



Progress Report 4
Transport Assessment
Glenorie Village Investigations & Place Plan
for
Hornsby Shire Council

Document Control

Project No: 0461
Project: Glenorie Village Investigations & Place Plan
Client: Hornsby Shire Council
File Ref: P0461r1v4 Glenorie Village Transport Assessment Progress Report 4

Revision History

Revision	Date	Details	Prepared by
v1	2/8/2024	Progress Report 1	A. Reisch
v2	17/9/2024	Progress Report 2	A. Reisch
v3	24/9/2024	Progress Report 3	A. Reisch
v4	1/11/2024	Progress Report 4	A. Reisch

This document has been prepared by [arc traffic + traffic](#) for the use of the stated Client only, and addresses the project specifically detailed in this document, and as such should not be considered in regard to any other project. This document has been prepared based on the Client's description of its requirements, information provided by the Client and other third parties. [arc traffic + transport](#) does not accept any responsibility for the use of or reference to this document other than intended by the stated Client.

Table of Contents

1	Introduction.....	1
1.1	Overview.....	1
1.2	Transport Assessment: Progress Report 3.....	1
1.3	Reference Documents	2
2	The Study Area	4
2.1	Location	4
2.2	Key Roads	5
2.3	Key Intersections	7
2.4	Traffic Surveys.....	7
2.5	Road Network Operations.....	8
2.6	Future Traffic Growth	11
2.7	Crash History	11
2.8	Public Transport.....	12
2.9	Active Transport.....	13
2.10	Movement & Place.....	15
3	Preliminary Investigations	18
3.1	Overview.....	18
3.2	New Development Locations.....	18
3.3	Traffic Generation & Distribution	18
3.4	Access Roads.....	19
3.5	Traffic Impacts	19
3.6	Intersection Operations.....	21
3.7	Active Transport.....	22
3.8	Public Transport.....	24
4	Progress Summary.....	25

Appendix A: Peak Period Traffic Surveys

Appendix B: Weekly Traffic Surveys

Appendix C: SIDRA Movement Summary Reports

Appendix D: TfNSW Count Station Data

1 Introduction

1.1 Overview

arc traffic + transport has been engaged as part of a broader the **Project Team** to examine the traffic and transport opportunities and constraints as part of the Glenorie Village (the **Village**) Investigations & Place Plan (the **Place Plan**) process for Hornsby Shire Council (**Hornsby Council**).

Council's Rural Lands Study 2022 (**Hornsby RLS**) sets the strategic direction for the future of the Shire's rural lands, providing key principles and recommendations for the ongoing management of rural land. One of those recommendations is to investigate the suitability of land generally east and north of the Village (the **Hornsby Land**) to provide greater housing diversity in the form of E4 Environmental Living allotments of 5,000 – 10,000m² which – further to additional assessments – is estimated to provide for no more than 100 low density residential dwellings.

At the same time, The **Hills Council** is currently developing its own RLS for land (**Hills Land**) within the western part of the Village which lies within the Hills Local Government Area (**Hills LGA**). While Hornsby Council has had some initial discussions with Hills Council in regard to the Place Plan, Hills Council currently have no estimates of potential yields within the portion of the **Study Area**.

While the preliminary analysis of future traffic conditions provided in **Section 3** does consider some additional development in the Hills Land, responsibility for more detailed investigations of the traffic characteristics and potential impacts of development within the Hills Land would lie with Hills Council as they further progress their RLS.

1.2 Transport Assessment: Progress Report 4

This **Progress Report 4** provides details of the assessment tasks that have been undertaken to date in the preparation of a more detailed Transport Assessment (**TA**) being prepared by arc traffic + transport, and updates **Progress Report 3** dated 24/9/2024. These updates include further consideration of any potential downstream [traffic] impacts arising from additional residential development within the Study Area.

Importantly, at this time the Project Team is still investigating issues key to our analysis of future traffic conditions further to any uplift in residential dwellings across the Study Area. As such, Progress Report 4 still largely focuses on the existing and future base (i.e. without uplift) conditions in the Study Area, as well as a high-level overview of anticipated transport network updates/changes that may be considered based on the information currently available. Our later work will of course include a detailed assessment of these transport networks once future yields are known.

1.3 Reference Documents

1.3.1 Planning Controls and Strategies

As discussed, part of the Study Area lies within the Hornsby Shire; key Hornsby Council planning documents referenced in the preparation of the Transport Assessment (and also referenced in this Progress Report 2) include:

- Hornsby Shire Development Control Plan (**Hornsby DCP**);
- Hornsby Shire Local Environmental Plan (**Hornsby LEP**);
- Hornsby RLS
- Hornsby Rural Lands Study Background Report (**Hornsby RLS Report**)
- Hornsby Local Strategic Planning Statement (**Hornsby LSPS**)
- Community ID profile data

Part of the Study Area also lies within the Hills LGA; key Hills Council planning documents referenced in the preparation of the Transport Assessment (and also referenced in this Progress Report 2) include:

- Hills Shire Development Control Plan (**DCP 2011**);
- The Hills Shire Council Rural Strategy 2019 (**Hills RLS**); and
- The Hills Shire Local Strategic Planning Statement (**Hills LSPS**)

1.3.2 Traffic and Transport Guidelines

The Transport Assessment (and Progress Report 3) also references general traffic and transport guidelines, and other reports relating to the Site and the traffic analysis provided in the Transport Assessment, including:

- Guide to Transport Impact Assessments, Transport for NSW (TfNSW) 2024 (**TfNSW Guide**);
- Roads & Maritime Services Trip Generation Surveys Small Suburban Shopping Centres Analysis Report 2018, Bitzios Consulting for RMS (**Small Centre Report**);
- Australian Standard 2890.1: Parking Facilities – Off-Street Car Parking 2009 (**AS 2890.1**);
- Australian Standard 2890.2: Parking Facilities – Off-Street Commercial Vehicle Facilities 2018 (**AS 2890.2**);
- Australian Standard 2890.6: Parking Facilities – Off-Street Parking for People with a Disability 2009 (**AS 2890.6**)
- Guide to Road Design Part 3: Geometric Design (**GRD Part 3**)
- Guide to Road Design Part 4: Intersections and Crossings General (**GRD Part 4**)
- Guide to Road Design Part 6A: Paths for Walking and Cycling (**GRD Part 6A**)
- Guide to Road Safety Part 1: Road Safety Overview (**GRS Part 1**)
- Guide to Traffic Management Part 7: Activity Centre Transport Management (**GTM Part 7**)

- Guide to Traffic Management Part 8: Local Street Management (**GTM Part 8**)
- Guide to Traffic Management Part 10: Transport Control Types of Device (**GTM Part 10**).
- Guide to Traffic Management Part 11: Parking Management Techniques (**GTM Part 11**).
- Austroads Safe System Assessment Framework (**Austroads SSAF**);
- Austroads Publication AP-R492-15 Bicycle Wayfinding (**Bicycle Wayfinding**).

2 The Study Area

2.1 Location

The Study Area is located across land surrounding the Village; Old Northern Road forms the boundary between Hornsby Shire and Hills Shire, with the Hornsby Land generally north and east of Old Northern Road, and the Hills Land generally south and west of Old Northern Road.

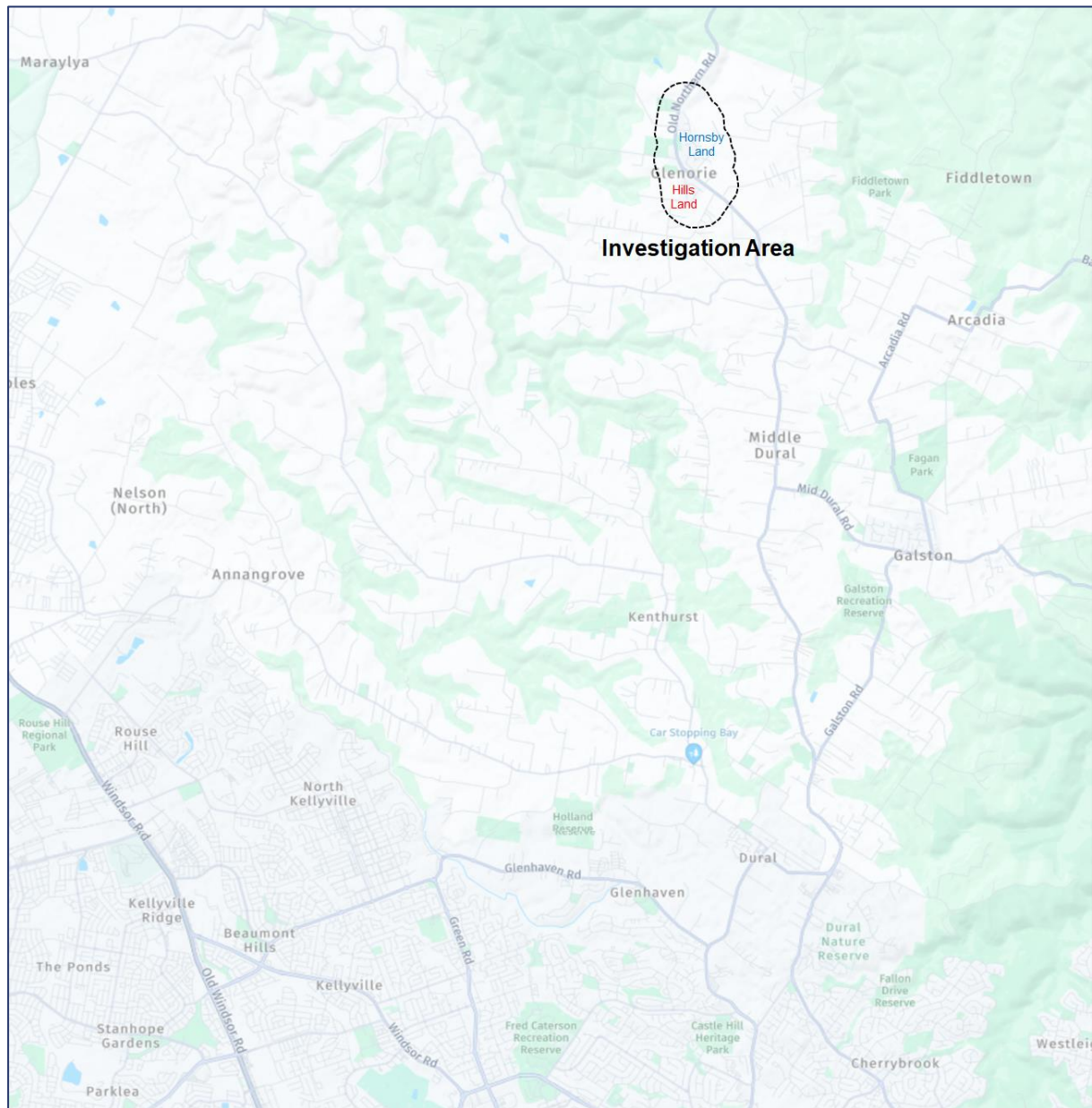
The Study Area for investigation, as well as the 400m residential buffer boundary within the Study Area, are shown in their local context in **Figure 1**, and the Study Area is shown in its sub-regional context in **Figure 2**. It is noted that the exact boundaries of the Study Area may change further to investigations by others in the Project Team.

Figure 1: Study Area: Local Context



Source: Council

Figure 2: Study Area: Sub-Regional Context



Source: Nearmap

For ease of reference, Old Northern Road is considered as running north-south through the Study Area.

2.2 Key Roads

2.2.1 Old Northern Road

Old Northern Road is a State Road that generally runs north-south from Wisemans Ferry to Windsor Road at Baulkham Hills.

Through the Study Area, Old Northern Road provides 1 traffic lane in each direction; formal and informal verges north and south of the Village; and limited on-street parking within the Village. Old Northern Road has a posted speed limit of 60km/h through the Study Area, as well as a School Zone speed limit of 40km/h immediately north of the Village in the vicinity of Glenorie Public School.

2.2.2 Timaru Street

Timaru Street is a local road that runs east from Old Northern Road; it provides a wide carriageway suitable for two-way traffic and kerbside parking, and has a posted speed limit of 50km/h. Timaru Street provides access to low density residential dwellings and other minor local roads.

2.2.3 Schwebel Lane

Schwebel Lane is a local road that runs west from Old Northern Road; it provides a narrow carriageway suitable for two-way traffic only, and has a posted speed limit of 50km/h. Schwebel Lane primarily provides access for rural residential and light industrial/produce lots.

2.2.4 Post Office Road

Post Office Road is a local road that generally runs north-south from Old Northern Road to Cattia Ridge Road. Within the Study Area, Post Office Road provides a wide carriageway suitable for two-way traffic and kerbside parking, and has a posted speed limit of 50km/h. Post Office Road provides access for low density dwellings and rural residential lots, as well as Woolworths and the Glenorie RSL Club.

2.2.5 Cairnes Road

Cairnes Road is a local road that generally east from Old Northern Road; it provides a wide carriageway suitable for two-way traffic and kerbside parking, and has a posted speed limit of 50km/h. Cairnes Road provides access for low density dwellings, and rural residential and light industrial/pastoral lots.

2.2.6 Whites Road

Whites Road is a local road that runs south from Old Northern Road; it provides a narrow carriageway suitable for two-way traffic only, and has a posted speed limit of 50km/h. Schwebel Lane primarily provides access for rural residential and light industrial/produce lots.

2.2.7 Bus Lane

A wide service lane is located north of Old Northern Road opposite Post Office Road, which provides a southbound bus stop and on-street parking, which we have termed lane “**Bus Lane**” for ease of reference. Bus Lane would largely operate as a one-way lane, with entry via Old Northern Road opposite Post Office Road, and exit to Old Northern Road immediately north of Cairnes Road, but it is noted that there are no signs specifically restricting two-way movements.

Council is currently considering an upgrade of Bus Lane and Old Northern Road adjacent to Bus Lane; this upgrade is examined in further detail in **Section 2.8.2**.

2.3 Key Intersections

2.3.1 Old Northern Road & Post Office Road

The intersection of Old Northern Road & Post Office Road operates under priority (Give Way) control, with priority to Old Northern Road. It provides a channelised right (**CHR**) treatment for the movement Old Northern Road to Post Office Road, and dual left and right turn lanes from Post Office Road to Old Northern Road.

2.3.2 Old Northern Road & Cairnes Road

The intersection of Old Northern Road & Cairnes Road operates under priority (Give Way) control, with priority to Old Northern Road. It provides an informal Basic Right (**BAR**) treatment for the movement Old Northern Road to Cairnes Road – which would allow a northbound vehicle in Old Northern Road to pass a vehicle turning right to Cairnes Road – but the BAR is available when vehicles are parked in the kerbside lane on the southern side of Old Northern Road. Single lanes are provided on all other approaches.

2.3.3 Old Northern Road & Whites Road

The intersection of Old Northern Road & Whites Road operates under priority (Give Way) control, with priority to Old Northern Road. While the northern kerb of Old Northern Road is widened in the vicinity of Whites Road, it does not provide a compliant BAR treatment for the movement Old Northern Road to Whites Road. Single lanes are provided on all other approaches.

2.3.4 Old Northern Road Local Intersections

All other local intersections with Old Northern Road operate as simple T-intersections under priority (Give Way) control with priority to Old Northern Road, and provide a single lane on each approach.

2.4 Traffic Surveys

2.4.1 Weekday Peak Period Traffic Surveys

To better inform the TA, arc traffic + transport commission weekday peak hour traffic surveys at the key intersections within the Study Area, including:

- Old Northern Road & Post Office Road;
- Old Northern Road & Cairnes Road; and
- Old Northern Road & Whites Road.

The traffic surveys were completed by TIS in June 2024, and are provided in full in **Appendix A**.

It is noted that the extent of the traffic surveys (and traffic analysis) is specifically based on the potential additional trip generation of the Study Area (see **Section 3.3**) and its potential to impact the broader sub-regional road network.

In this regard, the potential number of additional trips being generated to (for example) Old Northern Road (south of Round Corner) or New Line Road (south of Dural) would equate to only 1 – 2 additional vehicle trips a minute, which would have no significant impact on existing conditions in these road.

Notwithstanding, arc traffic + transport notes that if there were any significant increases in dwelling yields from those anticipated at the time, a more detailed assessment of these roads may be required; this would be the same case if the Hills Land were to generate higher yields than adopted in the preliminary traffic analysis provided in **Section 3**.

2.4.2 7 Day Traffic Surveys

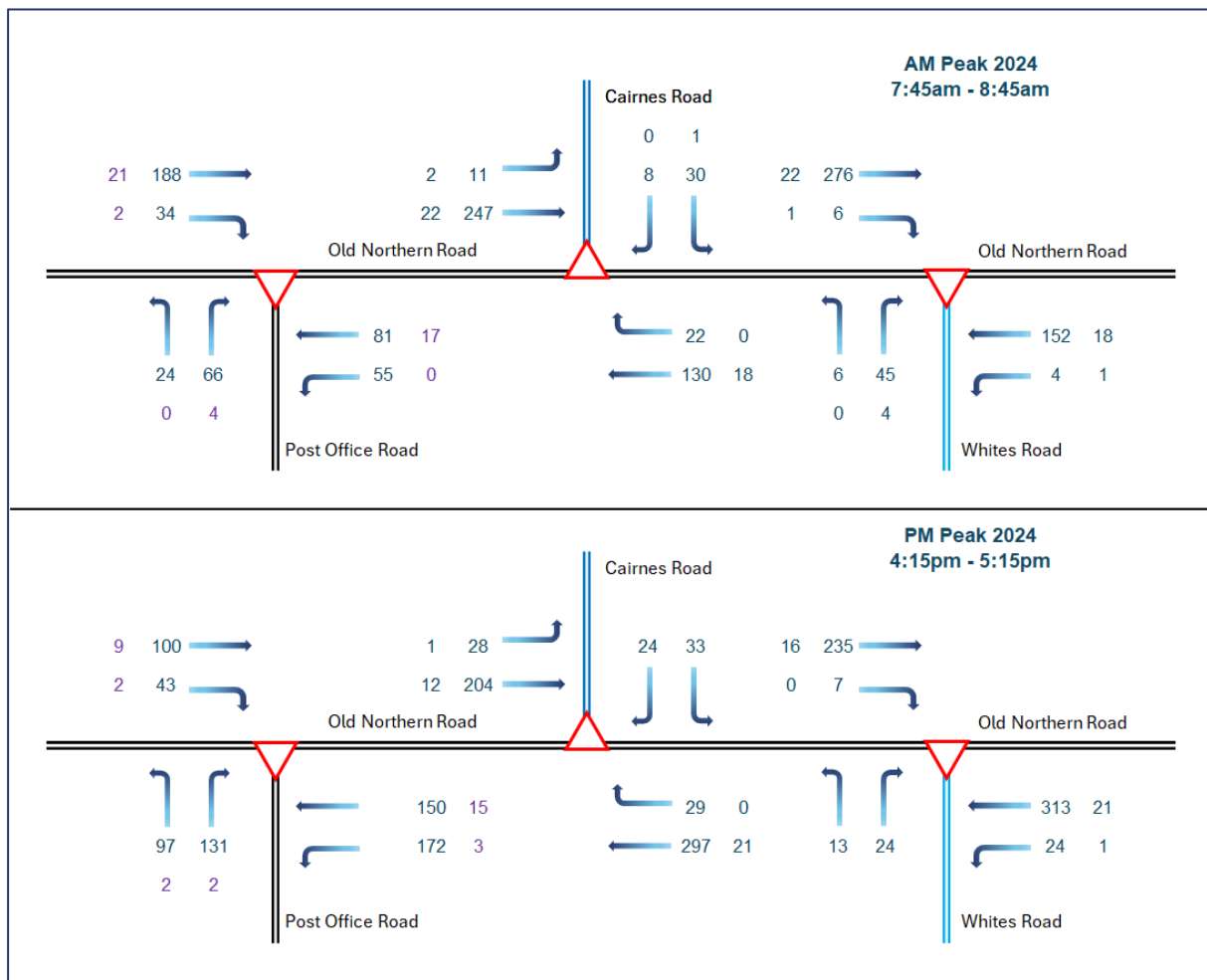
Council requested that a Traffic (Tube) Counter be installed in Old Northern Road to provide more detailed data on the daily variation in traffic volumes; the Counter provides 24/7 data, as well as a breakdown to vehicle types and vehicles speeds. The Counter was installed in Old Northern Road between Post Office Road and Cairnes Road in September 2024; the full survey data set is provided in **Appendix B**, and discussed further in **Section 2.5.4**.

2.5 Road Network Operations

2.5.1 Peak Hour Traffic Volumes

With reference to the traffic surveys in **Appendix A**, peak hour volumes were determined to be generated in Old Northern Road between 7:45am and 8:45am in the AM and 4:15pm and 5:15pm in the PM. A summary of these peak hour volumes is provided in **Figure 3**.

Figure 3: 2024 Peak Hour Traffic Volumes



Source: TIS

2.5.2 SIDRA

The operation of the key intersection has been assessed using the SIDRA intersection model. SIDRA provides a number of key outputs by which to measure the performance of an intersection, including:

- **Average Vehicle Delay (AVD):** AVD is used to determine an intersection's Level of Service (see below). For priority intersections, the AVD used to determine Level of Service is determined with reference to the [average] Worst Approach Delay (**WAD**), i.e. the highest delay of all approaches.
- **Degree of Saturation (DOS):** DOS is defined as the ratio of demand (arrival) flow to capacity. Degrees of Saturation above 1.0 represent over-saturated conditions (demand flows exceed capacity) and degrees of saturation below 1.0 represent under-saturated conditions (demand flows are below capacity).
- **95th Queue Length (95QL):** 95QL is the length of queue on an approach to an intersection below which 95% of all observed cycle queue lengths fall, or where 5% of observed queues exceed.

- **Level of Service (LOS):** is a comparative measure that provides an indication of the operating performance; as discussed, for priority intersections LOS is based on WVD.

With regard to LOS, **Table 1** provides a summary of the SIDRA recommended criteria for the assessment of intersections.

Table 1: SIDRA Level of Service Criteria

Level of Service	Worst Vehicle Delay (seconds per vehicle)	Stop & Give Way
A	less than 14	Good operation
B	15 to 28	Acceptable delays and spare capacity
C	29 to 42	Satisfactory, but accident study required
D	43 to 56	Near capacity and accident study required
E	57 to 70	At capacity, requires other control mode
F	More than 70	Unsatisfactory and requires other control mode or major treatment.

Source: SIDRA Systems

2.5.3 Existing Intersection Operations

Further to the SIDRA analysis, **Table 2** provides a summary of the existing operation of the key intersections; SIDRA Movement Summary reports are provided in **Appendix C**.

Table 2: Existing Intersection Operations

2024 Intersections	Level of Service		Worst Delay (s)		Degree of Saturation		Queue Length (m)	
	AM	PM	AM	PM	AM	PM	AM	PM
ONR & Post Office Rd	A	A	8.4	10.2	0.121	0.224	2.9	6.4
ONR & Cairnes Rd	A	A	7.5	9.2	0.161	0.227	1.4	3.8
ONR & Whites Rd	A	A	8.2	9.4	0.172	0.225	1.8	1.7

With reference to **Table 2**, each of the key intersections currently operates at a good LOS, with very minimal delays and queues, and with each intersection retains significant spare capacity.

2.5.4 Weekly Traffic Volumes

With reference to the Counter data set in **Appendix B**, the Average Weekly Traffic (**AWT**) volumes in Old Northern Road were:

- 6,740 vehicles per day (two-way) over 7 days;
- 6,792 vehicles per day (two-way) on weekdays; and
- 6,660 vehicles per day (two-way) on weekends.

As suggested by Council, traffic volumes in Old Northern Road are therefore not significantly different between weekdays and weekends. It is also noted that there was generally an even distribution of trips between eastbound and westbound trips on every day of the week.

With regard to vehicle types, 95% of vehicles were light vehicles, and 4% of vehicles were small trucks; only 1% of vehicles were medium or large trucks or buses.

With regard to vehicle speeds, the data indicates an 85th percentile speed in Old Northern Road between Post Office Road and Cairnes Road of 54km/h, which is lower than the posted speed limit, which likely reflects the additional activity within the Village, as well as their being more turning movements (which require that vehicles slow down).

2.6 Future Traffic Growth

While there is little data available in regard to historic traffic volumes in Old Northern Road in the Study Area, a review of TfNSW Count Station data for other key roads in the sub-region indicates that there has been little growth in Average Annual Daily Traffic (**AADT**) volumes over the past 10 years. The location of the Count Stations which provide historical data – provided in **Appendix D** - include:

- New Line Road north of County Drive;
- Galston Road east of Calderwood Road; and
- Old Northern Road north of Glenhaven Drive.

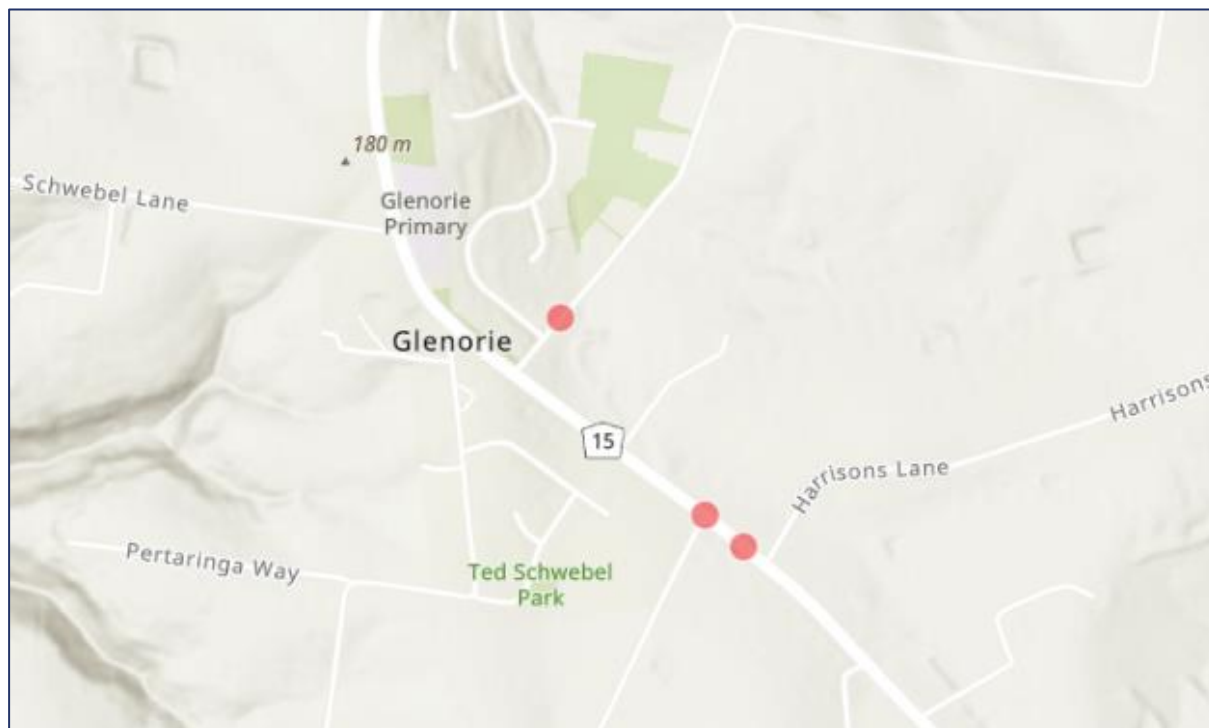
The fact that there has been little growth is not surprising given that many of the rural collector roads feeding traffic to/from Old Northern Road through the Study Area do not provide access to new development areas in the northern parts of the sub-regional serviced by these roads. As such, the only real potential for additional traffic volumes in Old Northern Road through the Study Area would result from targeted developments such as provided for in the Place Plan.

2.7 Crash History

Crash data for the reporting period 2018 to 2022 inclusive is available from TfNSW's Centre for Road Safety. The crash data provides information on the date and severity of all crashes, including the type of crash and whether or not speeding or fatigue were factors in the crash.

With reference to this data, 3 crashes occurred in the 5 year reporting period, each being a non-injury (tow away) crash; these crash locations are shown in **Figure 4**.

Figure 4: 2018 – 2022 Crash Locations



Source: TfNSW

With reference to **Figure 4**, 2 crashes occurred in Old Northern Road in the vicinity of Whites Road, with 1 being a run off road (right) and 1 being a rear end crash. 1 crash occurred in Cairnes Road north of Old Northern Road, being an off-road left (into object) crash.

Speeding or fatigue were no identified as contributing factors in any of the crashes, and as such it can only be assumed that they resulted from simple human error.

2.8 Public Transport

2.8.1 Existing Bus Services

Bus Route 637 operates between Castle Hill and Glenorie via Galston and Round Corner every 60 – 80 minutes across the day, with additional AM peak departure services (from Glenorie) and additional PM arrival services (to Glenorie). Bus services operate every 2 hours on Saturdays and Sundays.

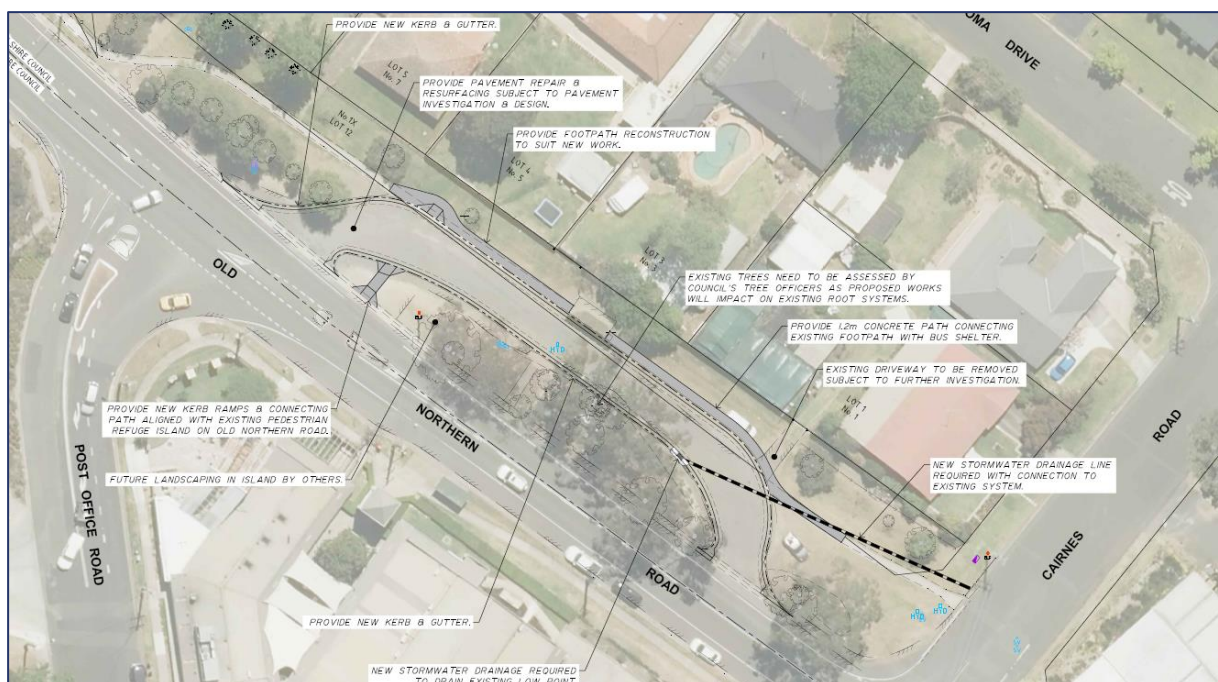
Bus services to Sydney City and Parramatta, including express services, are available at Round Corner, and it anticipated that some commuters would as such drive (or be driven) to Round Corner to use these services.

2.8.2 Future Bus Services

There is no information to indicate that TfNSW is examining the potential for additional bus services to/from Glenorie in the near future, and moreover it is likely that a private vehicle trip to major employment and service centres to the south and east of the Study Area will continue to be significantly quicker than a bus trip, reducing the potential for an increase in bus trips.

Notwithstanding, Council has developed preliminary plans for an upgrade of Bus Lane and Old Northern Road adjacent to Bus Lane to provide improved pedestrian connectivity and landscaping in Bus Lane and along its frontage to Old Northern Road. The preliminary plan for the upgrade of Bus Lane is shown below.

Figure 5: Bus Lane Preliminary Upgrade Plan



Source: Council

arc traffic + transport notes that the preliminary upgrade proposed for Bus Lane does not include the designation of Bus Lane as a one-way road.

2.9 Active Transport

2.9.1 Existing Active Transport

The Village provides a reasonable level of active transport accessibility, including:

- A footpath on the eastern side of Old Northern Road from Timaru Road to Cairnes Road;
- A footpath on the western side of Old Northern Road from Les Shor Oval to Whites Road;
- Footpaths on both sides of Post Office Road from Old Northern Road to Parkview Avenue;
- A pedestrian refuge (crossing) in Old Northern Road east of Post Office Road;

- A pedestrian refuge (crossing) in Post Office Road south of Old Northern Road; and
- A signalised pedestrian crossing of Old North Road adjacent to Glenorie Public School

With regard to the pedestrian refuge in Old Northern Road east of Post Office Road, it is noted that this does not actually lead to a footpath on the northern side of Old Northern Road but directly into Bus Lane, as shown in **Figure 6**.

Figure 6: Old Northern Road Pedestrian Refuge



Source: Google

It is noted that Council has developed a preliminary concept plan for the upgrade of Bus Lane and this section of Old Northern Road – including better linking the pedestrian refuge to adjacent footpaths; this is discussed further in **Section 2.9.2**.

No foot or cycle paths are provided to the north or south-east of the Study Area, and as such only experienced cyclists would cycle to/from Dural and beyond given that these trips would need to be on-road, i.e. sharing the carriageway with vehicular traffic.

Formal paths are not provided in the majority of local residential roads.

2.9.2 Future Active Transport Infrastructure

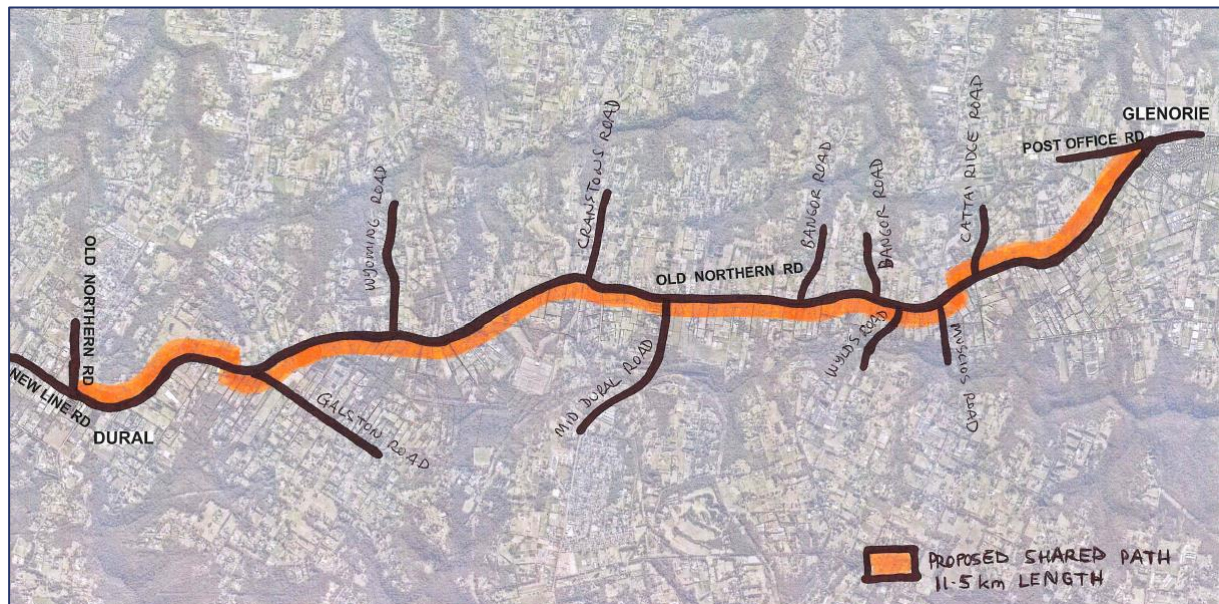
With reference to **Figure 5**, the upgrade of Bus Lane will also provide improved pedestrian accessibility in this key central part of the Village. New infrastructure including pedestrian paths along the northern side of Bus Lane (connection to existing paths north-west and south-east of Bus Lane); and a new footpath through the median island separating Bus Lane from Old Northern Road which would align with the existing pedestrian refuge in Old Northern Road immediately east of Post Office Road.

In addition, Council resolved in late 2023 to progress planning for a new shared path between Glenorie and New Line Road at Dural, a distanced of approximately 11.5km. Council subsequently wrote to the NSW Minister for Transport seeking funding for the shared path, and moreover its inclusion in the TfNSW's Central River City Strategic Cycleway Corridors Program, which we understand is currently being developed.

The shared path would run along the southern side of Old Northern Road between the Village and Muscios Road, then the northern side of Old Northern Road through to Galston Road before returning to the southern side of Old Northern Road through to New Line Road.

The proposed share path is shown in **Figure 7**.

Figure 7: Proposed Old Northern Road Shared Path



Source: Council

While the location and yields of potential new residential dwelling within the Study Area remains to be determined, it is anticipated that where possible additional active transport paths would link between these new residential areas and the Village.

2.10 Movement & Place

2.10.1 Overview

Movement & Place is a multi-disciplinary, **place-based** approach to the planning, design, delivery and operation of transport networks that recognises and looks to optimise networks of places for people formed by roads and streets, and the spaces they adjoin and impact.

Movement is how people get about to access their jobs, education and services, as well as the movement of goods required for our towns and villages to function.

Places are the spaces where we get together, relax, celebrate, work and participate in civic life.

In the past, roads have been considered as simply a way to get vehicles from A to B; Movement & Place recognises that roads are not just about moving people and goods – they are also places for people to live, work and spend time. Movement & Place is about getting the right mix of transport in the right locations to create places we can all enjoy.

By broadening our thinking about our roads and streets beyond their functional role in supporting movement, places can better deliver social, environmental and economic improvements for the entire community.

Likewise, by broadening our thinking about movement to include both mobility and access, we can promote the right mode for each trip purpose, and plan places that serve local areas and minimise the need to travel long distances.

The underlying objective of Movement & Place is therefore to provide roads and streets that:

- Contribute to the network of public space within a location, where people can live healthy, productive lives; meet each other; interact; and go about their daily activities.
- Are enhanced by transport, and have the appropriate space allocation to move people and goods safely and efficiently, and connect places together.

A place-based approach to planning also involves taking a collaborative, spatial, long-term approach to develop contextual responses that better meet the needs of local communities and their environments. Place-based planning aims to build and support thriving communities through collaboration, partnering, shared design, shared stewardship, and shared accountability.

2.10.2 Movement & Place in the Study Area

With specific reference to the Study Area, the only significant road (i.e. with a greater *movement* function) is Old Northern Road, which under the Movement & Place hierarchy would be classified as a Main Street, though it also has characteristics of a Local Street and even Civic Place.

All other roads would be classified as Local Streets, with Civic Places including Walter Buckingham Memorial Garden; Glenorie Memorial Hall; Glenorie Public School; and areas of activation around the corner of Old Northern Road & Post Office Road, including the Glenorie Bakery and Woolworths.

While local residents and visitors might not consider it a place, the Woolworths site is nonetheless the focal point of the Study Area (and Village) even if people would not necessarily consider it a place they want to be for anything other than shopping.

The ability to create a more inviting place may be limited at this time, but factors such as an additional population result not only in potential funding sources for Council (and the community) to investigate places, but also increase the potential for new businesses to open within the Village, as it is likely [relatively minor] demand that may at this time simply make some business not economically viable.

While the location of new development again remains to be determined, all indications are that Post Office Road will play a key role in providing access between these development and Old Northern Road. This means there is the potential to active all of Post Office Road, even if (for example) that means providing a shared path and a shaded bench.

2.10.3 The 15 Minute Neighbourhood

Recognising the differences in travel times between [private] vehicles and buses, much of the planning for future transport networks – and more environmentally friendly transport networks – focuses on developing around and within existing centres rather than an expansion of active and public transport to longer routes servicing satellite developments.

As an adjunct to Movement & Place, the 15 Minute Neighbourhood objectives are to provide a higher proportion of the population with access to key services within a 15 minute walk of cycle trip.

While the 15 Minute Neighbourhood therefore specifically improves the potential use of active transport for short distance trips, there will also need to be a focus on providing pedestrian facilities that ensure accessibility to bus stops for services to larger regional centres, a cornerstone of the 30 Minute City concept where everyone has access to a regional centre within a 30 minute public transport trip.

While the concept of 15 minute and 30 minute catchments have been specifically considered in the investigations, given the relative isolation of the Village it is important to also place these planning concepts into the unique context of the Village. In reality therefore, opportunities to create a fully walkable Study Area may be limited, but key to achieving sustainable travel modes and activating places where people want to be will perhaps only result from an increase in the local population, and in turn more local businesses and a good path network.

3 Preliminary Investigations

3.1 Overview

This sections provides an review of the opportunities and constraints relative to the local transport networks arising from the provision of additional residential density within the Study Area. As discussed, at this time potential yields and access points are still to be determined, and as such we have provided only a relatively high-level assessment, which may be subject to change based on the outcomes of other assessments.

3.2 New Development Locations

Based on all available information, the most likely locations for additional development would be north of Old Northern Road between Cairnes Road and Harrison Lane (Hornsby Land) and south and south-west of the Village, predominantly in the Hills Land. We note again that this assumption is based on available information, and as such may change.

As discussed in **Section 1.1**, while Hills Council is currently developing their own RLS, there is no information available at this time in regard to the potential yields of the Hills Land. For the purpose of this preliminary traffic analysis, we have assumed that the Hills Land could also yield 100 low density dwellings; again though, it would be the responsibility of Hills Council to undertake an assessment of future traffic conditions further to the development of the Hills Land.

3.3 Traffic Generation & Distribution

3.3.1 Trip Rates

Trip rates for the traffic analysis have been taken from the new TfNSW Guide, provides the following peak hour trips rates for low density dwellings:

- 0.68 and 0.77 trips per dwelling per hour in the AM and PM peaks respectively.

3.3.2 Additional Trips

While it is again essential to stress that potential residential yields remain to be determined, applying the trip rates above to the preliminary yield estimate of 200 dwellings across the Study Area results in an estimated 136vph and 154vph in the AM and PM peaks respectively.

3.3.3 Trip Distribution

If the high yields discussed above were to be achieved, it would require the development of numerous different locations across the Study Area, which in turn would reduce the number of additional trips being generated to any single road/intersection.

As previously discussed, the most likely locations for uplift would be the Hornsby Land with potential access to Cairnes Road, Harrison Lane or a new road mid-point between these existing roads. For

the Hills Land, the most likely access roads would be Post Office Road and Whites Road, though again this would need to be further investigated by Hills Council.

As is currently the case, the majority of residential trips would be generated to/from the south, with a majority being outbound in the AM and a majority being inbound in the PM.

3.4 Access Roads

Further to the above, notwithstanding the caveat to potential development locations and yields, it is anticipated that Post Office Road, Cairnes Road and Whites Road will likely play an important role in providing future access between new development sites and Old Northern Road.

In identifying these roads as providing primary future access, we note the following:

- It is unlikely that new roads would be constructed to Old Northern Road directly, but rather these roads may need to be upgraded or their profiles revised to meet additional vehicular and pedestrian/cyclist demands. The exception may be a new road running north-east from Old Northern Road between Cairnes Road and Harrisons Lane (if this parcel of Hornsby Land were to be developed).
- Some new local roads may need to be constructed, which may intersect with these existing local roads; however, the majority of trips will still be to/from the south-east, and as such via intersections with Old Northern Road providing the most direct access to/from the south east (see also **Section 3.6**).

In determining future designs for new or upgraded/revised local roads, guidance is provided in the Hornsby DCP (and Hills DCP) in regard to a standard road hierarchy and road profiles. However, any road profiles will also need to consider the unique characteristics of the Study Area, noting that most DCP road profiles are designed for new urban areas rather than areas such as the Study Area.

3.5 Traffic Impacts

3.5.1 Road Capacity

The nominal capacity of a road can be determined with reference to Table 4.1 of the RTA Guide, which provides upper limits by which to achieve “environmental amenity” for different roads in the standard hierarchy. Table 4.1 of the RTA Guide is reproduced below.

Table 3: Environmental Capacity Standards for Residential Streets

Road class	Road type	Maximum Speed (km/hr)	Maximum peak hour volume (veh/hr)
Local	Access way	25	100
	Street	40	200 environmental goal
			300 maximum
Collector	Street	50	300 environmental goal
			500 maximum

Source: RTA Guide

With reference to the potential access roads identified above, it is likely that Post Office Road would better be defined as a Collector Road if it were to provide access to additional local roads, while both Cairnes Road and Whites Road would be defined a Local Street.

3.5.2 Post Office Road Capacity

With reference to the existing peak hour volumes shown **Figure 3**, Post Office Road south of Old Northern Road currently accommodates just under 500vph (PM peak), but this is not representative of volumes along the entire length of Post Office Road, with volumes south of the Woolworths Drive likely less than half this volumes. As such, amenity in this northern – commercial - section of Post Office Road is not as relevant from an environmental capacity perspective, though of course the operation of the Old Northern Road & Post Office Road intersection will be relevant (see **Section 3.6.1**).

Notwithstanding, it is likely that no more than 50vph could be generated south of Woolworths without maximum environmental capacity being breached.

3.5.3 Cairnes Road

With reference to the existing peak hour volumes shown in **Figure 3**, Cairnes Road north of Old Northern Road currently accommodates just under 150vph (PM peak); this means that Cairnes Road could potential accommodate an additional 50vph and stay under the environmental goal, and an additional 150vph to stay under the maximum capacity.

3.5.4 Whites Road

With reference to the existing peak hour volumes shown in **Figure 3**, Whites Road south of Old Northern Road currently accommodates 90vph (PM peak); this means that Whites Road could potential accommodate an additional 110vph stay under the environmental goal, and an additional 210vph to stay under the maximum capacity.

3.5.5 Capacity Summary

Considering only what are anticipated to be the primary access roads between Old Northern Road and new development – Post Office Road, Cairnes Road and Whites Road – the traffic generated by the upper yield estimate could be accommodated by these access roads if to some degree spread across all 3 roads. Again though, more detailed analysis will be required once yields and development locations have been determined.

3.6 Intersection Operations

3.6.1 Old Northern Road & Post Office Road

As discussed in **Section 2.5**, this intersection currently operates at LOS A with significant spare capacity. Preliminary SIDRA modelling of the intersection further to accommodating an additional 150vph (distributed proportionally to the surveyed distribution) the intersection would continue to operate at a LOS A with moderate delays and queues while retaining spare capacity.

It is noted that Progress Report 1 provided a high level concept for the signalisation of the intersection; however, this concept was more retailed to creating a central location providing high standard crossings of all approaches, not specifically to accommodate traffic. Noting both the preliminary concept plan for Bus Lane, as well as the access to Bus Lane from the south that would be difficult if the intersection were signalised, signals at the intersection are unlikely to be either warranted or practical.

3.6.2 Old Northern Road & Cairnes Road and Old Northern Road & Whites Road

As discussed in **Section 2.5**, these intersections both currently operate at a LOS A, and preliminary SIDRA modelling of each accommodating an additional 150vph (both as through and turning movements) indicates no change from a LOS, nor significant delays or queues.

Notwithstanding, it may be that some upgrades of these intersection will be required, and specifically upgrades to provided either formal BAR treatments or – if there is a more significant right turn demand – potentially a CHR for the right turns from Old Northern Road to each local road. It is noted that upgrade warrants for intersections provided in GTM Part 6 do not apply to brownfield sites (i.e. existing intersections) but the GTM Part 6 warrants may still be a reasonable reference given that each road would be providing access to new, greenfield development sites even if somewhat removed from the intersections themselves.

3.6.3 Local Intersections

Away from Old Northern Road, there is no expectation that local intersection could no operate as simple priority (Give Way or Stop) intersections with single lane approaches.

3.6.4 Broader Road Network

As discussed in regard to the location of traffic surveys in **Section 2.4**, based on the current dwelling yield estimates the potential impact of additional trips would be limited to key intersections within the

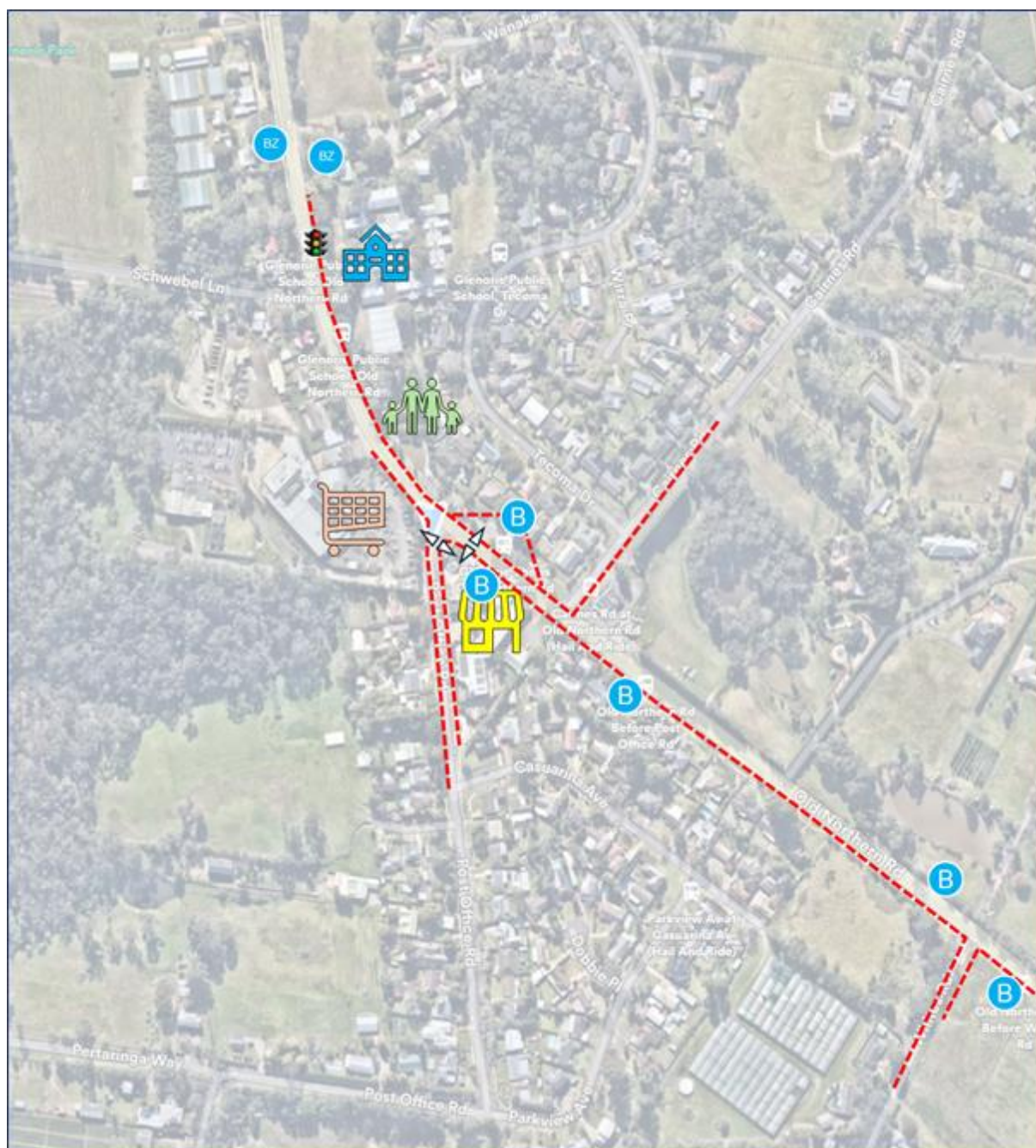
Study Area as identified above. Should there be a significant increase in yields, it may be that additional traffic analysis of other roads and intersection providing access to/from the Study Area may be required.

3.7 Active Transport

While the specific location of new development is to be determined, the primary attractors in the area will remain the Village itself (at the south-east corner of The Northern Road & Post Office Road); Woolworths; Glenorie Public School; and community and recreational facilities north of the Village.

Future key desire lines, which are essentially the same as existing desire lines, but with the potential for greater active trip demand further to trips being generated via Cairnes Road, Post Office Road and Whites Road, are shown in **Figure 8**.

Figure 8: Village Pedestrian Desire Lines



As discussed in **Section 3.6.1**, Progress Report 1 provided a high level discussion of signalling the intersection of Old Northern Road & Post Office Road to maximise the safety and efficiency of pedestrian movements at this central location; however, this is unlikely to be suitable further to consideration of the Bus Lane upgrade and economic viability.

We note that the pedestrian refuges in both Old Northern Road and Post Office Road do not provide hold rails, which assist those with limited mobility to cross the road in two stages, as well as providing an additional safety barrier for pedestrians. Hold rails at both refuges should be considered by Council regardless of new development within the Study Area.

3.8 Public Transport

Further to the discussion of signalling the Old Northern Road & Post Office Road intersection, we note that there are locations to the north of the Village where buses could turn around so as to enter Bus Lane from the north if a signalised intersection were to be considered. As importantly – with or without signals – extending bus services to the north to bus stops in the vicinity of Timaru Street would further enhance the potential for residents to use public transport.

4 Progress Summary

As detailed in Progress Report 4, a significant amount of work has been completed to date to provide important context to the unique nature of the Study Area, and the ways in which it is anticipated that additional residential growth can be accommodated by the transport networks within the Study Area.

The next stage of work will be based on more detailed development yields and locations being identified by the Project Team so that we can undertake traffic analysis of future road operations, as well as better define preferred Movement & Place, public transport and active transport outcomes.

Anton Reisch

Director, arc traffic + transport

Appendix A: Traffic Surveys

Source: TIS Surveys

Old Northern Road & Post Office Road, Tuesday 25th June 2024

All Vehicles Time Per Hour	NORTH									SOUTHEAST <i>Old Northern Road</i>									TOTAL					
	L			I			R			TOTAL	L			I			R			TOTAL	LIGHT	HEAVY	TOTAL	
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ					
7:00 - 8:00										52	0	52	59	16	75						127	436	45	481
7:15 - 8:15										50	0	50	59	20	79						129	433	59	492
7:30 - 8:30										45	0	45	71	18	89						134	430	52	482
7:45 - 8:45										55	0	55	81	17	98						153	448	44	492
8:00 - 9:00										56	0	56	91	18	109						165	441	42	483
Period End																								
16:00 - 17:00										190	0	190	138	18	156						346	754	47	801
16:15 - 17:15										195	0	195	147	17	164						359	791	44	835
16:30 - 17:30										184	0	184	142	20	162						346	783	48	831
16:45 - 17:45										181	0	181	146	18	164						345	709	41	750
17:00 - 18:00										172	0	172	154	15	169						341	699	29	728
Period End																								

All Vehicles Time Per Hour	SOUTH <i>Post Office Road</i>									NORTHWEST <i>Old Northern Road</i>									TOTAL				
	L			I			R			TOTAL	L			I			R			TOTAL	LIGHT	HEAVY	TOTAL
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ				
7:00 - 8:00	28	1	29				85	4	89	118				184	22	206	28	2	30	236	436	45	481
7:15 - 8:15	23	1	24				76	5	81	105				189	30	219	36	3	39	258	433	59	492
7:30 - 8:30	19	1	20				72	4	76	96				187	27	214	36	2	38	252	430	52	482
7:45 - 8:45	24	0	24				66	4	70	94				188	21	209	34	2	36	245	448	44	492
8:00 - 9:00	26	0	26				64	2	66	92				171	21	192	33	1	34	226	441	42	483
Period End																							
16:00 - 17:00	88	2	90				112	5	117	207				158	18	176	68	4	72	248	754	47	801
16:15 - 17:15	92	4	96				120	5	125	221				165	14	179	72	4	76	255	791	44	835
16:30 - 17:30	95	3	98				128	4	132	230				159	17	176	75	4	79	255	783	48	831
16:45 - 17:45	95	4	99				117	3	120	219				120	15	135	50	1	51	186	709	41	750
17:00 - 18:00	97	3	100				130	1	131	231				101	10	111	45	0	45	156	699	29	728
Period End																							

Old Northern Road & Cairnes Road, Tuesday 25th June 2024

All Vehicles Time Per Hour	NORTHEAST Cairnes Road										SOUTHEAST Old Northern Road										TOTAL		
	L			I			R			TOTAL	L			I			R			TOTAL	TOTAL		TOTAL
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		LIGHT	HEAVY	
7:00 - 8:00	28	2	30	0	0	0	16	2	18	48				91	21	112	10	2	12	124	409	52	461
7:15 - 8:15	33	2	35	0	0	0	18	1	19	54				92	23	115	14	1	15	130	424	62	486
7:30 - 8:30	32	2	34	0	0	0	16	1	17	51				104	21	125	19	1	20	145	429	56	485
7:45 - 8:45	30	1	31	0	0	0	8	0	8	39				130	18	148	22	0	22	170	448	43	491
8:00 - 9:00	35	2	37	0	0	0	8	0	8	45				143	20	163	24	2	26	189	450	48	498
Period End																							
16:00 - 17:00	34	3	37	0	0	0	24	0	24	61				298	20	318	47	5	52	370	665	52	717
16:15 - 17:15	36	3	39	0	0	0	29	0	29	68				307	19	326	47	4	51	377	694	44	738
16:30 - 17:30	45	3	48	0	0	0	29	0	29	77				295	24	319	28	4	32	351	680	53	733
16:45 - 17:45	33	1	34	0	0	0	22	0	22	56				303	23	326	32	1	33	359	630	47	677
17:00 - 18:00	34	0	34	0	0	0	24	0	24	58				293	18	311	29	0	29	340	610	35	645
Period End																							

All Vehicles Time Per Hour	SOUTH -										SOUTHWEST Old Northern Road										TOTAL		
	L			I			R			TOTAL	L			I			R			TOTAL	TOTAL		TOTAL
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		LIGHT	HEAVY	
7:00 - 8:00											14	1	15	250	24	274				289	409	52	461
7:15 - 8:15											12	1	13	255	34	289				302	424	62	486
7:30 - 8:30											12	1	13	246	30	276				289	429	56	485
7:45 - 8:45											11	2	13	247	22	269				282	448	43	491
8:00 - 9:00											15	2	17	225	22	247				264	450	48	498
Period End																							
16:00 - 17:00											31	1	32	231	23	254				286	665	52	717
16:15 - 17:15											27	1	28	248	17	265				293	694	44	738
16:30 - 17:30											30	2	32	253	20	273				305	680	53	733
16:45 - 17:45											24	1	25	216	21	237				262	630	47	677
17:00 - 18:00											28	1	29	202	16	218				247	610	35	645
Period End																							

Old Northern Road & Whites Road, Tuesday 25th June 2024

All Vehicles Time Per Hour	NORTH										SOUTHEAST										TOTAL				
	-										Old Northern Road										TOTAL				
	L			I			R			TOTAL	L			I			R			TOTAL	TOTAL		TOTAL		
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	TOTAL		
7:00 - 8:00											23	1	24	107	22	129						153	451	51	502
7:15 - 8:15											16	0	16	115	24	139						155	465	62	527
7:30 - 8:30											9	1	10	138	22	160						170	474	58	532
7:45 - 8:45											4	1	5	166	18	184						189	503	46	549
8:00 - 9:00											7	1	8	175	21	196						204	494	48	542
Period End																									
16:00 - 17:00											25	1	26	334	25	359						385	670	52	722
16:15 - 17:15											29	2	31	343	24	367						398	708	46	754
16:30 - 17:30											28	2	30	312	30	342						372	685	55	740
16:45 - 17:45											24	2	26	332	27	359						385	633	49	682
17:00 - 18:00											23	1	24	314	21	335						359	617	37	654
Period End																									

All Vehicles Time Per Hour	SOUTHWEST										NORTHWEST										TOTAL		
	Whites Road										Old Northern Road										TOTAL		
	L			I			R			TOTAL	L			I			R			TOTAL	TOTAL		TOTAL
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	TOTAL
7:00 - 8:00	1	0	1				41	1	42	43				270	27	297	9	0	9	306	451	51	502
7:15 - 8:15	4	0	4				42	2	44	48				280	35	315	8	1	9	324	465	62	527
7:30 - 8:30	4	0	4				45	2	47	51				272	32	304	6	1	7	311	474	58	532
7:45 - 8:45	6	0	6				45	4	49	55				276	22	298	6	1	7	305	503	46	549
8:00 - 9:00	11	0	11				37	4	41	52				259	21	280	5	1	6	286	494	48	542
Period End																							
16:00 - 17:00	14	0	14				28	1	29	43				253	25	278	16	0	16	294	670	52	722
16:15 - 17:15	12	0	12				35	0	35	47				277	20	297	12	0	12	309	708	46	754
16:30 - 17:30	10	0	10				33	0	33	43				289	23	312	13	0	13	325	685	55	740
16:45 - 17:45	10	0	10				19	0	19	29				239	20	259	9	0	9	268	633	49	682
17:00 - 18:00	13	0	13				24	0	24	37				236	15	251	7	0	7	258	617	37	654
Period End																							

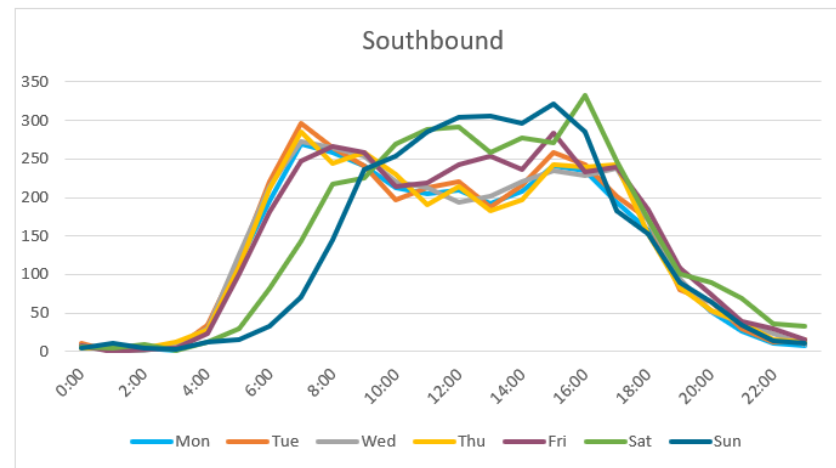
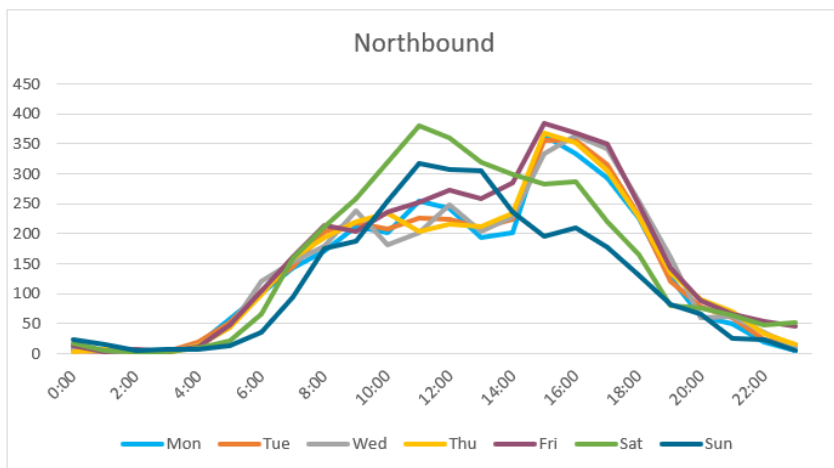
Appendix B: Classifier Counter Data

Source: TIS Surveys

Hourly Average Traffic Volumes

Time	Mon		Tue		Wed		Thu		Fri		Sat		Sun		7 Day Total	
	16-Sep		10-Sep		11-Sep		12-Sep		13-Sep		14-Sep		15-Sep		NB	SB
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB		
0:00	9	7	5	10	7	8	4	4	14	8	17	6	24	5	80	48
1:00	5	1	3	0	3	2	8	4	3	0	6	4	15	11	43	22
2:00	6	5	4	6	4	2	4	4	7	3	4	9	6	5	35	34
3:00	2	2	4	5	4	9	2	12	4	4	3	1	7	3	26	36
4:00	16	32	19	35	14	29	13	28	12	24	9	12	8	12	91	172
5:00	57	117	52	120	44	126	43	110	47	101	22	30	14	16	279	620
6:00	100	196	105	221	120	215	98	211	104	181	65	81	35	32	627	1137
7:00	143	269	145	297	154	273	160	285	162	248	160	144	94	71	1018	1587
8:00	172	258	204	265	179	265	194	245	214	267	212	218	175	145	1350	1663
9:00	213	241	219	241	238	254	220	259	204	259	258	226	188	236	1540	1716
10:00	202	213	208	197	182	220	235	230	237	215	319	269	255	253	1638	1597
11:00	254	205	226	213	202	212	204	191	252	219	380	288	318	285	1836	1613
12:00	243	210	225	221	249	194	216	215	272	242	361	292	307	304	1873	1678
13:00	194	192	210	188	203	202	212	182	259	254	319	258	305	306	1702	1582
14:00	202	208	224	216	229	221	235	197	286	236	300	277	236	296	1712	1651
15:00	364	241	356	259	333	234	368	242	385	284	284	271	195	322	2285	1853
16:00	333	234	357	243	365	229	353	239	369	233	288	333	209	285	2274	1796
17:00	294	194	315	201	342	238	305	243	351	239	221	248	178	183	2006	1546
18:00	226	157	230	172	255	170	229	153	249	185	165	172	131	152	1485	1161
19:00	127	88	121	80	161	95	135	84	144	108	80	100	82	90	850	645
20:00	62	51	79	65	60	51	90	53	89	74	76	90	65	64	521	448
21:00	50	26	59	29	62	38	71	37	66	39	64	69	25	35	397	273
22:00	20	10	23	12	35	23	33	16	53	29	48	36	23	14	235	140
23:00	6	8	15	16	11	9	15	13	45	16	51	32	5	11	148	105
07-19	2840	2622	2919	2713	2931	2712	2931	2681	3240	2881	3267	2996	2591	2838	20719	19443
06-22	3179	2983	3283	3108	3334	3111	3325	3066	3643	3283	3552	3336	2798	3059	23114	21946
06-00	3205	3001	3321	3136	3380	3143	3373	3095	3741	3328	3651	3404	2826	3084	23497	22191
00-00	3300	3165	3408	3312	3456	3319	3447	3257	3828	3468	3712	3466	2900	3136	24051	23123
Percent	51.04%	48.96%	50.71%	49.29%	51.01%	48.99%	51.42%	48.58%	52.47%	47.53%	51.71%	48.29%	48.05%	51.95%	50.98%	49.02%

Daily Traffic Patterns



7 Day Vehicle Speed Data

25-Oct	Speed Bins (Kmph)																Statistics		
	Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	150-160	Avg	85th	95th
Time																			
0:00	128	0	1	1	25	61	26	11	2	1	0	0	0	0	0	0	57	69	76
1:00	65	0	1	3	8	32	10	7	3	1	0	0	0	0	0	0	59	68	74
2:00	69	0	0	3	26	21	16	2	0	1	0	0	0	0	0	0	54	-	-
3:00	62	0	1	2	8	27	19	5	0	0	0	0	0	0	0	0	56	63	68
4:00	263	2	1	14	38	91	88	21	5	3	0	0	0	0	0	0	58	70	79
5:00	899	0	2	33	110	417	296	34	7	0	0	0	0	0	0	0	57	65	72
6:00	1764	10	28	117	449	858	279	22	1	0	0	0	0	0	0	0	53	60	64
7:00	2605	24	34	177	874	1212	267	16	0	1	0	0	0	0	0	0	51	58	63
8:00	3013	10	65	442	1338	1029	120	9	0	0	0	0	0	0	0	0	47	55	59
9:00	3256	21	117	527	1514	971	97	9	0	0	0	0	0	0	0	0	46	54	58
10:00	3235	20	120	588	1404	1001	97	4	1	0	0	0	0	0	0	0	46	54	58
11:00	3449	26	131	581	1602	981	119	6	2	0	1	0	0	0	0	0	46	54	59
12:00	3551	30	111	681	1687	918	117	7	0	0	0	0	0	0	0	0	45	53	58
13:00	3284	27	104	551	1524	942	128	8	0	0	0	0	0	0	0	0	46	54	59
14:00	3363	18	120	550	1584	962	114	11	2	0	2	0	0	0	0	0	46	54	58
15:00	4138	38	143	926	2073	869	83	6	0	0	0	0	0	0	0	0	45	52	56
16:00	4070	47	161	534	1878	1282	161	6	0	1	0	0	0	0	0	0	47	55	59
17:00	3552	15	83	477	1683	1155	129	8	2	0	0	0	0	0	0	0	47	55	59
18:00	2646	11	53	312	1178	923	153	14	1	0	0	0	1	0	0	0	48	56	61
19:00	1495	5	13	161	520	642	142	8	2	2	0	0	0	0	0	0	50	59	63
20:00	969	1	10	80	320	405	125	14	8	4	2	0	0	0	0	0	52	61	69
21:00	670	2	10	40	192	287	112	21	4	1	1	0	0	0	0	0	54	63	71
22:00	375	1	4	10	73	176	60	35	9	5	1	1	0	0	0	0	57	69	83
23:00	253	0	0	12	39	93	67	27	7	6	1	1	0	0	0	0	57	67	72
07-19	40162	287	1242	6346	18339	12245	1585	104	8	2	3	0	1	0	0	0	47	55	59
06-22	45060	305	1303	6744	19820	14437	2243	169	23	9	6	0	1	0	0	0	47	55	60
06-00	45688	306	1307	6766	19932	14706	2370	231	39	20	8	2	1	0	0	0	47	56	60
00-00	47174	308	1313	6822	20147	15355	2825	311	56	26	8	2	1	0	0	0	48	56	61

7 Day Vehicle Classification

	Total	Combined Classes												
		Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	
0:00	17	17	0	0	0	0	0	0	0	0	0	0	0	0
1:00	8	8	0	0	0	0	0	0	0	0	0	0	0	0
2:00	8	8	0	0	0	0	0	0	0	0	0	0	0	0
3:00	9	8	0	0	0	0	0	0	0	0	0	1	0	0
4:00	36	27	0	4	1	1	0	0	0	0	2	1	0	0
5:00	125	107	2	11	2	1	0	0	0	0	1	1	0	0
6:00	252	208	5	21	5	4	0	1	0	0	4	4	0	0
7:00	370	320	5	27	5	5	0	0	0	0	4	4	0	0
8:00	426	373	8	26	6	6	0	0	0	0	4	3	0	0
9:00	463	405	6	29	5	6	0	0	0	0	6	6	0	0
10:00	462	399	8	28	8	8	0	0	0	0	6	5	0	0
11:00	492	429	8	28	10	6	0	0	0	1	6	4	0	0
12:00	503	451	5	28	7	5	0	0	0	0	5	2	0	0
13:00	470	416	7	29	6	4	0	0	0	1	4	3	0	0
14:00	482	421	7	35	8	3	0	0	0	1	4	3	0	0
15:00	588	540	8	31	3	1	0	0	0	0	3	2	0	0
16:00	580	535	7	31	4	1	0	0	0	0	2	0	0	0
17:00	506	471	7	26	2	0	0	0	0	0	0	0	0	0
18:00	375	351	4	20	0	0	0	0	0	0	0	0	0	0
19:00	212	201	2	9	0	0	0	0	0	0	0	0	0	0
20:00	137	132	1	4	0	0	0	0	0	0	0	0	0	0
21:00	96	91	0	5	0	0	0	0	0	0	0	0	0	0
22:00	52	49	0	3	0	0	0	0	0	0	0	0	0	0
23:00	35	33	0	2	0	0	0	0	0	0	0	0	0	0
07-19	5717	5111	80	338	64	45	0	0	0	3	44	32	0	0
06-22	6414	5743	88	377	69	49	0	1	3	3	48	36	0	0
06-00	6501	5825	88	382	69	49	0	1	3	3	48	36	0	0
00-00	6704	6000	90	397	72	51	0	1	3	3	51	39	0	0

Appendix C: SIDRA Movement Summary Reports

Old Northern Road & Post Office Road Existing 2024

MOVEMENT SUMMARY

Site: [Old Northern Road & Post Office Road AM 2024 (Site Folder: General)]

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

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV] veh/h	[Total veh/h]	[HV] %	v/c	sec		[Veh.]	[Dist] m				km/h
South: Post Office Road														
1	L2	24	0	25	0.0	0.017	5.8	LOSA	0.1	0.5	0.20	0.54	0.20	53.0
3	R2	70	4	74	5.7	0.103	8.4	LOSA	0.4	2.9	0.49	0.71	0.49	50.8
Approach		94	4	99	4.3	0.103	7.7	LOSA	0.4	2.9	0.41	0.67	0.41	51.3
East: Old Northern Road														
4	L2	50	0	53	0.0	0.087	5.6	LOSA	0.0	0.0	0.00	0.20	0.00	56.4
5	T1	98	17	103	17.3	0.087	0.0	LOSA	0.0	0.0	0.00	0.20	0.00	57.9
Approach		148	17	156	11.5	0.087	1.9	NA	0.0	0.0	0.00	0.20	0.00	57.4
West: Old Northern Road														
11	T1	209	21	220	10.0	0.121	0.0	LOSA	0.0	0.0	0.00	0.00	0.00	59.9
12	R2	36	2	38	5.6	0.025	6.1	LOSA	0.1	0.8	0.27	0.55	0.27	52.4
Approach		245	23	258	9.4	0.121	0.9	NA	0.1	0.8	0.04	0.08	0.04	58.7
All Vehicles		487	44	513	9.0	0.121	2.5	NA	0.4	2.9	0.10	0.23	0.10	56.7

MOVEMENT SUMMARY

Site: [Old Northern Road & Post Office Road PM 2024 (Site Folder: General)]

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

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV] veh/h	[Total veh/h]	[HV] %	v/c	sec		[Veh.]	[Dist] m				km/h
South: Post Office Road														
1	L2	96	4	101	4.2	0.074	6.2	LOSA	0.3	2.2	0.28	0.56	0.28	52.6
3	R2	125	5	132	4.0	0.224	10.2	LOSA	0.9	6.4	0.59	0.84	0.59	49.6
Approach		221	9	233	4.1	0.224	8.4	LOSA	0.9	6.4	0.45	0.72	0.45	50.8
East: Old Northern Road														
4	L2	195	0	205	0.0	0.205	5.6	LOSA	0.0	0.0	0.00	0.32	0.00	55.5
5	T1	164	17	173	10.4	0.205	0.1	LOSA	0.0	0.0	0.00	0.32	0.00	56.9
Approach		359	17	378	4.7	0.205	3.1	NA	0.0	0.0	0.00	0.32	0.00	56.1
West: Old Northern Road														
11	T1	179	14	188	7.8	0.102	0.0	LOSA	0.0	0.0	0.00	0.00	0.00	60.0
12	R2	76	4	80	5.3	0.067	7.0	LOSA	0.3	2.1	0.45	0.64	0.45	51.9
Approach		255	18	268	7.1	0.102	2.1	NA	0.3	2.1	0.13	0.19	0.13	57.3
All Vehicles		835	44	879	5.3	0.224	4.2	NA	0.9	6.4	0.16	0.39	0.16	55.0

Old Northern Road & Cairnes Road Existing 2024

MOVEMENT SUMMARY

Site: [Old Northern Road & Cairnes Road AM 2024 (Site Folder: General)]

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

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	] HV] veh/h	[Total veh/h	] HV] %	v/c	sec		[Veh. veh	] Dist] m				km/h
East: Old Northern Road														
5	T1	148	18	156	12.2	0.103	0.2	LOS A	0.2	1.4	0.12	0.08	0.12	58.7
6	R2	22	0	23	0.0	0.103	6.6	LOS A	0.2	1.4	0.12	0.08	0.12	56.5
Approach		170	18	179	10.6	0.103	1.0	NA	0.2	1.4	0.12	0.08	0.12	58.4
North: Cairnes Road														
7	L2	31	1	33	3.2	0.037	6.6	LOS A	0.1	1.0	0.36	0.60	0.36	52.4
9	R2	8	0	8	0.0	0.037	7.5	LOS A	0.1	1.0	0.36	0.60	0.36	52.0
Approach		39	1	41	2.6	0.037	6.8	LOS A	0.1	1.0	0.36	0.60	0.36	52.3
West: Old Northern Road														
10	L2	13	2	14	15.4	0.161	5.8	LOS A	0.0	0.0	0.00	0.03	0.00	57.3
11	T1	269	22	283	8.2	0.161	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
Approach		282	24	297	8.5	0.161	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.6
All Vehicles		491	43	517	8.8	0.161	1.1	NA	0.2	1.4	0.07	0.09	0.07	58.5

MOVEMENT SUMMARY

Site: [Old Northern Road & Cairnes Road PM 2024 (Site Folder: General)]

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

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	] HV] veh/h	[Total veh/h	] HV] %	v/c	sec		[Veh. veh	] Dist] m				km/h
East: Old Northern Road														
5	T1	326	19	343	5.8	0.227	0.3	LOS A	0.5	3.8	0.15	0.09	0.15	58.7
6	R2	51	4	54	7.8	0.227	7.0	LOS A	0.5	3.8	0.15	0.09	0.15	56.1
Approach		377	23	397	6.1	0.227	1.2	NA	0.5	3.8	0.15	0.09	0.15	58.3
North: Cairnes Road														
7	L2	39	3	41	7.7	0.082	6.7	LOS A	0.3	2.1	0.41	0.67	0.41	51.7
9	R2	29	0	31	0.0	0.082	9.2	LOS A	0.3	2.1	0.41	0.67	0.41	51.5
Approach		68	3	72	4.4	0.082	7.7	LOS A	0.3	2.1	0.41	0.67	0.41	51.6
West: Old Northern Road														
10	L2	28	1	29	3.6	0.165	5.6	LOS A	0.0	0.0	0.00	0.06	0.00	57.6
11	T1	265	17	279	6.4	0.165	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	59.4
Approach		293	18	308	6.1	0.165	0.6	NA	0.0	0.0	0.00	0.06	0.00	59.2
All Vehicles		738	44	777	6.0	0.227	1.6	NA	0.5	3.8	0.12	0.13	0.12	58.0

Old Northern Road & Whites Road

MOVEMENT SUMMARY

Site: [Old Northern Road & Whites Road AM 2024 (Site Folder: General)]

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

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV] veh/h	[Total veh/h]	[HV] %	w/c	sec		[Veh.]	[Dist] m				km/h
South: Whites Road														
1	L2	6	0	6	0.0	0.076	6.2	LOSA	0.2	1.8	0.43	0.70	0.43	51.8
3	R2	49	4	52	8.2	0.076	8.2	LOSA	0.2	1.8	0.43	0.70	0.43	51.0
Approach		55	4	58	7.3	0.076	8.0	LOSA	0.2	1.8	0.43	0.70	0.43	51.1
East: Old Northern Road														
4	L2	5	1	5	20.0	0.109	5.8	LOSA	0.0	0.0	0.00	0.02	0.00	57.2
5	T1	184	18	194	9.8	0.109	0.0	LOSA	0.0	0.0	0.00	0.02	0.00	59.8
Approach		189	19	199	10.1	0.109	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
West: Old Northern Road														
11	T1	298	22	314	7.4	0.172	0.0	LOSA	0.0	0.2	0.01	0.01	0.01	59.9
12	R2	3	1	3	33.3	0.172	6.9	LOSA	0.0	0.2	0.01	0.01	0.01	55.9
Approach		301	23	317	7.6	0.172	0.1	NA	0.0	0.2	0.01	0.01	0.01	59.9
All Vehicles		545	46	574	8.4	0.172	0.9	NA	0.2	1.8	0.05	0.08	0.05	58.8

MOVEMENT SUMMARY

Site: [Old Northern Road & Whites Road PM 2024 (Site Folder: General)]

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

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV] veh/h	[Total veh/h]	[HV] %	w/c	sec		[Veh.]	[Dist] m				km/h
South: Whites Road														
1	L2	12	0	13	0.0	0.072	7.0	LOSA	0.2	1.7	0.50	0.75	0.50	51.2
3	R2	35	0	37	0.0	0.072	9.4	LOSA	0.2	1.7	0.50	0.75	0.50	50.7
Approach		47	0	49	0.0	0.072	8.8	LOSA	0.2	1.7	0.50	0.75	0.50	50.8
East: Old Northern Road														
4	L2	31	2	33	6.5	0.225	5.7	LOSA	0.0	0.0	0.00	0.05	0.00	57.5
5	T1	367	24	386	6.5	0.225	0.1	LOSA	0.0	0.0	0.00	0.05	0.00	59.5
Approach		398	26	419	6.5	0.225	0.5	NA	0.0	0.0	0.00	0.05	0.00	59.3
West: Old Northern Road														
11	T1	297	20	313	6.7	0.178	0.1	LOSA	0.1	1.0	0.05	0.02	0.05	59.5
12	R2	12	0	13	0.0	0.178	7.4	LOSA	0.1	1.0	0.05	0.02	0.05	57.3
Approach		309	20	325	6.5	0.178	0.4	NA	0.1	1.0	0.05	0.02	0.05	59.5
All Vehicles		754	46	794	6.1	0.225	1.0	NA	0.2	1.7	0.05	0.08	0.05	58.8

Appendix D: TfNSW Count Station Data

With reference to the tables below, only the most recent data is shown, but all sites also provide counts dating back to 2009; the full data set has been provided to Council.

Galston Road East of Calderwood Road

Week Beginning	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Weekly Total	Weekday Average	Weekend Average
1/01/2024		3238	3082	3036	3392	3028	2750	18526	2550	2889
8/01/2024	3314	3570	3537	3559	3875	3226	2775	23856	3571	3001
15/01/2024	3179	3487	3570	3790	4010	3317	2946	24299	3607	3132
22/01/2024	3764	3960	4135	4295	2823	3183	3212	25372	3795	3198
29/01/2024		4106	4238	4305	4406	4021	3126	24202	3411	3574
5/02/2024	4092	4148	4328	4640	4667	3429	3316	28620	4375	3373
12/02/2024	4280	4696	4476	4470	4542	3690	3236	29390	4493	3463
19/02/2024	4089	4106	4368	4620	4604	3683	3331	28801	4357	3507
26/02/2024	4315	4558	4607	4497	4918	3638	3284	29817	4579	3461
4/03/2024	4352	4696	4522	4698	4629	3944	3626	30467	4579	3785
11/03/2024	4336	4813	4613	4565	4678	3686	2926	29617	4601	3306
18/03/2024	4394	4661	4632	4553	4715	3709	3422	30086	4591	3566
25/03/2024	4370	4656	4704	4556		3315	3183	24784	3657	3249
1/04/2024	1792	4365	4608	4323	3589		3000	21677	3735	1500
8/04/2024	4309	4237	4547	4393	4450		3409	25345	4387	1705
15/04/2024	2099	4060	3983	3983	4085	2946	3113	24269	3642	3030
22/04/2024	3945	4210	4339	2999	4000		3340	22833	3899	1670
29/04/2024	4282	4283	4213	4274	4308	3296	2682	27338	4272	2989
6/05/2024	3888	4278	4129	4303	4201	3036	3101	26936	4160	3069
13/05/2024	4055	4376	4425	4471	4660	3393	3515	28895	4397	3454
20/05/2024	4100	4307	4390	4455	4363	3632	3226	28473	4323	3429

New Line Road North of County Drive

Week Beginning	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Weekly Total	Weekday Average	Weekend Average
1/01/2024		24341	25257	25030	26509	25749	22887	149773	25284	24318
8/01/2024	25500	27360	28163	28248	29889	28450	23481	191091	27832	25966
15/01/2024	25159	28615	28473	30515	31462	29806	25313	199343	28845	27560
22/01/2024	29532	31011	31740	31510	18447	27387	25597	195224	28448	26492
29/01/2024	18965	30988	31947	32250	33110	33137	26926	207323	29452	30032
5/02/2024	30889	30951	32159	32805	34147	32364	28391	221706	32190	30378
12/02/2024	31428	32205	32936	31894	33577	32675	28231	222946	32408	30453
19/02/2024	29535	31275	32250	33068	33379	32697	28527	220731	31901	30612
26/02/2024	31576	32245	32487	32138	34019	32455	28601	223521	32493	30528
4/03/2024	31296	32758	32667	33366	34403	33388	29001	226879	32898	31195
11/03/2024	31358	32345	32700	33262	34051	33445	27815	224976	32743	30630
18/03/2024	31160	32344	31827	33472	34036	33301	29156	225296	32568	31229
25/03/2024	31412	32819	33669	34954		27946	25243	186043	33214	26595
1/04/2024	20470	31745	32293	31468	28367	30980	27799	203122	28869	29390
8/04/2024	30954	30467	32251	32695	33405	32985	27488	220245	31954	30237
15/04/2024	29933	30957	31035	31043	32390	29541	27148	212047	31072	28345
22/04/2024	29966	30744	32740	19284	30934	30611	27021	201300	28734	28816
29/04/2024	30244	30911	31309	32402	32165	31922	25781	214734	31406	28852
6/05/2024	29722	31081	31277	32581	33494	30876	28309	217340	31631	29593
13/05/2024	30548	31965	32050	32431	33172	32731	28062	220959	32033	30397
20/05/2024	30773	31521	31122	32800	33002	32858	27338	219414	31844	30098

Old Northern Road North of Glenhaven Road

Week Beginning	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Weekly Total	Weekday Average	Weekend Average
8/08/2016	18672	18934	20086	20397	21274	9819	13703	122885	3264	3388
15/08/2016	18965	19541	19994	20121	20846	17593	14723	131783	3337	3594
22/08/2016	18519	19235	18465	19996	20899	18191	14978	130283	3251	2683
29/08/2016	19211	19318	20246	20529	19445	17255	14308	130312	1913	3033
5/09/2016	19309	19845	20392	20504	21161	17705	14743	133659	4303	3168
12/09/2016	19172	19734	19877	20735	21287	17558	12943	131306	4282	3226
19/09/2016	19070	20552	20629	21407	21107	17282	13728	133775	4132	3232
26/09/2016	17506	18340	18752	17984	19531	15057	12594	119764	4154	1689
10/10/2016	18674	20338	20713	21058	22105	17644	13851	134383	3593	3203
17/10/2016	19077	20457	20887	20138	22031	15966	14254	132810	3881	3004
24/10/2016	16704	20885	19886	19511	21819	17648	14145	130598	3466	2849
31/10/2016	20396	20468	18431	21553	22471	18772	14325	136416	4312	3478
7/11/2016	20021	20136	20010	21390	22464	19305	15463	138789	4271	3738
14/11/2016	20183	21276	21022	22041	22253	19069	15593	141437	4183	3588
21/11/2016	20434	21401	21492	22025	22699	19877	15714	143642	4334	3552
28/11/2016	20084	21255	21610	22113	22351	19158	15576	142147	4163	3495
5/12/2016	20468	21111	22176	22860	23105	19374	14980	144074	4195	3461
12/12/2016	20323	20049	20537	19807	19958	18457	14710	133841	4099	3236
9/01/2017	14889	15525	14079	16435	15316	14283	12540	103067	3783	3118
16/01/2017	16132	16479	16484	17686	17269	15825	13068	112943	4089	3468
30/01/2017	18109	19266	20744	20619	21353	16843	12758	129692	3244	3269