10.9. Young Street - Road Closure

AUTHOR	Gary Parsons, Director Open Space & Infrastructure
ATTACHMENTS	1. Young Street Partial Re-opening Concept Design [**10.9.1** - 1 page] 2. Stantec Report Young Street Re-opening [**10.9.2** - 38 pages]
CSP LINK	2. Our Built Infrastructure 2.2 Vibrant public domains and villages 2.4 Efficient traffic mobility and parking

PURPOSE:

The purpose of this report is to respond to Council's resolution of 26 April 2022 regarding Young Street Plaza.

EXECUTIVE SUMMARY:

- At its meeting 29 October 2018, Council resolved to execute a funding deed with Transport for New South Wales (TfNSW) covering a range of public domain works proposed to improve amenity, access in the Neutral Bay Village, and complement the Northern Beaches B-Line Bus Service. One project identified in the funding deed was the proposal to create a Public Plaza in Young Street.

- At its meeting on the 28 September 2020, Council approved the construction of the trial Young Street Plaza, which opened to the public on 23 December 2020. The trial incorporated the complete closure of Young Street and access to Military Road.

- At its meeting on the 26 April 2022 the Council resolved to re-open Young Street. Council staff have subsequently developed a design for the partial re-opening of Young Street with single-lane access to Military Road, and landscaping treatment of the remain streetscape that would remain permanently closed to traffic.

- It is now proposed to consult with the community and seek feedback to develop this concept design, with the outcomes of this consultation to be reported back to Council for consideration.

RECOMMENDATION:

1.THAT Council

a) note that a concept design has been developed for the partial reopening of Young Street, Neutral Bay in response to the Council Resolution of 26 April 2022;
b) note ongoing dialogue between TfNSW and Council in relation to the reopening of Young Street, Neutral Bay;
c) note that the concept design developed for the partial reopening of Young Street, Neutral Bay will now be further developed through formal engagement and community consultation; and
d) note that a further report will be brought back to Council in relation to the feedback received in relation to the development of the concept design for the partial reopening of Young Street, Neutral Bay.

Background

At its meeting of 29 October 2018, Council considered a report regarding a funding deed with Transport for New South Wales (TfNSW) covering a range of public domain works proposed to improve amenity, access in the Neutral Bay Village, and complement the Northern Beaches B-Line Bus Service. Council resolved at the meeting to execute the funding deed.

One project identified in the funding deed was the proposal to create a Public Plaza in Young Street, Neutral Bay (between Military Road and Grosvenor Lane). The possible closure of Young Street to assist bus movements down Military Road was originally identified as part of the B-Line project. The closure of Young Street was seen as a preferred alternative to the State Government's original proposal to impose a left turn ban onto Ben Boyd Road.

Community consultation of a concept design for the trial closure was undertaken between 31 May 2019 and 5 July 2019.

At its meeting on the 28 September 2020, Council approved the construction of the trial Young Street Plaza, which opened to the public on 23 December 2020. The trial incorporated the complete closure of Young Street and access to Military Road.

Community consultation of the trail plaza road closure was undertaken between 3 November 2020 and 30 April 2021.

At its meeting of 28 June 2021, Council resolved to undertake detailed design and construction for the permanent closure of the Young Street. Council staff subsequently developed a design of the Young Street Plaza and undertook a tender for the construction of the plaza.

At its meeting on 26 April 2022, Council resolved as follows:

> *1. THAT Council reject all tenders for Tender 34/2021 for Young Street Plaza Construction. THAT all Councillors be provided with the Funding Deed and any other correspondence /information.*
> *2. THAT the Mayor meet with Transport for NSW to discuss alternate options within the Military Road corridor including alternative options for Young Street.*
> *3. THAT Young Street be reopened and that the funding for the reopening be sourced from either the existing Transport for NSW funding which funded the temporary closure of Young Street in the first place or from the existing Engineering Budget.*
> *4. THAT the Confidential Report relating to matters specified in Section 10A(2)(d) be treated as confidential and remain confidential until Council determines otherwise.*

This report responds to part 3 of the above resolution.

Report

Council staff have discussed the technical matter of the Young Street closure with representatives from TfNSW in the context of the objectives of the funding deed and developed a concept design for the partial reopening of Young Street.

The design proposes a partial closure of Young Street, with single-lane access to Military Road. The remaining portion of Young Street would remain permanently closed and landscaped. The proposed concept design is attached herein.

To inform this design Council engaged consultants Stantec Pty Ltd to assess the traffic and transport impacts of reopening a section of Young Street for vehicular traffic between Grosvenor Lane and Military Road.

In summary the report notes:

> *the overall, the impacts of the reopening are considered to be minor, and no mitigation measures are necessary to address any future operating concerns. As such, the reopening of Young Street can be supported from a traffic and transport perspective.*

A complete copy of the Stantec report is attached to this report.

TfNSW have been consulted in relation to this proposed design in relation to the objectives of the grant and the continuing application of the grant application for Young Street. TfNSW have advised that the that the proposal is in alignment with the objectives of the funding, which was to support public domain improvement projects in Neutral Bay and Cremorne Villages; and that TfNSW would not seek reimbursement of these funds. It is noted however that the partial reopening of Young street would be subject to a formal s116 application under the NSW Roads Act (1993).

Given the confirmation from TfNSW in relation to funding it is now proposed to seek public consultation to inform the further development of the concept design that has been developed for the partial reopening of Young Street. A further report would be brought back to Council in relation to the outcomes of this public consultation process.

Consultation requirements

As outlined TfNSW the proposal to reopen Young Street has been discussed and consulted with TfNSW. No further consultation has been undertaken in relation to the development of this report.

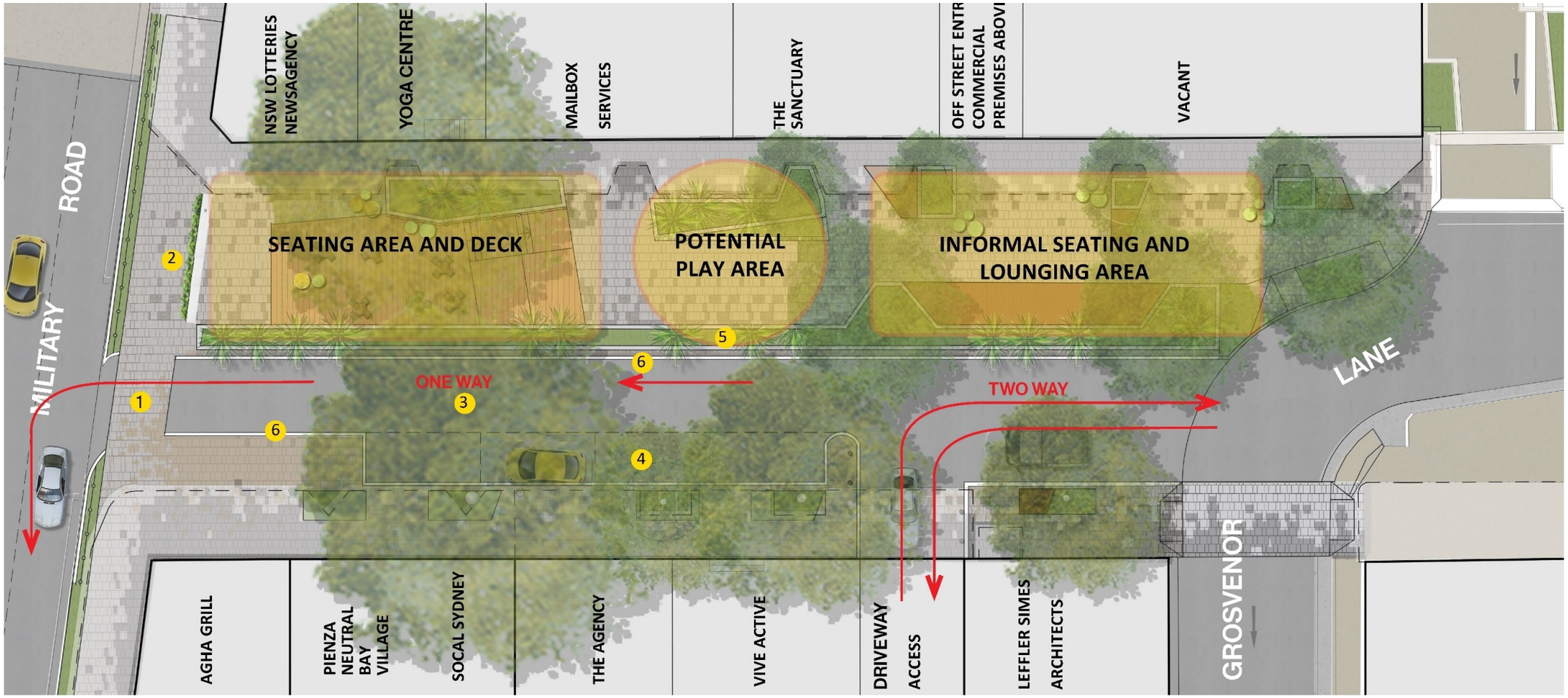
Financial/Resource Implications

It is estimated that the development and consultation of the concept design would cost in the order of $85,000, which can be covered from within the existing grant funding. It is also anticipated that the works which would be the subject of a further Council resolution could be funded from the remaining grant funding.

Legislation

The reopening of Young Street would be the subject of a formal application under s116 NSW Roads Act (1993.

CONCEPT DESIGN – PARTIAL ROAD CLOSURE ONE WAY TRAFFIC NORTHBOUND



1	Raised Continuous footpath treatment
2	Living Green Wall to buffer the plaza from Military Road
3	Access Lane - 3.5 m Wide
4	4 x Parking Bays
5	Raised Planter to separate plaza and road space
6	Standard Kerb

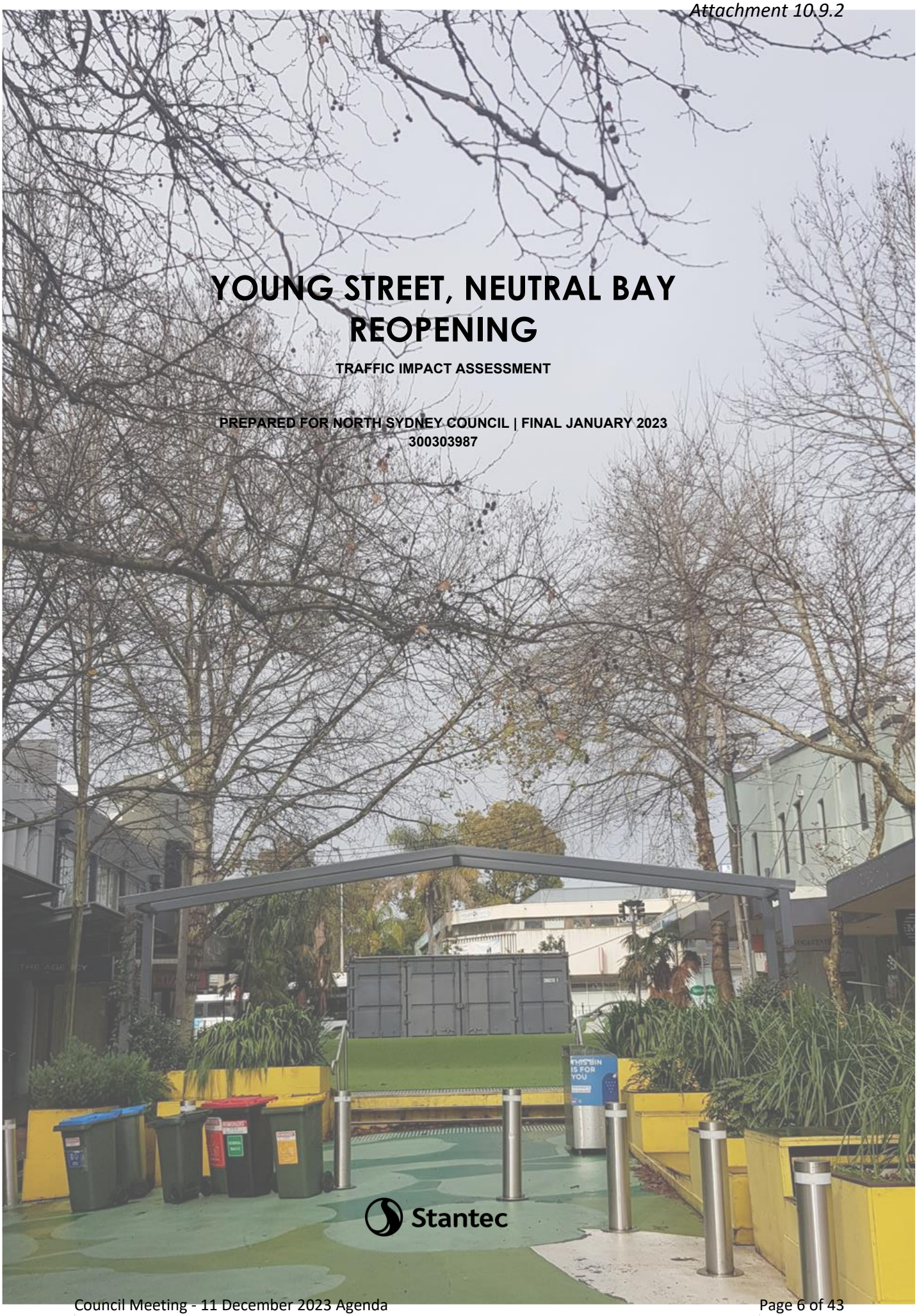
Existing Tree

New Tree

0 2 4 6 8 10m
Scale 1:200@A3

NEW OPEN SPACE	AREA (m²)
ORIGINAL DESIGN (FULL CLOSURE)	720
PROPOSED NEW LAYOUT (ONE LANE TRAFFIC)	420
TOTAL AREA DIFFERENCE	**300**

YOUNG STREET PLAZA – PARTIAL ROAD CLOSURE CONCEPT – NOVEMBER 2023



YOUNG STREET, NEUTRAL BAY REOPENING

TRAFFIC IMPACT ASSESSMENT

PREPARED FOR NORTH SYDNEY COUNCIL | FINAL JANUARY 2023
300303987

Stantec

Young Street Reopening

Revision	Description	Author	Quality Check	Independent Review	Date
A	Final	Helen Aberra	Connor Hoang	Steve Manton	20/01/2023

Young Street Reopening

The conclusions in the Report titled Young Street, Neutral Bay Reopening Traffic Impact Assessment are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

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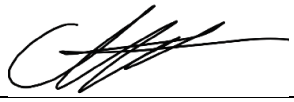
Prepared by: 

Signature

Helen Aberra

Printed Name

Reviewed by: 

Signature

Connor Hoang

Printed Name

Approved by: 

Signature

Steve Manton

Printed Name

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1 Introduction

1.1 Background

North Sydney Council (Council) has decided to reopen a section of Young Street, Neutral Bay to vehicular traffic between Grosvenor Lane and Military Road.

The closure of this section of road was implemented in December 2020 as part of Council's streetscape upgrade works along Military Road, which complemented the Northern Beaches B-Line Bus Service that commenced operation in 2018. A trial pedestrian plaza was implemented along the subject road section with the intent of activating the area adjacent to the existing shopping and commercial strip for pedestrians and encouraging town centre placemaking for both residents and visitors.

North Sydney Council commissioned Stantec in July 2022 to undertake a transport study to investigate the anticipated impacts of the road reopening. This study follows the previous assessments completed by WSP and Stantec (formerly GTA Consultants) outlined below:

- *Young Street Road Closure Traffic Impact Assessment* (**WSP, 2018**) – WSP investigated the potential impacts of the Young Street closure, particularly with regards to the redistribution of traffic within the local road network, prior to the implementation of the road closure and trial pedestrian plaza (i.e. pre-closure assessment).
- *Young Street Temporary Closure and Trial Plaza (Post-Implementation) Transport Impact Assessment* (**Stantec, 2021**) – following the closure Stantec (formerly GTA Consultants) confirmed the impacts of the road closure and trial pedestrian plaza on the local road network (i.e. post-closure assessment).

The following report investigates the potential impacts of reopening Young Street on the surrounding road network.

1.2 Purpose of this Report

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

- existing conditions within the surrounding area including traffic and parking conditions prior/ following the Young Street Closure
- access arrangements for Young Street
- suitability of the proposed reopening for the surrounding network
- the transport impact of the road reopening on the surrounding road network.

1.3 References

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

- inspections of the site and its surrounds conducted by Stantec in July 2022
- *Young Street Road Closure Traffic Impact Assessment*, December 2018 prepared by WSP
- *Young Street Temporary Closure and Trial Plaza (Post-Implementation) Transport Impact Assessment* prepared by Stantec in June 2021
- traffic surveys undertaking by Matrix Traffic and Transport and Trans Traffic Survey for WSP, dated 2018
- traffic surveys undertaken by Matrix Traffic and Transport for North Sydney Council, dated October 2020
- traffic surveys undertaken by Matrix Traffic and Transport for Stantec (formerly GTA Consultants), dated February 2021 and May 2021
- traffic surveys undertaken by Matrix Traffic and Transport for Stantec, dated July 2022
- other documents and data as referenced in this report.

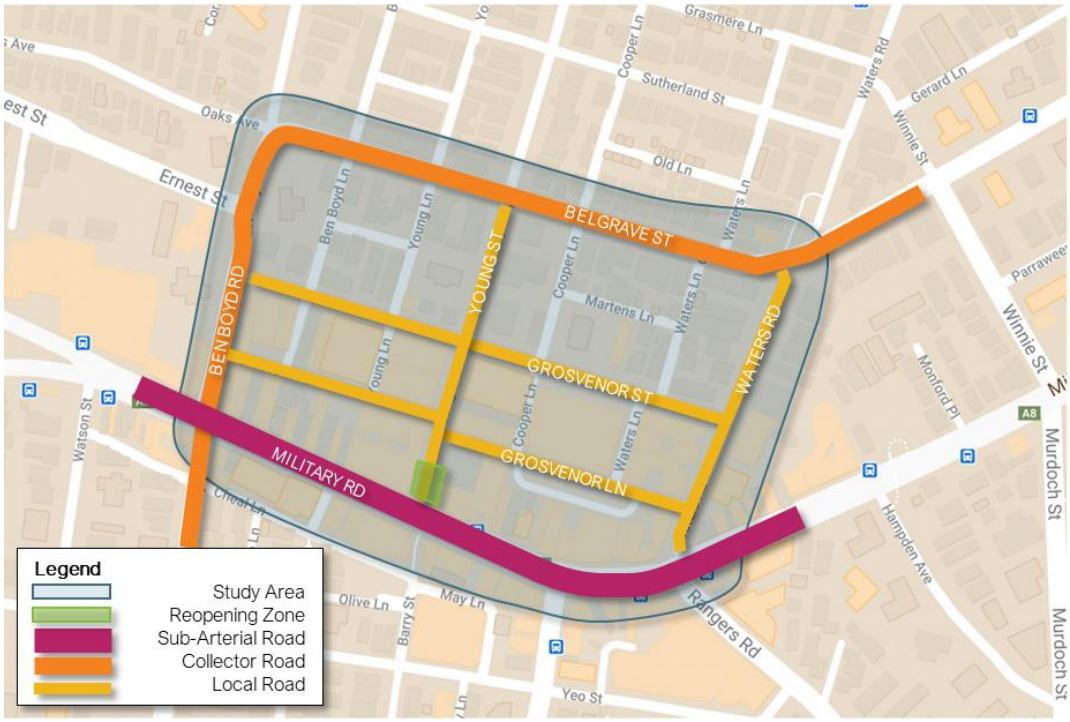
2 Existing Conditions

2.1 Location

The subject section of road that is proposed to be reopened is located at the southern end of Young Street within the Neutral Bay town centre (the study area). The existing road network within the study area that has been examined as part of this assessment consists of Military Road, Young Street, Ben Boyd Road, Belgrave Street, Grosvenor Street, Grosvenor Lane and Waters Road. The local road network within the study area is observed to be set out in a general grid pattern. Further details of key roads within the study area are provided in Section 2.2.

Figure 1 outlines the road network analysed as part of this study.

Figure 1: Study area and key roads



Base image source: Google Maps

2.2 Transport Network

2.2.1 ROAD HIERARCHY

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

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

TfNSW defines four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

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

2.2.2 SURROUNDING ROAD NETWORK

Military Road

Military Road is classified as a State main road (MR164) and functions as a sub arterial road. In the vicinity of the site it is aligned in an east-west direction and is a two-way road configured with three lanes in the eastbound direction and two lanes in the westbound direction, set within an approximately 24-metre-wide road reserve.

The road is subject to 60 kilometres per hour speed zoning. Kerbside parking is not permitted on either side of the road.

Military Road is shown in Figure 2 and Figure 3, and carries approximately 75,000 vehicles per day.

Figure 2: Military Road (looking east)

Figure 3: Military Road (looking west)

Ben Boyd Road

Ben Boyd Road functions as a collector road and in the vicinity of the site is aligned in a north-south direction. It is a two-way road configured with one lane in each direction, set within an approximately 20-metre-wide road reserve.

The road is subject to 50 kilometres per hour speed zoning. Kerbside parking is permitted, subject to time restrictions.

Ben Boyd Road is shown in Figure 4 and Figure 5, and carries approximately 7,500 to 8,000 vehicles per day.

Figure 4: Ben Boyd Road (looking north)

Figure 5: Ben Boyd Road (looking south)

Belgrave Street

Belgrave Street functions as a collector road and in the vicinity of the site is aligned in an east-west direction. It is a two-way road configured with two lanes in the westbound direction and one-lane in the eastbound direction, set within an approximately 19-metre-wide road reserve.

The road is subject to 50 kilometres per hour speed zoning. Kerbside parking is permitted, subject to time restrictions on the northern side of the street and carries approximately 20,000 vehicles per day.

Belgrave Street is shown in Figure 6 and Figure 7.

Figure 6: Belgrave Street (looking east)

Figure 7: Belgrave Street (looking west)

Young Street

Young Street functions as a local road and in the vicinity of the site is aligned in a north-south direction. It is a two-way road configured with one lane in each direction, set within an approximately 20-metre-wide road reserve.

The road is subject to 50 kilometres per hour speed zoning. Kerbside parking is permitted, subject to time restrictions and is ticketed in some sections. Residents' permits allow for unrestricted parking.

Young Street is shown in Figure 8 and Figure 9, and carries approximately 3,500 to 4,500 vehicles per day.

Figure 8: Young Street (looking north)

Figure 9: Young Street (looking south)

Waters Road

Waters Road functions as a local road and in the vicinity of the site is aligned in a north-south direction. It is a two-way road configured with one lane in each direction, set within an approximately 19-metre-wide road reserve.

The road is subject to 50 kilometres per hour speed zoning outside of school zones. Kerbside parking is permitted, subject to time restrictions and residents' exemptions.

Waters Road is shown in Figure 10 and Figure 11, and carries approximately 2,500 to 3,500 vehicles per day.

Figure 10: Waters Road (looking north)

Figure 11: Waters Road (looking south)

Grosvenor Street

Grosvenor Street functions as a local road and in the vicinity of the site is aligned in an east-west direction. It is a two-way road configured with one lane in each direction, set within an approximately 18-metre-wide carriageway.

The road is subject to 50 kilometres per hour speed zoning. Kerbside parking is permitted, subject to time restrictions. A combination of right-angle parking and parallel parking is provided on-street.

Grosvenor Street is shown in Figure 12 and Figure 13, and carries approximately 4,500 vehicles per day.

Figure 12: Grosvenor Street (looking east)

Figure 13: Grosvenor Street (looking west)

Grosvenor Lane

Grosvenor Lane functions as a local road and in the vicinity of the site is aligned in an east-west direction. It is a one-way eastbound road, set within an approximately 10-metre-wide carriageway.

The street is classified as a shared zone along its full length between Ben Boyd Road and Waters Road with 10 kilometre per hour speed zoning. Between Cooper Lane and Waters Lane, the street operates as a circulation road for an at-grade car park. Parallel / angle parking spaces are marked/ indented off the carriageway.

Grosvenor Lane is shown in Figure 14 and Figure 15, and carries approx. 1,500 vehicles per day.

Figure 14: Grosvenor Lane (looking east)

Figure 15: Grosvenor Lane (looking west)

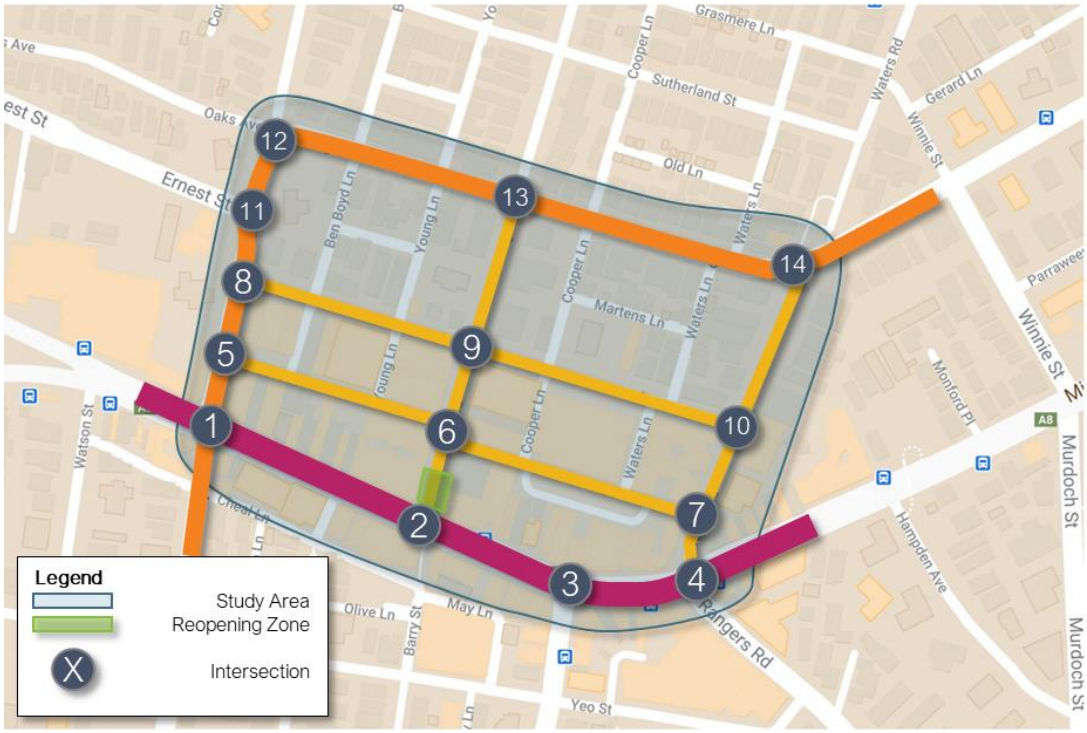
2.2.3 SURROUNDING INTERSECTIONS

The following key intersections currently exist near the site:

1. Military Road/ Ben Boyd Road
2. Military Road/ Young Street (currently closed but proposed to be reopened)
3. Military Road/ Wycombe Road
4. Military Road/ Rangers Road/ Waters Road
5. Ben Boyd Road/ Grosvenor Lane
6. Young Street/ Grosvenor Lane (currently restricted as part of previous Young Street closure)
7. Waters Road/ Grosvenor Lane
8. Ben Boyd Road/ Grosvenor Street
9. Young Street/ Grosvenor Street
10. Waters Road/ Grosvenor Street
11. Ben Boyd Road/ Ernest Street
12. Ben Boyd Road/ Oaks Avenue/ Belgrave Street
13. Belgrave Street/ Young Street
14. Belgrave Street/ Waters Road/ Gerard Street.

These intersections are shown in Figure 16.

Figure 16: Study intersections



Base image source: Google Maps

2.3 On-Street Parking

Site inspections conducted in February 2021 and July 2022 during the AM and PM peak periods provided the opportunity to observe and gain a qualitative appreciation of the parking demand and supply within the commercial centre. Generally, on-street parking within the study area was shown to be well utilised but with some spare capacity, and it is expected that drivers would for the most part be able to find a parking space reasonably close to their desired destination. The public parking lot on Grosvenor Lane experiences high demand, however, with some capacity observed as with other on-street parking.

Due to the short-term nature of some on-street parking, many parking manoeuvres were observed within the study area, slowing traffic circulation for general traffic.

Approximately 10 short-term parking spaces were removed as a result of the Young Street closure, however, as indicated above there is still some spare on-street parking available on a typical weekday within the study area.

Figure 17: General parking restriction

Figure 18: General parking supply- Grosvenor Lane

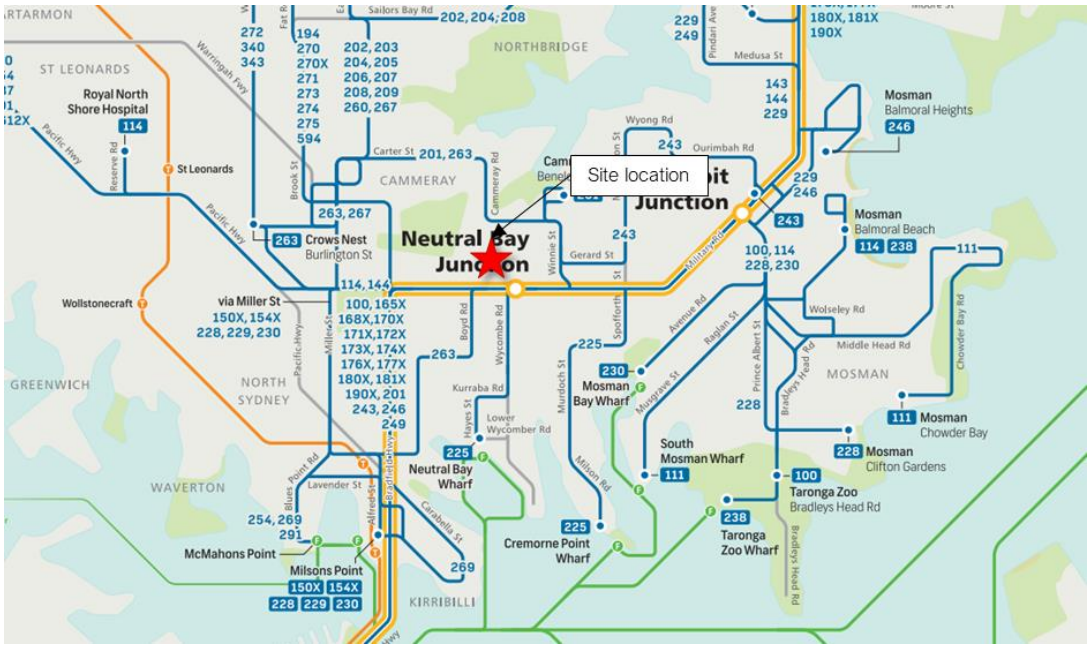
2.4 Public Transport

Bus provision is mostly unchanged from pre-closure conditions. A review of the major bus routes available near the site at Neutral Bay Junction, Military Road is summarised in Table 1 and shown indicatively in Figure 19.

Table 1: Public transport provision

Service	Route number	Route description	Frequency on/ off-peak
Bus	B1	B-Line Mona Vale to City Wynyard	6-10 mins/ 15 mins
	100	Taronga Zoo to City QVB (Loop)	5 mins/ 10 mins
	114	Balmoral to RNS Hospital	10 mins/ 15 mins
	144	Manly to Chatswood	10 mins (on and off-peak)
	154X	Milsons Point to Dee Why	5 mins/ 10 mins
	168X	Balgowlah to City Wynyard via North Balgowlah	20 mins (on and off-peak)
	171X	City Wynyard to Balgowlah via Clontarf	30-40 mins (on and off-peak)
	180X	City Wynyard to Collaroy Plateau	5 mins/ 20 mins
	181X	Narrabeen to City Wynyard	10 mins (on and off peak)
	190X	City Wynyard to Avalon Beach	10 mins/ 20 mins
	225	Cremorne Point Wharf to Neutral Bay Wharf	20 mins/ 30 mins
	263	Crows Nest to city Bridge St via Cremorne	15 mins/ 30 mins
	228, 229, 230, 243, 246, 249	Military Road to City	Various

Figure 19: Surrounding public transport network



Base image source: Transport for NSW, accessed 9 September 2022

It is understood that public transport provisions are expected to be unchanged as a result of the proposed Young Street reopening. Other minor routes are present in the network but provide very specific and infrequent services.

2.5 Walking and Cycling Infrastructure

Footpaths are provided along Military Road and most local streets within the study area, except some laneways where footpaths are narrow or disconnected. A shared zone is implemented along the full length of Grosvenor Lane between Ben Boyd Road and Waters Road, where the default speed limit is reduced to 10 km/h and vehicles are required to give way to pedestrians.

Signalised pedestrian crossings are provided on all legs of most intersections within the study area.

At Belgrave Street and Young Street, signalised pedestrian crossings are only provided on the east and west legs. Partial provision of crossing facilities at this intersection results in a disconnection of pedestrian access in an east-west direction.

Additionally, a pedestrian crossing is not provided on the western leg of the Belgrave Street and Waters Road intersection. Pedestrians crossing at this location would need to utilise the crossing facilities on other legs and travel a longer distance.

Other facilities within the study area include a pedestrian (zebra) crossing on Waters Road, south of Grosvenor Street. Ben Boyd Road, Young Street and Waters Road all provide north-south access for pedestrians within the study area connecting Military Road. There are also pedestrian laneways and through-building connections between the Grosvenor Lane car park and Military Road.

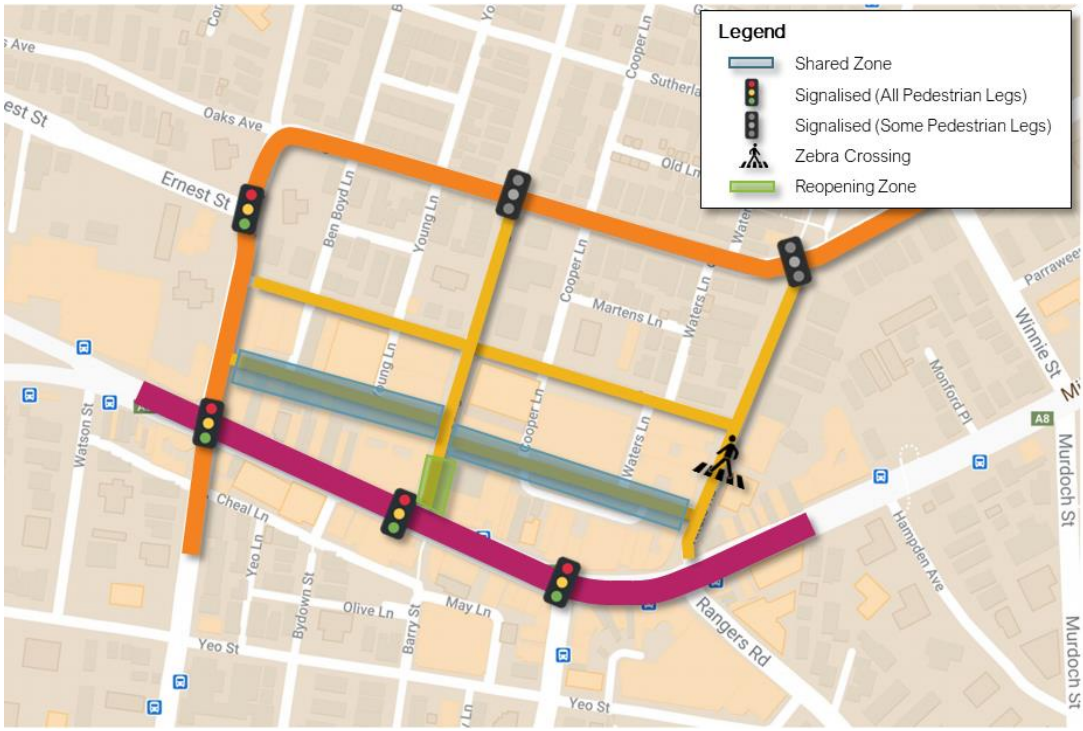
Young Street Reopening
2 Existing Conditions

Young Street is centrally located within the Neutral Bay town centre and attracts the most pedestrian demand and activity amongst the three north-south links. Young Street also intersects with Grosvenor Lane and Grosvenor Street, where high pedestrian activities are already generated by the existing shared zone, on-street and off-street parking and nearby shops.

During both peaks, moderate pedestrian volumes were generally observed, concentrated in the core retail area on and surrounding the Grosvenor Lane car park.

Pedestrian facilities are shown in Figure 20.

Figure 20: Surrounding pedestrian facilities



Base map: Google Maps, accessed 23 April 2021

High levels of cycling traffic were observed along Military Road. Young Street has been identified as a potential new cycling route in the future.

The surrounding cycling infrastructure is shown in Figure 21.

Young Street Reopening
2 Existing Conditions

Figure 21: Surrounding cycling network

Base image source: Northern Sydney Cycling Map, North Sydney Council, accessed 11 August 2022

3 Traffic Analysis

3.1 Historical Traffic Surveys

A number of different types of traffic surveys were previously conducted pre-and-post-closure of the subject section of Young Street for the surrounding road network, to assist in identifying the transport impacts of the closure. The details of those surveys are summarised in the following sections.

3.1.1 WSP, 2018

In preparation of the pre-closure *Young Street Road Closure Traffic Impact Assessment* report prepared by WSP in 2018, the following surveys were commissioned:

- intersection traffic counts
- queue-length surveys
- origin-destination (OD) surveys.

Intersection Traffic Counts

Weekday AM peak (6:00am to 10:00am), Weekday PM peak (3:00pm to 7:00pm) and Saturday midday peak (10:00am to 2:00pm) turning movement counts were conducted in June 2018 at the 14 key intersections within the study network, identified in Figure 16.

Queue-Length Surveys

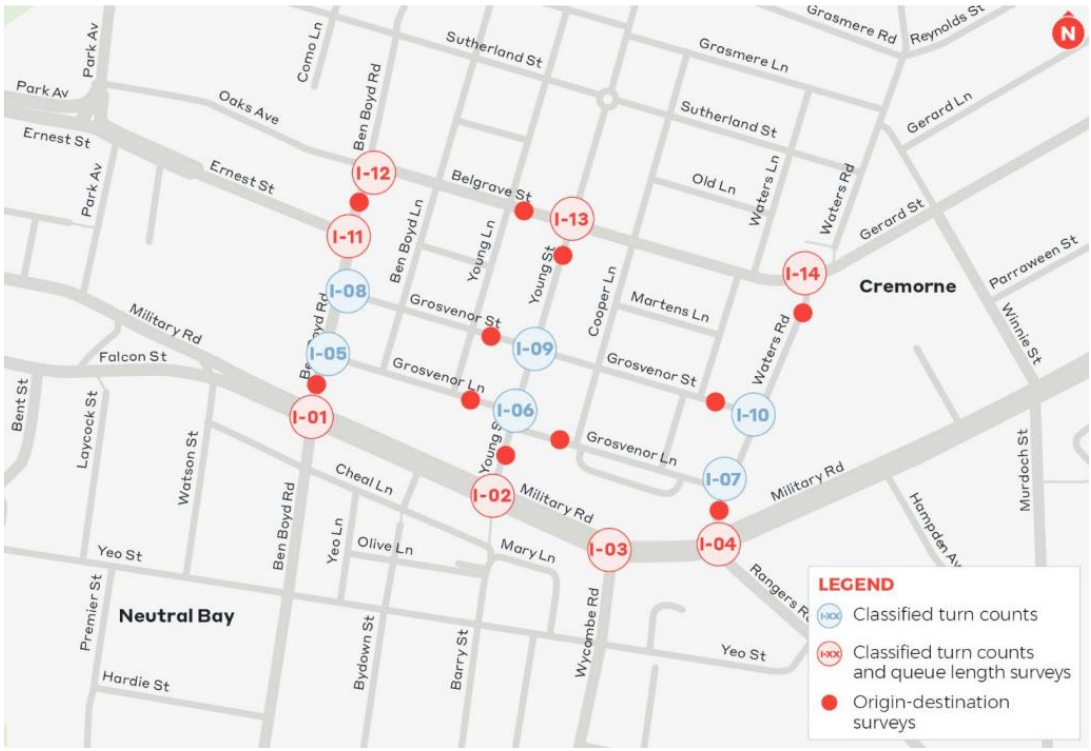
Undertaken on the same day as the intersection counts to observe queue lengths per lane by number of vehicles at eight (8) of the 14 key intersections.

Origin-Destination Surveys

Origin-destination (OD) surveys were undertaken at 11 locations in the surrounding area to understand the travel patterns within the network. The data was used to determine the likely redistribution of traffic within the surrounding road network due to the impending (at that time) closure of Young Street.

The locations of the surveys conducted by WSP are shown in Figure 22.

Figure 22: OD, intersection and queue length survey locations



Source: Young Street Road Closure Traffic Impact Assessment (WSP, 2018)

While additional intersection and queue length surveys have been conducted at the same locations as part of subsequent assessments for the subject road closure (as detailed further below), the OD survey remains a key reference source for understanding the trip patterns within the study area.

For the purpose of this assessment, it has been assumed that the 2022 origins and destinations are effectively the same as in 2018, since no disproportionate development has occurred between 2018 and 2022. All traffic movements previously observed at the intersection of Military Road and Young Street (which pre-closure permitted left-turn in and left-turn out movements only) are assumed to have been redirected to the most relevant intersections according to that survey data. Therefore, following reopening it is expected that those vehicles will be directed back through Young Street in the same proportions. This is discussed further in Section 3.4.1.

The origin-destination surveys conducted in 2018 generally showed that most vehicles entering Young Street at the intersection of Military Road and Young Street would be either accessing the car park (Woolworths) east down Grosvenor Lane, or heading through to the intersection of Belgrave Street and Young Street to exit the network. Vehicles egressing from Young Street at the Military Road and Young Street intersection would be travelling from Belgrave Street and Grosvenor Street. The critical traffic data prepared by WSP relating to the pre-closure traffic movements between Military Road and Young Street is presented in Table 2 and Table 3.

.

As can be observed from Table 2, the volumes of traffic at the Military Road/ Young Street intersection prior to its closure were modest only, being less than 120 veh/hr in or out in each of the observed peak periods.

Table 2: Pre-closure volumes in and out of Young Street

Peak Period	Left Turn in from Military Road	Left Turn out into Military Road
Weekday AM	88 veh/ hr	52 veh/ hr
Weekday PM	119 veh/ hr	67 veh/ hr
Saturday Midday	101 veh/ hr	103 veh/ hr

Source: 2018 base scenario traffic volumes as referenced in Appendix A of the *Young Street Road Closure Traffic Impact Assessment* (WSP, 2018)

Table 3: Origin-destination proportion results – Military Road/ Young Street

Peak Period	Direction	To/ From Young Street				
		Grosvenor Ln E(in)/ W(out)	Grosvenor St W	Grosvenor St E	Belgrave St	Within Network
Weekday AM	Into study area – northbound from intersection	31%	20%	7%	31%	11%
Weekday PM		34%	13%	5%	38%	10%
Saturday Midday		34%	22%	6%	24%	14%
Weekday AM	Out of study area – southbound from intersection	20%	22%	33%	26%	0%
Weekday PM		18%	24%	20%	38%	0%
Saturday Midday		11%	26%	17%	46%	0%

3.1.2 NORTH SYDNEY COUNCIL, 2020

North Sydney Council commissioned traffic surveys just before the closure of Young Street and the associated intersections with Military Road and Grosvenor Lane in October 2020, to examine the background traffic growth in the intervening period and the potential impacts arising from COVID-19.

Intersection Traffic Counts

The October 2020 counts were conducted at only four (4) of the 14 key intersections during similar peak periods to the WSP surveys. These included:

- Military Road/ Ben Boyd Road
- Military Road/ Rangers Road/ Waters Road
- Ben Boyd Road/ Grosvenor Lane
- Ben Boyd Road/ Grosvenor Street.

Mid-Block Counts

Council also commissioned mid-block (tube) counts over a 7-day period in October 2020 (pre-closure) to coincide with the timing of the intersection counts, at the locations shown in Figure 23.

Figure 23: Mid-block count locations

Source: North Sydney Council (2020)

Comparison of Council's survey data against the WSP data (where applicable) found that the 2020 surveyed volumes were a little higher (approx. 3% per annum) compared to pre-pandemic levels during the weekday peak periods, but conversely the Saturday midday peak volumes were observed to be lower (approx. 5% per annum).

As discussed in the Stantec 2021 reporting, it is likely that the trends observed in the traffic volumes may be explained in part by the coronavirus restrictions on bus capacity and general community concerns regarding public transport usage that existed at that time, with car drivership in broad terms observed to increase significantly in 2020 for commuter trips (i.e. corresponding to the weekday AM and PM peak hours). Conversely, weekend peak hour trips may have reduced due to a reduction in non-essential travel.

Notwithstanding the potential impacts arising from COVID-19, in broad terms the traffic volumes in 2018 and 2020 were observed to be of a similar magnitude to each other. Given this, both sets of data have been used in this report where appropriate[1] to enable comparisons between the existing (2022 post-closure/ pre-opening) conditions and the pre-closure traffic conditions to be made.

[1] The 2018 WSP data has been used for the intersection survey comparisons given its more extensive coverage, while the 2020 Council data has been used for the midblock volume comparisons since it is more recent and also directly comparable to the latest midblock surveys conducted in the study area by Stantec in 2022.

3.1.3 STANTEC, 2021

In preparation of the *Young Street Temporary Closure and Trial Plaza (Post-Implementation) Transport Impact Assessment* report prepared by Stantec in June 2021 to understand the impacts of the Young Street closure, post-closure traffic surveys were commissioned in February 2021[2] as follows:

- intersection traffic counts (same extent as previous surveys conducted by WSP in 2018, except for the Saturday where a select set of these intersections were surveyed as agreed with Council)
- mid-block counts (same extent as previous surveys conducted by Council in 2020 as shown in Figure 23, but excluding location 7 due to its closure to vehicular traffic)
- queue-length surveys (either quantitatively or qualitatively at all 14 study intersections)
- pedestrian surveys at each end of the Young Street trial pedestrian plaza to observe patronage levels.

These surveys were explicitly undertaken to measure the post-closure impacts of the changes at Young Street on the surrounding road network. Further surveys have been conducted in 2022 as part of this study (as discussed in the next section) which effectively update the majority of this data, and accordingly the 2021 survey data has not been used further in this report.

3.2 Updated Traffic Surveys

3.2.1 2022 INTERSECTION COUNTS

Stantec commissioned updated traffic movement counts at the 14 key intersections (consistent with WSP's 2018 and Stantec's 2021 survey extents) within the vicinity of the site in July 2022. The results of the traffic surveys are provided in Appendix A.

The 2022 intersection counts were conducted during the following peak periods:

- Weekday AM: 7:00am to 9:00am
- Weekday PM: 4:15pm to 6:15pm
- Saturday midday: 11:45am to 1:45pm (select intersections only as per Stantec 2021 survey methodology).

The AM and PM peak hours were found to occur from 7:30am to 8:30am and 4:45pm to 5:45pm respectively during the weekday, while the midday peak occurred from 12:15pm to 1:15pm on the Saturday.

As noted previously in Section 3.1.2, pre-closure traffic counts commissioned by North Sydney Council in 2020 were conducted during COVID-19. Analysis indicated that the volumes were likely to

[2] It is noted for completeness that repeat counts were also conducted in May 2021 at two of the intersections to check the pedestrian volumes.

have been impacted a little by changes in travel behaviour arising from the pandemic, although in broad terms the WSP 2018 volumes and Council 2020 volumes were of a similar magnitude. Given the above and noting that the WSP intersection data is more extensive than the Council data, comparison of the WSP 2018 (pre-closure) and July 2022 (post-closure/ existing) surveys during the peak periods at the 14 key intersections has been made and the results are summarised in Table 4.

Table 4: Comparison of network traffic volumes (WSP 2018 and Stantec 2022)

Intersection	Peak Period	WSP 2018 (pre-closure)	Stantec 2022	Percentage Change
Military Road/ Ben Boyd Road	AM	4,672	4,876	4%
	PM	4,818	4,704	-2%
	Sat	5,093	4,681	-8%
Military Road/ Young Street	AM	3,952	4,197	6%
	PM	4,091	4,098	0%
	Sat	4,327	-	-
Military Road/ Wycombe Road	AM	4,053	4,323	7%
	PM	4,172	4,273	2%
	Sat	4,609	-	-
Military Road/ Rangers Road/ Waters Road	AM	4,102	4,395	7%
	PM	4,243	4,382	3%
	Sat	4,689	4,262	-9%
Ben Boyd Road/ Grosvenor Lane	AM	718	635	-12%
	PM	784	621	-21%
	Sat	862	-	-
Young Street/ Grosvenor Lane	AM	283	177	-37%
	PM	412	253	-39%
	Sat	468	751	60%
Waters Road/ Grosvenor Lane	AM	213	220	3%
	PM	273	316	16%
	Sat	312	-	-
Ben Boyd Road/ Grosvenor Street	AM	695	589	-15%
	PM	723	579	-20%
	Sat	822	716	-13%
Young Street/ Grosvenor Street	AM	587	489	-17%
	PM	840	618	-26%
	Sat	914	-	-
Waters Road/ Grosvenor Street	AM	377	405	7%
	PM	514	449	-13%
	Sat	515	-	-
Ben Boyd Road/ Ernest Street	AM	2,856	2,273	-20%
	PM	2,874	2,011	-30%
	Sat	2,291	-	-

Intersection	Peak Period	WSP 2018 (pre-closure)	Stantec 2022	Percentage Change
Ben Boyd Road/ Oaks Avenue/ Belgrave Street	AM	2,733	2,214	-19%
	PM	2,791	1,978	-29%
	Sat	2,276	-	-
Belgrave Street/ Young Street	AM	2,871	2,351	-18%
	PM	3,029	2,098	-31%
	Sat	2,480	-	-
Belgrave Street/ Waters Road/ Gerard Street	AM	2,666	2,332	-13%
	PM	2,786	1,987	-29%
	Sat	2,265	-	-

Table 4 indicates the following intersections have experienced a notable **increase** (more than 10%) in traffic volumes during the peak hours between 2018 (pre-opening) and 2022 (post-opening):

- Young Street/ Grosvenor Lane (Sat)
- Waters Road/ Grosvenor Lane (PM)

Table 4 indicates the following intersections have experienced a notable **decrease** (more than 10%) in traffic volumes during the peak hours:

- Ben Boyd Road/ Grosvenor Lane (AM and PM)
- Young Street/ Grosvenor Lane (AM and PM)
- Ben Boyd Road/ Grosvenor Street (AM, PM and Sat)
- Young Street/ Grosvenor Street (AM and PM)
- Waters Road/ Grosvenor Street (PM)
- Ben Boyd Road/ Ernest Street (AM and PM)
- Ben Boyd Road/ Oaks Avenue/ Belgrave Street (AM and PM)
- Belgrave Street/ Young Street (AM and PM)
- Belgrave Street/ Waters Road/ Gerard Street (AM and PM).

Generally, eastbound and westbound traffic volumes on Military Road have increased and volumes on Belgrave Street have decreased during the peak hours. However, assessing the entire survey area traffic volumes have decreased by four per cent, 12 per cent and six per cent during the AM, PM and midday Saturday peak hours respectively compared to the 2018 volumes.

3.2.2 2022 MID-BLOCK COUNTS

As discussed, Council completed mid-block traffic counts in 2020. Consistent with the intersection counts completed during this period, the mid-block survey volumes across the week as a whole are also likely to be marginally higher than pre-pandemic levels. However, they are still expected to

provide a good indication of growth rates in the surveyed area prior to and following the closure of Young Street.

Stantec commissioned mid-block traffic counts at the same locations as depicted in Figure 23 (with the exception of location 7 on Young Street) in July 2022. The results of the traffic surveys are provided in Appendix A.

A comparison of the average daily traffic (ADT) volumes at each location in 2020 and 2022 is shown in Table 5.

Table 5: Comparison of network mid-block volumes (Council 2020 and Stantec 2022)

Ref. No.	Road	Between	Direction	ADT Volumes		
				Council 2020	Stantec 2022	Percentage Change
1	Ben Boyd Road	Grosvenor Lane and Military Road	North	4,957	4,961	0%
			South	2,687	2,736	2%
2	Ben Boyd Road	Grosvenor Street and Grosvenor Lane	North	4,346	4,857	12%
			South	2,861	3,216	12%
3	Grosvenor Street	Young Street and Ben Boyd Road	East	1,661	1,643	-1%
			West	3,064	2,654	-13%
4	Grosvenor Lane	Young Street and Ben Boyd Road	East	1,262	1,587	26%
			West	-	-	-
5	Young Street	Belgrave Street and Grosvenor Street	North	2,106	1,594	-24%
			South	2,496	2,075	-17%
6	Young Street	Grosvenor Street and Grosvenor Lane	North	1,687	903	-46%
			South	1,775	1,169	-34%
7	Young Street	Grosvenor Lane and Military Road	North	1,570	-	N/A
			South	1,018	-	N/A
8	Grosvenor Street	Waters Road and Young Street	East	1,618	1,695	5%
			West	2,437	2,531	4%
9	Grosvenor Lane	Waters Road and Young Street	East	1,576	1,546	-2%
			West		-	-
10	Waters Road	Grosvenor Lane and Military Road	North	622	1,180	90%
			South	1,203	1,541	28%
11	Waters Road	Grosvenor Street and Grosvenor Lane	North	2,150	2,217	3%
			South	989	1,105	12%
12	Waters Road	Belgrave Street and Grosvenor Street	North	2,157	2,107	-2%
			South	1,731	1,657	-4%

While there have been some increases in the ADT volumes at select locations, on average the network ADT volumes recorded in 2022 have experienced a seven per cent decrease compared to the 2020 volumes, which is in line with the trend identified from the intersection counts.

3.2.3 SUMMARY

Broadly, the network has experienced a decrease in traffic volumes between the pre-closure and post-closure observation periods (i.e. 2018/2020 vs 2022) according to both the intersection and mid-block traffic counts.

Accordingly, application of the previously-observed OD distribution patterns to the reduced 2022 traffic volumes would result in a lower volume of traffic redistributing to the Military Road / Young Street intersection with its proposed re-opening. However, as a conservative assessment the pre-closure volumes in and out of Young Street observed during 2018 (as previously summarised in Table 2) have been adopted as the future volumes along Young Street following its reopening, for the purposes of the future intersection modelling assessments. Further discussion on this is provided in Section 3.4.1.

3.3 Existing Intersection Operation

3.3.1 MODEL CALIBRATION

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

SIDRA intersection modelling was completed by WSP for the study area in 2018 and was made available to Stantec in 2021 to assist with preparation of the *Young Street Temporary Closure and Trial Plaza (Post-Implementation) Transport Impact Assessment* report. The WSP model was reviewed and calibrated accordingly to reflect the 2021 road network. Stantec has further updated and calibrated the model to reflect the current operation of the survey area. The following model parameters were updated from the 2021 SIDRA model to reflect existing 2022 intersection operations:

- **Cycle Length –** The cycle time was increased to 140 seconds at the traffic signal installations along the Military Road corridor to reflect on-site observations and a review of video footage. This has been incorporated into the models by fixing the user-given cycle length.
- **Phase Times –** The user-given phase times in the model were updated to reflect the change in cycle time. These changes were based on site observations and a review of video footage.
- **Peak Flow Factor -** The SIDRA default Peak Flow Factor of 95% has generally been retained. A peak flow factor of 100% has been applied to all eastbound and westbound movements along Military Road during the peak hours. This was confirmed against updated survey data which indicated a peak flow factor of about 100%.
- **Capacity Adjustment Factor –** This is used to specify capacity gain/ loss relative to normal program conditions which are typically determined by SIDRA. However, at intersections where critical approaches are congested and a Degree of Saturation (DOS) over 1.0 is determined (even after all other calibration methods have been tried) this has been set

manually. An iterative method was adopted adjusting the capacity factor for critical approaches until the DOS reduced below 1.0.

- **Lane Utilisation –** SIDRA has initially been permitted to distribute traffic based on the adopted lane geometry. Alterations to the lane utilisation values for the northern and southern approach legs to the Military Road/ Ben Boyd Road intersection were completed for the Saturday midday model to improve the operation of these legs and reduce the DOS below 1.0 (as the application of capacity adjustment factors did not provide a suitable outcome in this instance).
- In addition to the above, traffic and pedestrian volumes were updated with the 2022 surveyed volumes and the intersection road geometry was altered where necessary.

Calibration was completed until a degree of saturation marginally less than 1.0 was achieved to reflect the over-saturated road network, specifically the intersections on Military Road, which was observed on-site.

To confirm the calibration process, comparison of the average queue lengths as determined by the base SIDRA model and the 2022 queue length surveys for minor approaches along the Military Road, Ben Boyd Road and Belgrave Street corridor was completed. The results are summarised in Table 6.

Table 6: Queue length comparison

Intersection	Road	Lane	AM Peak Avg. Queue (vehs)		PM Peak Avg. Queue (vehs)		Saturday Peak Avg. Queue (vehs)	
			SIDRA	Surveys	SIDRA	Surveys	SIDRA	Surveys
Military Road/ Ben Boyd Road	Ben Boyd Road (South)	Lane 1	5	6	5	4	5	5
		Lane 2	7	5	7	6	9	7
	Ben Boyd Road (North)	Lane 1	4	4	4	4	4	4
		Lane 2	4	3	4	3	4	5
Military Road/ Wycombe Road	Wycombe Road (South)	Lane 1	6	4	3	4	-	-
		Lane 2	5	4	5	4	-	-
Military Road/ Waters Road/ Rangers Road	Rangers Road (South)	Lane 1	1	4	1	3	-	-
	Waters Road (North)	Lane 1	1	2	1	5	-	-
Belgrave Street/ Waters Road	Waters Road (South)	Lane 1	2	1	2	1	-	-
		Lane 2	3	2	6	3	-	-

Intersection	Road	Lane	AM Peak Avg. Queue (vehs)		PM Peak Avg. Queue (vehs)		Saturday Peak Avg. Queue (vehs)	
			SIDRA	Surveys	SIDRA	Surveys	SIDRA	Surveys
Belgrave Street/ Young Street	Young Street (South)	Lane 1	2	1	2	1	-	-
		Lane 2	3	2	4	2	-	-
	Young Street (North)	Lane 1	2	2	1	1	-	-
		Lane 2	5	1	6	2	-	-
Ben Boyd Road/ Ernest Street	Ben Boyd Road (South)	Lane 1	3	3	3	3	-	-
		Lane 2	4	3	4	2	-	-

Table 6 indicates that the base SIDRA model generally produces a slightly higher queue length compared to the observed on-site queue lengths. However, the model is considered to be appropriately calibrated and reflective of the existing road network.

3.3.2 INTERSECTION OPERATION

The commonly used measure of intersection performance, as defined by TfNSW, is vehicle delay. SIDRA determines the average delay that vehicles encounter and provides a measure of the level of service (LOS).

Table 7 shows the criteria that SIDRA adopts in assessing the LOS.

Table 7: SIDRA level of service criteria

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

Table 8 presents a summary of the existing operation of the intersections (July 2022), with full results presented in Appendix B of this report.

Table 8: Existing (2022) intersection operating conditions (prior to reopening)

Intersection	Peak	Degree of saturation (DOS)	Average delay (sec)	95th percentile queue (m)	Level of service (LOS)
Military Road/ Ben Boyd Road	AM	0.998	42	316	C
	PM	0.974	34	580	C
	Sat	0.991	19	229	B
Military Road/ Young Street	AM	0.997	40	229	C
	PM	0.969	22	229	B
	Sat	0.984	35	672	C
Military Road/ Wycombe Road	AM	0.998	42	141	C
	PM	0.991	31	196	C
Military Road/ Rangers Road/ Waters Road	AM	0.615	35	19	C
	PM	0.503	19	18	B
Ben Boyd Road/ Grosvenor Lane	AM	0.229	4	6	A
	PM	0.210	4	5	A
	Sat	0.314	5	8	A
Young Street/ Grosvenor Lane	AM	0.071	8	2	A
	PM	0.112	8	4	A
Waters Road/ Grosvenor Lane	AM	0.067	8	2	A
	PM	0.121	8	3	A
Ben Boyd Road/ Grosvenor Street	AM	0.177	9	5	A
	PM	0.187	8	6	A
	Sat	0.221	9	7	A
Young Street/ Grosvenor Street	AM	0.185	10	9	A
	PM	0.210	10	9	A
Waters Road/ Grosvenor Street	AM	0.093	7	2	A
	PM	0.139	6	4	A
Ben Boyd Road/ Ernest Street	AM	0.902	41	73	C
	PM	0.512	19	91	B
Ben Boyd Road/ Oaks Avenue/ Belgrave Street	AM	0.915	372	24	F
	PM	0.431	106	11	F
Belgrave Street/ Young Street	AM	0.916	13	193	A
	PM	0.833	12	65	A
Belgrave Street/ Waters Road/ Gerard Street	AM	0.710	11	65	A
	PM	0.905	16	106	B

On the basis of the above assessment, it is clear that the network generally operates well with minimal queues and delays at each intersection. The exceptions to this are the intersections along the

Military Road corridor which are over-saturated and approaching capacity. These intersections experience some delays and reduced levels of service on the minor road approaches with long queues for eastbound and westbound traffic on Military Road. While LOS C or better is generally achieved, LOS F currently occurs at the Ben Boyd Road/ Oaks Avenue/ Belgrave Street intersection in the weekday AM and PM peaks due to excessive delays occurring at this intersection.

3.4 Future Intersection Operation

3.4.1 TRAFFIC REDISTRIBUTION

As discussed in Section 3.1.1, WSP commissioned origin-destination surveys on Thursday 14 June and Saturday 16 June 2018 prior to the closure of Young Street. This data was used to identify the trip patterns in the study area at that time and to predict the redistribution of traffic as a result of the road closure.

For the purposes of this assessment, it has been assumed that the 2022 origins and destinations are effectively the same as in 2018, since no disproportionate development has occurred in the study area between 2018 and 2022. The redistributions estimated for the road closure can therefore be 'reverse-engineered' to calculate the redistribution of traffic back to Young Street as a result of its reopening.

In practice the assessment has been simplified due to the existing (2022) volumes in the study area generally being lower than those previously surveyed in 2018, as discussed in Section 3.2.3. This would result in a lower volume of traffic redistributing to the Military Road / Young Street intersection with its proposed re-opening, if the same proportions were adopted for the analysis as used in the 2018 assessment. However, as a conservative assessment the pre-closure volumes in and out of Young Street observed during 2018 (as previously summarised in Table 2) have been adopted as the future volumes along Young Street following its reopening. Using this data, the 2022 traffic volumes prior to and following the re-opening of Young Street have been calculated and are summarised in Figure 24 to Figure 29 for the weekday AM and PM peak and Saturday midday peak periods, respectively.

Figure 24: 2022 Existing (Pre-opening) AM Traffic Volumes

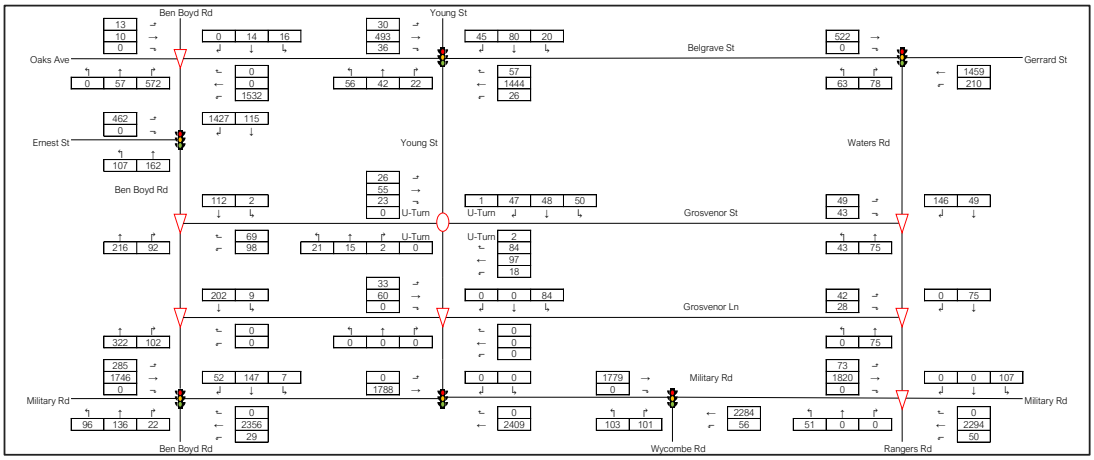


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Figure 25: 2022 Existing (Pre-opening) PM Traffic Volumes

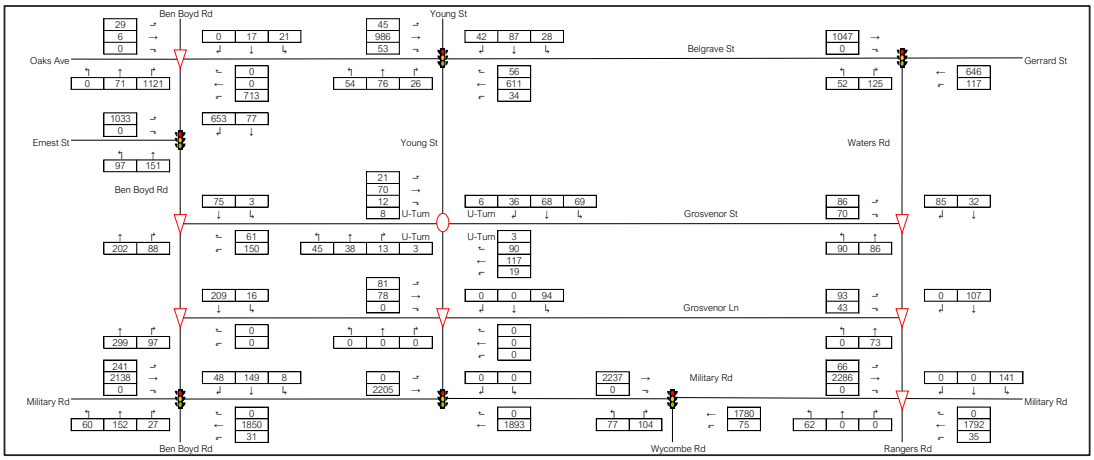

Figure 26: 2022 Existing (Pre-opening) SAT Traffic Volumes

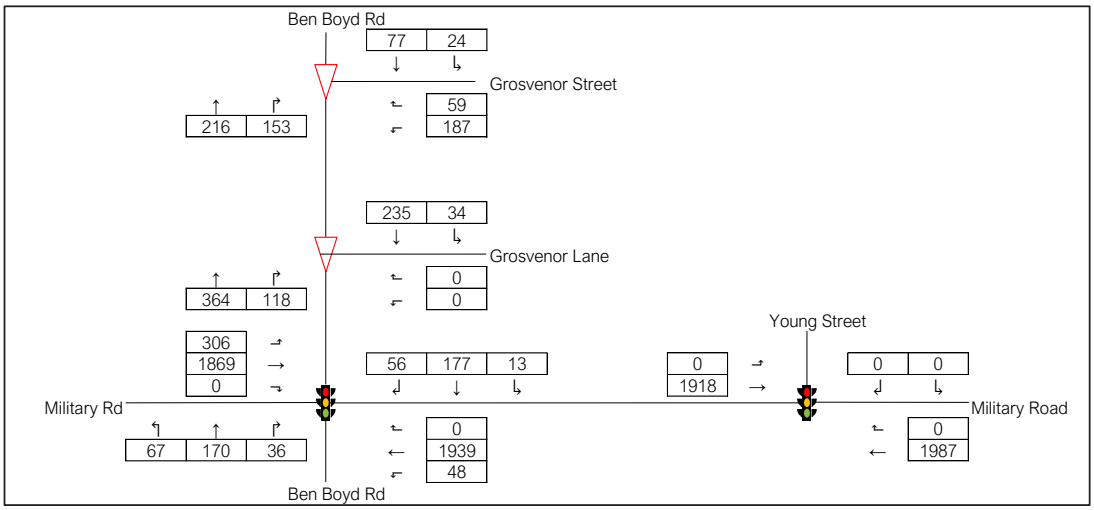

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Figure 27: 2022 Post-opening AM Traffic Volumes

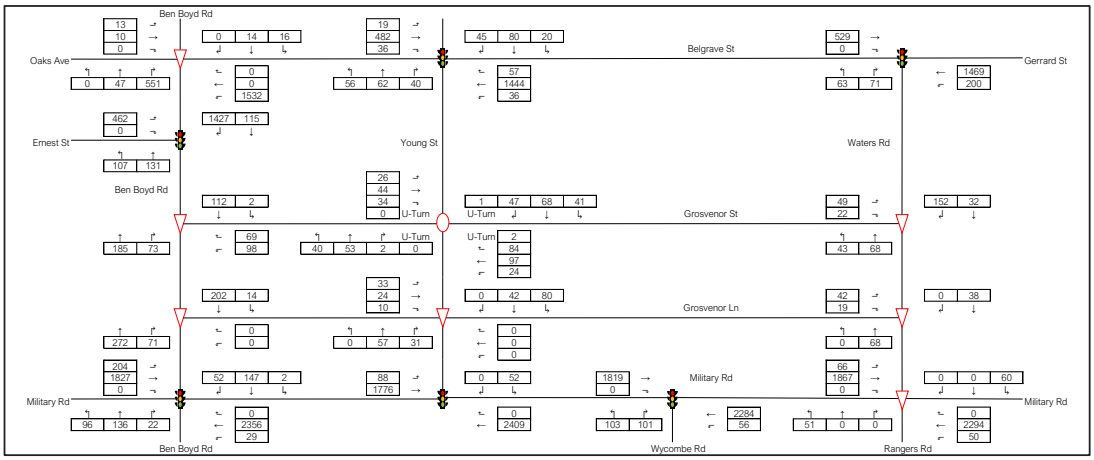


Figure 28: 2022 Post-opening PM Traffic Volumes

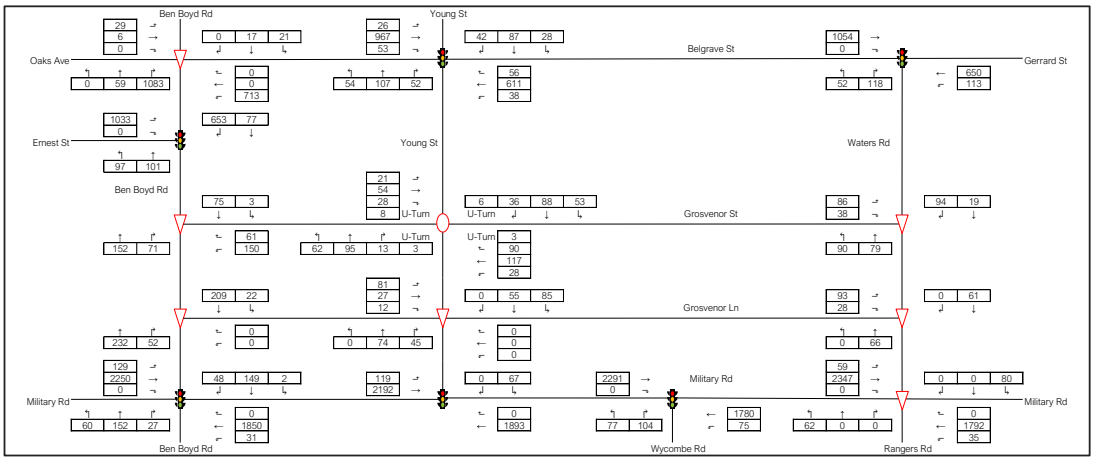
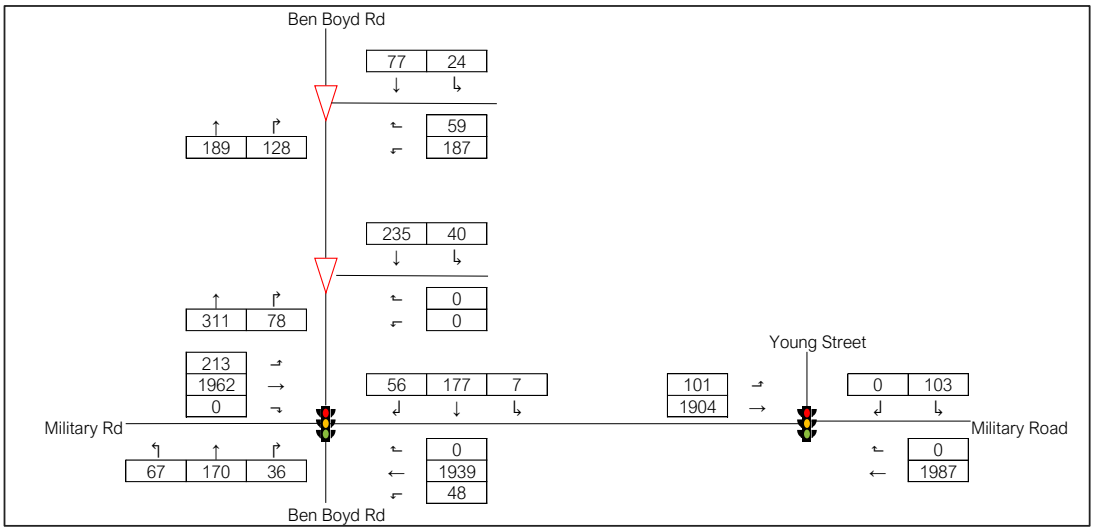


Figure 29: 2022 Post-opening SAT Traffic Volumes



3.4.2 INTERSECTION PERFORMANCE

The future (2022) intersection performance as a result of the Young Street reopening based on the traffic redistributions presented in the previous section is shown in Table 9, with the full SIDRA results provided in Appendix C.

Table 9: Future (2022) intersection operating conditions (following reopening)

Intersection	Peak	Degree of saturation (DOS)	Average delay (sec)	95th percentile queue (m)	Level of service (LOS)
Military Road/ Ben Boyd Road	AM	0.998	42	365	C
	PM	0.960	31	556	C
	Sat	1.076	22	356	B
Military Road/ Young Street	AM	0.997	36	229	C
	PM	0.991	28	229	B
	Sat	0.956	27	571	B
Military Road/ Wycombe Road	AM	0.998	45	196	D
	PM	1.014	38	196	C
Military Road/ Rangers Road/ Waters Road	AM	0.325	27	9	B
	PM	0.291	16	8	B
Ben Boyd Road/ Grosvenor Lane	AM	0.181	4	4	A
	PM	0.146	4	3	A
	Sat	0.242	5	5	A
Young Street/ Grosvenor Lane	AM	0.065	9	2	A
	PM	0.111	9	3	A

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Intersection	Peak	Degree of saturation (DOS)	Average delay (sec)	95th percentile queue (m)	Level of service (LOS)
Waters Road/ Grosvenor Lane	AM	0.056	8	2	A
	PM	0.103	8	3	A
Ben Boyd Road/ Grosvenor Street	AM	0.169	8	5	A
	PM	0.180	8	6	A
	Sat	0.214	9	7	A
Young Street/ Grosvenor Street	AM	0.198	10	8	A
	PM	0.113	11	4	A
Waters Road/ Grosvenor Street	AM	0.065	7	2	A
	PM	0.102	6	3	A
Ben Boyd Road/ Ernest Street	AM	0.902	41	73	C
	PM	0.519	18	95	B
Ben Boyd Road/ Oaks Avenue/ Belgrave Street	AM	0.858	327	21	F
	PM	0.343	79	9	F
Belgrave Street/ Young Street	AM	0.919	14	194	A
	PM	0.759	23	142	B
Belgrave Street/ Waters Road/ Gerard Street	AM	0.648	10	62	A
	PM	1.021	16	93	B

A comparison of the degree of saturation, average delay and intersection level of service pre- and post-reopening is summarised in Table 10.

Table 10: Comparison of pre- and post-reopening (2022) intersection performance

Intersection	Peak	Degree of saturation (DOS)		Average delay (sec)		Level of service (LOS)	
		Existing	Future	Existing	Future	Existing	Future
Military Road/ Ben Boyd Road	AM	0.998	0.998	42	42	C	C
	PM	0.974	0.960	34	31	C	C
	Sat	0.991	1.076	19	22	B	B
Military Road/ Young Street	AM	0.997	0.997	40	36	C	C
	PM	0.969	0.991	22	28	B	B
	Sat	0.984	0.956	35	27	C	B
Military Road/ Wycombe Road	AM	0.998	0.998	42	45	C	D
	PM	0.991	1.014	31	38	C	C
Military Road/ Rangers Road/ Waters Road	AM	0.615	0.325	35	27	C	B
	PM	0.503	0.291	19	16	B	B
Ben Boyd Road/ Grosvenor Lane	AM	0.229	0.181	4	4	A	A
	PM	0.210	0.146	4	4	A	A
	Sat	0.314	0.242	5	5	A	A
Young Street/ Grosvenor Lane	AM	0.071	0.065	8	9	A	A
	PM	0.112	0.111	8	9	A	A
Waters Road/ Grosvenor Lane	AM	0.067	0.056	8	8	A	A
	PM	0.121	0.103	8	8	A	A
Ben Boyd Road/ Grosvenor Street	AM	0.177	0.169	9	8	A	A
	PM	0.187	0.180	8	8	A	A
	Sat	0.221	0.214	9	9	A	A
Young Street/ Grosvenor Street	AM	0.185	0.198	10	10	A	A
	PM	0.210	0.113	10	11	A	A
Waters Road/ Grosvenor Street	AM	0.093	0.065	7	7	A	A
	PM	0.139	0.102	6	6	A	A
Ben Boyd Road/ Ernest Street	AM	0.902	0.902	41	41	C	C
	PM	0.512	0.519	19	18	B	B
Ben Boyd Road/ Oaks Avenue/ Belgrave Street	AM	0.915	0.858	372	327	F	F
	PM	0.431	0.343	106	79	F	F
Belgrave Street/ Young Street	AM	0.916	0.919	13	14	A	A
	PM	0.833	0.759	12	23	A	B
Belgrave Street/ Waters Road/ Gerard Street	AM	0.710	0.648	11	10	A	A
	PM	0.905	1.021	16	16	B	B

Table 10 indicates that the reopening would result in minor increases in the degree of saturation and average delay to a small number of intersections, predominantly those along the Military Road and

Belgrave Street corridors. These intersections would continue to operate as per existing conditions with a high degree of saturation, long queues and near capacity.

Internal intersections within the town centre would benefit from the redistribution of traffic, with a minor reduction to the degrees of saturation and average delays predicted to occur.

Overall, the reopening would only result in a deterioration in the predicted LOS at two intersections due to a slight increase in average delay, with these intersections already being on the boundary to a lower LOS prior to the reopening:

- Military Road/ Wycombe Road (AM) from LOS C to D (corresponding to an increase in average delay from 42sec to 45sec)
- Belgrave Street/ Young Street (PM) from LOS A to B (corresponding to an increase in average delay from 12sec to 23sec).

The change in average delay at the Military Road/ Wycombe Road intersection in particular is minor, while LOS B at the Belgrave Street/ Young Street intersection still represents good operating conditions overall. The changes in intersection performance arising from the proposed reopening of Young Street are therefore considered to be supportable, without the need for any additional mitigation measures.

4 Conclusion

Based on the analysis presented in this report the following key points are made:

- North Sydney Council is proposing to reopen the section of Young Street between Military Road and Grosvenor Lane to vehicular traffic, with the trial pedestrian plaza to be removed accordingly.
- Stantec was engaged in July 2022 to examine the likely traffic and transport performance of the Neutral Bay town centre as a result of the proposed Young Street reopening.
- Stantec has reviewed the previous pre- and post-closure transport impact assessment reports prepared by WSP in 2018 and Stantec (formerly GTA Consultants) in 2021, as well as all historical traffic surveys commissioned by WSP (2018), North Sydney Council (2020) and Stantec (2021).
- Compared to the 2018 and 2020 traffic surveys the surrounding road network has experienced an overall reduction in traffic volumes based on new traffic surveys conducted by Stantec in 2022 as part of this assessment.
- SIDRA modelling has been conducted based on the original WSP base models of the network that were updated in 2021 by Stantec in the preparation of its transport impact assessment at that time. The models have been further reviewed and calibrated to reflect 2022 conditions.
- SIDRA modelling reveals that the proposed reopening would result in minimal impacts to the surrounding road network. There would be minor increases in DOS and average delays for a small number of intersections (primarily on Military Road), however, only two intersections would experience a deterioration in LOS.
- Overall, the impacts of the reopening are considered to be minor, and no mitigation measures are necessary to address any future operating concerns.

As such, the reopening of Young Street can be supported from a traffic and transport perspective.