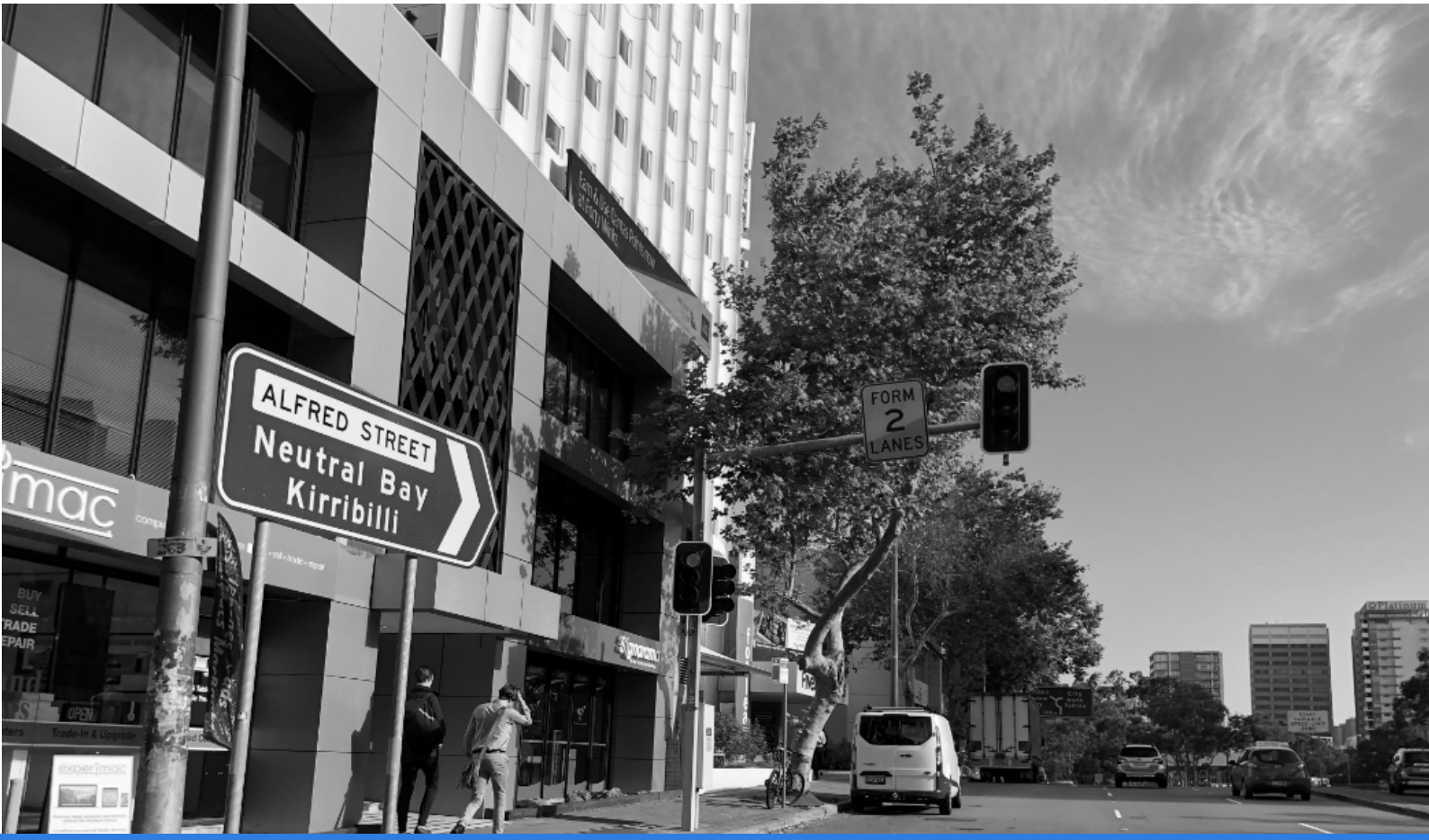


Alfred Street Precinct, North Sydney
Transport Impact Assessment

Prepared for:

Benmill Pty Ltd & JB No. 3 Pty Ltd

26 April 2024

The Transport Planning Partnership

Alfred Street Precinct, North Sydney
Transport Impact Assessment

Client: Benmill Pty Ltd & JB No. 3 Pty Ltd

Version: V03

Date:26 April 2024

TTPP Reference: 18387

Quality Record

Version	Date	Prepared by	Reviewed by	Approved by	Signature
V01	21/03/19	Kenta Lam	Jessica Szeto	Ken Hollyoak	-
V02	17/11/23	Jessica Ng	Jessica Ng	Ken Hollyoak	-
V03	26/04/24	James Goodman	Paul Cai	Ken Hollyoak	

Table of Contents

Tables

Figures

APPENDICES

1 Introduction

The Transport Planning Partnership (TTPP) has been commissioned by Benmill Pty Ltd & JB No. 3 Pty Ltd to prepare this transport impact assessment report to accompany the revised planning proposal to North Sydney Municipal Council (Council) for the entire Alfred Street Precinct.

The proposal comprises the following four key sites:

- Site A – 283 Alfred Street
- Site B – 275 Alfred Street
- Site C – 271-273 Alfred Street
- Site D – 263-269 Alfred Street & 4 Little Alfred Street.

The proposal seeks approval to:

- Rezone the Precinct (Sites A, B, C and D) from E2 Commercial Centre to MU1 Mixed Use
- Remove FSR controls from the Precinct (Sites A, B, C and D)
- Increase the maximum building height for Site B (275 Alfred Street) from 13m to RL 120.00
- Introduce a Design Excellence Clause and Map into the North Sydney LEP 2013 that:
  - Requires a Design Excellence Competition to be held where a proposed building on Site B (275 Alfred Steet) exceeds RL 101.00
- Introduce a Development Control Plan clause into North Sydney LEP 2013 that:
  - Requires a Development Control Plan to be prepared of the land that provides for detailed development controls for Site B (275 Alfred Street)

1.1 Project Background

On 3 September 2015, a planning proposal for 275 Alfred Street, North Sydney (the 'Bayer Building'), was submitted to Council. On 15 February 2016, Council resolved that "*any changes to the planning controls for the precinct be considered holistically and involve all landowners in the context of a comprehensive strategic planning study for the locality which includes planning for defined public benefits for any additional residential density.*"

Subsequent to this, Benmill (the landowners of the Bayer Building) was commissioned to prepare a revised planning proposal for the entire Alfred Street Precinct. This revised planning proposal was submitted in 2019, which included a holistic assessment of the cumulative traffic and parking implications associated with the entire Alfred Street Precinct planning proposal.

Since the 2019 submission, extensive consultation with the Department of Planning and District Planning Panel (SNPP) has been undertaken in relation to the proposed scheme. Based on feedback received, it was agreed to update the planning proposal scheme to remove any development uplift from sites A, C and D.

On this basis, this transport impact assessment has been updated to reflect the updated scheme. It is noted that the proposed scheme only contains development uplift on Site B, while the previous 2019 scheme included uplift across all four sites on Sites A, B, C and D. Therefore, the traffic generation impacts will be less than the previous 2019 scheme.

A comparison of the total development yields (including proposed uplifting and existing sites that will remain) of the previous 2019 scheme and the current scheme (of which this report relates to) is provided in Table 1.1.

Table 1.1: Comparison of 2019 and Current Scheme

Land Use	2019 Scheme (development uplift for all four sites)	Current Scheme* (development uplift for Site B only)	Net Difference
Residential	156 units	148 units	-8 units
Commercial/Retail	10,127m²	4,220m² GFA	-5,907m² GFA

** The current scheme includes the existing 33 residential units on Site D and 4,050m² of commercial GFA on Site A and C, which will remain.*

The current scheme has been updated based on feedback received from the Department of Planning and SNPP.

1.2 Report Structure

The remainder of the report is set out as follows:

- Chapter 2 discusses the existing conditions including a description of the subject site
- Chapter 3 provides a brief overview of the proposed development
- Chapter 4 assesses the proposed on-site parking provision and internal layout
- Chapter 5 examines the traffic generation of the proposed development
- Chapter 6 presents the summary and conclusion of the assessment.

2 Existing Conditions

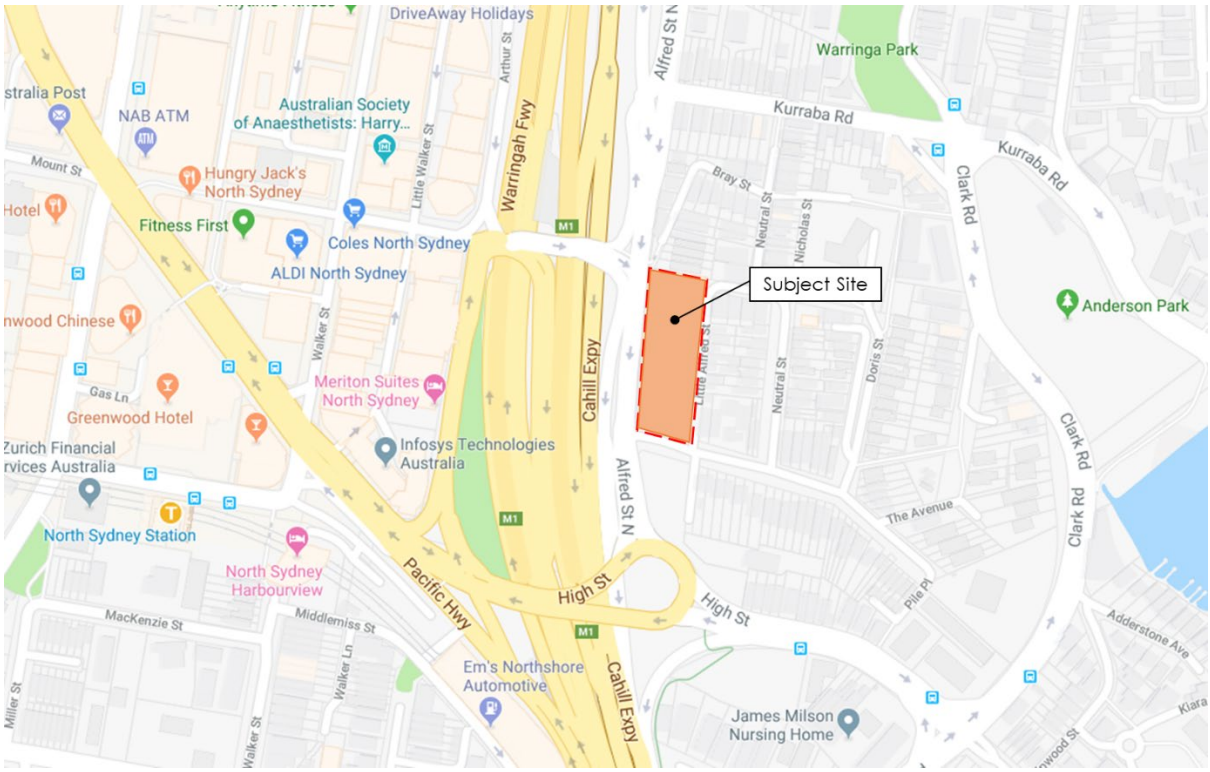
2.1 Site Description

The Alfred Street Precinct (the 'site') is generally bound by Little Alfred Street, Alfred Street North and Whaling Road along the east, west and south boundaries of the site respectively. The site falls within the local government area of North Sydney Municipal Council. The site is separated from the North Sydney CBD by the Warringah Expressway to the west.

At present, the site is currently occupied by some 33 residential flat dwellings at 263-269 Alfred Street North and 4 Little Alfred Street and three commercial office buildings at 271-273, 275 and 283 Alfred Street North, including the existing 17-storey Bayer Building.

The site location and its surrounds are shown in Figure 2.1.

Figure 2.1: Site Locality



Basemap Source: Google Maps Australia

Land uses surrounding the site primarily comprise low-medium density residential dwellings and public recreational parks to the north, east and south and the North Sydney CBD to the west. In addition, the North Sydney Railway Station is conveniently located about 400m south-west of the site, which is an approximate eight-minute walk to the station.

It should also be noted that the site is within close proximity of the future Victoria Cross Metro station which is expected to commence operations in 2024. The Victoria Cross Metro Station

seeks to provide services every 4 minutes during peak hours with a travel time of 9 minutes to Central Station. The station is located some 700m north-west of the site beneath Miller Street between McLaren Street and Berry Street.

2.2 Abutting Road Network

The site is surrounded by a network of local roads, including Alfred Street North, Little Alfred Street and Whaling Road to the east, west and south boundaries of the site respectively. A brief description of these roads is provided below.

2.2.1 Alfred Street North

Within the immediate vicinity of the site, Alfred Street North is configured as a three-lane one-way southbound local road between Mount Street and Whaling Road and travels along the western boundary of the site. The inner lane on Alfred Street North becomes a dedicated left-turn lane into Whaling Road. The road continues south onto High Street to provide good linkages to the wider arterial road network, including Pacific Highway and Warringah Freeway/Bradfield Highway.

In addition to this, a kerbside car parking lane is provided on the east side of the road. A loading zone is provided along the frontage of the site, which operates between 8:30am to 6:00pm, Monday to Friday and caters for approx. 6-7 commercial vehicles. There is also one hour restricted kerbside parallel parking between 8:30am to 5:30pm, Monday to Friday, as well as dedicated motorcycle parking for about say three motorcycles and a mail zone along Alfred Street North towards Whaling Road.

The road is shown in Figure 2.2 and Figure 2.3.

Figure 2.2: Alfred Street North (looking south)

Figure 2.3: Alfred Street North (looking north)

2.2.2 Little Alfred Street

Little Alfred Street is an undivided two-way local road extending along the eastern boundary of the site. The road carriageway is approximately 5.8m wide with parking along the western side of the road. Parking is restricted with one-hour parking restrictions between 8:30am to 6:00pm, Monday to Friday with resident permit holders excepted.

The road provides connectivity to/from Ormiston Avenue and Neutral Street via a two-way loop road onto Whaling Road and predominately services commercial traffic to/from the properties fronting Alfred Street North. The road also services residential traffic to properties to the north on Neutral Street and Bray Street and to the east on Ormiston Avenue and Neutral Street. The road is shown in Figure 2.4.

Figure 2.4: Little Alfred Street (looking north from Whaling Road)

2.2.3 Whaling Road

Within the immediate vicinity of the site, Whaling Road is an undivided two-way local road adjoining with Alfred Street North and Little Alfred Street in an east-west alignment. The road is configured with a road carriageway width of approximately 12.0m with two-hour kerbside parallel parking provided on both sides between 8:30am to 6:00pm, Monday to Friday with resident permit holders excepted. A posted speed limit of 50km/h is applicable.

The road predominately services residential traffic and commercial traffic associated from the site and functions as the only connection to the wider arterial network for surrounding properties via Alfred Street North. At the intersection with Alfred Street North, traffic is restricted to left-out only restrictions onto Alfred Street North, whereby traffic would continue onto High Street to travel onto Pacific Highway or the Warringah Freeway/Bradfield Highway.

The road is shown in Figure 2.5.

Figure 2.5: Whaling Road (looking west onto Alfred Street North)

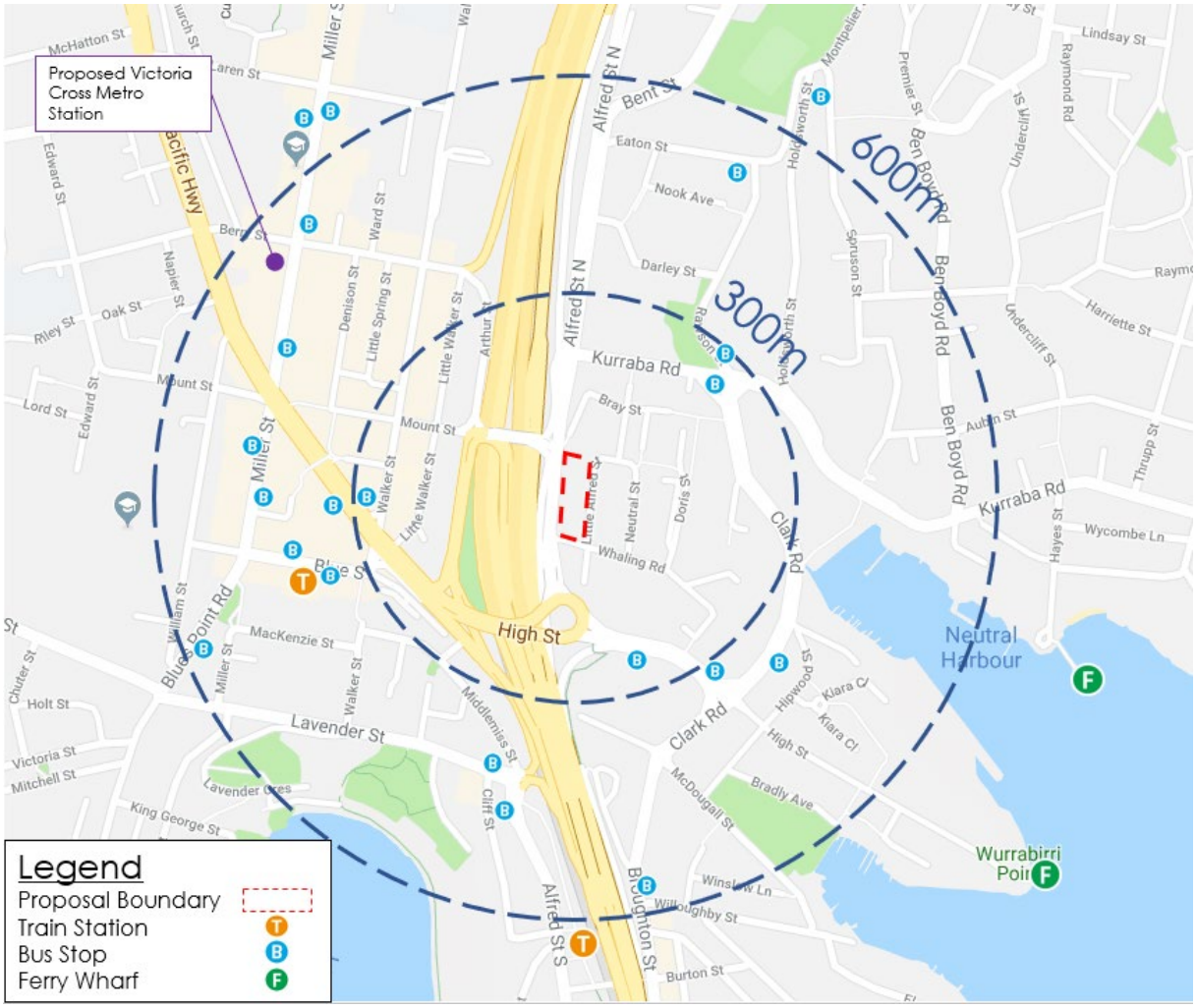
2.3 Public Transport Facilities

High frequency public transport services are available at the North Sydney bus interchange and North Sydney Railway Station located approximately 400m west of the site. North Sydney Station provides frequent train services to Hornsby, Chatswood and Sydney CBD via the T1 North Shore Line & Western Line and T9 Northern Line. These services generally operate every 3-5 minute during peak times and 5-10 minutes during off peak times.

In addition to this, multiple bus services are accessible at the North Sydney bus interchange to various northern suburbs such as Cherrybrook, Epping, Ryde and Manly.

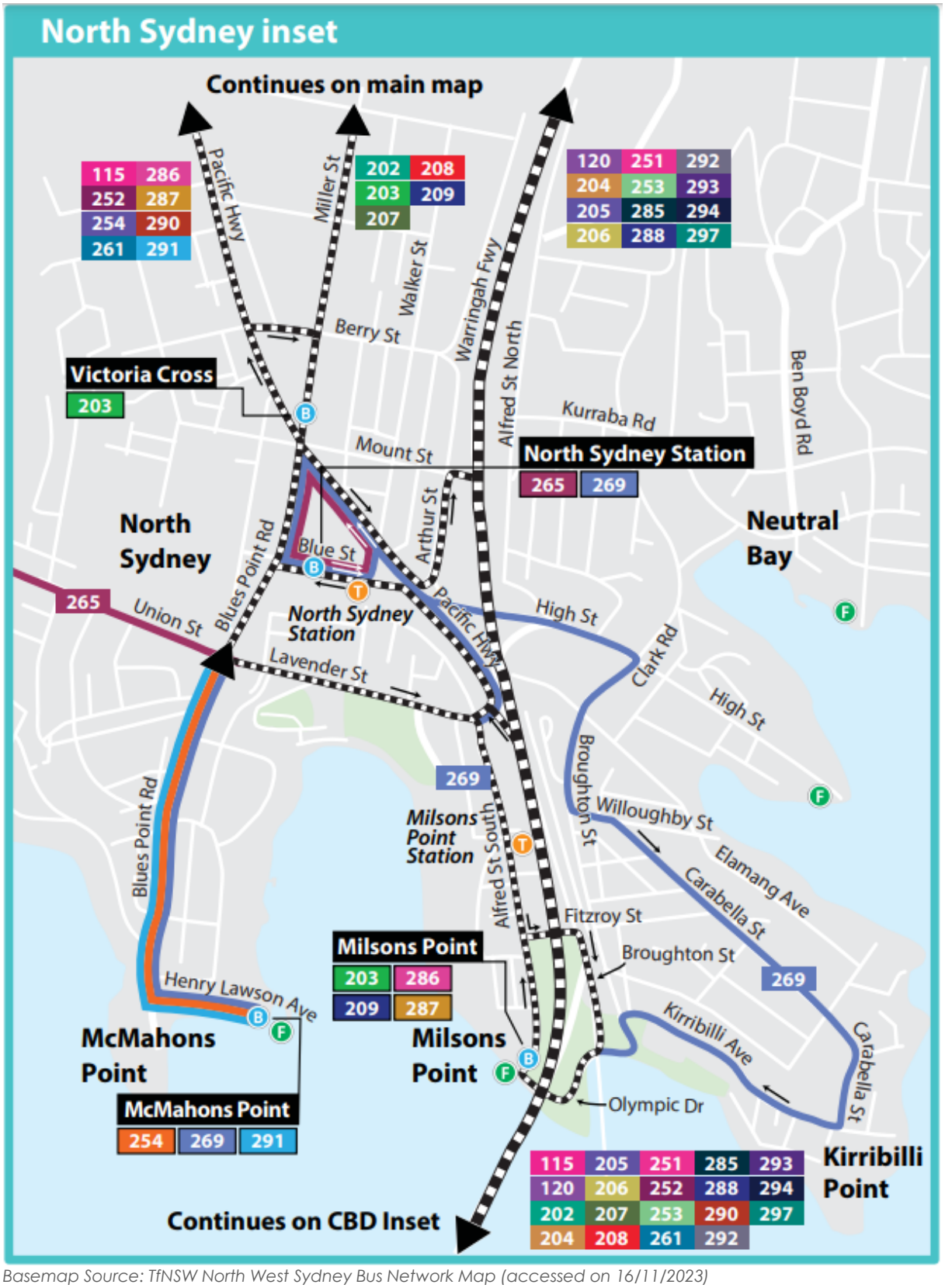
Figure 2.6 below shows the site proximity to existing public transport facilities, with a map of the existing facilities provided in Figure 2.7. It is also noted that the Neutral Bay wharf is located an approximate 15-minute walk from the site and that the location of the Victoria Cross Metro Station is indicative.

Figure 2.6: Site Proximity to Public Transport



Basemap Source: Google Maps Australia

Figure 2.7: Public Transport Map



Basemap Source: TfNSW North West Sydney Bus Network Map (accessed on 16/11/2023)

A summary of the existing bus services and associated frequencies near the site is presented in Table 2.1. This does not include any school bus services, night services and temporary bus services.

Table 2.1: Public Transport Services

Route	Route Description	Morning Peak (7:00 am - 9:00 am)		Off-Peak (11:00 am - 1:00 pm)	
		Number of Services	Frequency (mins)	Number of Services	Frequency (mins)
115	Newcastle to Central via Strathfield or Gordon	10	12	6	20
150X	Manly to North Sydney (Night Service)	10	12	0	N/A
154X	Manly to Milsons Point (Express Service)	14	9	0	N/A
200	Dee Why to Milsons Point (Express Service)	6	20	0	N/A
202	Milsons Point to Dee Why (Express Service)	6	20	4	30
203	Bondi Junction to Gore Hill	3	40	0	N/A
207	City Bridge St to Northbridge via North Sydney	6	20	4	30
208	Northbridge to City Bridge St via North Sydney	0	N/A	0	N/A
209	Milsons Point to Castlecrag via North Sydney	9	13	0	N/A
228	City Bridge St to East Lindfield via North Sydney & Northbridge	2	60	0	N/A
229	East Lindfield to Milsons Point via North Sydney	1	120	2	60
230	Clifton Gardens to Milsons Point	14	9	7	17
252	Beauty Point to Milsons Point via Balmoral Heights	5	24	5	24
254	Milsons Point to Beauty Point via Balmoral Heights	4	30	2	60
260	Milsons Point to Mosman Wharf via North Sydney	4	30	0	N/A
261	Mosman Wharf to Milsons Point via North Sydney	6	20	2	60
263	City King Street Wharf to Gladesville via North Sydney	9	13	3	40
265	Riverview to McMahons Point via North Sydney	5	24	2	60
269	Terrey Hills to North Sydney	1	120	4	30

Route	Route Description	Morning Peak (7:00 am - 9:00 am)		Off-Peak (11:00 am - 1:00 pm)	
		Number of Services	Frequency (mins)	Number of Services	Frequency (mins)
286	City Bridge St to Crows Nest via Cremorne	3	40	0	N/A
287	Crows Nest to City Bridge St via Cremorne	6	20	0	N/A
290	McMahons Point to North Sydney	0	N/A	0	N/A
291	McMahons Point to North Sydney	5	24	2	60
320	Denistone East to Milsons Point via St Leonards & North Sydney	12	10	8	15
602X	Denistone East to Milsons Point via St Leonards & North Sydney	9	13	0	N/A
612X	Denistone East to Milsons Point via St Leonards & North Sydney	12	10	0	N/A
622	Milsons Point to Denistone East via North Sydney & St Leonards	5	24	0	N/A
T1	Ryde to Milsons Point via St Leonards & North Sydney	30	4	20	6
T9	City Erskine St to Epping via North Sydney (Night Service)	9	13	8	15

Source: Transport for NSW (timetable information on Thursday 2 November 2023)

2.4 Pedestrian and Cycle Infrastructure

Well-established pedestrian facilities are provided within the vicinity of the site. Sealed footpaths are present on both sides of surrounding local roads. The exception to this is on Alfred Street North, where a sealed footpath is only provided on the east side of the road.

Pedestrian connectivity to the North Sydney CBD is available via the pedestrian footpath on the northern side of Alfred Street North-Mount Street overpass. Signalised and non-signalised pedestrian crossings at the Alfred Street North-Mount Street intersection offer safe accessibility to the overpass.

In addition to this, suggested unmarked cycle routes are present in the vicinity of the site along Alfred Street North and High Street. These routes provide linkages to on and off-road cycle paths, which provide good connectivity to nearby major town centres such as the North Sydney and Sydney CBD.

A map of existing cycle routes in the surrounding area is shown in Figure 2.8.

Figure 2.8: Surrounding Cycle Routes

Source: North Sydney Cycling Guide and Map (accessed on 16/11/23)

2.5 Traffic Volumes

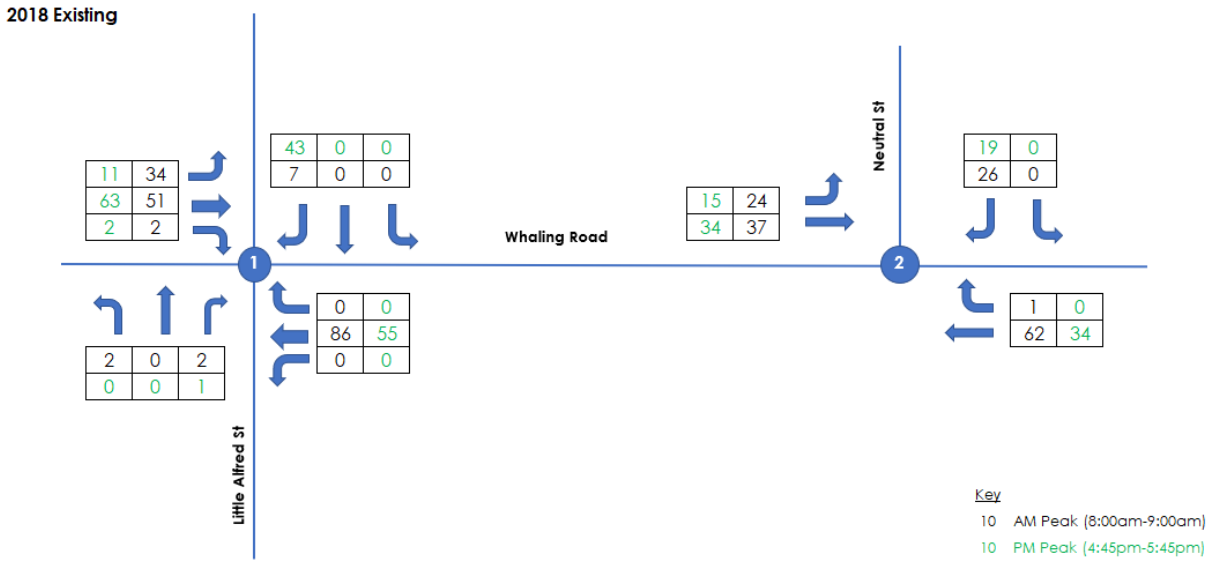
TTPP commissioned traffic surveys on Thursday, 22 November 2018 between 7:30am and 9:30am and between 4:00pm and 6:00pm at the following intersections:

- Little Alfred Street-Whaling Road

- Neutral Street-Whaling Road.

Based on the traffic surveys, the network peak hour times were recorded between 8:00am and 9:00am (AM Peak) and between 4:45pm and 5:45pm (PM Peak). A summary of the network peak hour traffic volumes at the above nominated intersections is shown in Figure 2.9.

Figure 2.9: Existing Network Peak Hour Traffic Volumes



Based on site observations, the majority of traffic associated with the site travelled via Little Alfred Street to access the car parking areas to the rear of the site, rather than travelling via Neutral Street. It should also be noted that sufficient traffic gaps were generally observed on Alfred Street North due to the presence of the traffic signals at Alfred Street North and Mount Street. However, the existing 'Keep Clear' pavement marking on Alfred Street North also helped facilitate traffic movements from Alfred Street North into Whaling Road when southbound queues extended beyond Whaling Road.

The existing intersection performance at the above nominated intersections are further discussed in Section 5.

3 Proposed Development

3.1 Development Description

The proposed development accompanies a planning proposal seeking approval to:

- Rezone the Precinct (Sites A, B, C and D) from E2 Commercial Centre to MU1 Mixed Use
- Remove FSR controls from the Precinct (Sites A, B, C and D)
- Increase the maximum building height for Site B (275 Alfred Steet) from 13m to RL 120.00
- Introduce a Design Excellence Clause and Map into the North Sydney LEP 2013 that:
  - Requires a Design Excellence Competition to be held where a proposed building on Site B exceeds RL 101.00
- Introduce a Development Control Plan clause into North Sydney LEP 2013 that:
  - Requires a Development Control Plan to be prepared of the land that provides for detailed development controls for Site B

As this is a Planning Proposal, the apartment number and mix together with the non-residential floor areas will be finalised at the future DA stage. However, for traffic analytical purposes, the indicative development yields of Site B are sourced for assessment, as shown below:

- 115 residential units (approx.)
- 170m^2 of retail floor space, comprising various low scale retail tenancies

The planning proposal previously split the land rezoning site into four separate sites (Sites A, B, C and D). It is however noted that no development uplift is proposed for Sites A, C and D (which were included in the previous 2019 scheme) based on consultation feedback received from the Department and SNPP.

On this basis, the revised development scheme for the site, which includes existing uses on Sites A, C and D which will remain as is under the proposal, is summarised in Table 3.1.

Table 3.1: Proposed Development Yields

Land Use	Indicative Development Yields (no. of units/GFA)			
	Site A (existing)	Site B	Site C (existing)	Site D (existing)
Residential				
Studio	-	23	-	33
1 Bedroom		30		
2-Bedroom		50		
3-Bedroom		12		
Sub-Total	**-**	**115**	**-**	**33**
Commercial/Retail				
Retail	-	170 m² GFA	-	-
Commercial	1,850m² GFA	-	2,200m² GFA	-
Sub-Total	**1,850m² GFA**	**170m² GFA**	**2,200m² GFA**	**-**

Whilst the above development yields of Site B are indicative only, it is not expected that the ultimate development mix would vary significantly from the above. Additionally, following the approval of the planning proposal, separate development applications for the proposed sites would be submitted to Council for approval.

3.2 Proposed Pedestrian and Vehicle Access Arrangements

It is proposed to provide a through pedestrian site link between Alfred Street and Little Alfred Street. In addition to this, the main pedestrian access for each site will be provided from Alfred Street North. In terms of vehicle access, separate vehicle access points are proposed on Little Alfred Street to service the respective basement car parking and loading dock areas for each site. This is not dissimilar to existing vehicle access arrangements to/from the site.

The proposed indicative vehicle access locations are shown in Figure 3.1.

Figure 3.1: Proposed Indicative Vehicle Access Locations

Basemap Source: Grimshaw Architects

The concept architectural layout plans are provided in Appendix A.

3.3 Loading Facilities

Based on the existing building constraints and topography surrounding the site, at this stage, it is proposed to provide on-site loading areas for Site B. These loading areas are expected to predominately cater for waste collection vehicles and occasional deliveries.

It is however expected that the existing loading zone on Alfred Street North would continue to service the site due to its proximity to the main road (where trucks travel to/from) in order to minimise truck movements along Little Alfred Street and Whaling Road.

4 Parking Assessment

4.1 Car Parking Requirement

4.1.1 North Sydney Development Control Plan

The parking assessment for this development has been assessed using the same car parking rates against Part B Section 10 (Car Parking and Transport) of the North Sydney Development Control Plan 2013 (DCP2013) and the North Sydney Local Environmental Plan 2013 (LEP2013) which were applicable at the time of the previous 2019 submission.

A summary of the above relevant maximum allowable DCP2013 car parking provision for the proposed development is provided in Table 4.1. Sites A, C and D will remain as per existing uses and have not been included as part of this assessment.

Table 4.1: Car Parking Requirement (DCP2013)

Unit Type	Indicative Development Yields (no. of units/GFA)	Maximum DCP2013 Car Parking Rate*	Maximum Allowable DCP2013 Parking Provision
	Site B		Site B
Studio	23	0.5 car space per unit	11
1 Bedroom	30	0.5 car space per unit	15
2-Bedroom	50	1 car space per unit	50
3-Bedroom	12	1 car space per unit	12
Sub-Total	**115**		**88**
Retail	170 m^2	1 space per 400m^2 GFA	0
Total			**88**

**Rates applicable at the time of the 2019 submission and rounded down to the nearest integer where relevant.*

Table 4.1 indicates that Site B would be permitted to provide a maximum of 88 car parking spaces, under the maximum parking rates stipulated in the DCP2013 relevant at the time of the previous 2019 submission.

It is proposed to comply with the car parking requirements as set out in the DCP2013. In addition to this, appropriate allocation of accessible car parking spaces would be provided in accordance with DCP2013/National Construction Code Australia parking requirements.

The car park and associated elements are proposed to be designed in accordance with the design requirements set out in the relevant Australian Standards for car parking facilities.

4.1.2 State Environmental Planning Policy No. 65 (SEPP 65)

In addition, it is noted that SEPP 65 states that a development application cannot be refused on car parking grounds "*if the car parking for the building will be equal to, or greater than, the recommended minimum amount of car parking specified in Part 3J of the Apartment Design Guide*".

More specifically, Part 3J of the Apartment Design Guide (ADG) states:

> *"For development...on sites that are within 800 metres of a railway station…the minimum car parking requirement for residents and visitors is set out in the Guide to Traffic Generating Developments, or the car parking requirement prescribed by the relevant council, whichever is less".*

It is noted that the subject site is located approximately 800m walking distance from North Sydney Railway Station. In this regard, a parking assessment adopting the parking requirements set out in the *Guide to Traffic Generating Developments* is presented in Table 4.2. It is noted that the parking requirements referred by the ADG relates to residential use only. As such, Table 4.2 continues to adopt DCP parking rates for non-residential uses.

Table 4.2: Development Parking Requirements - ADG Requirements

Unit Type	Indicative Development Yields (no. of units)	ADG Car Parking Rate	Minimum Parking Spaces*
	Site B		Site B
Studio	23	0.4 car spaces per unit	10
1 Bedroom	30	0.4 car spaces per unit	12
2-Bedroom	50	0.7 car spaces per unit	35
3-Bedroom	12	1.2 car spaces per unit	15
Sub-Total	**115**		**72**

** the minimum parking spaces are rounded up to the nearest integer*

As such, the minimum residential parking requirements set out by the ADG are 72 spaces for Site B. It proposed to comply with the minimum requirements of the ADG and maximum requirements of the DCP.

4.2 Bicycle Parking Requirement

The DCP2013 requires bicycle parking provision for occupants, visitors and customers of the proposed residential and commercial components of the development. It is noted that DCP2013 stipulates a minimum bicycle parking provision to encourage the use of bicycles as an environmentally beneficial form of transport and an alternative to the use of private motor vehicles. The bicycle parking assessment for the site is provided in Table 4.3.

Table 4.3: Bicycle Parking Requirement (DCP2013)

Unit Type	Indicative Development Yields (no. of units/GFA)	Minimum Bicycle Parking Rate	Minimum Parking Requirements
	Site B		Site B
Residential			
Tenants	115	1 space per unit	115
Visitors		1 space per 10 units	12
Sub-Total			**127**
Commercial/Retail			
Tenants	170m²	1 space per 150m² GFA	2
Visitor/Customers		1 space per 400m² GFA	1
Sub-Total			**3**
Total			**130**

Based on Table 4.3, Site B would require a total minimum of 130 bicycle parking spaces respectively. Additionally, the DCP2013 specifies Class 1 or 2 secure bicycle parking facilities are to be provided for tenants of the proposed dwelling and Class 3 facilities for visitors in accordance with AS2890.3. It is proposed to comply with these parking and design requirements.

4.3 Motorcycle Parking Requirement

The DCP2013 stipulates that a maximum motorcycle parking rate of 1 space per 10 car parking spaces for mixed use developments in a B4 Mixed-Use zoning. Using this metric, the motorcycle parking requirement for Site B would be 8 motorcycle spaces.

It is proposed to satisfy the above parking requirements. The proposed motorcycle parking spaces are proposed to be designed in accordance with AS2890.1, with minimum dimensions of a 1.2m wide by 2.5m long parking space.

5 Traffic Assessment

Transport for NSW (TfNSW), formerly Roads and Maritime Services, provides traffic generation rates for different land uses in their Guide to Traffic Generating Developments (Guide), and in their technical direction TDT 2013/4a containing revised rates from the recent surveys conducted by TfNSW.

These traffic generation rates have been used for the purposes of estimating the anticipated traffic impact of the proposed development, as well as understanding the existing traffic generation of the site.

5.1 Existing Traffic Generation

As indicated previously, the existing site is currently occupied by some 33 residential flat dwellings at 263-269 Alfred Street North and 4 Little Alfred Street and three commercial office buildings at 271-273, 275 and 283 Alfred Street North. It is understood that the existing commercial office buildings permit an allowable maximum floor space of some 14,200m^2 GFA.

The TDT2013/04a stipulates traffic generation rates for residential flat dwellings and commercial office blocks as follows:

- Residential Flat Dwellings
  - 0.19 trips per dwelling per hour in the AM peak hour
  - 0.15 trips per dwelling per hour in the PM peak hour
- Commercial Office Blocks
  - 1.6 trips per 100m^2 gross floor area per hour in the AM peak hour
  - 1.2 trips per 100m^2 gross floor area per hour in the PM peak hour

Using the above metrics, a summary of the potential existing traffic generation of the site is presented in Table 5.1.

Table 5.1: Existing Traffic Generation Potential of the Site

Land Use	No. of Dwellings / GFA	Vehicle Trips per hour	
		AM Peak	PM Peak
Residential	33 units	6 trips	5 trips
Commercial/Office	14,200m^2	227 trips	170 trips
Total		**233 trips**	**175 trips**

Table 5.1 indicates that the current site could generate in the order of 233 and 175 trips in the AM and PM peak respectively.

5.2 Future Traffic Generation

Using the same trip rates for the proposed land uses as noted above, a summary of the traffic generation potential arising from the proposed development of the site is provided in Table 5.2. It is noted that the proposed retail use (170m^2 GFA) is expected to serve as an ancillary purpose such that patronage to these retail uses would primarily be generated by walk-in trips from local residents and employees in the area.

The retail uses would not be a destination for retail customers. Therefore, the proposed retail uses are not expected to generate any vehicle trips. However, for the purpose of estimating the traffic generation profile of the retail use, the TfNSW suggested trip rate for commercial uses has been adopted. This approach is considered conservative.

Table 5.2: Proposed Development Traffic Generation Potential

Land Use	No. of Dwellings / GFA	Trip Generation	
		AM Peak	PM Peak
Site A			
Commercial/Retail	1,850m^2	30 trips	22 trips
Sub-Total		**30 trips**	**22 trips**
Site B			
High density residential	115 units	22 trips	17 trips
Commercial/Retail	170m^2	3 trips	2 trips
Sub-Total		**25 trips**	**19 trips**
Site C			
Commercial/Retail	2,200m^2	35 trips	26 trips
Sub-Total		**35 trips**	**26 trips**
Site D			
Residential	33 units	6 trips	5 trips
Sub-Total		**6 trips**	**5 trips**

Land Use	No. of Dwellings / GFA	Trip Generation	
		AM Peak	PM Peak
Planning Proposal Scheme (Site B only)		**25 trips**	**19 trips**
Total Site (Site A + B + C + D)		**96 trips**	**72 trips**

Table 5.2 indicates that by adopting traffic rates, the proposal is theoretically anticipated to generate a total of 96 and 72 trips in the AM and PM peak hours respectively. This includes the existing uses on Sites A, C and D which will remain as is as part of the proposal.

For Site B (i.e. of which the revised planning proposal relates to), it is anticipated that the proposed land uses would generate 25 and 19 two-way trips in the AM and PM peak hours respectively. This level of development traffic is considered low and equates to one vehicle every 2-3 minutes.

Therefore, the proposal could not be expected to result in any adverse traffic impact on the surrounding road network. Further to this, no deduction of the existing site traffic has been considered as part of this traffic assessment. This is further discussed below.

5.3 Net Traffic Generation

The net change in traffic generation between the existing potential and future land uses of the site are summarised in Table 5.3.

Table 5.3: Net Changes in Traffic Generation

Traffic Generation	AM Peak	PM Peak
Existing Traffic Generation	233	175
Future Traffic Generation	96	72
Net Change	**-137**	**-103**

Table 5.3 indicates that the proposed development could in theory result in a net reduction in traffic when compared to the existing potential traffic generation of the site. This is a result of the proposed development significantly reducing the commercial floor area onsite compared to existing conditions, which typically generate a higher rate of traffic than high density residential.

For the purpose of this traffic assessment, the existing development potential of the site (existing Sites A, C and D) has been excluded as part of this traffic assessment in order to provide a more rigorous traffic assessment, i.e. assuming the proposal would generate an additional 25 trips (AM) and 19 trips (PM) onto the surrounding road network. In reality, the

proposal is expected to generate less than this as the existing site is currently occupied and therefore, already generates some traffic on the road network.

5.4 Traffic Distribution

The directional distribution and assignment of traffic generated by the proposed sites are based on the following assumptions:

- residential trips: 20% inbound / 80% outbound movements (AM Peak); 80% inbound / 20% outbound movements (PM Peak)
- commercial/retail trips: 80% inbound / 20% outbound movements (AM Peak); 20% inbound / 80% outbound movements (PM Peak)
- all vehicle access points within the precinct will be via Little Alfred Street
- all inbound and outbound traffic would approach/depart the site from Alfred Street North
- 90% of traffic generated by the proposed sites will use Little Alfred Street-Whaling Road intersection
- 10% of traffic generated by the proposed sites will use Neutral Street-Whaling Road intersection.

In addition, annual background traffic growth was not considered as part of the traffic modelling analysis as the existing land uses east of the site are low density residential dwellings, which are not expected to be rezoned to significant land uses in the future. Therefore, the main future traffic generator in the area is expected to be from the Alfred Precinct site, which has been accounted for in our assessment.

5.5 Traffic Modelling Scenarios

The following modelling scenarios have been undertaken to provide an analysis of the potential traffic impact of the proposed development on the surrounding road network:

- **Scenario 1 (S1): Existing Base Case** – This scenario includes the current performance of the road network using the surveyed traffic flows shown in Figure 2.9
- **Scenario 2 (S2): Proposed Development Case** – this scenario includes the S1 traffic and the development traffic associated with the proposed development on Site B as outlined in Table 5.2.

5.6 Verification of 2018 Traffic Surveys

TTPP has reviewed the nearest permanent traffic count located on Military Road in Cremorne (Station ID 22001) to compare 2018 and 2023 traffic volumes. A summary of this comparison is provided in Figure 5.1.

Figure 5.1: Comparison of 2018 and 2023 Traffic Volumes

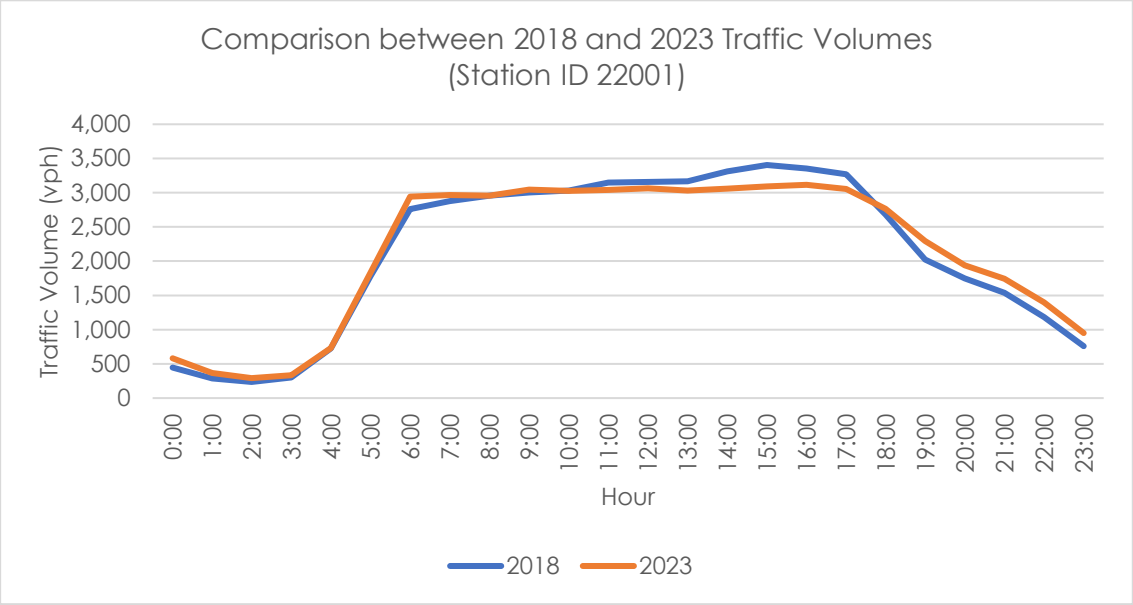


Figure 5.1 indicates that traffic volumes in 2018 and 2023 are generally comparable, noting that there were slightly higher traffic volumes in 2018 when compared to 2023, particularly during evening peak commuter times.

On this basis, TTPP is of the view that the 2018 traffic surveys would still be an appropriate representation of current traffic conditions. Therefore, the previous traffic surveys have been retained as part of this traffic assessment, specifically for traffic modelling purposes.

5.7 Traffic Volumes

The existing base case traffic and anticipated development traffic in the AM and PM peak hours are presented in Figure 5.2 and Figure 5.3 respectively. The numbers shown in green are the traffic associated with the rezoned precinct and the number shown in black are the existing surveyed volumes.

As indicated previously, the traffic generated by the existing buildings within the site are included in the traffic modelling as a conservative measure to assess the traffic implications arising from the proposal.

Figure 5.2: S2 Traffic Volumes (AM Peak)

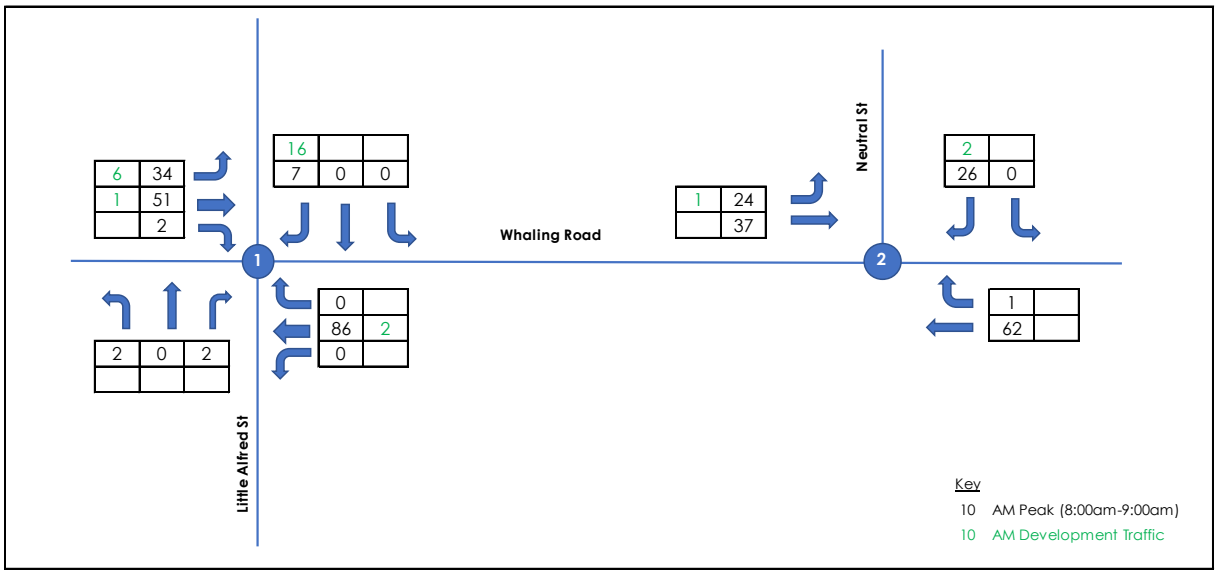
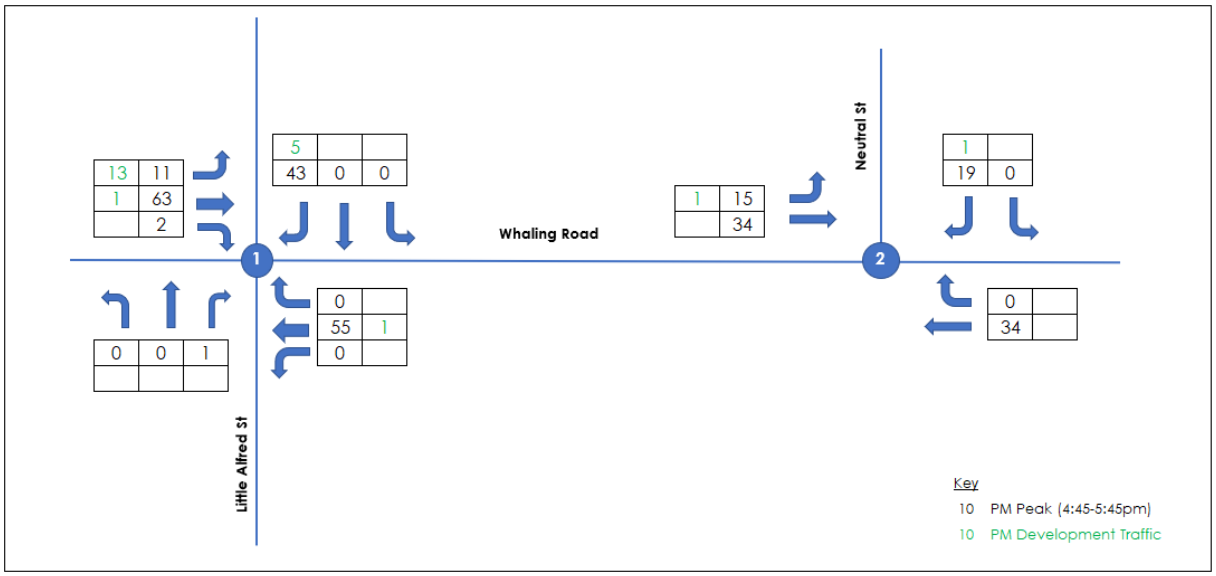


Figure 5.3: S2 Traffic Volumes (PM Peak)



5.8 Intersection Capacity Assessment

The traffic effects of the proposal on the surrounding intersections have been assessed using SIDRA INTERSECTION 9.1, a computer-based traffic modelling package which assesses intersection performance under prevailing traffic conditions.

The SIDRA modelling software was used for the following intersections:

- Little Alfred Street-Whaling Road
- Neutral Street-Whaling Road

It is noted that the proposed development traffic is not expected to adversely impact on the existing Alfred Street North-Whaling Road intersection as sufficient traffic gaps are provided on Alfred Street North due to the presence of the traffic signals at Mount Street and Alfred Street North and existing geometry of the road – i.e. one way southbound on Alfred Street North such that left-turn and right-turn movements into Whaling Road can easily be accommodated on the road. Therefore, the Alfred Street North-Whaling Road intersection has been excluded as part of this intersection capacity assessment.

Intersection configurations were sourced from aerial imagery and the traffic conditions were calibrated to the conditions observed during the traffic surveys.

The SIDRA modelling determines the intersection capacity based on the level of service (LoS). LoS is a basic performance parameter used to describe the operation of an intersection. Levels of service indicators range from A (indicating good intersection operation) to F (indicating over-saturated conditions with long delays and queues).

At priority controlled (give-way and stop controlled) and roundabout intersection, the LoS is based on the modelled delay (seconds per vehicle) for the most delayed movement (refer to Table 5.4).

Table 5.4: Level of Service for Intersection Operation

Level of Service	Average Delay (seconds per vehicle)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity, at signals, incidents will cause excessive delays, Roundabouts require other control mode	At capacity, requires other control mode
F	Greater than 70	Unsatisfactory with excessive queuing	Unsatisfactory with excessive queuing; requires other control mode

Souce: Roads and Maritime Guide to Traffic Generating Developments, 2002

Based on the traffic volumes in Sections 2.5 and 5.7, a summary of the SIDRA network modelling results for each scenario is presented in Table 5.5. The full movement summaries are provided in Appendix B.

Table 5.5: Intersection Operation Results

Scenario	Intersection	AM Peak			PM Peak		
		95th Percentile Queue (m)	Ave. Delay (sec/veh)	Level of Service (LoS)	95th Percentile Queue (m)	Ave. Delay (sec/veh)	Level of Service (LoS)
S1 Existing Base Case (No Dev)	Little Alfred St-Whaling Rd	1	6	A	1	6	A
	Neutral St-Whaling Rd	1	6	A	1	6	A
S2 Proposed Development Case (With Dev)	Little Alfred St-Whaling Rd	1	6	A	1	6	A
	Neutral St-Whaling Rd	1	6	A	1	6	A

Table 5.5 indicates that the proposed additional traffic generated by the proposal would not result in any noticeable impact on the surrounding road network. The assessed intersections would continue to operate at LoS A during peak periods with the proposed development traffic. Therefore, no mitigation measures are required as the proposed development traffic can be satisfactorily accommodated on the existing road network.

6 Conclusion

This report accompanies a planning proposal seeking approval to rezone the Alfred Street precinct. The planning proposal has been updated to reflect extensive consultation feedback received from the Department of Planning and District Planning Panel from the previous 2019 submission.

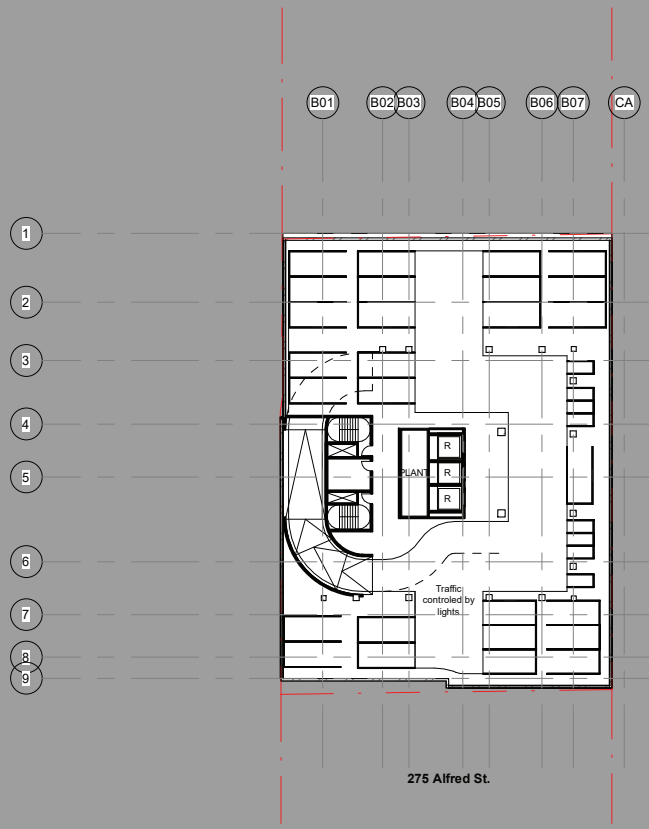
The salient findings of this report are presented below.

- The planning proposal has split the land rezoning site into four separate sites (Sites A, B, C and D).
- The revised scheme only contains development uplifts on Site B. No development uplifts are proposed on Sites A, C and D as per consultation feedback from the previous 2019 scheme.
- Separate vehicular access to each site would be provided from Little Alfred Street.
- The maximum car parking spaces required in accordance with North Sydney DCP2013 relevant at the time of the previous submission is 88 residential car parking spaces.
- The minimum car parking spaces required in accordance with Apartment Design Guide (ADG) is 72 residential car parking spaces.
- A minimum of 130 bicycle parking spaces are to be provided in Site B in accordance with North Sydney DCP2013.
- A maximum of 8 motorcycle parking spaces are to be provided in Site B in accordance with North Sydney DCP2013.
- The proposal (Site B) has been estimated to generate 25vph (AM) and 19vph (PM), which is considered low (i.e. one vehicle every 2-3 minutes).
- The full development traffic from the revised scheme has been assessed with no deductions of the existing site traffic to ensure a more rigorous traffic assessment for the purpose of the planning proposal.
- The traffic modelling results indicate that the modelled intersections at Little Alfred Street-Whaling Road and Neutral Street-Whaling Road intersections would continue to operate well at LoS A during both peak periods.

As such, the proposal is not expected to result in any significant traffic impacts on the surrounding road network and therefore, is considered acceptable from a traffic perspective.

Appendix A

Concept Layout Plans



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REV.	DATE	DESCRIPTION
A	17.11.2023	PLANNING PROPOSAL

CLIENT
Benmill Pty Ltd
275 Alfred St Level 7,
North Sydney New South Wales 2060

DRAWING KEY

PROJECT
NORTH ALFRED PRECINT

ADDRESS
263-283 ALFRED STREET

GRIMSHAW PROJECT NO.
13119

NORTH

SCALE
1 : 500

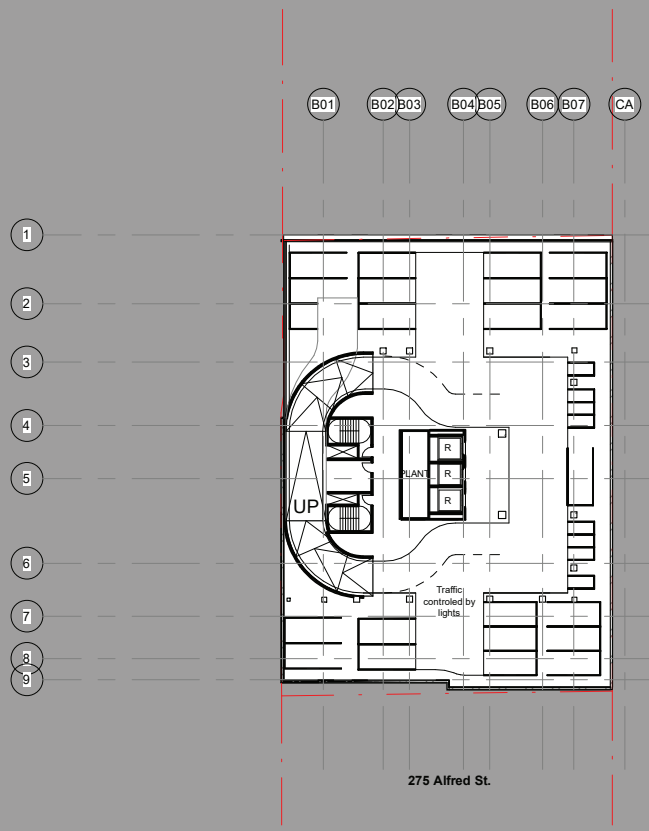
STATUS
PLANNING PROPOSAL

DRAWING
LEVEL B3

DRAWN	CHECKED	AUTHORISED
RR.SL	RS	RS

DRAWING NUMBER
A03 1001

REVISION
A



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REV.	DATE	DESCRIPTION
A	17.11.2023	PLANNING PROPOSAL

CLIENT
Benmill Pty Ltd
275 Alfred St Level 7,
North Sydney New South Wales 2060

DRAWING KEY

PROJECT
NORTH ALFRED PRECINT

ADDRESS
263-283 ALFRED STREET

GRIMSHAW PROJECT NO.
13119

NORTH

SCALE
1 : 500

STATUS
PLANNING PROPOSAL

DRAWING
LEVEL B2

DRAWN	CHECKED	AUTHORISED
RR.SL	RS	RS

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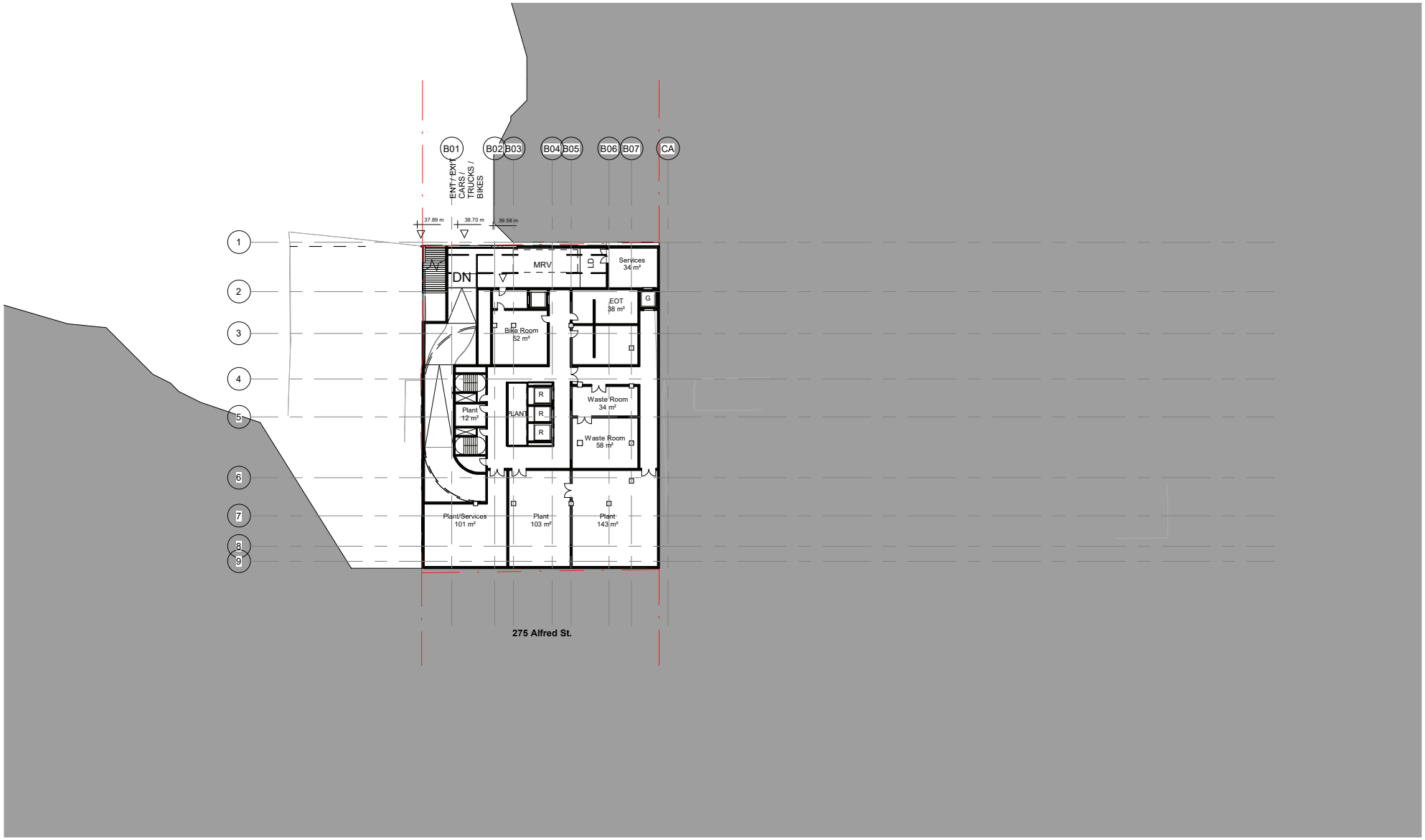
REVISION
A



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A	17.11.2023	PLANNING PROPOSAL

CLIENT
Benmill Pty Ltd
275 Alfred St Level 7,
North Sydney New South Wales 2060

DRAWING KEY

PROJECT
NORTH ALFRED PRECINT

ADDRESS
263-283 ALFRED STREET

GRIMSHAW PROJECT NO.
13119

NORTH

SCALE
1 : 500

STATUS
PLANNING PROPOSAL

DRAWING
LEVEL B1

DRAWN	CHECKED	AUTHORISED
RR.SL	RS	RS

DRAWING NUMBER
A03 1003

REVISION
A

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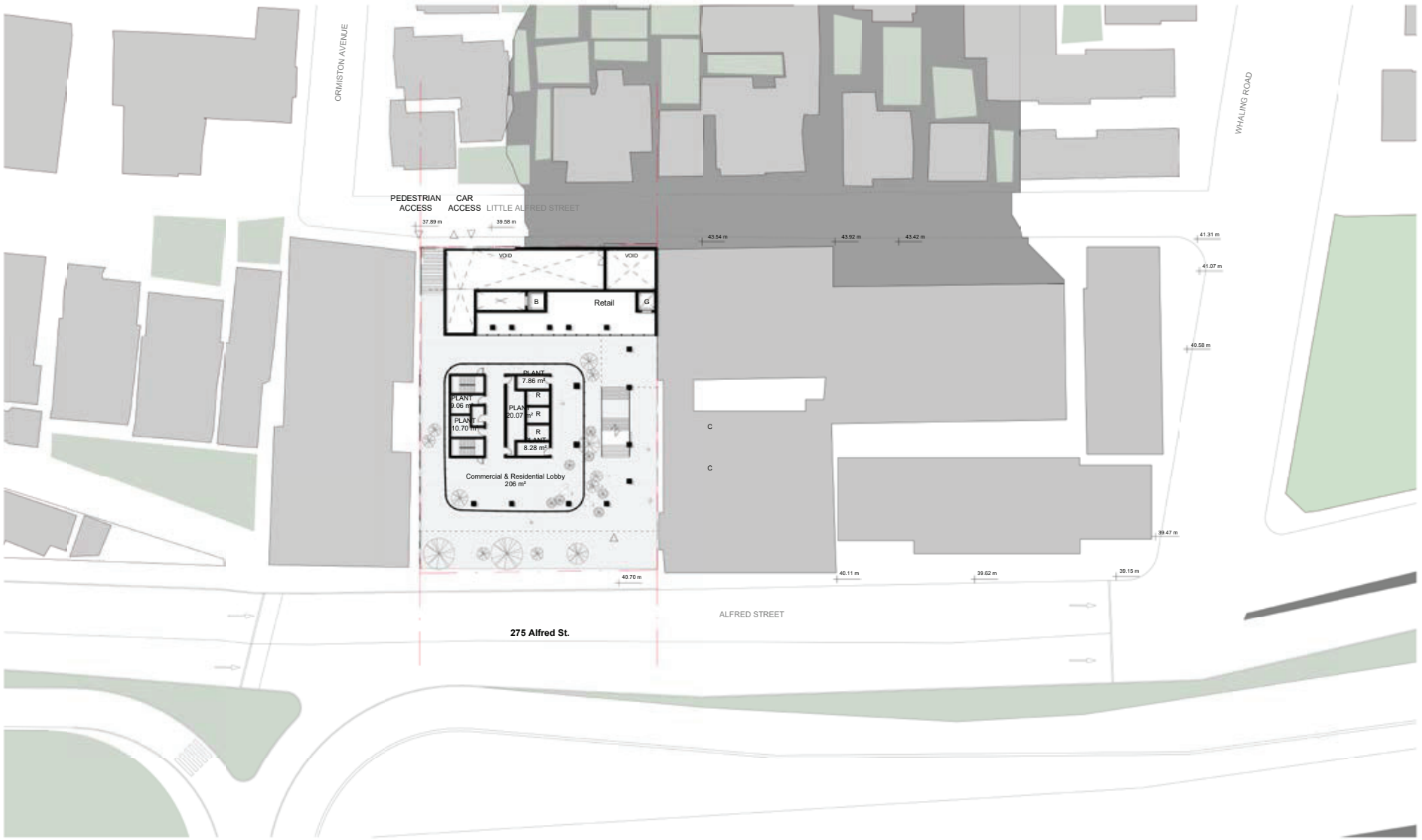

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REV.	DATE	DESCRIPTION
A	17.11.2023	PLANNING PROPOSAL

CLIENT
Benmill Pty Ltd
275 Alfred St Level 7,
North Sydney New South Wales 2060

DRAWING KEY

PROJECT
NORTH ALFRED PRECINT

ADDRESS
263-283 ALFRED STREET

GRIMSHAW PROJECT NO.
13119

NORTH

SCALE
1 : 500

STATUS
PLANNING PROPOSAL

DRAWING
GROUND FLOOR - RETAIL

DRAWN	CHECKED	AUTHORISED
RR.SL	**RS**	**RS**

DRAWING NUMBER
A03 1004

REVISION
A

Appendix B

SIDRA Results

MOVEMENT SUMMARY

Site: 101v [Existing - AM Peak - Whaling Road/Little Alfred Street (Site Folder: Existing Base Case)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Little Alfred Street															
1	L2	All MCs	2	0.0	2	0.0	0.004	5.8	LOS A	0.0	0.1	0.21	0.53	0.21	52.5
2	T1	All MCs	1	0.0	1	0.0	0.004	4.8	LOS A	0.0	0.1	0.21	0.53	0.21	52.9
3	R2	All MCs	2	0.0	2	0.0	0.004	6.1	LOS A	0.0	0.1	0.21	0.53	0.21	52.2
Approach			5	0.0	5	0.0	0.004	5.7	LOS A	0.0	0.1	0.21	0.53	0.21	52.5
East: Whaling Road															
4	L2	All MCs	1	0.0	1	0.0	0.048	5.5	LOS A	0.0	0.1	0.01	0.01	0.01	57.4
5	T1	All MCs	91	1.0	91	1.0	0.048	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	59.8
6	R2	All MCs	1	0.0	1	0.0	0.048	5.5	LOS A	0.0	0.1	0.01	0.01	0.01	57.0
Approach			93	1.0	93	1.0	0.048	0.1	NA	0.0	0.1	0.01	0.01	0.01	59.8
North: Little Alfred Street															
7	L2	All MCs	1	0.0	1	0.0	0.009	5.7	LOS A	0.0	0.2	0.23	0.55	0.23	52.4
8	T1	All MCs	1	0.0	1	0.0	0.009	4.7	LOS A	0.0	0.2	0.23	0.55	0.23	52.8
9	R2	All MCs	7	0.0	7	0.0	0.009	6.2	LOS A	0.0	0.2	0.23	0.55	0.23	52.1
Approach			9	0.0	9	0.0	0.009	6.0	LOS A	0.0	0.2	0.23	0.55	0.23	52.2
West: Whaling Road															
10	L2	All MCs	36	0.0	36	0.0	0.048	5.5	LOS A	0.0	0.1	0.01	0.25	0.01	55.4
11	T1	All MCs	54	1.0	54	1.0	0.048	0.0	LOS A	0.0	0.1	0.01	0.25	0.01	57.8
12	R2	All MCs	2	0.0	2	0.0	0.048	5.7	LOS A	0.0	0.1	0.01	0.25	0.01	55.1
Approach			92	0.6	92	0.6	0.048	2.3	NA	0.0	0.1	0.01	0.25	0.01	56.8
All Vehicles			199	0.7	199	0.7	0.048	1.6	NA	0.0	0.2	0.03	0.16	0.03	57.8

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

MOVEMENT SUMMARY

Site: 101v [Existing - PM Peak - Whaling Road/Little Alfred Street (Site Folder: Existing Base Case)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Little Alfred Street															
1	L2	All MCs	1	0.0	1	0.0	0.003	5.7	LOS A	0.0	0.1	0.18	0.52	0.18	52.7
2	T1	All MCs	1	0.0	1	0.0	0.003	4.6	LOS A	0.0	0.1	0.18	0.52	0.18	53.2
3	R2	All MCs	1	0.0	1	0.0	0.003	6.0	LOS A	0.0	0.1	0.18	0.52	0.18	52.5
Approach			3	0.0	3	0.0	0.003	5.4	LOS A	0.0	0.1	0.18	0.52	0.18	52.8
East: Whaling Road															
4	L2	All MCs	1	0.0	1	0.0	0.031	5.5	LOS A	0.0	0.1	0.01	0.02	0.01	57.3
5	T1	All MCs	58	1.0	58	1.0	0.031	0.0	LOS A	0.0	0.1	0.01	0.02	0.01	59.8
6	R2	All MCs	1	0.0	1	0.0	0.031	5.5	LOS A	0.0	0.1	0.01	0.02	0.01	57.0
Approach			60	1.0	60	1.0	0.031	0.2	NA	0.0	0.1	0.01	0.02	0.01	59.7
North: Little Alfred Street															
7	L2	All MCs	1	0.0	1	0.0	0.048	5.7	LOS A	0.2	1.1	0.23	0.58	0.23	52.3
8	T1	All MCs	1	0.0	1	0.0	0.048	4.6	LOS A	0.2	1.1	0.23	0.58	0.23	52.7
9	R2	All MCs	45	0.0	45	0.0	0.048	6.1	LOS A	0.2	1.1	0.23	0.58	0.23	52.1
Approach			47	0.0	47	0.0	0.048	6.0	LOS A	0.2	1.1	0.23	0.58	0.23	52.1
West: Whaling Road															
10	L2	All MCs	12	0.0	12	0.0	0.042	5.5	LOS A	0.0	0.1	0.01	0.10	0.01	56.6
11	T1	All MCs	66	1.0	66	1.0	0.042	0.0	LOS A	0.0	0.1	0.01	0.10	0.01	59.0
12	R2	All MCs	2	0.0	2	0.0	0.042	5.5	LOS A	0.0	0.1	0.01	0.10	0.01	56.3
Approach			80	0.8	80	0.8	0.042	0.9	NA	0.0	0.1	0.01	0.10	0.01	58.6
All Vehicles			191	0.7	191	0.7	0.048	2.0	NA	0.2	1.1	0.07	0.20	0.07	57.0

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

MOVEMENT SUMMARY

Site: 101 [Existing - AM Peak - Whaling Road/Neutral Street (Site Folder: Existing Base Case)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Whaling Road															
5	T1	All MCs	65	1.0	65	1.0	0.033	0.0	LOS A	0.0	0.0	0.01	0.01	0.01	59.9
6	R2	All MCs	1	0.0	1	0.0	0.033	5.5	LOS A	0.0	0.0	0.01	0.01	0.01	57.2
Approach			66	1.0	66	1.0	0.033	0.1	NA	0.0	0.0	0.01	0.01	0.01	59.8
North: Neutral Street															
7	L2	All MCs	1	0.0	1	0.0	0.024	5.6	LOS A	0.1	0.5	0.18	0.56	0.18	52.4
9	R2	All MCs	27	0.0	27	0.0	0.024	5.9	LOS A	0.1	0.5	0.18	0.56	0.18	52.2
Approach			28	0.0	28	0.0	0.024	5.9	LOS A	0.1	0.5	0.18	0.56	0.18	52.2
West: Whaling Road															
10	L2	All MCs	25	0.0	25	0.0	0.033	5.5	LOS A	0.0	0.0	0.00	0.23	0.00	55.6
11	T1	All MCs	39	1.0	39	1.0	0.033	0.0	LOS A	0.0	0.0	0.00	0.23	0.00	57.9
Approach			64	0.6	64	0.6	0.033	2.2	NA	0.0	0.0	0.00	0.23	0.00	57.0
All Vehicles			159	0.7	159	0.7	0.033	2.0	NA	0.1	0.5	0.04	0.20	0.04	57.2

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

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

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

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

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

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

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

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

MOVEMENT SUMMARY

Site: 101 [Existing - PM Peak - Whaling Road/Neutral Street (Site Folder: Existing Base Case)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Whaling Road															
5	T1	All MCs	36	1.0	36	1.0	0.018	0.0	LOS A	0.0	0.0	0.01	0.02	0.01	59.8
6	R2	All MCs	1	0.0	1	0.0	0.018	5.5	LOS A	0.0	0.0	0.01	0.02	0.01	57.1
Approach			37	1.0	37	1.0	0.018	0.2	NA	0.0	0.0	0.01	0.02	0.01	59.7
North: Neutral Street															
7	L2	All MCs	1	0.0	1	0.0	0.017	5.6	LOS A	0.1	0.4	0.14	0.55	0.14	52.5
9	R2	All MCs	20	0.0	20	0.0	0.017	5.7	LOS A	0.1	0.4	0.14	0.55	0.14	52.3
Approach			21	0.0	21	0.0	0.017	5.7	LOS A	0.1	0.4	0.14	0.55	0.14	52.4
West: Whaling Road															
10	L2	All MCs	16	0.0	16	0.0	0.026	5.5	LOS A	0.0	0.0	0.00	0.18	0.00	56.0
11	T1	All MCs	36	1.0	36	1.0	0.026	0.0	LOS A	0.0	0.0	0.00	0.18	0.00	58.3
Approach			52	0.7	52	0.7	0.026	1.7	NA	0.0	0.0	0.00	0.18	0.00	57.6
All Vehicles			109	0.7	109	0.7	0.026	2.0	NA	0.1	0.4	0.03	0.20	0.03	57.2

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

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

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

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

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

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

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

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

MOVEMENT SUMMARY

Site: 101v [Dev+Existing - AM Peak - Whaling Road/Little Alfred Street (Site Folder: Future Dev Case)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Little Alfred Street															
1	L2	All MCs	2	0.0	2	0.0	0.005	5.8	LOS A	0.0	0.1	0.21	0.53	0.21	52.5
2	T1	All MCs	1	0.0	1	0.0	0.005	4.8	LOS A	0.0	0.1	0.21	0.53	0.21	52.9
3	R2	All MCs	2	0.0	2	0.0	0.005	6.1	LOS A	0.0	0.1	0.21	0.53	0.21	52.2
Approach			5	0.0	5	0.0	0.005	5.7	LOS A	0.0	0.1	0.21	0.53	0.21	52.5
East: Whaling Road															
4	L2	All MCs	1	0.0	1	0.0	0.049	5.5	LOS A	0.0	0.1	0.01	0.01	0.01	57.4
5	T1	All MCs	93	1.0	93	1.0	0.049	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	59.8
6	R2	All MCs	1	0.0	1	0.0	0.049	5.5	LOS A	0.0	0.1	0.01	0.01	0.01	57.0
Approach			95	1.0	95	1.0	0.049	0.1	NA	0.0	0.1	0.01	0.01	0.01	59.8
North: Little Alfred Street															
7	L2	All MCs	1	0.0	1	0.0	0.027	5.7	LOS A	0.1	0.6	0.25	0.58	0.25	52.3
8	T1	All MCs	1	0.0	1	0.0	0.027	4.8	LOS A	0.1	0.6	0.25	0.58	0.25	52.7
9	R2	All MCs	24	0.0	24	0.0	0.027	6.2	LOS A	0.1	0.6	0.25	0.58	0.25	52.0
Approach			26	0.0	26	0.0	0.027	6.2	LOS A	0.1	0.6	0.25	0.58	0.25	52.1
West: Whaling Road															
10	L2	All MCs	42	0.0	42	0.0	0.052	5.5	LOS A	0.0	0.1	0.01	0.26	0.01	55.3
11	T1	All MCs	55	1.0	55	1.0	0.052	0.0	LOS A	0.0	0.1	0.01	0.26	0.01	57.6
12	R2	All MCs	2	0.0	2	0.0	0.052	5.7	LOS A	0.0	0.1	0.01	0.26	0.01	55.0
Approach			99	0.6	99	0.6	0.052	2.5	NA	0.0	0.1	0.01	0.26	0.01	56.5
All Vehicles			225	0.7	225	0.7	0.052	2.0	NA	0.1	0.6	0.04	0.20	0.04	57.2

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

MOVEMENT SUMMARY

Site: 101v [Dev+Existing - PM Peak - Whaling Road/Little Alfred Street (Site Folder: Future Dev Case)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Little Alfred Street															
1	L2	All MCs	1	0.0	1	0.0	0.003	5.7	LOS A	0.0	0.1	0.18	0.52	0.18	52.7
2	T1	All MCs	1	0.0	1	0.0	0.003	4.7	LOS A	0.0	0.1	0.18	0.52	0.18	53.1
3	R2	All MCs	1	0.0	1	0.0	0.003	6.0	LOS A	0.0	0.1	0.18	0.52	0.18	52.5
Approach			3	0.0	3	0.0	0.003	5.4	LOS A	0.0	0.1	0.18	0.52	0.18	52.8
East: Whaling Road															
4	L2	All MCs	1	0.0	1	0.0	0.032	5.5	LOS A	0.0	0.1	0.01	0.02	0.01	57.3
5	T1	All MCs	59	1.0	59	1.0	0.032	0.0	LOS A	0.0	0.1	0.01	0.02	0.01	59.8
6	R2	All MCs	1	0.0	1	0.0	0.032	5.6	LOS A	0.0	0.1	0.01	0.02	0.01	57.0
Approach			61	1.0	61	1.0	0.032	0.2	NA	0.0	0.1	0.01	0.02	0.01	59.7
North: Little Alfred Street															
7	L2	All MCs	1	0.0	1	0.0	0.053	5.7	LOS A	0.2	1.2	0.24	0.58	0.24	52.3
8	T1	All MCs	1	0.0	1	0.0	0.053	4.7	LOS A	0.2	1.2	0.24	0.58	0.24	52.7
9	R2	All MCs	51	0.0	51	0.0	0.053	6.1	LOS A	0.2	1.2	0.24	0.58	0.24	52.0
Approach			53	0.0	53	0.0	0.053	6.1	LOS A	0.2	1.2	0.24	0.58	0.24	52.1
West: Whaling Road															
10	L2	All MCs	25	0.0	25	0.0	0.050	5.5	LOS A	0.0	0.1	0.01	0.17	0.01	56.0
11	T1	All MCs	67	1.0	67	1.0	0.050	0.0	LOS A	0.0	0.1	0.01	0.17	0.01	58.4
12	R2	All MCs	2	0.0	2	0.0	0.050	5.5	LOS A	0.0	0.1	0.01	0.17	0.01	55.7
Approach			95	0.7	95	0.7	0.050	1.6	NA	0.0	0.1	0.01	0.17	0.01	57.7
All Vehicles			212	0.6	212	0.6	0.053	2.4	NA	0.2	1.2	0.07	0.24	0.07	56.6

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

MOVEMENT SUMMARY

Site: 101 [Dev+Existing - AM Peak - Whaling Road/Neutral Street (Site Folder: Future Dev Case)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Whaling Road															
5	T1	All MCs	65	1.0	65	1.0	0.033	0.0	LOS A	0.0	0.0	0.01	0.01	0.01	59.9
6	R2	All MCs	1	0.0	1	0.0	0.033	5.5	LOS A	0.0	0.0	0.01	0.01	0.01	57.2
Approach			66	1.0	66	1.0	0.033	0.1	NA	0.0	0.0	0.01	0.01	0.01	59.8
North: Neutral Street															
7	L2	All MCs	1	0.0	1	0.0	0.026	5.6	LOS A	0.1	0.6	0.18	0.56	0.18	52.4
9	R2	All MCs	29	0.0	29	0.0	0.026	5.9	LOS A	0.1	0.6	0.18	0.56	0.18	52.2
Approach			31	0.0	31	0.0	0.026	5.9	LOS A	0.1	0.6	0.18	0.56	0.18	52.2
West: Whaling Road															
10	L2	All MCs	26	0.0	26	0.0	0.033	5.5	LOS A	0.0	0.0	0.00	0.24	0.00	55.5
11	T1	All MCs	39	1.0	39	1.0	0.033	0.0	LOS A	0.0	0.0	0.00	0.24	0.00	57.8
Approach			65	0.6	65	0.6	0.033	2.2	NA	0.0	0.0	0.00	0.24	0.00	56.9
All Vehicles			162	0.6	162	0.6	0.033	2.0	NA	0.1	0.6	0.04	0.21	0.04	57.1

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

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

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

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

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

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

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

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

MOVEMENT SUMMARY

Site: 101 [Dev+Existing - PM Peak - Whaling Road/Neutral Street (Site Folder: Future Dev Case)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Whaling Road															
5	T1	All MCs	36	1.0	36	1.0	0.018	0.0	LOS A	0.0	0.0	0.01	0.02	0.01	59.8
6	R2	All MCs	1	0.0	1	0.0	0.018	5.5	LOS A	0.0	0.0	0.01	0.02	0.01	57.1
Approach			37	1.0	37	1.0	0.018	0.2	NA	0.0	0.0	0.01	0.02	0.01	59.7
North: Neutral Street															
7	L2	All MCs	1	0.0	1	0.0	0.018	5.6	LOS A	0.1	0.4	0.15	0.56	0.15	52.5
9	R2	All MCs	21	0.0	21	0.0	0.018	5.7	LOS A	0.1	0.4	0.15	0.56	0.15	52.3
Approach			22	0.0	22	0.0	0.018	5.7	LOS A	0.1	0.4	0.15	0.56	0.15	52.3
West: Whaling Road															
10	L2	All MCs	17	0.0	17	0.0	0.027	5.5	LOS A	0.0	0.0	0.00	0.19	0.00	55.9
11	T1	All MCs	36	1.0	36	1.0	0.027	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	58.3
Approach			53	0.7	53	0.7	0.027	1.8	NA	0.0	0.0	0.00	0.19	0.00	57.5
All Vehicles			112	0.6	112	0.6	0.027	2.0	NA	0.1	0.4	0.03	0.21	0.03	57.1

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

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

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

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

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

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

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

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

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