrial use of the site, as well as the trip generation rates being comparable to those adopted from the *RMS Guide for Traffic Generating Developments (2013).* The proportions of inbound and outbound traffic flows for the AM and PM peak periods are shown below in Table 23.

Table 21 – Comparison of trip generation rates from the review

Land Use	AM Peak (7-9)		PM Peak (4-6)	
	Inbound	Outbound	Inbound	Outbound
General Light Industrial	88%	12%	13%	87%

Source: ITE Trip Generation (2018)

Analysis of existing year traffic counts, shown in Figure 18 and Figure 19, was also undertaken to provide an insight into road users' direction of travel from the proposed site for onward travel to each of the two intersections. Therefore, the total inbound and outbound development trips are provided in Table 24.

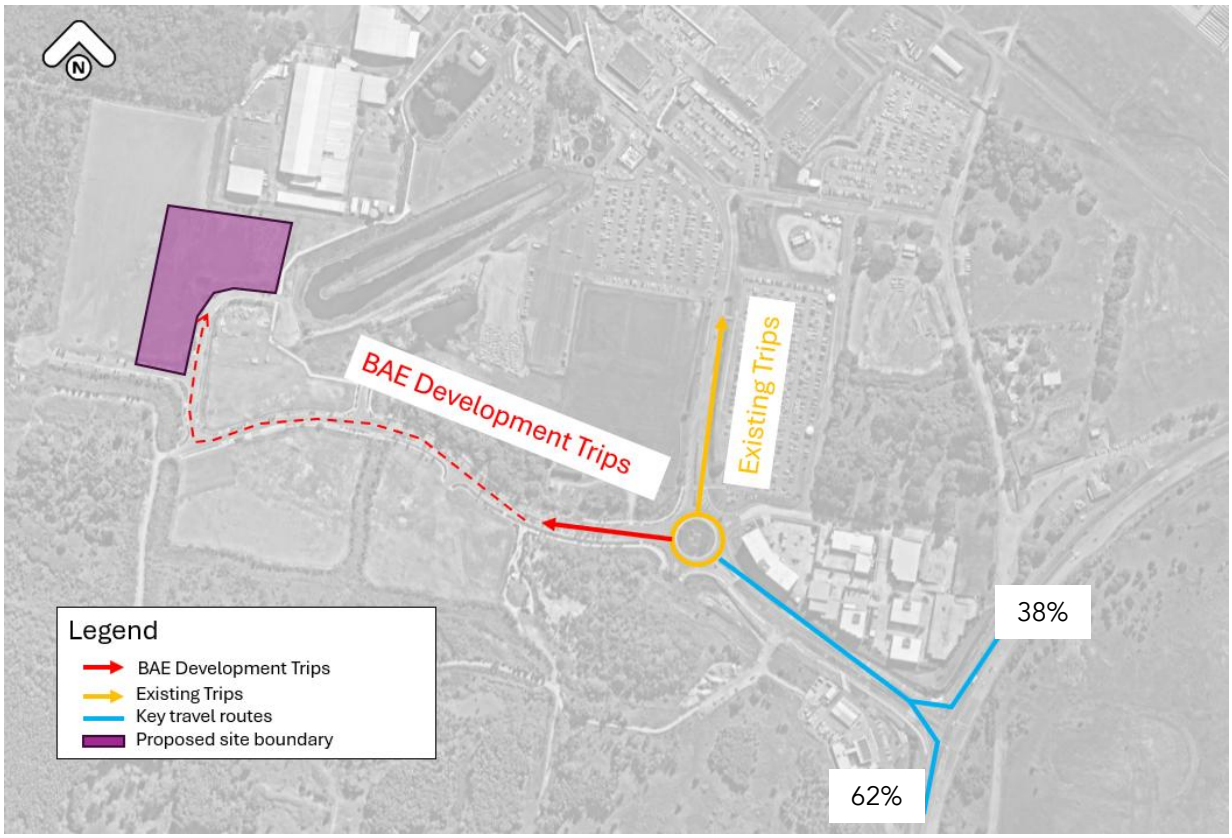
Table 22 – Total Inbound and Outbound development trips

	Rate (trips/ $100m^2$GFA)	GFA	Total Development trips	Inbound	Outbound
AM Peak	0.7	21,900	153	135	18
PM Peak	0.78	21,900	171	22	148

Note that, in the Future 2034 + Development traffic, the net AM and PM trips to the PEW development site have been added to Aerospace Ave/Jeffries Circuit, and for robust assessment, no redistribution or removal of trips which may already be travelling north along Williamtown Drive following the roundabout has occurred.

For inbound development trips, it is assumed that

- 62% of trips will turn left from Williamtown Drive
- 38% of trips will turn right from Williamtown Drive

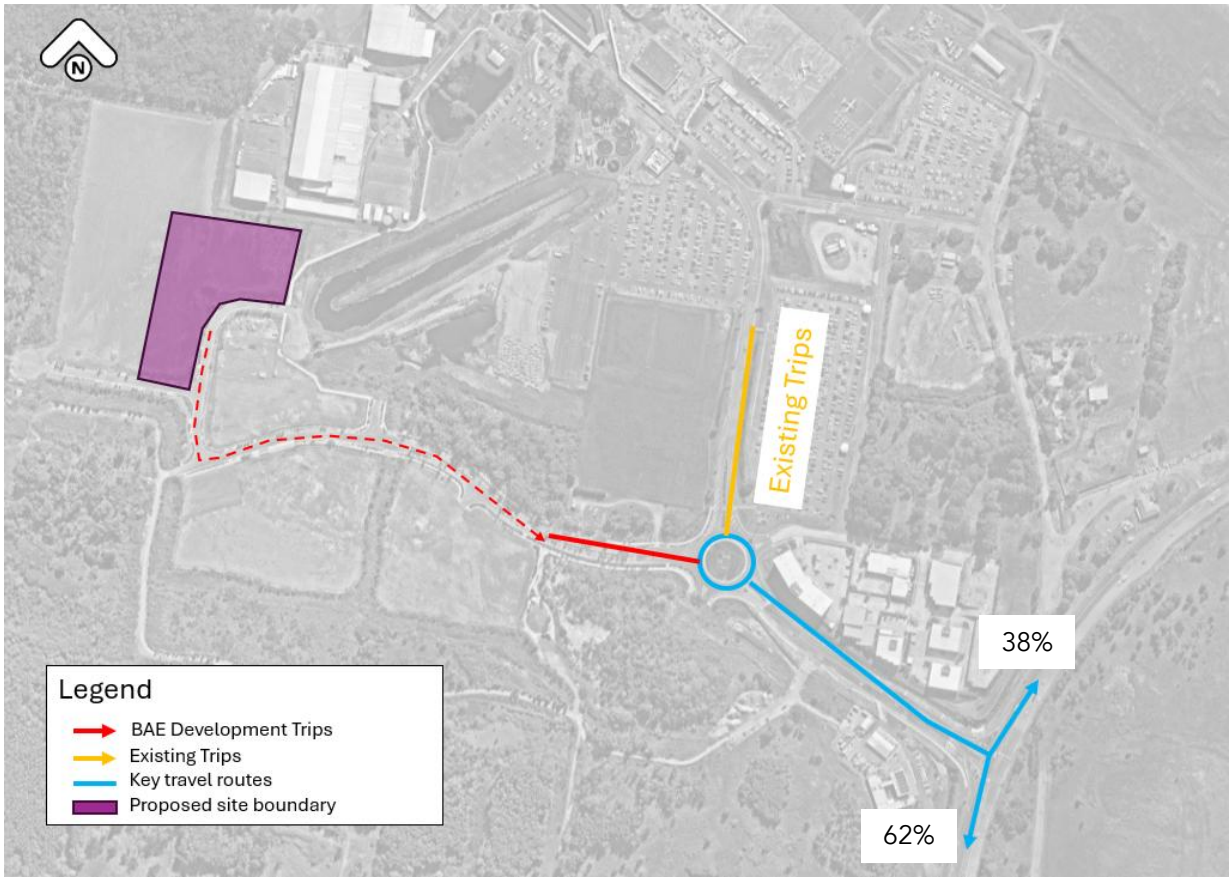


Source: Nearmap 2024, modified by PTC Consultant

Figure 20 – Inbound development trip distribution

For outbound development trip, it is assumed that

- 38% of trips will turn left to Williamtown Drive
- 62% of trips will turn right to Williamtown Drive



Source: Nearmap 2024, modified by PTC Consultant

Figure 21 – Outbound development trip distribution

The detailed number of vehicle trips in 2034 during the peak hour can be found in Appendix B.

4.2.7. Cumulative Traffic Impact

A summary of the nearby developments within the vicinity of the BAESA site is outlined in Table 23.

Table 23 – Surrounding Project in Airport Precinct

Project	Application type	Status	Potential Impact	Available Info
BAE Systems South Hangar Internal Refurbishments	Part 4	Construction commenced and due to complete in 2025	Assumed overlap with construction period of the Project.	As assessed in the South Hangar Works TIA prepared by **ptc.** (dated 12/09/2022): *A review of the potential traffic activity associated with the development site has found that the minor building extensions to existing storage facilities within the site are not expected to generate additional trips when compared to the current operation of the site.*
Newcastle Airport Carpark	Part 4	Construction commenced and	Traffic generation and upgraded	Based on the partially released information from Port Stephens

& Utility Upgrades		due to complete by Q3 2023	intersection geometry assumed overlap with the Project.	Council in relation to DA's 16-2008-940–5 and 16-2022-903–1, **ptc.** is able to derive the following traffic generation of the Newcastle Airport Carpark & Utility Upgrades development: • AM Peak: a total of 256 trips • PM Peak: a total of 564 trips The Nelson Bay Road / Williamtown Drive intersection has been upgraded to include the second right turn lane on western leg of the intersection. Overall, the SIDRA modelling demonstrates that the cumulative traffic associated with the Newcastle Airport Carpark & Utility Upgrades project and the proposed North Hangar development has minimal impact on the intersection operation and capacity.
Newcastle Airport Terminal Expansion	Part 4	Construction commenced and due to complete in late 2024	Assumed overlap with construction period of the Project.	DA 16-2008-940-5
Newcastle Airport Code E Runway Upgrade	Federal	Construction commenced and due to complete in Q4 2024 assumed completion	Assumed overlap with construction period of the Project.	No
Newcastle Airport Apron & Taxiway Upgrade	Part 4	Construction commenced and due to complete in Q2 2024	None	DA 23-205-1
Astra Aerolab Stage 1	Part 4	Subdivision complete; land registering and select development underway	Assumed overlap with construction period of the Project.	Stages 2A, 2C and 4 have commenced
BAE Systems Aircraft Coating Facility	SSD	Forecast start on site in April 2025 with completion by July 2026	Assumed overlap with construction period of the Project.	-
BAE Systems Precinct Entry Works	Part 4	Forecast start in July 2024 with completion by Feb 2025	Assumed overlap with construction period of the Project.	-
North Hangar SSDA	SSD	Forecast March 2024 – June 2025	Assumed overlap with construction period of the Project.	Average 3 construction vehicles per day, up to 20 per day at peak periods. Refer to CTMP prepared by PTC for further information.

The appointed Principal Contractor will coordinate with other concurrent projects near the BAESA site. Construction activities that involve heavy traffic movements, such as concrete pours, will be scheduled carefully to minimise overlap with other projects whenever feasible, thus mitigating potential impacts on the surrounding road network. Consequently, the development of Precinct Entry works will be evaluated independently.

5. Assessment criteria and modelled network

5.1. Assessment criteria

The SIDRA Intersection 9.1 modelling software was used to assess the peak-hour operating performance of the BAESA Williamtown development precinct entry road network.

The criteria for evaluating the operational performance of intersections are provided by the Guide to Traffic Generating Development (TfNSW, 2022) and reproduced in Table 24. To quantify intersection performance, the following performance measures have been reported for each scenario.

- **Degree of Saturation –** The DOS is a measure of how much demand there is for movement in comparison to the total capacity. DOS above 1.0, for example, represents oversaturated conditions where demand flows exceed capacity, and the degree of saturation below 1.0 represents under saturations where demand flows are below capacity. Table 25 lists practical degree of saturation for different intersection types. If the value is greater than the corresponding values provided in the table for any movement, then the intersection requires appropriate treatment to maintain an acceptable level of DOS.
- **Average Delay**—The average delay encountered by all vehicles passing through the intersection. It is often important to review the average delay of each approach, as a side road could have a long delay time, while the large free-flowing major traffic will provide an overall low average delay.
- **95% Queue Lengths (m)** – is defined to be the queue length in metres that has only a 5-percent probability of being exceeded during the analysis period. It transforms the average delay into measurable distance units.
- **Level of Service (LOS)** – This is a categorisation of average delay, intended for simple reference. It is a good indicator of overall performance for individual intersections.

The operational performance assessment of intersections is based on "Level of Service" (LOS), a quantitative measure related to the average Delay experienced by vehicles. Typically, a LOS D or better is considered to be an acceptable level of operation.

Table 24 - Intersection Performance - Levels of Service (LOS) criteria

Level of Service	Average Delay (secs/vehicle)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	<14	Good operation	
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity. At signals, incidents would cause excessive delays. Roundabouts require other control mode.	At capacity, requires other control modes.
F	>70	Extra capacity required	Extreme delay, major treatment required

Source: Guide to Traffic Generating Development (Roads and Maritime Services 2002)

Table 25 - Intersection Performance – Maximum DOS criteria

Intersection Type	Maximum practical degree of saturation
Signalised Intersection	0.90
Roundabouts	0.85
Priority Intersection	0.80

Source: SIDRA Software and the RMS Traffic Modelling Guidelines

5.2. SIDRA Modelling Inputs

The SIDRA Model was developed based on the below key assumptions and reference (See Table 26).

Table 26 – Modelling Inputs

No.	Traffic Volumes	Reference	Assumption
1	Traffic Demand Volumes	Traffic Survey	Traffic Volume is assumed to be true and accurate.
2	Pedestrian Volumes	SIDRA Assumption	50 pedestrians at each Leg at peak hour (SIDRA Default)
3	Signal Phases	TCS Plan	Signalling was completed in reference to TCS plan

5.3. Scenario 1 – 2024 Base Year Scenario

5.3.1. Intersection Nelson Bay Road/ Williamtown Drive

The upgraded intersection layout for intersection Nelson Bay Road/ Williamtown Drive has been sourced from the latest aerial imagery and is shown in Figure 22. This geometry is used in all scenarios presented.

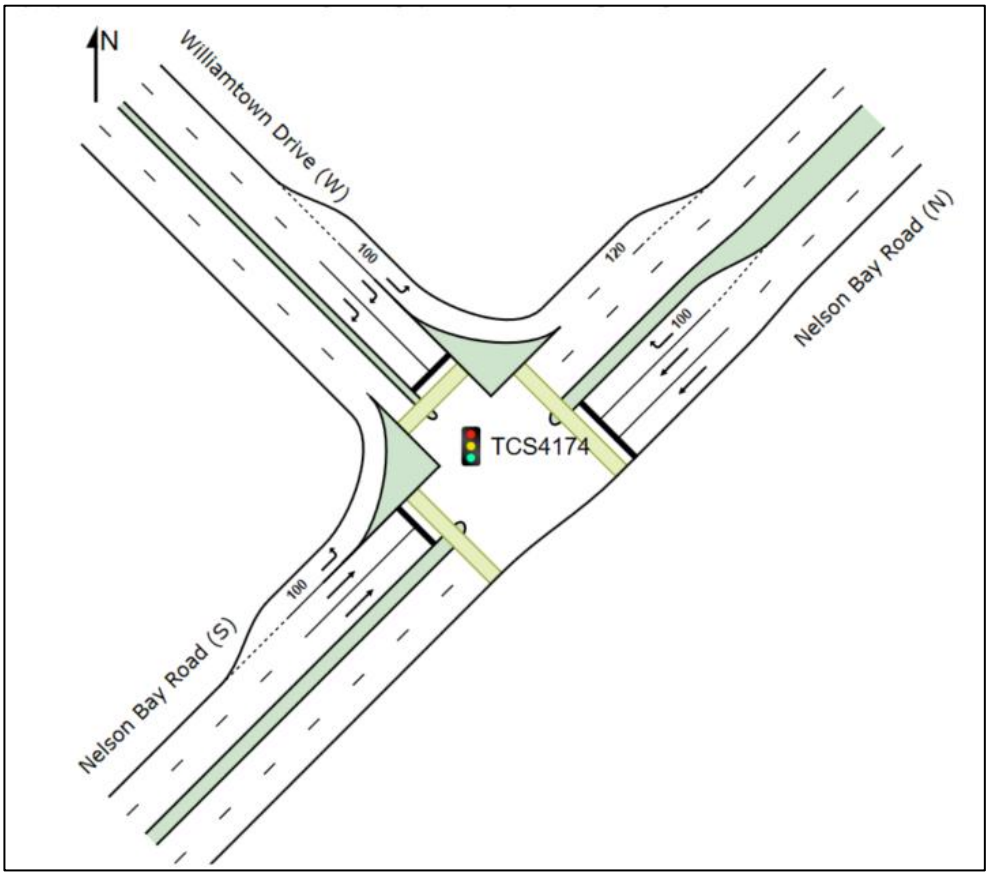


Figure 22 – Upgraded Intersection Layout

Table 23 presents the performance of intersection layout of Nelson Bay Road/ William Drive excluding BAE Precinct Entry Work development in 2024. The results reveal that all intersection is under capacity in both AM and PM peak period.

Table 27 – Intersection Nelson Bay Road/ Williamtown Drive performance_2024 Base Option

Approach (Road)	Approach	Total Veh/hr	DOS	Avg. Delay (sec)	LOS	95% Back of Queue (m)
AM PEAK						
Nelson Bay Road	Northeast	1308	0.446	7.0	A	107
Williamtown Drive	Northwest	132	0.172	39.0	C	16.8
Nelson Bay Road	Southwest	1305	0.528	15.3	B	163.5
Intersection		2745	0.528	12.5	A	163.5
PM PEAK						
Nelson Bay Road	Northeast	1262	0.459	8	A	118.8
Williamtown Drive	Northwest	451	0.535	43.7	D	66.1
Nelson Bay Road	Southwest	1300	0.520	13.4	A	158.2
Intersection		3013	0.535	15.7	B	158.2

A summary of the AM and PM signal phases as depicted in Figure 24 and the signal time is summarised in Table 29.

Figure 23 - Signal Phase Sequence – Base Option

Table 28 - Existing Intersection Phasing Summary _2024 Base Option

Split detail	Phase A	Phase C	Phase D	Total
2024 AM Phase Time (sec)	92	27	21	140
Phase split	66%	19%	15%	100%
2024 PM Phase Time (sec)	97	31	12	140
Phase split	69%	22%	9%	100%

5.3.2. Intersection Aerospace Avenue/ Williamtown Drive

The existing and modelled intersection layout for Aerospace Avenue Circuit/ Williamtown Drive are shown in Figure 24 below.

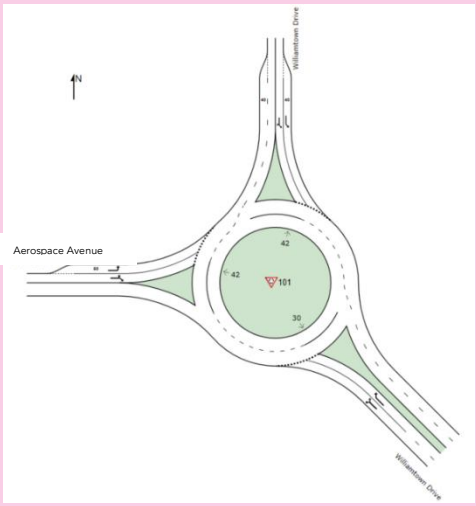
Existing Intersection Layout	SIDRA Intersection Layout
	

Figure 24 –Exisitng and model Intersection Layout

Table 29 present the performance of intersection Aerospace Avenue/ Williamtown Drive excluding BAE Precinct Entry Work development in 2024. The results reveal that all intersection is under capacity in both AM and PM peak period.

Table 29 – Intersection Aerospace Avenue/ Williamtown Drive performance_2024 Base Option

Approach (Road)	Approach	Total Veh/hr	DOS	Avg. Delay (sec)	LOS	95% Back of Queue (m)
AM PEAK						
Williamtown Drive	Southeast	239	0.097	8.2	A	3.2
Williamtown Drive	North	133	0.041	2.5	A	1.6
Aerospace Avenue	West	2	0.00	5.7	A	0
Intersection		374	0.097	6.2	A	3.2
PM PEAK						
Williamtown Drive	Southeast	92	0.038	8.1	A	1.2
Williamtown Drive	North	451	0.133	2.4	A	5.3
Aerospace Avenue	West	2	0.00	5.3	A	0
Intersection		544	0.133	3.4	A	5.3

5.4. Scenario 2 – 2034 Future Base) Scenario

5.4.1. Intersection Nelson Bay Road/ Williamtown Drive

Table 30 present the performance of approved intersection layout of Nelson Bay Road/ William Drive excluding BAE Precinct Entry Work development in 2034. The results reveal that all intersection would operate within capacity in both AM and PM peak in 2034.

Table 30 – Intersection Nelson Bay Road/ Williamtown Drive performance_2034 Future Do Minimum Scenario

Approach (Road)	Approach	Total Veh/hr	DOS	Avg. Delay (sec)	LOS	95% Back of Queue (m)
AM PEAK						
Nelson Bay Road	Northeast	1659	0.565	8.5	A	157.7
Williamtown Drive	Northwest	167	0.219	39.4	C	21.5
Nelson Bay Road	Southwest	1655	0.690	19.3	B	251.0
Intersection		**3481**	**0.690**	**14.9**	**B**	**251.0**
PM PEAK						
Nelson Bay Road	Northeast	1601	0.584	9.4	A	175.7
Williamtown Drive	Northwest	571	0.667	45.3	D	86.7
Nelson Bay Road	Southwest	1648	0.670	18.2	B	238.8
Intersection		**3820**	**0.677**	**18.2**	**B**	**238.8**

A summary of the AM and PM signal phases as depicted in Figure 25 and the signal time is summarised in Table 31.

Figure 25 –Signal phase Sequence – 2034 Future Do Minimum Scenario

Table 31 – Existing Intersection Phasing Summary _2034 Future Do Minimum Scenario

Split detail	Phase A	Phase C	Phase D	Total
2034 AM Phase Time (sec)	93	27	20	**140**
Phase split	66%	19%	14%	**100%**
2034 PM Phase Time (sec)	97	31	12	**140**
Phase split	69%	22%	9%	**100%**

5.4.2. Intersection Aerospace Avenue/ Williamtown Drive

Table 29 presents the performance of intersection Aerospace Avenue/ Williamtown Drive excluding BAE Precinct Entry Work development in 2034. The results reveal that all intersection is under capacity in both AM and PM peak period in 2034.

Table 32 – Intersection Aerospace Avenue/ Williamtown Drive performance_2024 Base Option

Approach (Road)	Approach	Total Veh/hr	DOS	Avg. Delay (sec)	LOS	95% Back of Queue (m)
AM PEAK						
Williamtown Drive	Southeast	302	0.123	8.3	A	4
Williamtown Drive	North	168	0.052	2.5	A	2.1
Aerospace Avenue	West	2	0.00	5.9	A	0
Intersection		**473**	**0.123**	**6.2**	**A**	**4.0**
PM PEAK						
Williamtown Drive	Southeast	116	0.048	8.2	A	1.5
Williamtown Drive	North	572	0.169	2.4	A	7.0
Aerospace Avenue	West	2	0.00	5.4	A	0
Intersection		**689**	**0.169**	**3.4**	**A**	**7.0**

5.5. Scenario 3 – 2034 Future Post-development Scenario

5.5.1. Intersection Nelson Bay Road/ Williamtown Drive

Table 33 present the performance of approved intersection layout of Nelson Bay Road/ William Drive including BAE Precinct Entry Work development in 2034. The results reveal that all intersection is under capacity in both AM and PM peak period in 2034 with development trips.

Table 33 – Intersection Nelson Bay Road/ Williamtown Drive performance_2024 Future Post-development

Approach (Road)	Approach	Total Veh/hr	DOS	Avg. Delay (sec)	LOS	95% Back of Queue (m)
AM PEAK						
Nelson Bay Road	Northeast	1714	0.682	10.1	A	157.1
Williamtown Drive	Northwest	187	0.247	39.9	C	24.3
Nelson Bay Road	Southwest	1743	0.683	17.2	B	247.2
Intersection		**3644**	**0.683**	**14.8**	**B**	**247.2**
PM PEAK						
Nelson Bay Road	Northeast	1615	0.629	12.9	A	208.2
Williamtown Drive	Northwest	726	0.694	42.6	D	107.0
Nelson Bay Road	Southwest	1663	0.714	21.9	B	267.2
Intersection		**4004**	**0.714**	**21.9**	**B**	**267.2**

A summary of the AM and PM signal phases as depicted in Figure 26 and the signal time is summarised in Table 34.

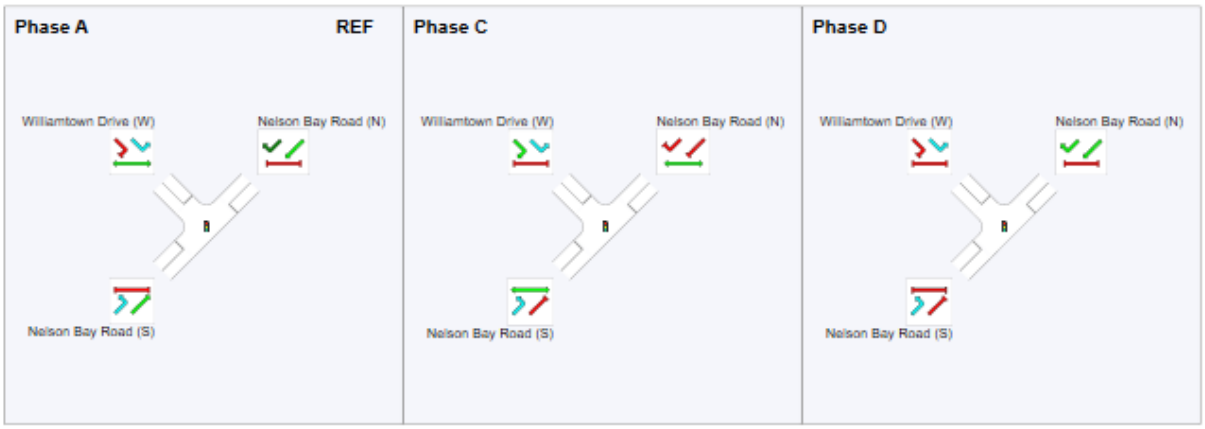


Figure 26 –Signal phase Sequence – 2034 Future Post development Scenario

Table 34 – Existing Intersection Phasing Summary _2034 Future Post development Scenario

Split detail	Phase A	Phase C	Phase D	Total
2034 AM Phase Time (sec)	95	27	18	140
Phase split	68%	19%	13%	100%
2034 PM Phase Time (sec)	92	36	12	140
Phase split	66%	26%	9%	100%

5.5.2. Intersection Aerospace Avenue/ Williamtown Drive

Table 35 present the performance of intersection Aerospace Avenue / Williamtown Drive including BAE Precinct Entry Work development in 2034. The results reveal that all intersection is under capacity in both AM and PM peak period in 2034 with development trips.

Table 35 – Intersection Aerospace Avenue / Williamtown Drive performance_2034 Future Post development Scenario

Approach (Road)	Approach	Total Veh/hr	DOS	Avg. Delay (sec)	LOS	95% Back of Queue (m)
AM PEAK						
Williamtown Drive	Southeast	452	0.172	6.5	A	5.9
Williamtown Drive	North	168	0.056	2.6	A	2.3
Aerospace Avenue	West	20	0.014	8.8	A	0.5
Intersection		640	0.172	5.5	A	5.9
PM PEAK						
Williamtown Drive	Southeast	38	0.057	7.4	A	2
Williamtown Drive	North	572	0.212	3.2	A	9.0
Aerospace Avenue	West	157	0.104	8.5	A	3.3
Intersection		866	0.212	4.8	A	9.0

It should be noted that the SIDRA modelling undertaken and presented above has the following arrangements:

- Use of road geometry as per current 2024/2025 aerial imagery, and
- Use of traffic survey data from 2022 (growth factor applied for 2 years to generate 2024 base year).

Comparison of Scenario 2 with Scenario 3 demonstrates no significant negative impact to the road network as a result of the development traffic associated with the PEW. The road network has been developed to accommodate the wider approved Aerolab precinct traffic generation, and as such, the development traffic associated with the PEW does not raise concern regarding to network performance.

6. Access and Car Park Arrangements

6.1. Car Park Layout and Circulation

Car parking must comply with the following design requirements.

6.1.1. General Requirements

In accordance with Table 1.1 of *AS2890.1:2004*, which categorizes car parks based on land-use, the designated staff car park is classified as a Class 1A facility. The minimum dimensions for parking spaces in a Class 1A facility are:

- Space: 2.4m x 5.4m
- Aisle widths: 5.8m (plus an additional 300mm to accommodate any vertical obstructions over 150mm in height, such as walls or bollards).

Parking spaces must adhere to the following maximum grades as per *AS2890.1:2004*:

- Maximum of 1:20 (5%) measured parallel to the angle of parking.
- Maximum of 1:16 (6.25%) measured in any other direction.

A minimum clear headroom of 2.2m above Class 1A parking bays and circulation areas for B99 vehicles must be maintained.

6.1.2. Accessible Parking

Accessible parking spaces must meet minimum dimensions of 2.4m x 5.4m, with an adjacent shared bay of equal dimensions. Installation of shared bays and accessible spaces must comply with *AS2890.6:2009*, including the placement of bollards and pavement markings.

Accessible parking bays are subject to the following grade limitations:

- Maximum grade of 1:40 in any direction.
- Maximum grade of 1:33 if the surface is a bituminous seal and the parking space is outdoors.
- A minimum clear headroom of 2.5m above accessible and shared bays is required.

6.1.3. Service Vehicle Requirements

For areas requiring access by heavy vehicles (e.g., HRV, AV), all grades must conform to Table 3.2 of *AS2890.2:2018 Off-street Commercial Vehicle Facilities*.

Where heavy vehicle access is necessary, a minimum clear headroom of 4.5m must be maintained along all heavy vehicle circulation and manoeuvring areas.

Waste Collection

Waste collection is currently managed by a private contractor and will continue as part of the development process.

6.2. Swept Path Analysis

A swept path assessment of the proposed vehicle access to the site from Jeffries Circuit has been undertaken and is included in Appendix C.

6.3. Vehicular Access

6.3.1. Access Arrangements

Access into the subject site is via Jeffries Circuit. The vehicle and pedestrian access points are illustrated in Figure 27.

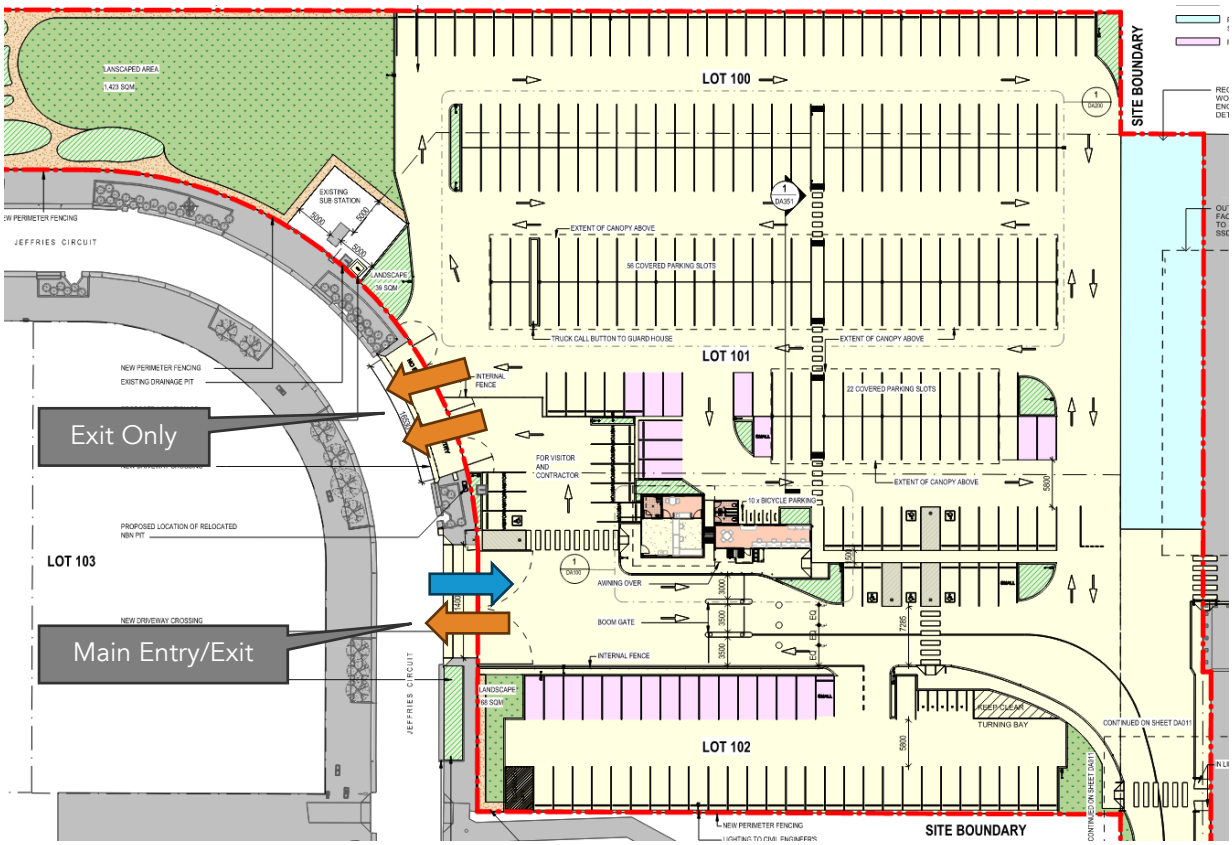


Figure 27 - Access Points

The main site entry and exit driveway is able to accommodate the largest design vehicle, being a 19m semi-trailer (expected for deliveries only). All smaller vehicles are able to be accommodated.

The primary vehicle type to use this access will be B99 passenger vehicles, driven by staff members as the car park is a secure facility. Visitor parking is provided before the secure control line.

6.4. Fire Truck Access

In the event of an emergency, a 12.5m HRV representing an aerial appliance will be used. The fire truck access arrangements by a 12.5m HRV are shown in the swept paths in Appendix C.

7. Preliminary Construction Traffic Management Plan

The following sections outline the proposed construction activity, anticipated timeline as well as the proposed management measures relating to vehicular access, pedestrian access and other key considerations for the duration of the works. This CTMP is preliminary and subject to further rationalisation.

7.1. Objectives

The traffic management plan associated with the construction activity aims to ensure the safety of all workers and road users within the vicinity of the construction site and the following are the primary objectives:

- To minimise the impact of the construction vehicle traffic on the overall operation of the road network;
- To ensure continuous, safe and efficient movement of traffic for both the general public and construction workers. One movement is defined as a single vehicle performing either entry or exit to site in a single direction, not both.
- Installation of appropriate advance warning signs to inform users of the changed traffic conditions;
- To provide a description of the construction vehicles and the volume of these construction vehicles accessing the construction site;
- To provide information regarding the changed access arrangement and also a description of the proposed external routes for vehicles including the construction vehicles accessing the site; and
- Establishment of a safe pedestrian environment in the vicinity of the site.

7.2. Traffic Management Planning Process

Temporary Traffic Management (TTM) for the project has been planned in accordance with Transport for NSW, *Traffic control at work sites – Technical Manual, Issue No.6.1,* March 2022 (TCAWS). The process is shown in Figure 28.

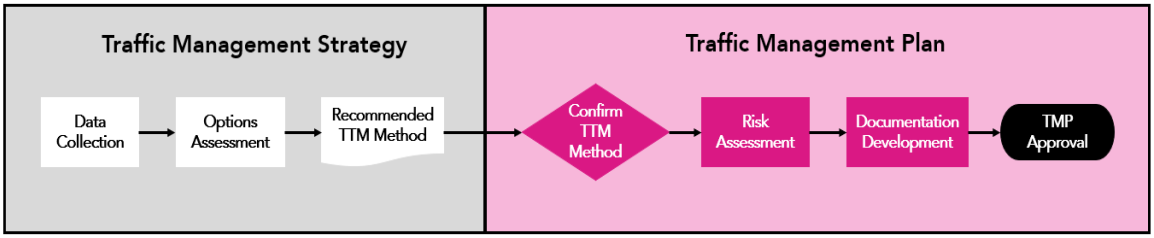


Figure 28 - Traffic Management Planning Process

An iterative process is being adopted in collaboration with relevant stakeholders to adopt the most appropriate traffic management approach and develop the associated documents for the work.

7.3. Traffic Management Strategy

A traffic management strategy has been chosen to support the appropriate allocation of time, funds and resources for the project, and allow for consultation in determining the safest and most efficient way for road users to interact with the work site. The following have been considered in determining the TTM method:

Detour Options

No detours are necessary or proposed by the client and therefore, disproportionate amount of disruption to the road users will NOT be introduced.

Site Location

The site of the works does not contain infrastructure that may obstruct signs and devices needed for certain strategies.

Work Area

All work is to be contained to the site boundaries, unless otherwise permitted. No road closures are proposed.

Vulnerable Road Users

Desire lines of pedestrians, cyclists, motorcyclists do not have significant impact on works or create undesired interaction between these road users and traffic. Consideration has been taken to minimise impact on the daily ongoing operations of the site and its users while works are undertaken.

Community Facilities and Needs

Access to all site facilities will remain during these works. Signage or directions for any detours or changes are to be implemented where necessary.

7.4. Decision of TTM Method

Based on the above assessment of the site and initial traffic management strategy, the method selected is Around (Elimination) as all typical truck and excavation/construction activity will take place on site, including the delivery of plant and site goods.

7.5. General Requirements

In accordance with TfNSW requirements, all vehicles transporting loose materials will have the entire load covered and/or secured to prevent any large items, dust or dirt particles depositing onto the roadway during travel to and from the site. All subcontractors must be inducted by the Principal Contractor to ensure that the procedures are met for all vehicles entering and exiting the construction site. The Principal Contractor shall monitor the roads leading to and from the site and take all necessary steps to rectify any road deposits caused by site vehicles. Vehicles operating to and from and within the site shall do so in a manner, which does not create unnecessary noise or vibration.

No tracked vehicles will be permitted or required on any paved roads. Public roads and access points will not be obstructed by any materials, vehicles, refuse skips or the like, under any circumstances. No construction vehicles are permitted to double park, or park on the public road.

No building, demolition, excavation or material of any nature and no hoist, plant and machinery (crane, concrete pump or lift) shall be placed on Council's footpaths, roadways, parks or grass verges without Council approval.

No trees or native shrubs or understorey vegetation on public property (footpaths, roads, reserves, etc.) or on the land to be developed shall be removed or damaged during construction unless specifically approved in this consent including for the erection of any fences, hoardings or other temporary works.

7.6. Hours of Work

All works associated with any demolition, excavation and construction, and activities in the vicinity of the site generating noise associated with the preparation for the commencement of work (e.g. loading/unloading of goods, transferring of tools etc.) in connection with the proposed development shall be limited to the permitted work hours as per the Conditions of Consent. Note that all work outside of the approved hours requires approval from Council, prior to any works being undertaken.

Notwithstanding the above, the use of a crane for special operations including the delivery of materials, hoisting of plant and equipment and erection and dismantling of onsite tower cranes which warrant the on-street use of mobile cranes outside of the above hours can occur, subject to a separate application being submitted to and approved by Council under Section 68 of the Local Government Act 1993 and Sections 138/139 of the Roads Act 1993.

7.7. Construction Phasing

The delivery of the project will be undertaken in stages or phases. It is expected that these would be rationalised further and provided by the principal contractor once defined.

7.8. Construction Vehicle Types

It is anticipated that the works will involve the use of the following vehicle types going forward:

- 19m Articulated Vehicles (semi-trailer and truck and dogs)
- 12.5m Heavy Rigid Vehicles (HRV)
- Various smaller rigid vehicles and cars/vans/utes

Any oversized vehicle (including the use of mobile cranes) that is required to travel to the project into the vicinity of the site will be dealt with separately, with the submission of required permits to and subsequent approval from Council and TfNSW prior to any delivery being undertaken.

Refer to Section 7.16 for further details regarding special deliveries.

7.9. Construction Traffic Volumes

The delivery of materials to and from the site will result in some generated traffic activity associated with the works. The construction vehicle volumes are expected to be lesser, and less concentrated, than the proposed operational development traffic generation, and thus unlikely to have significant negative impact to the road network.

Deliveries should aim to be scheduled outside of the commuter peak periods (AM and PM) so as to minimise potential for impact to the surrounding road network traffic.

7.10. Construction Vehicle Routes

The construction vehicles routes have been determined taking into consideration the surrounding road network. Routes follow State Roads, which are deemed adequate to accommodate vehicles up to and including 19m Articulated Vehicles. Figure 29 indicates the proposed truck access and egress routes to be prescribed to all vehicles coming to and departing from the construction site.

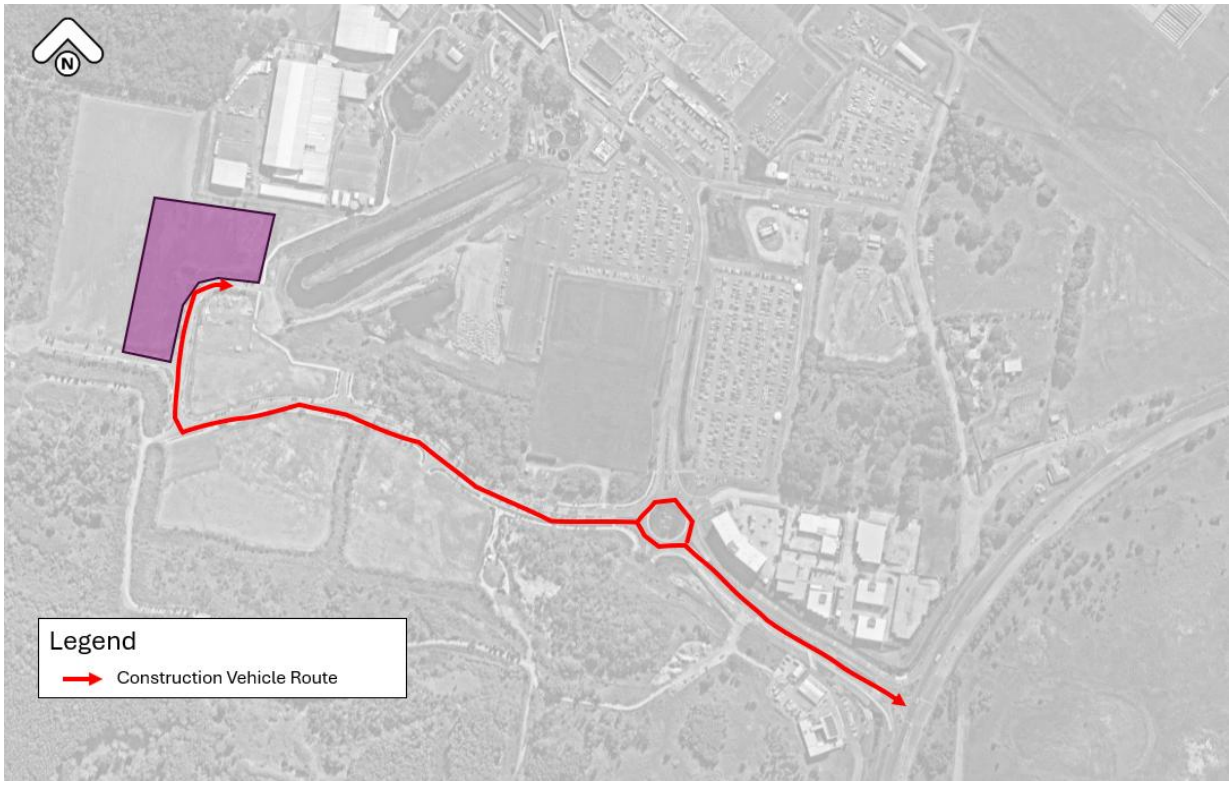


Figure 29 - Haulage Route

7.11. Construction Vehicle Site Access

All construction traffic and vehicular movements are to enter the site, unless specifically except under a separate application process with the authorities. All construction vehicles (excluding site personnel vehicles) are to be contained wholly within the site, except if located in an approved on-street work zone, and vehicles must enter the site before stopping.

All site access and egress are to be undertaken via a forward-in and forward-out direction from Jeffries Circuit.

7.12. Work Zones

No Work Zones are proposed as part of this CTMP. All work is to take place within the site boundaries. Any instances where Work Zones or Road Occupancy Licences (ROLs) are required, a separate application will be submitted to the relevant authority by the Principal Contractor.

7.13. Emergency Vehicle Access

All emergency vehicle access, both to the site itself and through all roads in the vicinity, shall be maintained and accommodated throughout the duration of works.

7.14. Traffic Control Measures

It is not expected that Traffic Controllers are required for the duration of work, however should they be, they are to be implemented in accordance with TCAWS.

It should be noted that Traffic Controllers are NOT to stop traffic on the public street(s), pedestrians and cyclists to allow trucks to enter or leave the site. They MUST wait until a suitable gap in traffic

allows them to assist trucks to enter or exit the site. The Roads Act does not give any special treatment to trucks leaving a construction site – the vehicles already on the road and pedestrians on the footpath have right of-way.

Pedestrians may be held only for very short periods to ensure safety when trucks are leaving or entering BUT you must NOT stop pedestrians in anticipation i.e. at all times the pedestrians have right-of-way on the footpath, not the trucks.

The Applicant must apply to Council to organise appropriate approvals for fencing / hoarding prior to commencement of works.

7.15. Pedestrian Access

The Principal Contractor shall provide appropriate traffic and pedestrian management at all site interfaces with the public road. This will ensure truck movements and deliveries are received efficiently and safely. These individuals are required only on occasions or days where truck arrivals and departures are occurring.

Pedestrian access to the site shall be managed by the principal contractor to ensure that safe paths of travel are provided throughout the various construction stages.

7.16. Special Deliveries

It is understood that oversize and over-mass vehicles are generally not allowed to travel on Local Roads unless approval for a one-off occasion is obtained from the National Heavy Vehicle Regulator (NHVR) and Council. Requests to use these vehicles must be submitted to the NHVR 28 days prior to the vehicle's scheduled travel date. For more information, please contact the NHVR on 1300 696 487 or www.nhvr.gov.au.

Should the contractor require a partial road closure on State, Regional and/or Local Roads, or carry out work within 100m of traffic signals, an application will be made to the relevant authority to obtain their approval.

7.17. Work Site Security

To provide security to the work site and protection to the general public, it is proposed that the site perimeter boundaries consist of temporary fencing or hoardings. These boundaries will be established immediately following site possession and fitted with appropriate signage where required.

All gates are securely locked outside of working hours and may be regularly patrolled by security staff. This security network shall continue to work closely with the contractor to ensure that security is being maintained throughout construction.

The contractor shall maintain a site entry register requiring all visitors to sign in upon entry. All visitors are required to wear an identification "visitor" badge and wear appropriate PPE at all times whilst on site.

7.18. Plant/Equipment Management

At the commencement of construction, plant and equipment, including construction hoarding/scaffolding material, site sheds, mobile cranes and machinery will be required to be delivered to the site. The delivery and removal of plant and equipment to and from the site will be undertaken from the on-site materials handling/loading area, via the use of machine floats.

The delivery and removal of plant and equipment that requires a wide or long load vehicle will be subject to a separate application/permit and separate prior approval from Council and other relevant authorities. In order to minimise traffic disruption during the delivery of the plant and equipment, it is proposed to undertake this work during the late evening/early morning period. All plant and equipment deliveries will be carried out in accordance with Council/TfNSW requirements and the NSW Police regulations.

All sediment and loose material shall be removed from construction vehicles before returning to public roads.

7.19. Staff Induction

All contractor staff and subcontractors are required to undergo a site-specific induction which outlines the construction procedures and management framework specific to the project. The induction is aimed at instilling in each person a common-sense approach to safety, to ensure they employ the responsible environmental practices and awareness needed to deliver the project in accordance with the relevant regulations and standards.

7.20. Contractor Staff Parking

The contractor staff volumes on site at any one time are not yet known.

All personnel must report to the security gate upon arrival and travel directly to the site compound and nominated parking zone without delay following admission to the site. This will be communicated to personnel during site inductions and meetings.

Vehicular access to the site will be via Nelson Bay Road and Williamtown Drive and parking available within the work site compound.

7.21. Driver Code of Conduct

All heavy vehicle drivers are required to follow the ingress and egress routes in a forward-in and forward-out manner, whilst adhering to all road rules and regulations. This is essential to minimise the impacts of construction activity om the local and regional road network, In the event of an emergency or where a large vehicle cannot turn around within the confines of the site, a reverse manoeuvre to enter and exit the site can be performed under the direction of SafeWork NSW accredited traffic controllers.

Note: Any adjustment to the CTPMP should be developed in consultation with Council and the Principal Contractor prior to being implemented onsite. A suitable Traffic Guidance Scheme (TGS) will be required to be prepared by the appointed traffic management contractor.

Furthermore, construction traffic activity is to be limited to the permitted work hours to minimise road traffic noise.

This Driver Code of Conduct will be advised to all drivers engaged as part of the staff induction.

7.22. Access to Adjoining Properties

Access to all adjoining properties will be maintained throughout the works. The adjacent landowners will be notified of works via letter box distribution and road signage to advised of anticipated truck movements in operation with access to adjoining properties being maintained at all times.

7.23. Impacts to Surrounding Public Transport Services

The work area is fully contained within the BAESA site boundaries, and where required, appropriate TGS signage will be provided to advise motorists using Williamtown Drive of the presence of trucks in the area. It is not anticipated that there will be any notable impact on the existing bus services to Newcastle Airport. The Principal Contractor will consult with the relevant stakeholders to ensure any potential impacts are mitigated.

7.24. Occupational Health and Safety

Any workers required to undertake works or traffic control within the public domain shall be suitably trained and will be covered by adequate and appropriate insurances. All traffic control personnel will be required to hold SafeWork NSW accreditation in accordance with Section 8 of Traffic Control at Worksites.

A comprehensive Work Health and Safety management plan will be implemented by the contractor and available upon request by council or residents and shall be constantly reviewed as the design and construction methodology progress.

7.25. Consultation and Method of Communicating Traffic Changes

Traffic Guidance Schemes in accordance with Australian Standards (AS 1742.3 – Traffic Control Devices for Works on Roads) and TfNSW Traffic Control at Worksites will advise motorist of upcoming changes in the road network.

During site operation the contractor shall, each morning, prior to work commencing, ensure all signage is erected in accordance with the TGS and clearly visible. Each evening, upon completion of work, the contractor is to ensure signage is either covered or removed as required. Sign size is to be size "A".

The associated TGS road signage will inform drivers of works activities in the area including truck movements in operation. Any variation to the layout of the TGS on site is to be recorded and certified by authorised SafeWork NSW accredited personnel. Amended TGSs must also be approved by Council prior to implementing any changes.

7.26. Hazard and Risk Identification

All construction projects entail a set of risks—from a transport perspective—that may need to be mitigated. Some of these hazards and risks are related to:

- Moving traffic;
- Queued traffic;
- Site vehicle access and egress points;
- Highly vulnerable road user activity;
- Other construction activity or roadworks in close proximity to the proposed work site; and
- Reduced lane and shoulder widths.

This is appropriate for the construction of the development because of the following:

Risk Matrix Reference: R1 – Conflict between construction traffic and the general public, especially vulnerable road users such as pedestrians and cyclists.

Risk Matrix Reference: R2 – Construction traffic creating localised negative impact to the surrounding road network.

A risk matrix has been prepared to assist with rating the risk of deviation to the procedures described in this report. The risk matrix is shown in Table 36 using the following definitions:

Risk Rating

- Very High (VH)
- High (H)
- Medium (M)
- Low (L)

Consequence

- Insignificant: Illness, first aid or injury not requiring medical treatment. No lost time.
- Minor: Minor injury or illness requiring medical treatment. No lost time post medical treatment.
- Moderate: Minor injuries or illnesses resulting in lost time.
- Major: 1 to 10 serious injuries or illnesses resulting in lost time or potential permanent impairment.
- Severe: single fatality and/or 11 to 20 serious injuries or illnesses resulting in lost time or potential permanent impairment.
- Catastrophic: multiple fatalities and/or more than 20 serious injuries or illnesses resulting in lost time or potential permanent impairment.

Likelihood

- Almost certain: expected to occur multiple times (10 or more times) during any given year.
- Very likely: expected to occur occasionally (1 to 10 times) during any given year.
- Likely: expected to occur once during any given year.
- Unlikely: expected to occur once every 1 to 10 years.
- Very unlikely: expected to occur once every 10 to 100 years.
- Almost unprecedented: not expected to occur in the next 100 years.

The resulting level of risk and treatment approach is:

Intolerable: Must be corrected.

High: Should be corrected or the risk significantly reduced, even if the treatment costs is high.

Medium: Should be corrected or the risk significantly reduced, if the treatment cost is moderate, but not high.

Low: Should be corrected or the risk reduced if the treatment cost is low.

Table 36 - Risk Matrix

Likelihood	Consequence						
		Insignificant	Minor	Moderate	Major	Severe	Catastrophic
	Almost certain						
	Very likely						
	Likely						
	Unlikely						
	Very unlikely		R2				
	Almost unprecedented				R1		

Some recommended risk mitigation measures include:

- Implementation of traffic control where required to reduce potential conflict between road users.
- Adequate signage and warning of the ongoing construction activity at the site.

7.27. Contact Details for On-Site Enquiries and Site Access

The following contact details for on-site enquiries are to be utilised.

Role	Name	Email	Phone
Design Director	Adrian Topping	AdrianTopping@built.com.au	0413641343

7.28. Maintenance of Roads and Footpaths

The roads and footpaths along the route of travel will be kept in a serviceable state at all times. Any damage arising as a result of the proposed truck movements will be treated / repaired by the Principal Contractor at no cost to Council.

8. Summary and Conclusion

In summary, Built has engaged ptc. to assess the potential intersection performance on Nelson Bay Road/ Williamtown Drive and intersection Aerospace Avenue / Williamtown Drive, accounting for additional traffic from BAE development and redistribute the traffic to use Jeffries Circuit.

Traffic modelling was undertaken using SIDRA focusing on the intersection Nelson Bay Road/ Williamtown Drive and Intersection Aerospace Avenue / Williamtown Drive, for existing year 2024 and proposed future year 2034.

The summary intersection results are outlined in Table 37 and Table 38.

Table 37 – Summary of Results (Overall Intersection) – Intersection Nelson Bay Road/ Williamtown Drive

Scenario	Option Description	DOS (AM)	LOS (AM)	DOS (PM)	LOS (PM)
Base Option	2024 Existing traffic	0.528	A	0.535	B
Future Do Minimum	2034 forecast traffic volumes without development trips	0.690	B	0.667	B
Future Post-development	2034 forecast traffic volumes with development trips	0.683	B	0.714	B

Table 38 – Summary of Results (Overall Intersection) – Intersection Jeffries Circuit/ Williamtown Drive

Scenario	Option Description	DOS (AM)	LOS (AM)	DOS (PM)	LOS (PM)
Base Option	2024 Existing traffic	0.097	A	0.133	A
Future Do Minimum	2034 forecast traffic volumes without development trips	0.123	A	0.169	A
Future Post-development	2034 forecast traffic volumes with development trips	0.172	A	0.212	A

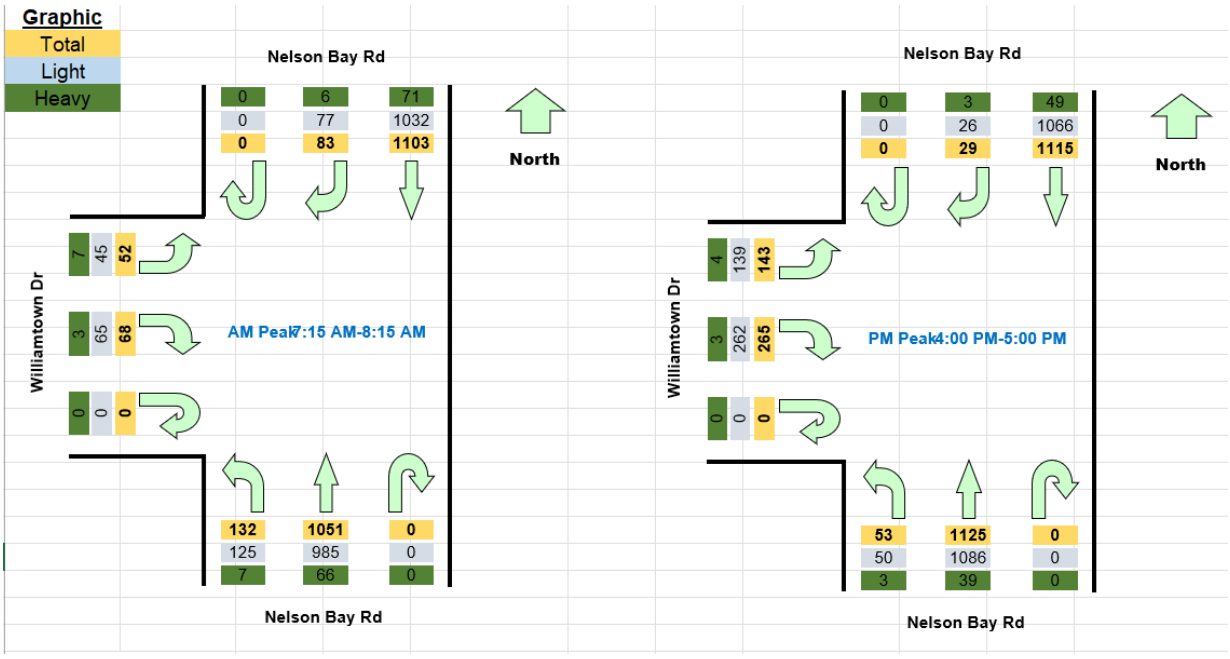
The results indicate that:

- The additional traffic from the BAE development will have minimal impact on the performance of intersection Nelson Bay Road/ Williamtown Drive and intersection Jeffries Circuit and Williamtown Drive.
- As a result of the construction of new access to the site via Aerospace Avenue and Jeffries Circuit, the existing BAESA traffic will be redirected to these new access, thus reducing the site related traffic on Williamtown Drive.

The development design is found to meet the requirements of the AS2890 suite of standards.

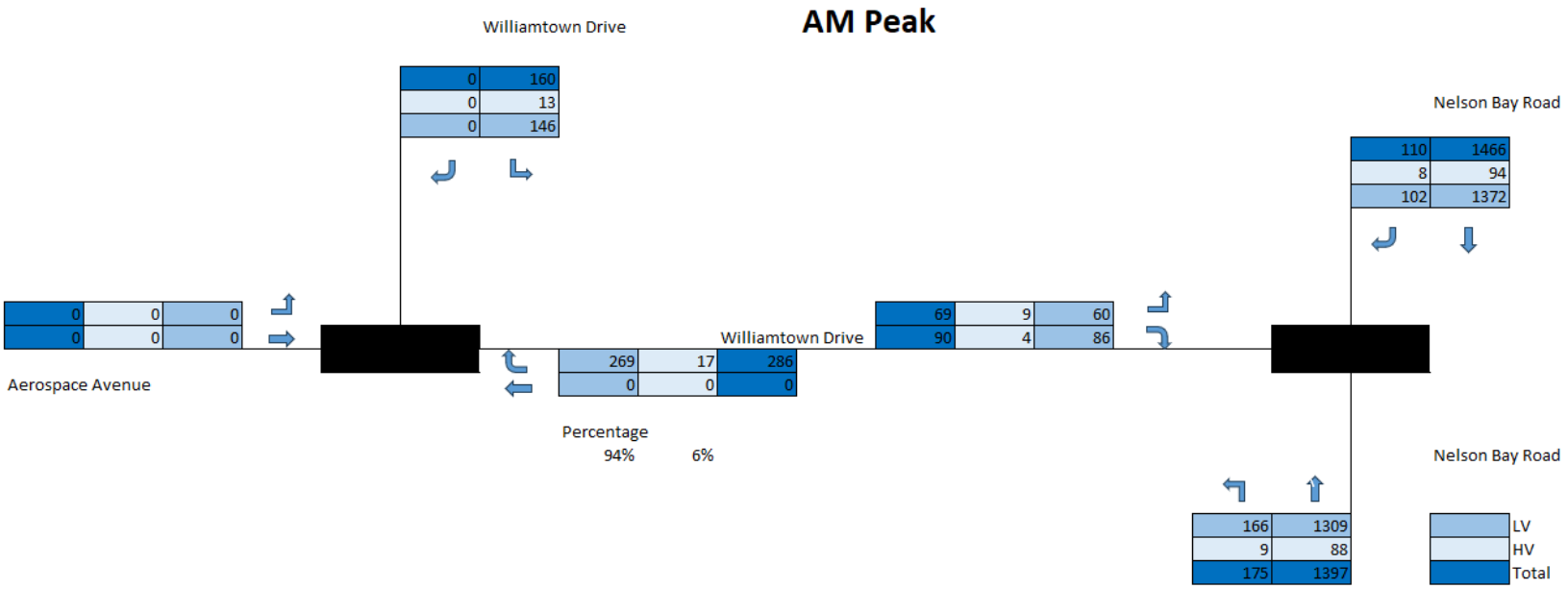
The development is supported from a traffic engineering perspective.

Appendix A. Survey Data (TTS)

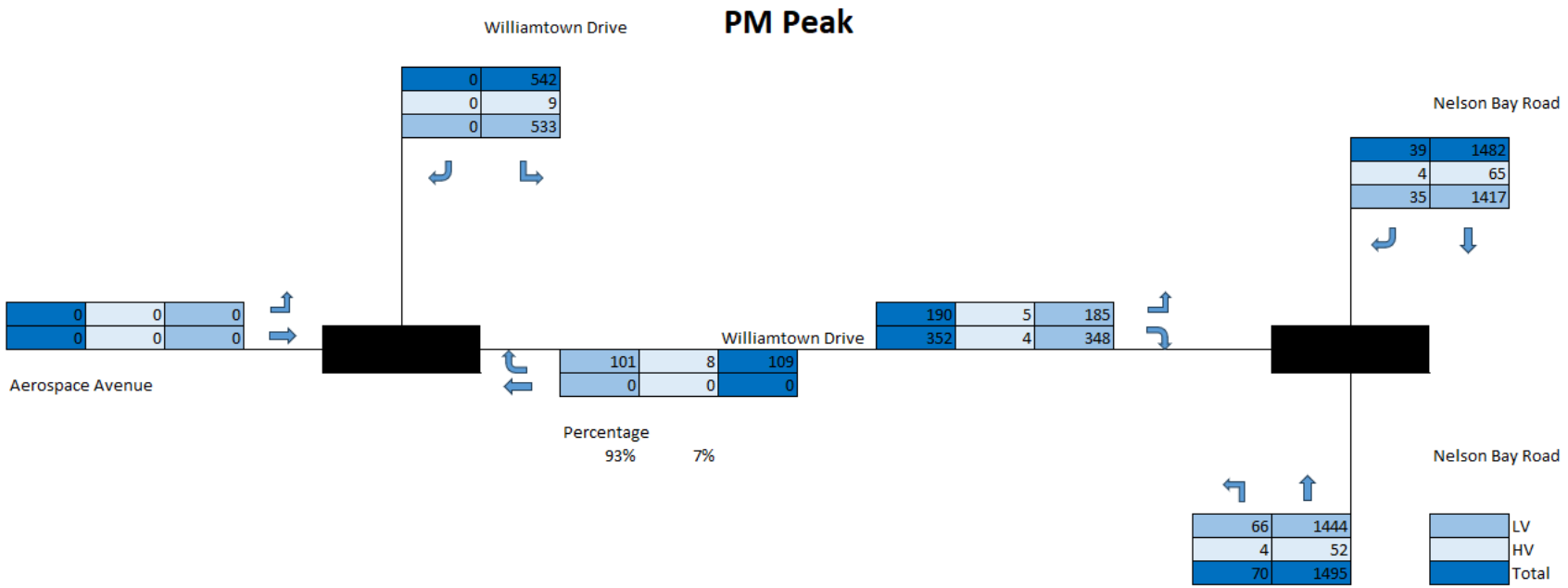


Appendix B. Detailed Vehicle Demand Stick Diagram

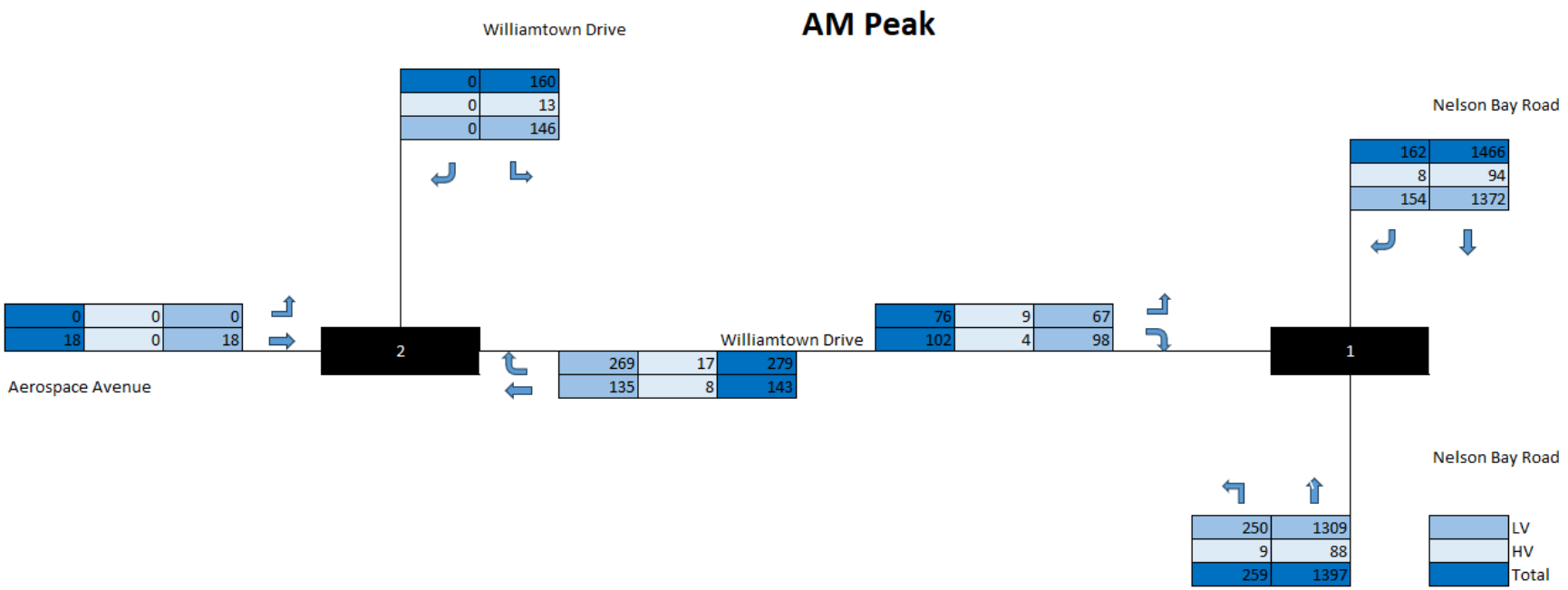
2034 Future Do Minimum Scenario – AM Peak



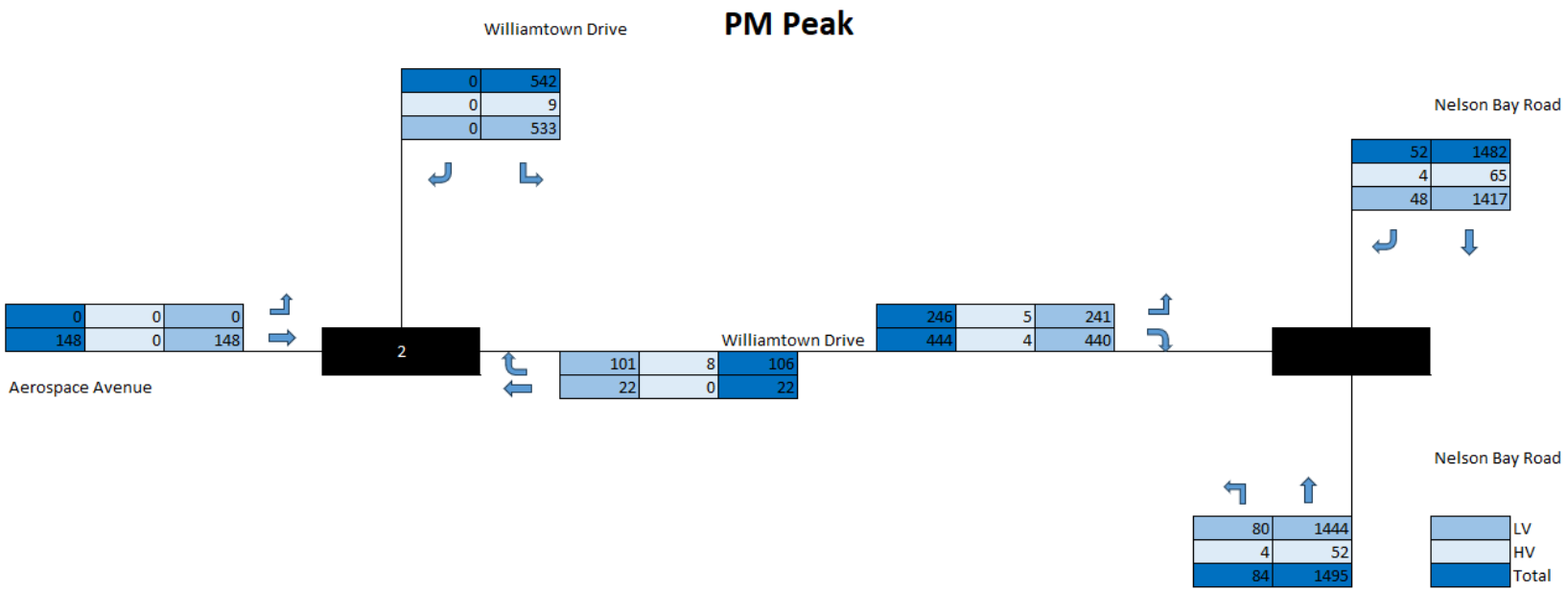
2034 Future Do Minimum Scenario – PM Peak



2034 Future Post-development Scenario – AM Peak



2034 Future Post-development Scenario – PM Peak



Appendix C. Swept Path Assessment

GUARDHOUSE DEMOUNTABLE

NEW PERIMETER FENCING

REGRADING TO CIVIL ENGINEER'S DETAILS

SITE BOUNDARY

SITE BOUNDARY

LANSCAPED AREA
1,423 SQM

LOT 100

1
DA200

REGRADING WORKS TO CIVIL ENGINEER'S DETAILS

OUTLINE OF NEW FACILITY SUBJECT TO SEPARATE SSDA

SITE BOUNDARY

EXISTING SUB-STATION

5000

5000

5000

NEW PERIMETER FENCING

JEFFRIES CIRCUIT

TREES TO BE REPLACED WITH LOW LEVEL PLANTING

LANDSCAPE
39 SQM

EXTENT OF CANOPY ABOVE

56 COVERED PARKING SLOTS

TRUCK TURNAROUND TO GUARD HOUSE

EXTENT OF CANOPY ABOVE

LOT 101

5.80

NEW PERIMETER FENCING

EXISTING DRAINAGE PIT

6.00

NO ENTRY

INTERNAL FENCE

7.00

22 COVERED PARKING SLOTS

6.17

FOR VISITOR AND CONTRACTOR

EXTENT OF CANOPY ABOVE

10 x BICYCLE PARKING

6.00

7.00

CAR SPACES: 261 TOTAL
inc 3 small car bays, 7 visitor spaces & 6 accessible spaces
M/C SPACES: 4

AWNING OVER

Cars Only

All Vehicles

14.00

3.00

3.50

0.60

0.60

INTERNAL FENCE

3.50

LANDSCAPE
68 SQM

33.00 (5 car queue)

KEEP CLEAR

TURNING BAY

CONTINUED ON SHEET DA011

3.00

5.80

5.80

LOT 102

TURNING BAY

CONTINUED ON SHEET DA011

IN LINE KERB RAMPS

NEW PERIMETER FENCING

LIGHTING TO CIVIL ENGINEER'S DRAWINGS

SITE BOUNDARY

PROPOSED LANDSCAPING
EXISTING PATHWAY

Rejection of AV Requires Traffic Management

7.17

NEW CONCRETE FOOTPAT

NEW ASPHALT AND ROADS TO CIVIL ENGINEER'S DETAILS

13.65

EXISTING KERB AND LANDSCAPING

TREES TO BE REPLACED WITH LOW LEVEL PLANTING
REFER LANDSCAPE DRAWINGS FOR DETAILS

1 metre diameter convex mirror

79526

B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m

HRV - Heavy Rigid Vehicle

Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.417m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

AV - Articulated Vehicle

Overall Length	19.000m
Overall Width	2.500m
Overall Body Height	4.301m
Min Body Ground Clearance	0.418m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

ptc.
Suite 502, 1 James Place
North Sydney NSW 2060
t +61 2 8920 0800
ptcconsultants.co

REV	DATE	DESCRIPTION	DRAWN	REVIEWED
7	24.07.24	FOR INFORMATION	JAJ	SW
6	01/07/24	FOR INFORMATION	JAJ	SW
5	25/06/24	FOR INFORMATION	JAJ	SW
4	19/06/24	FOR INFORMATION	JAJ	SW
3	11/06/24	UPDATED 2 LANE LAYOUT	SW	SW/JAJ
2	29/05/24	UPDATED ASSESSMENT	SW	SW
1	23.05.24	FOR INFORMATION	JAJ	SW
8	11.09.24	FOR INFORMATION	JJ	SW

The turning paths illustrated in this drawing have been prepared using the Autotrack vehicle modelling software in conjunction with AutoCAD. The vehicle model was prepared by Analytico Pty Ltd based upon vehicle data provided by Austroads. While this modelling represents a conservative assessment of the vehicles ability, it is not possible to account for all vehicle types/characteristics or driver ability.

PROJECT
BAE WILLIAMTOWN

DRAWING TITLE
SITE ASSESSMENT
2 lane entry
sheet 1

CLIENT	BUILT
DRAWING #	ptc-002
PROJECT #	22-0563
SCALE	1 : 250 @ A1

PRELIMINARY

REV 8

CAR SPACES: 261 TOTAL
inc 3 small car bays, 7 visitor spaces & 6 accessible spaces
M/C SPACES: 4

125591 | 28800 | 7877 GUARDHOUSE | 1200 | 12000 DEMOUNTABLE | 38275

NEW PERIMIETER FENCING
REGRADING TO CIVIL ENGINEER'S DETAILS
SITE BOUNDARY
LANSCAPED AREA
1,423 SQM
LOT 100
REGRADING WORKS TO CIVIL ENGINEER'S DETAILS
OUTLINE OF NEW FACILITY SUBJECT TO SEPARATE SSDA
EXISTING SUB-STATION
LANDSCAPE 39 SQM
NEW PERIMETER FENCING
JEFFRIES CIRCUIT
EXTENT OF CANOPY ABOVE
56 COVERED PARKING SLOTS
TRUCK CALL BUTTON TO GUARD HOUSE
EXTENT OF CANOPY ABOVE
LOT 101
NEW PERIMETER FENCING
EXISTING DRAINAGE PIT
INTERNAL FENCE
22 COVERED PARKING SLOTS
NO ENTRY
FOR VISITOR AND CONTRACTOR
10 x BICYCLE PARKING
EXTENT OF CANOPY ABOVE
PROPOSED LOCATION OF RELOCATED NBN PIT
LOT 103
FENCE
NEW DRIVEWAY CROSSING TO CIVIL ENGINEER'S DETAILS
AWNING OVER
Cars Only
All Vehicles
BOOM GATE
INTERNAL FENCE
JEFFRIES CIRCUIT
LANDSCAPE 68 SQM
33.00 (5 car queue)
EXISTING KERB AND LANDSCAPING
TREES TO BE REPLACED WITH LOW LEVEL PLANTING
REFER LANDSCAPE DRAWINGS FOR DE...
LOT 102
KEEP CLEAR
TURNING BAY
CONTINUED ON SHEET DA011
IN LINE KERB RAMPS
NEW CONCRETE FOOTPATH
NEW ASPHALT AND ROADS TO CIVIL ENGINEER'S DETAILS
PROPOSED LANDSCAPING
EXISTING PATHWAY
NEW PERIMETER FENCING
LIGHTING TO CIVIL ENGINEER'S DRAWINGS

B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m

HRV - Heavy Rigid Vehicle

Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.417m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

AV - Articulated Vehicle

Overall Length	19.000m
Overall Width	2.500m
Overall Body Height	4.301m
Min Body Ground Clearance	0.418m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

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ptcconsultants.co

REV	DATE	DESCRIPTION	DRAWN	REVIEWED
7	24.07.24	FOR INFORMATION	JAJ	SW
6	01/07/24	FOR INFORMATION	JAJ	SW
5	25/06/24	FOR INFORMATION	JAJ	SW
4	19/06/24	FOR INFORMATION	JAJ	SW
3	11/06/24	UPDATED 2 LANE LAYOUT	SW	SW/JAJ
2	29/05/24	UPDATED ASSESSMENT	SW	SW
1	23.05.24	FOR INFORMATION	JAJ	SW
8	11.09.24	FOR INFORMATION	JJ	SW

The turning paths illustrated in this drawing have been prepared using the Autotrack vehicle modelling software in conjunction with AutoCAD. The vehicle model was prepared by Analytico Pty Ltd based upon vehicle data provided by Austroads. While this modelling represents a conservative assessment of the vehicles ability, it is not possible to account for all vehicle types/characteristics or driver ability.

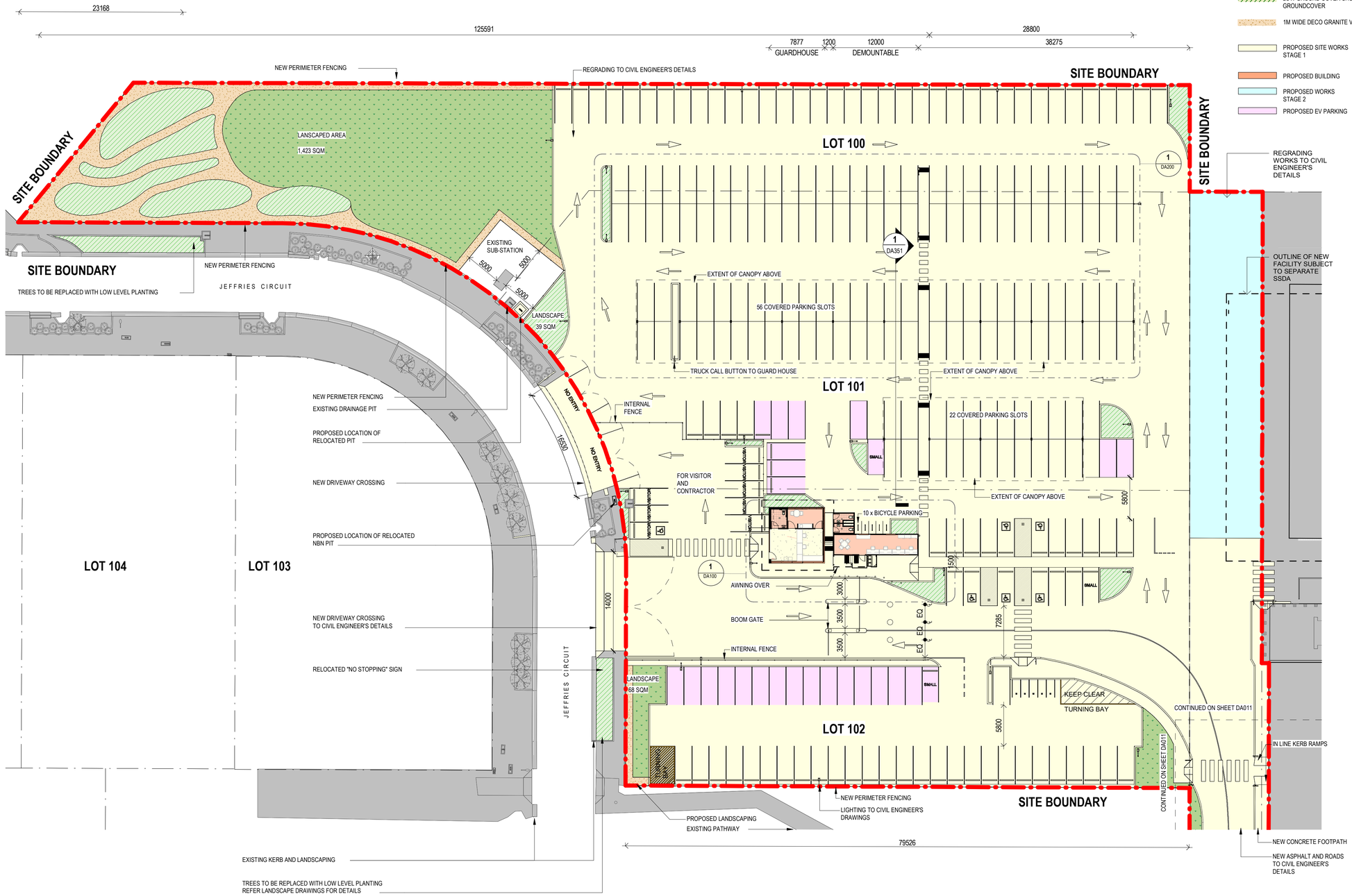
PROJECT
BAE WILLIAMTOWN

DRAWING TITLE
SITE ASSESSMENT
2 lane entry
sheet 2

CLIENT	BUILT
DRAWING #	ptc-002
PROJECT #	22-0563
SCALE	1 : 250 @ A1

PRELIMINARY
REV 8

Appendix D. Architectural Drawings



LEGEND

- LOT BOUNDARY
- SITE BOUNDARY
- EXISTING
- PROPOSED TURF
- PROPOSED GROUNDCOVER
- LOW GROUND COVER SHURBS & GROUNDCOVER
- 1M WIDE DECO GRANITE VERGE
- PROPOSED SITE WORKS STAGE 1
- PROPOSED BUILDING
- PROPOSED WORKS STAGE 2
- PROPOSED EV PARKING

0 3 6 9 12 15 m

SCALE BAR - 1:300

DRAWING TO BE PRINTED IN COLOUR

PLOTTED : 6/09/2024 2:29:59 PM

OFFICIAL

BAE SYSTEMS PROPRIETARY

No	DATE	REVISIONS	BY
M	06/09/2024	DEVELOPMENT APPLICATION ISSUE	CK

ENVIRONMENTAL ENGINEER: sonversa

PROJECT MANAGER: rps

GEOTECHNICAL ENGINEER: PSM

TRAFFIC ENGINEER: ptc.

BCA / DDA CONSULTANT: JENSEN HUGHES

PCA CONSULTANT: newcert

ENGINEER: NORTHROP

D&C CONTRACTOR: Built

ARCHITECT

DesignInc

DesignInc Sydney Pty Ltd
Level 12, 126 Phillip Street
Sydney NSW 2000 Australia
+61 2 8905 7100
sydney@designinc.com.au

Nominated Architects

Ian Armstrong	7260
Cathryn Drew-Bredin	7269
Mary Anne McGirr	10946
Cameron Martin	9194

CLIENT: BAE SYSTEMS

PROJECT

PRECINCT ENTRY WORKS

WILLIAMTOWN, NSW

DETAILS

DRAWN	SG	SCALE
CHECKED	CK	
APPROVED	CDB	1:300 @ A1

TITLE

PROPOSED GROUND FLOOR PLAN
01

STATUS

DEVELOPMENT APPLICATION

DRAWING NUMBER: DA010

REVISION: M

NOT FOR CONSTRUCTION

Appendix E. Detailed SIDRA results

MOVEMENT SUMMARY

Site: TCS4174 [2024 Nelson Bay Road / Williamtown Drive - AM Peak (Site Folder: 2024 Base Year Scenario)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2024 AM Peak (Network Folder: 2024 Scenario 1_ Base Year Scenario)]

Existing AM Peak
Peak hour: 7:15am - 8:15am
Survey date: 18/08/2022
Site Category: Proposed Design 1
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
NorthEast: Nelson Bay Road (N)															
8	T1	All MCs	1217	6.4	1217	6.4	0.446	6.2	LOS A	14.5	107.0	0.39	0.35	0.39	72.2
9	R2	All MCs	92	6.9	92	6.9	* 0.263	17.1	LOS B	1.9	14.1	0.57	0.73	0.57	51.3
Approach			1308	6.4	1308	6.4	0.446	7.0	LOS A	14.5	107.0	0.40	0.38	0.40	71.1
NorthWest: Williamtown Drive (W)															
10	L2	All MCs	57	13.0	57	13.0	0.039	6.0	LOS A	0.0	0.0	0.00	0.46	0.00	46.1
12	R2	All MCs	75	4.2	75	4.2	* 0.172	64.0	LOS E	2.3	16.8	0.93	0.73	0.93	27.6
Approach			132	8.0	132	8.0	0.172	39.0	LOS C	2.3	16.8	0.53	0.61	0.53	33.7
SouthWest: Nelson Bay Road (S)															
1	L2	All MCs	145	5.1	145	5.1	0.092	7.7	LOS A	0.0	0.0	0.00	0.60	0.00	63.1
2	T1	All MCs	1160	6.3	1160	6.3	* 0.528	16.3	LOS B	22.2	163.5	0.62	0.56	0.62	62.3
Approach			1305	6.1	1305	6.1	0.528	15.3	LOS B	22.2	163.5	0.55	0.56	0.55	62.3
All Vehicles			2745	6.4	2745	6.4	0.528	12.5	LOS A	22.2	163.5	0.48	0.48	0.48	64.1

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthEast: Nelson Bay Road (N)											
P3	Full	53	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92
NorthWest: Williamtown Drive (W)											
P4	Full	53	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92
SouthWest: Nelson Bay Road (S)											
P1	Full	53	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92
All Pedestrians		158	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92

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

MOVEMENT SUMMARY

Site: 101 [2024 Jeffries Circuit/ Wiliamtown Drive - AM Peak (Site Folder: 2024 Base Year Scenario)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2024 AM Peak (Network Folder: 2024 Scenario 1_ Base Year Scenario)]

2. Jeffries Circuit/ Wiliamtown Drive - AM Peak
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Williamtown Drive															
21a	L1	All MCs	1	0.0	1	0.0	0.051	3.2	LOS A	0.2	1.6	0.01	0.60	0.01	51.1
23a	R1	All MCs	238	6.2	238	6.2	0.097	8.3	LOS A	0.4	3.2	0.01	0.60	0.01	50.0
Approach			239	6.2	239	6.2	0.097	8.2	LOS A	0.4	3.2	0.01	0.60	0.01	50.0
North: Williamtown Drive															
7a	L1	All MCs	132	8.0	132	8.0	0.041	2.5	LOS A	0.2	1.6	0.02	0.28	0.02	55.5
9	R2	All MCs	1	0.0	1	0.0	0.041	7.5	LOS A	0.2	1.6	0.02	0.28	0.02	51.8
Approach			133	7.9	133	7.9	0.041	2.5	LOS A	0.2	1.6	0.02	0.28	0.02	55.5
West: Jeffries Circuit															
10	L2	All MCs	1	0.0	1	0.0	0.001	2.7	LOS A	0.0	0.0	0.32	0.41	0.32	47.8
12a	R1	All MCs	1	0.0	1	0.0	0.001	8.8	LOS A	0.0	0.0	0.30	0.46	0.30	46.6
Approach			2	0.0	2	0.0	0.001	5.7	LOS A	0.0	0.0	0.31	0.43	0.31	47.4
All Vehicles			374	6.8	374	6.8	0.097	6.2	LOS A	0.4	3.2	0.02	0.48	0.02	51.3

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

MOVEMENT SUMMARY

Site: TCS4174 [2024 Nelson Bay Road / Williamtown Drive - PM Peak (Site Folder: 2024 Base Year Scenario)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2024 PM Peak (Network Folder: 2024 Scenario 1_ Base Year Scenario)]

Existing PM Peak
Peak hour: 4:00pm - 5:00pm
Survey date: 18/08/2022
Site Category: Proposed Design 1
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
NorthEast: Nelson Bay Road (N)															
8	T1	All MCs	1231	4.4	1231	4.4	0.459	7.8	LOS A	16.4	118.8	0.43	0.39	0.43	70.4
9	R2	All MCs	32	10.0	32	10.0	* 0.136	17.5	LOS B	0.6	4.8	0.54	0.69	0.54	50.9
Approach			1262	4.5	1262	4.5	0.459	8.0	LOS A	16.4	118.8	0.44	0.40	0.44	70.1
NorthWest: Williamtown Drive (W)															
10	L2	All MCs	158	2.7	158	2.7	0.097	6.0	LOS A	0.0	0.0	0.00	0.47	0.00	46.2
12	R2	All MCs	293	1.1	293	1.1	* 0.535	64.0	LOS E	9.4	66.1	0.97	0.80	0.97	27.9
Approach			451	1.6	451	1.6	0.535	43.7	LOS D	9.4	66.1	0.63	0.69	0.63	32.6
SouthWest: Nelson Bay Road (S)															
1	L2	All MCs	58	5.5	58	5.5	0.037	7.7	LOS A	0.0	0.0	0.00	0.60	0.00	63.2
2	T1	All MCs	1242	3.5	1242	3.5	* 0.520	13.6	LOS A	21.9	158.2	0.57	0.52	0.57	64.6
Approach			1300	3.6	1300	3.6	0.520	13.4	LOS A	21.9	158.2	0.55	0.52	0.55	64.6
All Vehicles			3013	3.7	3013	3.7	0.535	15.7	LOS B	21.9	158.2	0.51	0.50	0.51	59.8

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthEast: Nelson Bay Road (N)											
P3	Full	53	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92
NorthWest: Williamtown Drive (W)											
P4	Full	53	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92
SouthWest: Nelson Bay Road (S)											
P1	Full	53	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92
All Pedestrians		158	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92

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

MOVEMENT SUMMARY

Site: 101 [2024 Jeffries Circuit/ Wiliamtown Drive - PM Peak (Site Folder: 2024 Base Year Scenario)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2024 PM Peak (Network Folder: 2024 Scenario 1_ Base Year Scenario)]

2. Jeffries Circuit/ Wiliamtown Drive - AM Peak
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Williamtown Drive															
21a	L1	All MCs	1	0.0	1	0.0	0.020	3.2	LOS A	0.1	0.6	0.01	0.59	0.01	51.3
23a	R1	All MCs	91	7.0	91	7.0	0.038	8.2	LOS A	0.2	1.2	0.01	0.60	0.01	50.0
Approach			92	6.9	92	6.9	0.038	8.1	LOS A	0.2	1.2	0.01	0.60	0.01	50.0
North: Williamtown Drive															
7a	L1	All MCs	449	1.6	449	1.6	0.133	2.4	LOS A	0.7	5.3	0.02	0.28	0.02	55.6
9	R2	All MCs	1	0.0	1	0.0	0.133	7.5	LOS A	0.7	5.2	0.02	0.28	0.02	51.9
Approach			451	1.6	451	1.6	0.133	2.4	LOS A	0.7	5.3	0.02	0.28	0.02	55.6
West: Jeffries Circuit															
10	L2	All MCs	1	0.0	1	0.0	0.001	2.2	LOS A	0.0	0.0	0.20	0.39	0.20	48.1
12a	R1	All MCs	1	0.0	1	0.0	0.001	8.4	LOS A	0.0	0.0	0.18	0.45	0.18	47.2
Approach			2	0.0	2	0.0	0.001	5.3	LOS A	0.0	0.0	0.19	0.42	0.19	47.8
All Vehicles			544	2.5	544	2.5	0.133	3.4	LOS A	0.7	5.3	0.02	0.33	0.02	54.1

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

MOVEMENT SUMMARY

Site: TCS4174 [2034 Nelson Bay Road / Williamtown Drive - AM Peak (Site Folder: 2034 Do Min Scenario)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2034 Do Min AM Peak (Network Folder: 2034 Scenario 2_Future Do Min Scenario)]

Existing AM Peak
Peak hour: 7:15am - 8:15am
Survey date: 18/08/2022
Site Category: Proposed Design 1
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
NorthEast: Nelson Bay Road (N)															
8	T1	All MCs	1543	6.4	1543	6.4	0.565	7.2	LOS A	21.4	157.7	0.45	0.42	0.45	71.1
9	R2	All MCs	116	7.3	116	7.3	* 0.436	26.1	LOS B	4.6	34.0	0.83	0.81	0.83	43.1
Approach			1659	6.5	1659	6.5	0.565	8.5	LOS A	21.4	157.7	0.48	0.44	0.48	69.3
NorthWest: Williamtown Drive (W)															
10	L2	All MCs	73	13.0	73	13.0	0.050	6.6	LOS A	0.0	0.0	0.00	0.46	0.00	46.1
12	R2	All MCs	95	4.4	95	4.4	* 0.219	64.5	LOS E	3.0	21.5	0.93	0.74	0.93	27.5
Approach			167	8.2	167	8.2	0.219	39.4	LOS C	3.0	21.5	0.53	0.62	0.53	33.6
SouthWest: Nelson Bay Road (S)															
1	L2	All MCs	184	5.1	184	5.1	0.117	7.7	LOS A	0.0	0.0	0.00	0.60	0.00	63.1
2	T1	All MCs	1471	6.3	1471	6.3	* 0.690	20.3	LOS B	34.0	251.0	0.72	0.66	0.72	60.4
Approach			1655	6.2	1655	6.2	0.690	19.3	LOS B	34.0	251.0	0.64	0.65	0.64	60.6
All Vehicles			3481	6.4	3481	6.4	0.690	14.9	LOS B	34.0	251.0	0.56	0.55	0.56	62.5

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthEast: Nelson Bay Road (N)											
P3	Full	53	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92
NorthWest: Williamtown Drive (W)											
P4	Full	53	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92
SouthWest: Nelson Bay Road (S)											
P1	Full	53	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92
All Pedestrians		158	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92

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

MOVEMENT SUMMARY

Site: 101 [2034 Jeffries Circuit/ Wiliamtown Drive - AM Peak (Site Folder: 2034 Do Min Scenario)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2034 Do Min AM Peak (Network Folder: 2034 Scenario 2_Future Do Min Scenario)]

2. Jeffries Circuit/ Wiliamtown Drive - AM Peak
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Williamtown Drive															
21a	L1	All MCs	1	0.0	1	0.0	0.064	3.2	LOS A	0.3	2.0	0.01	0.60	0.01	51.1
23a	R1	All MCs	301	5.9	301	5.9	0.123	8.3	LOS A	0.5	4.0	0.01	0.60	0.01	50.0
Approach			302	5.9	302	5.9	0.123	8.3	LOS A	0.5	4.0	0.01	0.60	0.01	50.0
North: Williamtown Drive															
7a	L1	All MCs	167	8.2	167	8.2	0.052	2.5	LOS A	0.3	2.1	0.02	0.28	0.02	55.6
9	R2	All MCs	1	0.0	1	0.0	0.052	7.5	LOS A	0.3	2.1	0.02	0.28	0.02	51.9
Approach			168	8.1	168	8.1	0.052	2.5	LOS A	0.3	2.1	0.02	0.28	0.02	55.5
West: Jeffries Circuit															
10	L2	All MCs	1	0.0	1	0.0	0.001	2.9	LOS A	0.0	0.0	0.35	0.42	0.35	47.7
12a	R1	All MCs	1	0.0	1	0.0	0.001	8.9	LOS A	0.0	0.0	0.34	0.46	0.34	46.5
Approach			2	0.0	2	0.0	0.001	5.9	LOS A	0.0	0.0	0.34	0.44	0.34	47.2
All Vehicles			473	6.7	473	6.7	0.123	6.2	LOS A	0.5	4.0	0.02	0.48	0.02	51.3

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

MOVEMENT SUMMARY

Site: TCS4174 [2034 Nelson Bay Road / Williamtown Drive - PM Peak (Site Folder: 2034 Do Min Scenario)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2034 Do Min PM Peak (Network Folder: 2034 Scenario 2_Future Do Min Scenario)]

Existing PM Peak
Peak hour: 4:00pm - 5:00pm
Survey date: 18/08/2022
Site Category: Proposed Design 1
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
NorthEast: Nelson Bay Road (N)															
8	T1	All MCs	1560	4.4	1560	4.4	0.584	9.1	LOS A	24.2	175.7	0.50	0.46	0.50	69.1
9	R2	All MCs	41	10.3	41	10.3	* 0.249	22.8	LOS B	1.1	8.5	0.67	0.73	0.67	46.0
Approach			1601	4.5	1601	4.5	0.584	9.4	LOS A	24.2	175.7	0.51	0.47	0.51	68.6
NorthWest: Williamtown Drive (W)															
10	L2	All MCs	200	2.6	200	2.6	0.123	6.8	LOS A	0.0	0.0	0.00	0.47	0.00	46.2
12	R2	All MCs	371	1.1	371	1.1	* 0.677	66.1	LOS E	12.3	86.7	1.00	0.84	1.02	27.4
Approach			571	1.7	571	1.7	0.677	45.3	LOS D	12.3	86.7	0.65	0.71	0.66	32.2
SouthWest: Nelson Bay Road (S)															
1	L2	All MCs	74	5.7	74	5.7	0.047	7.8	LOS A	0.0	0.0	0.00	0.60	0.00	63.2
2	T1	All MCs	1575	3.5	1575	3.5	* 0.670	17.8	LOS B	33.1	238.8	0.67	0.62	0.67	62.5
Approach			1648	3.6	1648	3.6	0.670	17.5	LOS B	33.1	238.8	0.64	0.62	0.64	62.5
All Vehicles			3820	3.7	3820	3.7	0.677	18.2	LOS B	33.1	238.8	0.59	0.57	0.59	58.4

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthEast: Nelson Bay Road (N)											
P3	Full	53	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92
NorthWest: Williamtown Drive (W)											
P4	Full	53	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92
SouthWest: Nelson Bay Road (S)											
P1	Full	53	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92
All Pedestrians		158	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92

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

MOVEMENT SUMMARY

Site: 101 [2034 Jeffries Circuit/ Wiliamtown Drive - PM Peak (Site Folder: 2034 Do Min Scenario)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2034 Do Min PM Peak (Network Folder: 2034 Scenario 2_Future Do Min Scenario)]

2. Jeffries Circuit/ Wiliamtown Drive - AM Peak
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Williamtown Drive															
21a	L1	All MCs	1	0.0	1	0.0	0.025	3.2	LOS A	0.1	0.8	0.01	0.59	0.01	51.2
23a	R1	All MCs	115	7.3	115	7.3	0.048	8.2	LOS A	0.2	1.5	0.01	0.60	0.01	50.0
Approach			116	7.3	116	7.3	0.048	8.2	LOS A	0.2	1.5	0.01	0.60	0.01	50.0
North: Williamtown Drive															
7a	L1	All MCs	571	1.7	571	1.7	0.169	2.4	LOS A	1.0	7.0	0.02	0.27	0.02	55.6
9	R2	All MCs	1	0.0	1	0.0	0.169	7.5	LOS A	1.0	6.9	0.02	0.28	0.02	51.9
Approach			572	1.7	572	1.7	0.169	2.4	LOS A	1.0	7.0	0.02	0.27	0.02	55.6
West: Jeffries Circuit															
10	L2	All MCs	1	0.0	1	0.0	0.001	2.3	LOS A	0.0	0.0	0.22	0.39	0.22	48.0
12a	R1	All MCs	1	0.0	1	0.0	0.001	8.5	LOS A	0.0	0.0	0.21	0.45	0.21	47.1
Approach			2	0.0	2	0.0	0.001	5.4	LOS A	0.0	0.0	0.22	0.42	0.22	47.7
All Vehicles			689	2.6	689	2.6	0.169	3.4	LOS A	1.0	7.0	0.02	0.33	0.02	54.1

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

MOVEMENT SUMMARY

Site: TCS4174 [2034 Nelson Bay Road / Williamtown Drive - AM Peak (Site Folder: 2034 Future Post-development Scenario)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2034 Future Post Development AM Peak (Network Folder: 2034 Scenario 3_Future Post Development Scenario)]

Existing AM Peak
Peak hour: 7:15am - 8:15am
Survey date: 18/08/2022
Site Category: Proposed Design 1
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
NorthEast: Nelson Bay Road (N)															
8	T1	All MCs	1543	6.4	1543	6.4	0.565	7.2	LOS A	21.4	157.7	0.45	0.42	0.45	71.1
9	R2	All MCs	171	4.9	171	4.9	* 0.682	36.1	LOS C	9.0	65.8	1.00	0.90	1.04	36.5
Approach			1714	6.3	1714	6.3	0.682	10.1	LOS A	21.4	157.7	0.51	0.46	0.51	67.5
NorthWest: Williamtown Drive (W)															
10	L2	All MCs	80	11.8	80	11.8	0.054	6.5	LOS A	0.0	0.0	0.00	0.46	0.00	46.1
12	R2	All MCs	107	3.9	107	3.9	* 0.247	64.8	LOS E	3.4	24.3	0.94	0.75	0.94	27.5
Approach			187	7.3	187	7.3	0.247	39.9	LOS C	3.4	24.3	0.54	0.62	0.54	33.5
SouthWest: Nelson Bay Road (S)															
1	L2	All MCs	273	3.5	273	3.5	0.170	7.7	LOS A	0.0	0.0	0.00	0.60	0.00	63.1
2	T1	All MCs	1471	6.3	1471	6.3	* 0.683	18.5	LOS B	33.5	247.2	0.70	0.64	0.70	61.4
Approach			1743	5.9	1743	5.9	0.683	17.2	LOS B	33.5	247.2	0.59	0.64	0.59	61.5
All Vehicles			3644	6.1	3644	6.1	0.683	14.8	LOS B	33.5	247.2	0.55	0.55	0.55	62.1

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthEast: Nelson Bay Road (N)											
P3	Full	53	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92
NorthWest: Williamtown Drive (W)											
P4	Full	53	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92
SouthWest: Nelson Bay Road (S)											
P1	Full	53	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92

All Pedestrians	158	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92

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

MOVEMENT SUMMARY

Site: 101 [2034 Jeffries Circuit/ Wiliamtown Drive - AM Peak (Site Folder: 2034 Future Post-development Scenario)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2034 Future Post Development AM Peak (Network Folder: 2034 Scenario 3_Future Post Development Scenario)]

2. Jeffries Circuit/ Wiliamtown Drive - AM Peak
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Williamtown Drive															
21a	L1	All MCs	151	5.6	151	5.6	0.106	3.2	LOS A	0.5	3.4	0.01	0.34	0.01	55.3
23a	R1	All MCs	301	5.9	301	5.9	0.172	8.2	LOS A	0.8	5.9	0.01	0.60	0.01	50.0
Approach			452	5.8	452	5.8	0.172	6.5	LOS A	0.8	5.9	0.01	0.51	0.01	51.6
North: Williamtown Drive															
7a	L1	All MCs	167	8.2	167	8.2	0.056	2.5	LOS A	0.3	2.3	0.10	0.27	0.10	54.7
9	R2	All MCs	1	0.0	1	0.0	0.056	7.5	LOS A	0.3	2.3	0.10	0.28	0.10	51.5
Approach			168	8.1	168	8.1	0.056	2.6	LOS A	0.3	2.3	0.10	0.27	0.10	54.7
West: Jeffries Circuit															
10	L2	All MCs	1	0.0	1	0.0	0.001	3.5	LOS A	0.0	0.0	0.41	0.34	0.41	47.2
12a	R1	All MCs	19	0.0	19	0.0	0.014	9.1	LOS A	0.1	0.5	0.37	0.56	0.37	46.4
Approach			20	0.0	20	0.0	0.014	8.8	LOS A	0.1	0.5	0.37	0.55	0.37	46.5
All Vehicles			640	6.3	640	6.3	0.172	5.5	LOS A	0.8	5.9	0.05	0.45	0.05	52.0

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

MOVEMENT SUMMARY

Site: TCS4174 [2034 Nelson Bay Road / Williamtown Drive - PM Peak (Site Folder: 2034 Future Post-development Scenario)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2034 Future Post Development PM Peak (Network Folder: 2034 Scenario 3_Future Post Development Scenario)]

Existing PM Peak
Peak hour: 4:00pm - 5:00pm
Survey date: 18/08/2022
Site Category: Proposed Design 1
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
NorthEast: Nelson Bay Road (N)															
8	T1	All MCs	1560	4.4	1560	4.4	0.629	12.4	LOS A	28.7	208.2	0.58	0.54	0.58	66.3
9	R2	All MCs	55	7.7	55	7.7	* 0.341	29.1	LOS C	1.7	12.9	0.77	0.76	0.77	42.4
Approach			1615	4.5	1615	4.5	0.629	12.9	LOS A	28.7	208.2	0.59	0.54	0.59	65.6
NorthWest: Williamtown Drive (W)															
10	L2	All MCs	259	2.0	259	2.0	0.159	7.0	LOS A	0.0	0.0	0.00	0.47	0.00	46.2
12	R2	All MCs	467	0.9	467	0.9	* 0.694	62.4	LOS E	15.2	107.0	0.99	0.84	1.00	28.3
Approach			726	1.3	726	1.3	0.694	42.6	LOS D	15.2	107.0	0.64	0.71	0.65	33.1
SouthWest: Nelson Bay Road (S)															
1	L2	All MCs	88	4.8	88	4.8	0.056	7.8	LOS A	0.0	0.0	0.00	0.60	0.00	63.2
2	T1	All MCs	1575	3.5	1575	3.5	* 0.714	22.3	LOS B	37.1	267.2	0.75	0.69	0.75	59.6
Approach			1663	3.5	1663	3.5	0.714	21.8	LOS B	37.1	267.2	0.71	0.68	0.71	59.7
All Vehicles			4004	3.5	4004	3.5	0.714	21.9	LOS B	37.1	267.2	0.65	0.63	0.65	55.4

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
NorthEast: Nelson Bay Road (N)											
P3	Full	53	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92
NorthWest: Williamtown Drive (W)											
P4	Full	53	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92
SouthWest: Nelson Bay Road (S)											
P1	Full	53	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92

All Pedestrians	158	64.3	LOS F	0.2	0.2	0.96	0.96	218.1	200.0	0.92

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

MOVEMENT SUMMARY

Site: 101 [2034 Jeffries Circuit/ Wiliamtown Drive - PM Peak (Site Folder: 2034 Future Post-development Scenario)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2034 Future Post Development PM Peak (Network Folder: 2034 Scenario 3_Future Post Development Scenario)]

2. Jeffries Circuit/ Wiliamtown Drive - AM Peak
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Williamtown Drive															
21a	L1	All MCs	23	0.0	23	0.0	0.029	3.2	LOS A	0.1	1.0	0.02	0.48	0.02	53.5
23a	R1	All MCs	115	7.3	115	7.3	0.057	8.2	LOS A	0.3	2.0	0.01	0.58	0.01	50.3
Approach			138	6.1	138	6.1	0.057	7.4	LOS A	0.3	2.0	0.02	0.56	0.02	50.8
North: Williamtown Drive															
7a	L1	All MCs	571	1.7	571	1.7	0.212	3.2	LOS A	1.3	9.0	0.35	0.36	0.35	52.5
9	R2	All MCs	1	0.0	1	0.0	0.212	8.3	LOS A	1.2	8.8	0.36	0.36	0.36	50.4
Approach			572	1.7	572	1.7	0.212	3.2	LOS A	1.3	9.0	0.35	0.36	0.35	52.5
West: Jeffries Circuit															
10	L2	All MCs	1	0.0	1	0.0	0.001	2.6	LOS A	0.0	0.0	0.25	0.28	0.25	47.7
12a	R1	All MCs	156	0.0	156	0.0	0.104	8.5	LOS A	0.5	3.3	0.23	0.57	0.23	47.2
Approach			157	0.0	157	0.0	0.104	8.5	LOS A	0.5	3.3	0.23	0.57	0.23	47.3
All Vehicles			866	2.1	866	2.1	0.212	4.8	LOS A	1.3	9.0	0.28	0.43	0.28	51.1

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