Resource Recovery & Truck Parking Depot

Tomago

Remondis Australia Pty Ltd

Traffic Impact Assessment

April 2021

SECA solution

Resource Recovery & Truck Parking Depot, Tomago

Traffic Impact Assessment

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Contents

1. Introduction

1.1 Background

Seca Solution Pty Ltd (Seca Solution) has been commissioned by Remondis Australia Pty Ltd through Jackson Environmental and Planning to provide a Traffic Impact Assessment to support the Environmental Impact Statement for the proposed Resource Recovery facility located in Tomago, New South Wales (NSW). The project involves modifying the existing buildings on the site and operation of a new resource recovery facility and truck parking facility.

As part of the project, Seca Solution has utilised current traffic data and observed the traffic operations at the key intersections in the locality of the site during peak periods to assess the potential impacts of the project on the road network.

1.2 Scope of Report

The scope of this report is to review the external traffic movements associated with the proposed development. The report provides advice on the operation and capacity of key intersections in the locality, taking into account the impact of the future M1 Pacific Highway extension to Raymond Terrace (M12RT), the preferred route for which includes a Tomago Interchange that shall incorporate proposed road infrastructure within the subject site.

1.3 Scope and Objectives of the study

The scope of the study included:

- Assessing additional traffic flows associated with the development, during both the construction phase and operational phase and any likelihood of impact on the local road network;
- Reviewing the proposed access arrangements for the development;
- Assessing the likelihood of the development affecting any other transport modes/vehicles, including cumulative impacts associated with other proposed and existing projects in the area.

The objective of the report is to document any likely impacts the proposed development may have and confirm the capacity of the road network to cater for the development.

1.4 Planning Context

In preparing this document, the following guides and publications have been considered:

- Roads Maritime Services (RMS) Guide to Traffic Generating Developments, Version 2.2 Dated October 2002
- Austroads Guide to Traffic Management Part 12: Traffic Impacts of Project
- Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections
- Port Stephens Development Control Plan 2014
- Port Stephens Local Environment Plan 2013
- Australian / New Zealand Standard – Parking Facilities Part 1: off-street car parking (AS2890.1:2004)

1.5 Authority Requirements

The Department of Planning Industry and Environment (DPIE) have provided SEARs (Secretary's Environmental Assessment Requirements) that provide advice on what is to be assessed for the project and the information that is required to be provided in the Environmental Impact Statement (EIS). Relevant to traffic and transport are the requirements to follow.

The Roads and Maritime Services have provided separate details on their requirements for the project which are provided in the SEARs.

Table 1-1 - Roads and Maritime Services requirements per SEARs.

Requirement	Response / Section of Seca Solution report
Details of all traffic type and volumes likely to be generated during construction and operation, including a description of the haul routes. Traffic flows are to be shown diagrammatically to a level of detail sufficient for easy interpretation	Section 4.2.1
An assessment of the predicted impacts of this traffic on road safety and the capacity of the road network, including consideration of the cumulative traffic impacts key intersections using Sidra or similar traffic model. This is to include identification and consideration of approved and / or proposed developments in the vicinity	Section 4.4.
Detailed plans on the proposed layout of the internal road and pedestrian network on site in accordance with relevant Australian Standard and Council's DCP	Internal traffic / pedestrian management plan. No public access
Plan of any proposed road upgrades, infrastructure works or new roads required for the development	No works proposed
Plans demonstrating how all vehicles associated with construction and operation awaiting loading, unloading and servicing can be accommodated on site to avoid queuing in the street network	Appendix D
Swept path diagrams depicting vehicles entering, exiting and manoeuvring throughout the site for both light and heavy vehicles	Appendix D

1.6 Consultation with Transport for New South Wales

An important and major road upgrade in the general locality of the site is the M1 to Raymond Terrace project. This major road upgrade will provide a new link between the northern end of the M1 Motorway from Sydney and Raymond Terrace, providing a bypass for the high through traffic demands along the Pacific Highway on the north-western side of the Tomago area. This will provide significant traffic relief to the traffic signal-controlled intersection of Tomago Road and the Pacific Highway.

Seca Solution have previously attended a meeting with Transport for New South Wales (TfNSW) and the key item discussed at the meeting related to the approval and timing of the project works. TfNSW indicated that based on the funding allocated by the federal government it is now very likely to proceed. TfNSW also noted however that implementation of the M12RT works were in a state of flux, with this being dependent upon final funding approval and the completion of the EIS. The subsequent approvals process will determine the timing of the construction works with TfNSW unable to confirm an indicative time frame at this stage of the process. The TfNSW website is consistent with the above stating timing for construction is not confirmed and would be dependent on planning approval, future traffic needs and funding availability.

2. Existing Situation

2.1 Site Description and Proposed Activity

The subject site is located to the south east of the Pacific Highway, off School Drive which connects to Tomago Road via McIntyre Road. The site is currently vacant, with large shed buildings and on-site parking as well as a large open area to the east of the existing buildings..

The proposed development involves the operation of a new waste resource management facility, utilising the existing buildings as well as providing an area for the storage of trucks on site currently owned and operated by REMONDIS Australia Pty Ltd .

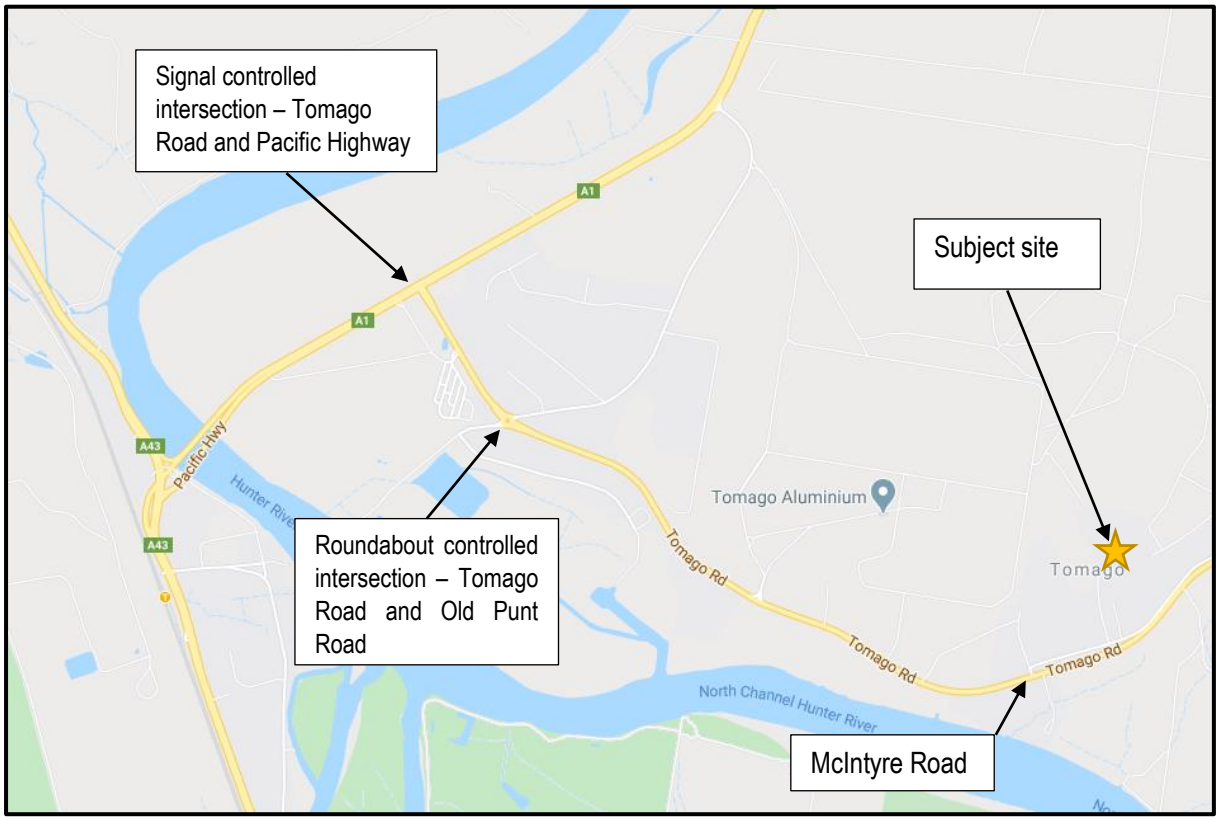


Figure 2-1: Site location and the location of major intersections

2.1.1 Zoning and Adjacent Land Use

The land pertaining to the subject site is zoned for general industrial use per the Port Stephens Local Environment Plan (2013). Surrounding land uses in the vicinity to the east of the Pacific Highway are also zoned for general industrial use, with a wide range of industrial developments in operation in the surrounding area including the Newcastle Gas Storage Facility and the Tomago Aluminium smelter.

2.2 Site Access

The site has access via an existing driveway off the northern extension of School Drive associated with the previous industrial use on site.

2.2.1 Road Hierarchy

2.2.1.1 Pacific Highway

The main road through the locality is the **Pacific Highway** (HW10) which forms part of the state road network providing the major the east coast connection between Sydney/Newcastle through to Queensland. In the locality of Tomago, it provides a dual carriageway allowing for two lanes of travel in both directions separated by a vegetated central median. A sealed shoulder/breakdown lane is provided in each direction with an unsealed verge, with no kerb and guttering provided. The posted speed limit on the Pacific Highway is 80 km/hr in this location.

2.2.1.2 Tomago Road

Tomago Road forms part of the state road network (MR302) providing connection between Nelson Bay Road to the east and the Pacific Highway to the west. The intersection with the Pacific Highway is a T-intersection, controlled by traffic signals, with left turns only available out of Tomago Road. Two turning lanes are provided for this movement. The Pacific Highway operates as a dual carriageway through the intersection, with a channelised left turn lane provided for southbound vehicles to turn into Tomago Road and two channelised right turn lanes provided on the northbound approach. The layout of this intersection is shown in Figure 2-2.

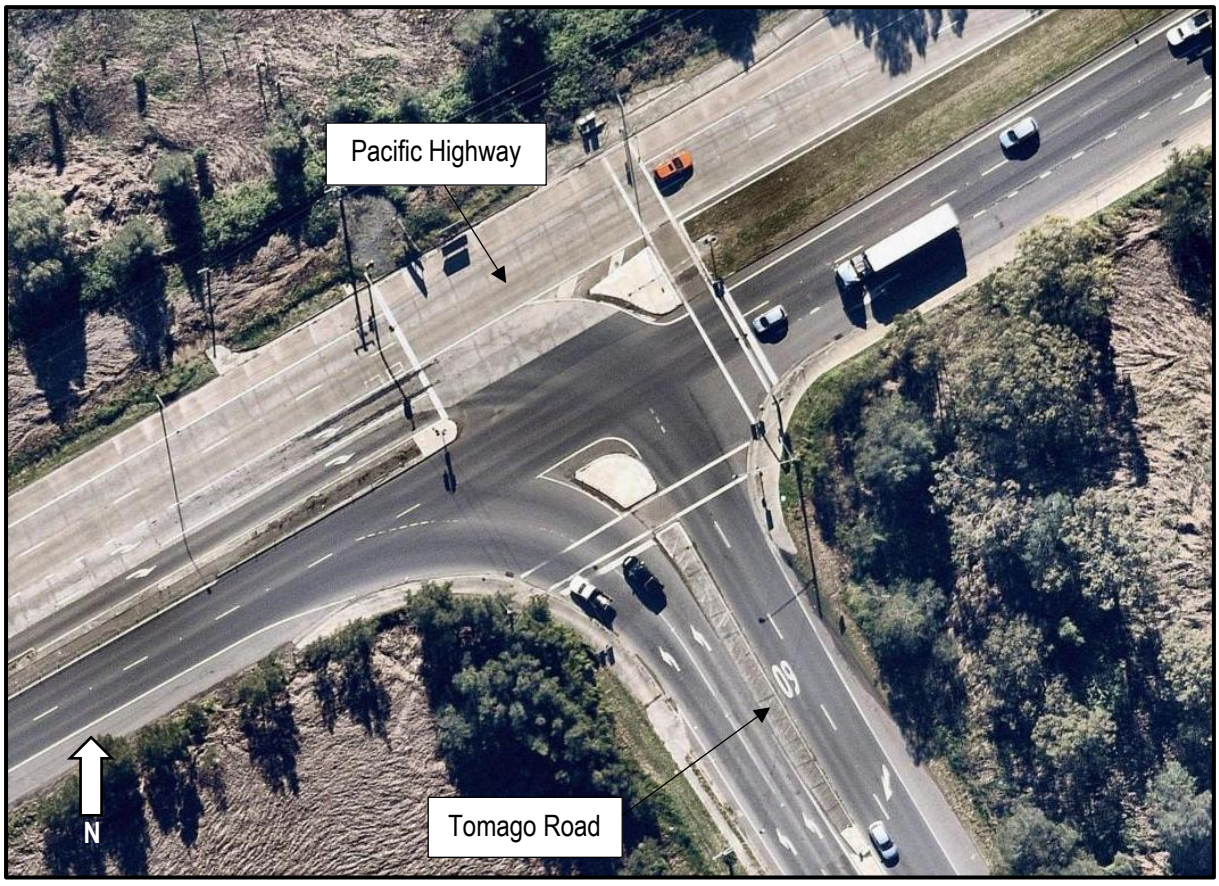


Figure 2-2: Aerial view of the intersection of the Pacific Highway and Tomago Road (Source: Nearmap)

Tomago Road provides one lane of travel in each direction along the majority of its length, with widening at intersections to provide increased capacity. In the vicinity of the roundabout intersection with Old Punt Road (700 metres south-east of the Pacific Highway) it operates under the posted speed limit of 60 km/hr, with two lanes provided on both the eastbound and westbound approaches allowing for left turn/through movements and right turn/through movements. The layout of this intersection is shown in Figure 2-3 to follow.

Figure 2-3: Aerial view of the intersection of the Tomago Road and Old Punt Road (Source: Nearmap)

2.2.1.3 Old Punt Road

Old Punt Road provides a single lane of travel in each direction on the northbound and southbound approaches to the intersection with Tomago Road. To the north of the intersection it has a sealed pavement in the order of 11 metres wide and an unsealed verge. It operates under the posted speed limit of 60 km/hr.

At its northern end, Old Punt Road intersects with the Pacific Highway at a signalised T-intersection. The Pacific Highway operates as a dual carriageway in this location with a dedicated left turn lane provided for southbound vehicles to turn into Old Punt Road and a sheltered right turn lane provided for northbound vehicles to turn into Old Punt Road. These turning movements are both controlled by traffic signals at the Pacific Highway.

On Old Punt Road a left turn slip lane is provided for southbound travel along the Pacific Highway. This movement is not controlled by the traffic signals. The intersection layout provides an acceleration lane approximately 150 metres in length (including taper) to allow for efficient merging into the traffic stream. The right turn out of Old Punt Road onto Pacific Highway is controlled by the traffic signals. The layout of this intersection is shown in Figure 2-4 to follow.

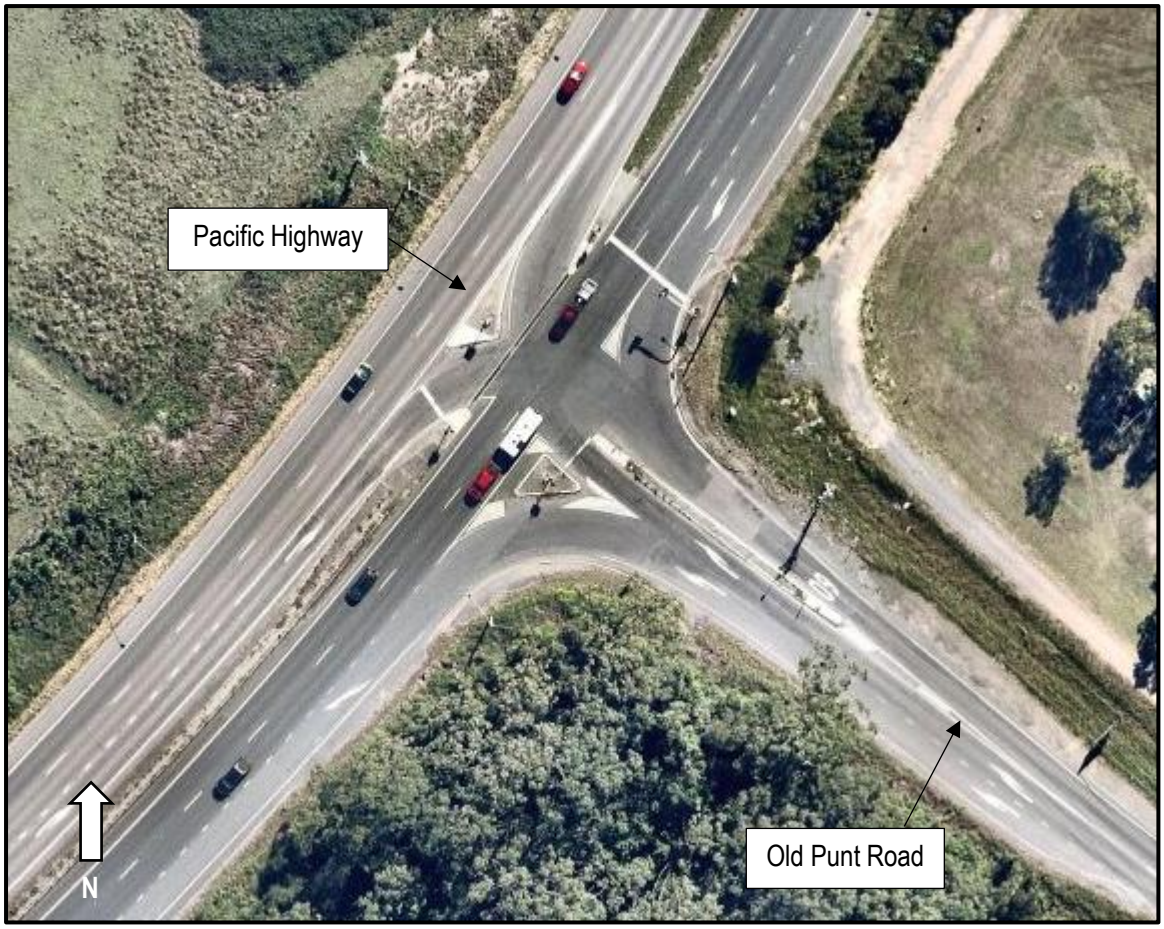


Figure 2-4: Aerial view of the intersection of the Pacific Highway and Old Punt Road

2.2.1.4 McIntyre Road / School Drive

McIntyre Road connects with Tomago Road via a simple give way-controlled T-intersection, with Tomago Road being the priority road. McIntyre Road provides a single lane of travel in both directions and provides access to the various industrial users in this location. Part of the road network includes School Drive, which connects with McIntyre Road via a T-intersection with McIntyre Road being the priority road. School Drive provides access to industrial land, including the subject site and provides a single lane of travel in both directions. It is an industrial estate road with a width of 8 metres, with no footpaths and continues to operate under a speed limit of 80 km/h.

2.2.2 Roadworks and Traffic Management Works

A review of the Port Stephens Council website indicates that there are currently no road upgrades or traffic management works occurring in the immediate vicinity of the site.

Planning is currently underway for the future extension of the M1 Pacific Motorway from its existing termination at Beresfield through to Raymond Terrace (M12RT). This project has been declared critical State Significant Infrastructure (SSI 7319), as it is considered essential to the State for economic, environmental or social reasons. TfNSW is currently carrying out an environmental assessment of the project through the completion of an EIS.

The construction of this road link will result in significant changes to the traffic flows in the locality, with a positive impact on the existing intersections of Tomago Road and the Pacific Highway. There is currently no timetable available for the construction work to commence, with this being dependent on planning approval, future traffic needs and funding availability. The Infrastructure Priority List compiled by Infrastructure Australia lists the project as a Priority Initiative, with a near term delivery timescale (0-5 years).

To date the project has received the below funding allocation:

- The NSW Government has committed $200 million from Rebuilding NSW towards getting the project ready for construction.
- The 2019-20 Federal Budget allocated $1.6 billion towards the project which will see funding contributions each year between FY2021-22 and FY2027-28.
- The 2019-20 NSW Budget provided $4.3 million to continue planning for the future extension of the M1 Pacific Motorway to the Pacific Highway at Raymond Terrace.

The environmental assessment of the project was released in 2017, whilst the concept design is still being finalised. The preferred route is proposed to bypass Hexham and Heatherbrae providing approximately 15 kilometres of dual carriageway motorway with two lanes in each direction, with a number of interchanges including one providing connection to Tomago (refer to Figure 2-5).

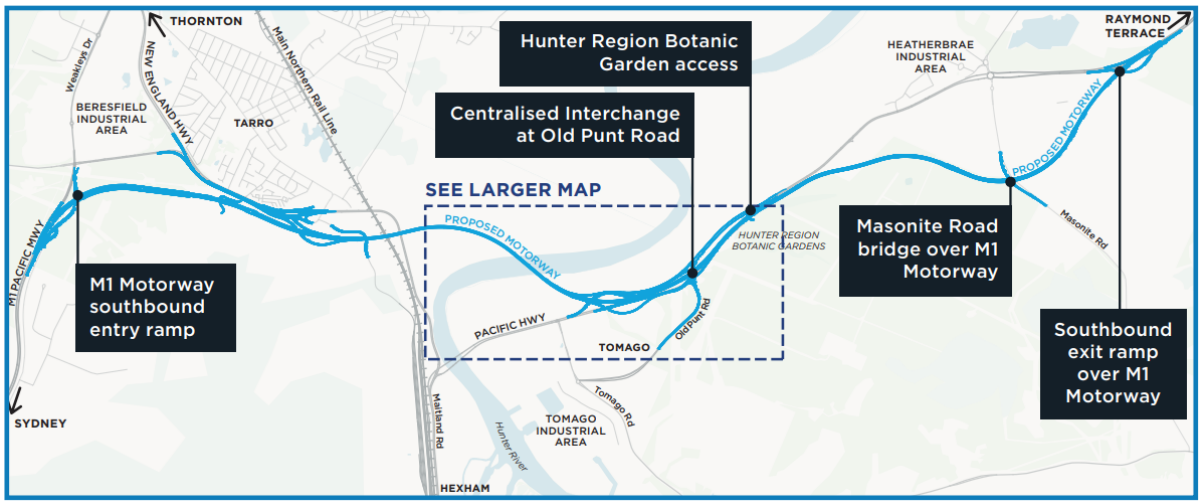


Figure 2-5: Preferred Route Overview of M1 Pacific Motorway extension to Raymond Terrace (Source TfNSW Community Consultation 2017)

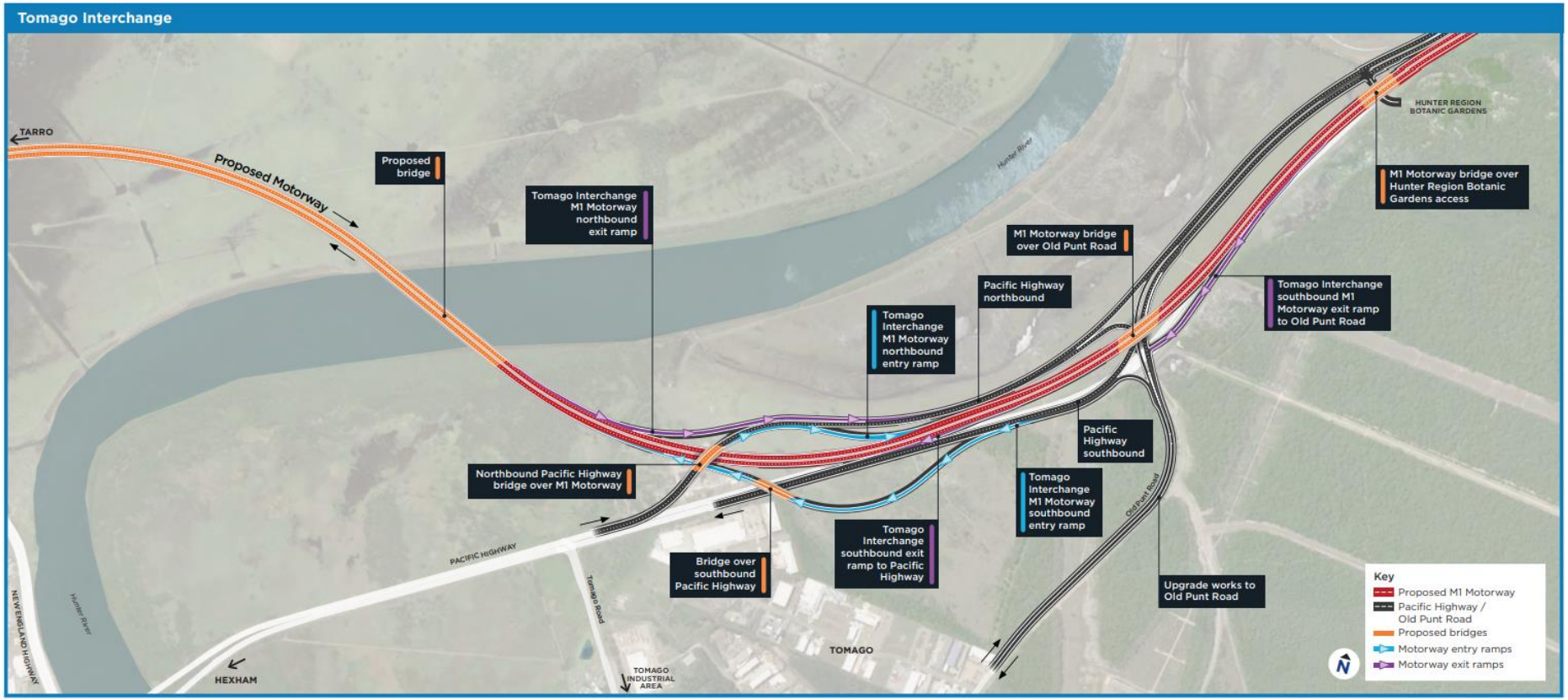


Figure 2-6: Indicative location of Tomago Interchange on M1 Pacific Motorway extension to Raymond Terrace (Source TfNSW Community Consultation October 2020)

2.2.3 Pedestrian and Cycling Facilities

There are no pedestrian facilities within the vicinity of the site reflecting the relative isolated nature of the area. No pedestrian demands were observed during the traffic surveys on site at the intersection of Tomago Road and McIntyre Road.

There are no dedicated cycling facilities or cycling lanes provided along the local roads surrounding the site with cyclists required to travel within the vehicle lanes. Cyclist are able to utilise the shoulder/breakdown lane along the Pacific Highway.

2.3 Traffic Flows

2.3.1 Peak Hour Flows

Seca Solution have previously completed traffic surveys at the roundabout controlled intersection of Tomago Road and Old Punt Road to determine the road operation and traffic volumes. Traffic surveys were undertaken during the morning (6:00am to 8:30am) and afternoon (2:00pm to 5:00pm) on Tuesday 6th February 2018, reflecting typical busy periods for the Tomago Industrial area. From the surveys, the peak hours were determined as 6:00am – 7:00am and 4:00pm – 5:00pm.

A summary of the peak hour flows is shown in Figure 2-7 (AM) and Figure 2-8 (PM). The survey data is provided in **Appendix B.**

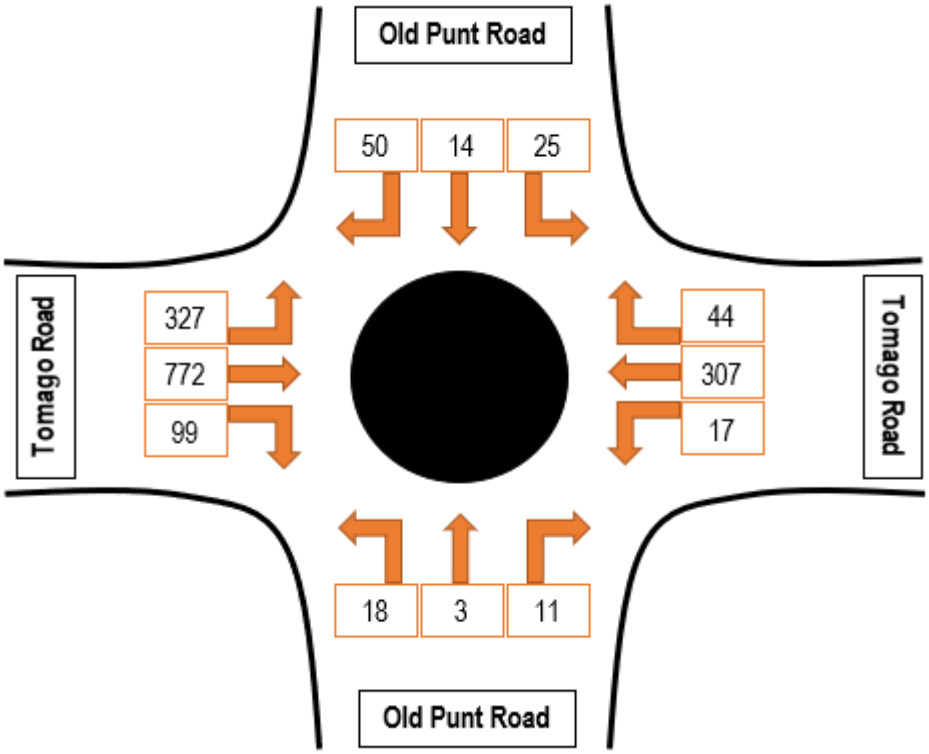


Figure 2-7: AM peak hour flows at Old Punt Road and Tomago Road

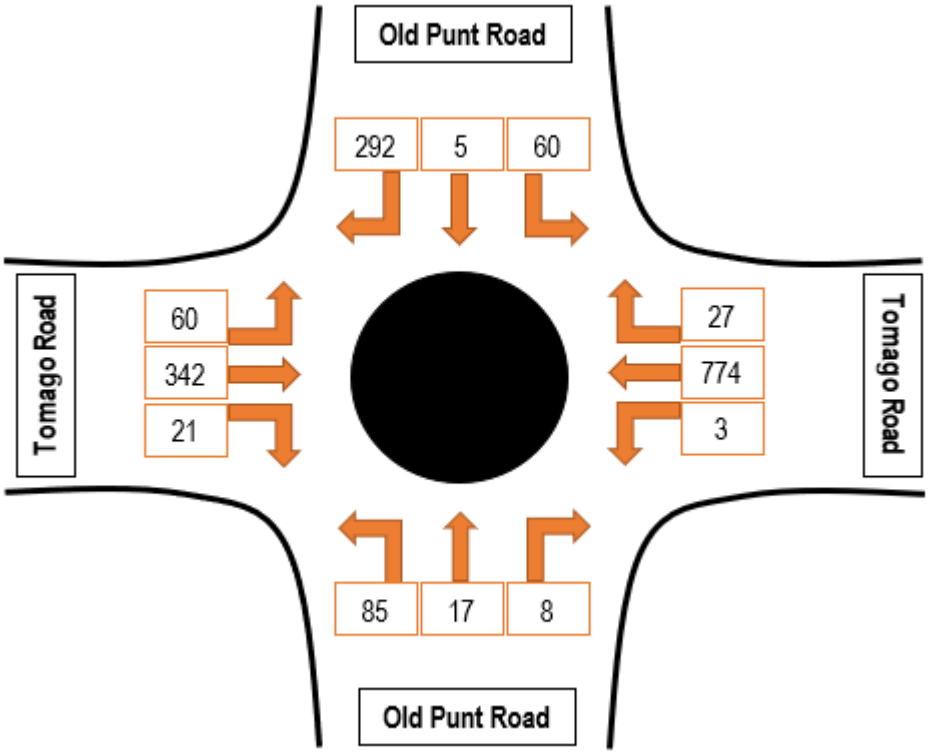


Figure 2-8: PM peak hour flows at Old Punt Road and Tomago Road

A summary of the peak hour traffic flows is provided in Table 2-1.

Table 2-1: Peak Hour Traffic Flows

Location		Peak Flow	
		AM	PM
Tomago Road (West of Old Punt Road)	Eastbound	1,198	433
	Westbound	375	1,151
Old Punt Road (North of Tomago Road)	Northbound	374	104
	Southbound	89	357
Tomago Road (East of Old Punt Road)	Eastbound	808	410
	Westbound	368	804
Old Punt Road (South of Tomago Road)	Northbound	32	110
	Southbound	132	29

It can be determined from Table 2-1 that the peak traffic demands along Tomago Road between Old Punt Road and the Pacific Highway are eastbound in the AM and westbound in the PM, with 1,198 and 1,151 vehicles respectively. The Guide to Traffic Generating Developments provides advice on urban road peak hour flows per direction. For one lane per direction the peak traffic flows (1,198 vehicles) along Tomago Road are classified as Level of Service (LoS) D. This indicates that drivers are restricted in their freedom to select desired speed and to manoeuvre within the traffic stream during this peak traffic flow period.

The peak demands on Old Punt Road are for 374 vehicles northbound in the AM peak and 357 vehicles southbound in the PM peak, indicating a LoS A with the limit for LoS B being 380 vehicles per hour based on RMS guidelines.

Traffic data has also been collected at the intersection of Tomago Road and McIntyre Road. This survey was completed on Monday 6th July 2020. The results of this survey are shown below, with the morning peak being between 7:30 AM and 8:30 PM, based on the survey period between 7:30 and 9:30 AM. For the PM peak, the survey extended between 3:00 and 5:30 PM with the peak hour being 3:30 to 4:30 PM.

Figure 2-9 – AM peak traffic demands, intersection of McIntyre Road and Tomago Road

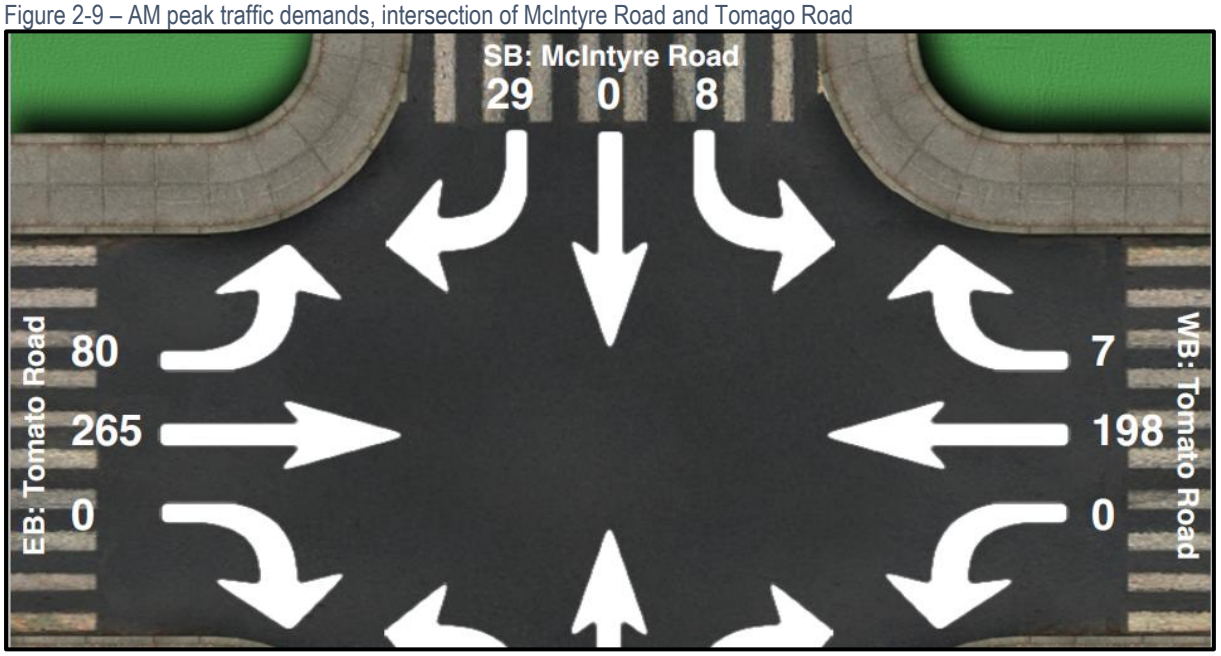
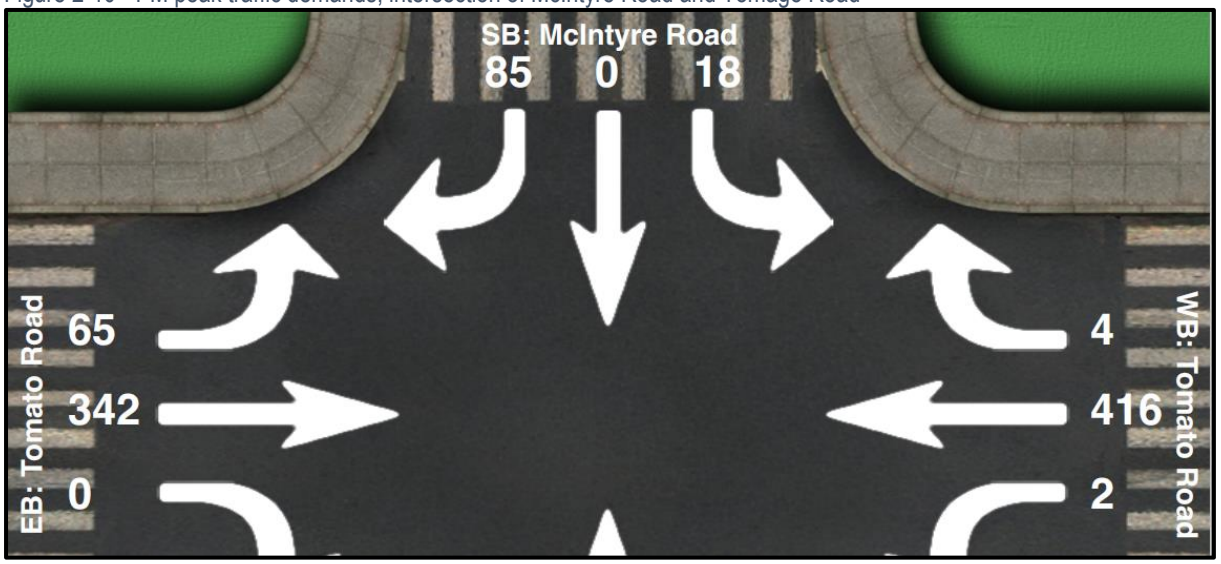
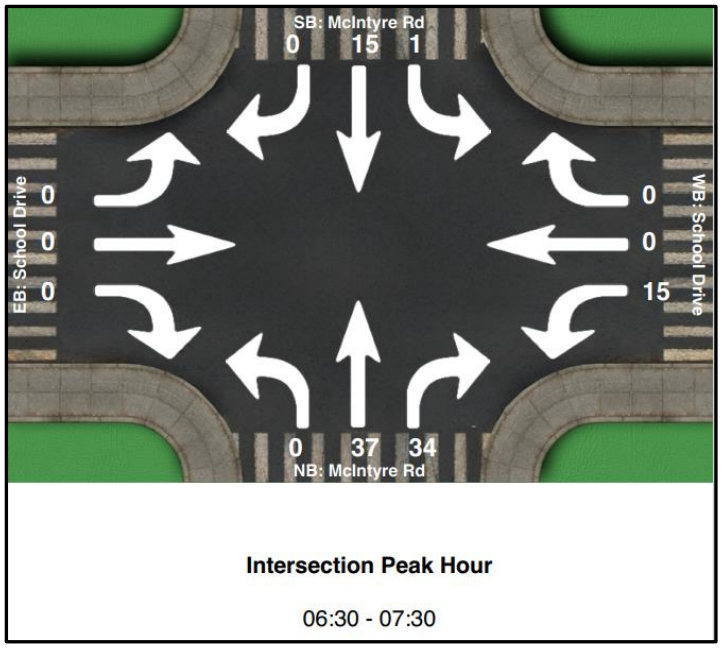
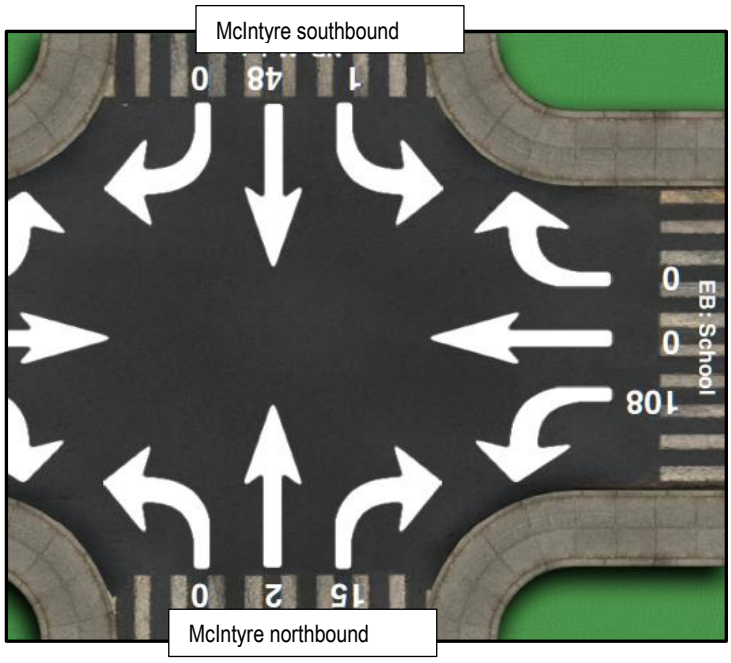


Figure 2-10 - PM peak traffic demands, intersection of McIntyre Road and Tomago Road



Separate traffic surveys have also been completed at the intersection of School Drive at its connection at McIntyre Road and the results are provided below (Thursday 18th March 2021).





2.3.2 Daily Traffic Flows

Peak hour flows typically represent 10% of the daily traffic volumes. Taking the average of the total AM and PM peak hour traffic flows this equates to the following daily traffic volumes:

- Daily flows along Tomago Road (west of Old Punt Road) in the order of 15,800 vehicles per day.
- Daily flows on Tomago Road to the west of McIntyre Road being in the order of 7,500 vehicles per day.

- Daily flows along Old Punt Road (north of Tomago Road) are in the order of 4,600 vehicles per day.

TfNSW sample classifier data is available on Tomago Road, 180 metres north-west of Old Punt Road (Station Id: 05590). Data recorded in 2010 (the most recent data supplied) shows weekday daily flows of 13,401 vehicles evenly distributed in both directions with 12% heavy vehicles. Based on the 2018 daily traffic volumes of 15,780 vehicles obtained from the survey data, there has been a 17.8% increase in traffic flows along Tomago Road in this location between 2010 and 2018 (in the order of 2.2% per annum).

There is also a permanent counter installed on the Pacific Highway, 380 metres south-west of Tomago Road (Station Id: 05001). Data from 2018 indicates weekday daily traffic flows in this location of 52,680 vehicles per day. The weekday daily flows recorded along the Pacific Highway in 2010 were 43,801 vehicles per day, equating to a 20.3% increase in traffic flows between 2010 and 2018 (in the order of 2.5% per annum).

2.3.3 Daily Traffic Flow Distribution

In the morning peak, the dominant movement is to the east along Tomago Road. This would represent employees for the extensive range of developments in the area including through traffic to Williamtown airport and the RAAF base. Traffic flows are tidal with the majority of vehicles observed to travel westbound along Tomago Road in the PM.

Based on the AM and PM survey data, traffic flows along Old Punt Road to the north of Tomago Road also experience a tidal pattern with a northbound bias in the morning peak and a southbound bias in the evening peak.

2.3.4 Vehicle Speeds

No speed surveys were completed as part of the survey work, however, observations completed by Seca Solution staff during the traffic survey indicate that drivers appear to travel close to or just over the posted speed limit on Tomago Road in the general vicinity of the subject site, due to the relatively low traffic demands and good road alignment.

2.3.5 Heavy Vehicle Flows

Based on the traffic survey data at the roundabout controlled intersection of Tomago Road and Old Punt Road, heavy vehicle movements represented just under 12% (195 heavy vehicles) of the total vehicle flows in the AM and around 8% (140 heavy vehicles) in the PM.

Given the industrial development positioned along Tomago Road and Old Punt Road there is a requirement for these roads to provide vehicular access to accommodate a demand for a range of heavy vehicles up to and including B-double combinations.

2.3.6 Current Road Network Operation

Traffic observations were conducted at the two major connections onto the Pacific Highway, being the intersection of the Pacific Highway and Tomago Road and the intersection of the Pacific Highway and Old Punt Road. Observations were also conducted at the intersection of Tomago Road and Old Punt Road. These observations were completed on Tuesday the 30th April 2019 with the following noted:

2.3.6.1 Intersection of the Pacific Highway and Tomago Road

The observations for this intersection confirm that this signal-controlled intersection operates well and manages the delays and queues. The volume of traffic through this intersection during peak periods does see long queues on the southbound approach to the traffic lights.

- The major traffic movement is along the Pacific Highway and the delays and queues for the southbound movement are low outside of the morning and afternoon peak periods. In the peak periods there are long queues southbound created by the high demand for right turning traffic in and out of Tomago Road. As these traffic signals are vehicle actuated the capacity is maximised.

- The traffic signals do not stop the northbound through movement on the Pacific Highway.
- The right turn demand appeared high prior to 6am and associated with the operational hours of a number of industrial users located along Tomago Road. As the traffic demands on the Pacific Highway were lower at this time, the delays and congestion are acceptable.
- A second morning peak occurs at 8 am to 9 am which is most likely associated with general commuter demands.
- During the afternoon peak the queue for the left turn onto the Pacific Highway was observed to extend back to the roundabout intersection with Old Punt Road. This queue clears quickly on the green phase for this movement at the signals so as not to cause congestion.

2.3.6.2 Intersection of the Pacific Highway and Old Punt Road

Observations on site show that this intersection works effectively, with very low delays.

- This intersection is controlled by signals with right turns into and out of Old Punt Road controlled on demand
- Current delays and congestion are very low
- At peak periods generally between 7.00 & 8.00 southbound traffic can queue up to 300 metres. The queue dissipates within one phase of the signals with this only occurring every 3-4 minutes typically in the peak periods. The traffic signals timings at this location are vehicle actuated and the signal timings adjust to reflect the varying traffic demands through this intersection
- The queue for the right turns in and out of Old Punt Road are typically one vehicle only and all vehicles clear the lights in one phase.

2.3.6.3 Intersection of Tomago Road and Old Punt Road

Observations during the morning and afternoon traffic surveys indicate that the roundabout intersection of Tomago Road and Old Punt Road operates with minimal delays or congestion.

- In the evening peak, queueing was observed on Tomago Road to the west of the roundabout, with vehicles temporarily backed up into the roundabout. These queues related to the signalised T-intersection of the Pacific Highway 700 metres to the west. The queue cleared quickly in conjunction with the green phase of the signals.

2.3.6.4 Intersection of Tomago Road and McIntyre Road

Observations on site during the morning and afternoon traffic survey periods shows that this intersection works very well with low delays and no congestion. Traffic exiting the side road can on occasion be delayed but the majority of these vehicles exiting the side road do so with minor delays.

The Sidra Intersection 8, which is a lane based micro-modelling software package recognised by TfNSW for the modelling of single intersections and simple linear networks, was utilised to model the current operation of the intersection of Tomago Road/Old Punt Road. A summary of the results of this assessment are outlined in

Table 2-2, with the Sidra outputs provided in **Appendix C.**

Table 2-2: Sidra Results - Existing Situation 2018 (AM/PM)

Approach	Movement	Level of Service	Average Delay (s)	95% Queue (m)
Tomago Road (West of Old Punt Road)	Left	A / A	4.4 / 5.4	5.1 / 11.8
	Through	A / A	4.7 / 5.6	10.5 / 27.0
	Right	A / A	11.4 / 12.8	10.5 / 27.0
Old Punt Road (North of Tomago Road)	Left	A / A	8.9 / 5.1	8.5 / 11.1
	Through	A / A	8.4 / 5.2	
	Right	B / A	15.0 / 9.4	
Tomago Road (East of Old Punt Road)	Left	A / A	3.4 / 3.7	11.5 / 4.4
	Through	A / A	3.9 / 3.8	31.3 / 8.3
	Right	A / A	10.8 / 11.0	31.3 / 8.6
Old Punt Road (South of Tomago Road)	Left	A / A	5.5 / 7.1	1.2 / 5.5
	Through	A / A	4.9 / 7.2	
	Right	A / A	9.5 / 11.5	

The results indicate that the roundabout intersection currently operates well with very minimal delays and queuing on all approaches during the peak hours, consistent with observations on site. Each approach operates well within its capacity, with individual movements providing an overall level of service A or B.

2.3.6.5 Intersection of McIntyre Road and School Drive

Observations on site during the morning and afternoon traffic survey periods shows that this intersection works very well with low delays and no congestion. Sidra modelling has been completed for this intersection and the results are provided below.

Table 2-3: Sidra results – existing situation 2021 (AM / PM peak)

Approach	Level of service	Average Delay (seconds)	Queue (metres
McIntyre Road (south)	A / A	3.1 / 3.3 (right turn)	1.4 / 0.5
School Drive	A / A	6.0 / 5.7 (left turn)	0.4 / 2.2
McIntyre Road (north)	A / A	5.5 / 5.5 (left turn)	0.0 / 0.0

Note: AM / PM results

The above results confirm the site observations.

2.3.7 Traffic Safety and Accident History

A review of accident data provided by TfNSW indicates that in the period between July 2012 and June 2017, near the intersection of Tomago Road and Old Punt Road, three accidents were recorded. One accident occurred at the intersection relating to a cross-traffic collision between a vehicle travelling westbound in Tomago Road and a southbound vehicle out of Old Punt Road. A second accident related to an overtaking manoeuvre along Old Punt Road 50 metres south of the Tomago Road intersection. The third accident, relating to a rear end collision, occurred on Tomago Road 20 metres to the south-east of the roundabout.

During this 5-year period there were no repeating causes for accidents at this intersection. Given the high volume of traffic and the subsequent low number of accidents recorded, it is evident that this intersection provides a good level of safety for road users.

Over the same 5 year timeframe, a single accident has been recorded at the intersection of Tomago Road and McIntyre Road. Given the straight section of road in this location and associated good visibility, it is considered that this intersection is well laid out and offers a safe control for vehicle movements accordingly.

2.4 Parking Supply and Demand

2.4.1 On-street Parking Provision

There is no formal on-street parking available along School Drive near the site, however, there is an informal verge with sufficient width to allow vehicles to pull over safely along the eastern boundary of this road.

2.4.2 Off-Street Parking Provision

There are no public off-street parking opportunities in the vicinity of the subject site. Parking is provided on-site for a number of industrial developments in the surrounding area.

2.4.3 Parking Demand and Utilisation

There was limited demand observed for parking along School Drive during the survey work.

2.4.4 Short term Set down or pick up areas

There are no set down or pick up areas in the vicinity of the site.

2.5 Public Transport

2.5.1 Rail Station Locations

The site is not serviced by rail, with the nearest railway station in Hexham some 6 km to the west of the subject site.

2.5.2 Bus Service Frequencies

Hunter Valley Buses operate one service (route 140) from Raymond Terrace to Newcastle. This route provides connection along Tomago Road/Old Punt Road with limited services from Monday to Friday during the periods below.

- Services every 30 minutes on average in the AM between 6:28am to 9:44am from Newcastle to Raymond Terrace.
- Services every 30 minutes on average in the PM between 3:24pm – 6:30pm from Raymond Terrace to Newcastle.

These bus routes are 4.5 kms from the site and not considered attractive for workers on the site.

2.5.3 Bus Routes and Associated Facilities

There are bus stops either side of the Pacific Highway to the east of the intersection with Tomago Road. Both of these provide seating and shelter.

There are informal bus stops along Old Punt Road located to the south of Kennington Drive. There are bus stops located on Tomago Road 400 metres to the west of the roundabout intersection with Old Punt Road, near the Tomago Village Van Park. The eastbound stop provides seating and shelter, whilst there are no facilities provided for the westbound stop.

2.6 Other Proposed Developments

A review of the Port Stephens Council DA tracker has determined the following significant development applications have been recently approved or are currently under assessment in the locality:

- DA (16-2019-181) for an Industrial warehouse, workshop, ancillary office and associated works including car parking and landscaping at 15 Old Punt Rd, Tomago.
- DA (16-2018-817-1) Heavy industry - Galvanizing plant (use of existing warehouse) capable of processing up to 50,000 tonnes of steel per annum, 13A Old Punt Rd, Tomago 2322 NSW
- DA (16-2018-752-1) Depot – construction of Industrial building and associated office, car parking, landscaping and site works at 9 Kennington Dr, Tomago.
- DA (16-2016-794-3) – S4.55 modification to caravan park at 1824 Pacific Hwy, Tomago 2322 NSW
- AGL are developing a new power station off Old Punt Road, which will have a large impact during construction but a minor impact once operational.

As discussed in Section 2.3.2 the M1 extension to Raymond Terrace is to include a Tomago Interchange that will incorporate new road links in the surrounding area, including improved access to the subject site from all the major centres.

3. Proposed Development

3.1 The Development

The proposed development involves the development of a Resource Recovery Facility and Truck parking depot. Remondis Australia Pty Ltd propose to relocate their existing truck depot and resource recovery facility at Thornton to the site located at 21D and 21F School Drive, Tomago. A small part of Lot 301 / DP634536 to the north of 21D School Drive is also included in the proposal, which will enable heavy vehicle access into the northern side of Building 2.

Remondis Australia Pty Ltd is seeking approval for the receipt and processing of up to 98,200 tonnes of solid and liquid waste materials per annum. Waste material includes dry non-putrescible waste materials from domestic sources, commercial and industrial sources. It will also receive within this total a small amount of putrescible waste materials from the de-packing of food, such as drinks and packaged food items. The facility will also receive and recycle liquid wastes such as drill muds from hydro-excavation and oily wastes from mining and industrial activities across the region.

The recycling operations will be established within existing buildings on 21D School Drive, Tomago, which were approved under Major Project MP 10_003. Each recycling operation will be established in discreet parts of the existing industrial warehousing and collectively, the Tomago Resource Recovery Facility will provide a wide range of recycling services through:

- Materials Recovery Facility for sorting and processing commercial and industrial mixed general solid waste (non-putrescible) and construction building waste from residential and commercial construction;
- A cardboard baling facility for source separated carboard collection from businesses
- A drill mud recycling facility for drill muds
- A packaging food recycling plant, which will accept packaged foods and drinks, separating the food contents and packaging for recycling
- A garden organics primary processing plant, which will receive, decontaminate and shred woody garden organics for off-site composting
- A hazardous waste recycling facility for sorting and aggregating a range of spent solid materials and liquids containing oils and chemicals
- A copper processing area, and
- A metals recycling facility

A truck parking depot will be established on the adjacent vacant lot 21F School Drive.

The following drivers' facilities will be provided on site:

- Separate male driver facilities in Building 1 including:
  - Male toilets x 3
  - Male showers x 3
  - Lockers
- Separate female driver facilities in Building 1 including:
  - Female toilets x 1
  - Female showers x 2
  - Lockers
- Accessible bathroom amenities:
  - Accessible toilet
  - Accessible shower
- Shared driver facilities:
  - First aid room
  - Meeting room
  - Lunch room

3.1.1 Phasing and Timing

The project will be developed in a single phase.

The project will primarily utilise the existing buildings on the site and hence the extent of construction work will be minimal.

3.1.2 Working Hours

The facility will be open 24 hours a day and 7 days a week, to allow for vehicles associated with out of hours waste pick up. Waste processing and product transfer off site shall operate between 6AM and 10 PM.

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3.1.3 Design vehicles for access and circulation requirements

Port Stephens Council requires all vehicles to enter and exit the site in a forward direction. The on-site traffic management plan will cater for this requirement. Truck sizes will vary with the typical refuse truck being a 12.5 metres rigid and larger trucks for specialist material and removal of product being 19 m semi-trailers. A fuel truck will also access the site which will be a 19 metre semi-trailer.

3.2 Access

3.2.1 Access Location

Access to the development is proposed off School Drive via the existing gated access.

3.2.2 Sight Distance

The site access is via the existing access road at the northern end of School Drive and provides a good safe access with good visibility for vehicles entering and exiting the site.

The key intersection impacted upon by the project is the intersection of Tomago Road and McIntyre Road. This is a simple T intersection on Tomago Road with Tomago Road being the priority intersection. Tomago Road in this location provides a straight alignment to maximise sight lines and road safety. The speed limit in this location is 80 km/h. Under Austroads Guidelines, the sight distance requirement is 181 metres desirable and 170 metres minimum. The sight lines have been assessed on site and exceed 200 metres in both directions.

Photo 1 – View to left for driver exiting McIntyre Road onto Tomago Road.

Photo 2 - View to right for driver exiting McIntyre Road onto Tomago Road

The other key intersections along the route between the site and the Pacific Highway, are all well laid out and provide good visibility for road users. The roundabout of Tomago Road and Old Punt Road has good visibility on all approaches with straight alignments on all approaches. The traffic signal-controlled intersection of Tomago Road and the Pacific Highway is also well laid out with good forward visibility to allow drivers to observe this intersection and adjust their vehicle speed as appropriate.

3.2.3 Service Vehicle Access

The design of the internal access road would allow appropriate circulation for service vehicles, which will typically be similar in size or smaller than the vehicles that will be operating. All service vehicles will be able to enter and exit the site in a forward direction.

Specialist machinery will be used on site for moving waste, with this equipment being based on site permanently and not needing to be removed. These vehicles will be service on site as required.

3.2.4 Queuing at entrances

No vehicle queues are anticipated at the new access road for the project when operational, with no potential hold point along the access road for at least 120 metres, allowing free flow into the site.

3.2.5 Access to Public Transport

Only a small number of bus services operate through the locality. This reflects the minimal local demand for these services. There are no formal pedestrian pathways and pedestrians are able to walk along the road verge and reserve where required. It is considered that there will be no demands for access to the site from public transport.

3.3 Circulation

3.3.1 Pattern of circulation

The internal driveways and layout allow for appropriate circulation for the specific end user and in accordance with the requirements of Port Stephens Council DCP and AS2890. Refer to **Appendix D** for Autoturn simulation demonstrating access to all bays within the buildings.

3.3.2 Internal Road width

The width of the parking aisles and internal roads allows for 2-way vehicles movements in accordance with AS2890.

3.3.3 Internal Bus Movements

No internal bus movements are anticipated for the project.

3.3.4 Service Area Layout

Truck loading/unloading facilities are incorporated as part of the design for the various recycling elements of the project.

3.4 Parking

3.4.1 Proposed Supply

The project shall utilise the existing parking supply on site, with 66 parking spaces provided on site for staff parking demands. There is also a space for 9 rigid trucks to be parked adjacent to the detention basin with the remaining parking for trucks provided on the existing vacant land to the immediate south of the existing buildings. This will provide parking for 24 rigid trucks and 9 semi-trailers for overnight parking demands associated with the project needs. One of the existing buildings will also be used for parking 6 rigid trucks overnight.

3.4.2 Council code and local parking policies and plans

Port Stephens Council DCP does not specify a parking rate for this type of land use.

Industrial uses would typically allow 1 parking space per employee with sufficient parking to cater for shift changeover and the operational requirements of the facility. The parking provision on site will meet this requirement to allow for all staff vehicles to be parked on site.

The site staff numbers are provided below, for the daytime and night-time.

Day shift: 4am – 5pm-

- Drivers- 36;
- MRF Operators- 4;
- Office Staff- 12;
- Sales- 4 (mobile). These staff are not located site for the majority of the day and as such do not require on-site parking.
- Operations Staff- 3 (mobile);
- Mine Site Reps- 4 (mobile);

Evening shift: 5pm to 10pm

- 7 Mechanics

Night shift: 10pm to 7am

- Up to 6 depending on workload

Based on the above, the peak on-site staff number is 63 requiring 63 parking spaces. This includes the sales staff who are not on site for the majority of the day.

The on-site parking provision is 66 which shall accommodate this peak parking demand.

The project shall provide a dedicated parking area for trucks associated with the project. All trucks shall be parked up overnight on site with a site-specific management plan to control the movement of these trucks. The parking area allows for the parking of all trucks for the site and access has been assessed with Autoturn to confirm that the layout can accommodate these trucks. Refer to **Appendix D** for the Autoturn simulation.

3.4.3 Pedestrian and Bicycle Facilities

Given the locality of the site and the type of development, it is considered there is no requirement for pedestrian or bicycle facilities. Any pedestrian and cyclist movements would be catered for per the existing situation using the surrounding roads and road reserve, with very low demands expected within the immediate area.

4. Transportation Analysis

4.1 Traffic Generation

Traffic generation has been determined from first principles in conjunction with advice from the study team on the anticipated demands for the development, based upon operational characteristics of similar sites operated by Remondis. This assessment has allowed for traffic associated with the construction and operational phases of the development.

4.1.1 Construction Traffic

The project will require minimal construction work as the existing buildings on the site shall be used for the resource management centre operations. Some work will be required to accommodate the specific needs of the project, including the installation of a diesel fuel tank, weigh bridge and other assorted construction specific to the end user.

It is considered that these works on site are minor and that there would be less than 20 people involved in the construction work, with associated low traffic generation.

4.1.2 Operational Traffic

Once operational, the development would generate daily traffic associated with staff movements, as well as heavy vehicles associated with the regular inbound waste and outbound waste removal, after sorting on site. Other servicing would be minimal with general waste collection and some vehicle maintenance on site as required.

4.1.2.1 Staff Movements

The operational stage may have up to 63 staff at any time including management, administration and maintenance personnel on rotating shifts. Minimal visitors are expected, and with no general public access permitted there are no other traffic demands. The facility will be open 24 hours a day and 7 days week, with the core staff located on site during normal working hours 7 days a week.

4.1.2.2 Heavy vehicle movements

Heavy vehicles will include inbound waste product via trucks together with sorted outbound material. The inbound material is carried in a mixture of 12.5 metre rigid trucks, 19 metre semi-trailers and truck and dog combinations.

Outbound material is removed via a mixture of 19 metre tankers and semi-trailers.

A summary of the predicted heavy vehicle numbers is provided below. The table shows that there will be 174 inbound and 174 outbound truck movements per day generated by the project.

Collection vehicle type - in-bound waste collection vehicles	Numbers of vehicles to be parked on-site			Number of vehicle movements per day (1)
	12.5m Heavy Rigid Truck	19m Semi-Trailer	dog trailer	
Front lift trucks	10			30
Hook lift trucks (3 with dog trailers which if connected become 19m)	11		3	60
Rear lift trucks	3			9
Tanker trucks (1 x tanker dog/trailer to be connected to 1 HRV	4	6	1	20
SuperVac trucks (includes transfer of liquids offsite) (5)	3			9
Walking floor trucks		1		6
Tautliner trucks (includes hazardous waste transfers off-site) (4)	1			2
Hiab trucks	2			4
Merrell trucks	2			10
Workshop truck	1			10 (upto 5 outbound and 5 inbound per day depending upon requirements on the day. Operates between 5 AM and 6PM only)
TOTAL	**37**	**7**	**4**	**160**
Collection vehicle type - out-bound vehicles transporting product and waste off site				
Cardboard bale trucks - semi-trailers (2)		n/a		10
Food from depackaging plant and Garden Organics				4
TOTAL				**14**
Total vehicle movements per typical day				**174**

1) Vehicle movements represent number of vehicles each requiring one inbound and one outbound trip

Table 4-1 – Predicted truck numbers associated with the project site

4.1.3 Daily and Seasonal Factors

There is limited daily and season factor expected to impact upon the operation of the site.

4.1.4 Pedestrian Movements

It is considered that the proposed development would not generate additional pedestrian demands. This is consistent with the isolated nature of the area and limited public transport.

4.2 Traffic Distribution and Assignment

The distribution of operational related traffic on the external road network has been assessed as this allows for the critical impact of the development on the road network to be understood, with the impact of the construction traffic to be significantly less by comparison.

4.2.1 Origin / Destinations Assignment

Based on the location of the site and the market for inbound product, the following splits are allowed for vehicle movements:

- 10% will have a destination east towards Williamtown and Nelson Bay
- 20% will access the Pacific Highway and head north
- 30% will access the Pacific Highway, connect to the New England Highway and head towards Maitland and beyond
- 40% will access the Pacific Highway to connect to Greater Newcastle

4.3 Impact on Road Safety

It is considered that the additional traffic volumes associated with the project would have an acceptable impact on traffic safety in the locality, which accommodates high traffic demands during the peak periods as well as currently carrying heavy vehicles associated with industrial use in this location.

It is also noted that the former use on the site was for industrial use, which included heavy vehicle movements in and out of the site.

The majority of traffic would have an origin/destination along the Pacific Highway with all traffic accessing Tomago Road via the existing intersection of Tomago Road and McIntyre Road. This intersection allows for all turning movements and the historic accident data shows that there has been one minor accident near this intersection. The intersection is located on a straight section of road, offering good visibility for all drivers approaching this intersection. Whilst there is no sheltered right turn, the existing traffic demands for this right turn are very low (7 in the AM peak and 4 in the PM peak from the surveys completed by Seca Solution) there is a sealed shoulder that allows for through traffic movements. The project will have 90% of the traffic movements being a left turn into McIntyre Road and 90% right turn out, providing a minor increase only in this right turn demand.

The other intersections impacted upon by the project is the roundabout controlled intersection of Tomago Road and Old Punt Road together with the signal controlled intersection of Tomago Road and the Pacific Highway. Both of these intersections are well laid out and provide a safe and acceptable layout for road users.

It can be seen that when the M1 to Raymond Terrace road upgrade is provided, the access route can alter to allow for the new link road, as well as allow for ongoing use of the traffic signals on Old Punt Road/Pacific Highway and Tomago Road/Pacific Highway. This road upgrade is being designed in accordance with Austroads Guidelines with the design to accommodate heavy vehicle movements associated with the existing industrial users along Tomago Road. It is therefore considered that this road upgrade will provide a safe and appropriate access for heavy vehicles.

4.4 Impact of Generated Traffic

4.4.1 Impact on Daily Traffic Flows

The additional daily traffic that would be generated during the peak construction phase of the development is considered to be low, at less than 100 vehicles per day. This would be similar or less than the previous use on the site and will have an acceptable impact upon the local road network.

For the operational stage of the project, the predicted vehicle movements are:

- Staff movements based on 60 staff would be 60 inbound and 60 outbound per day
- Inbound waste transport 160 outbound and 160 outbound per day
- Outbound sorted waste transport 14 inbound and 14 outbound per day

This would give a total of 234 vehicles inbound and 234 vehicles outbound (60 light and 174 heavy each way).

The current traffic flows along Tomago Road to the immediate west of McIntyre Road are 7,500 vehicles per day, indicating that with the development traffic this would increase by around 6% over the existing volumes. These flows are spread out over a number of hours, with limited cross over of inbound and outbound movements.

Traffic associated with the project can then disperse over 2 alternative routes to access the Pacific Highway beyond Tomago:

- North via Old Punt Road to connect to the Pacific Highway north towards Raymond Terrace and beyond
- Via the existing traffic signal controlled intersection of Tomago Road and the Pacific Highway to head towards Newcastle

Overall, the operational traffic would have a minimal impact on daily traffic flows. It is noted that the M12RT project would see traffic volumes along the Pacific Highway decrease significantly, thereby having a positive impact upon traffic flows in this locality.

4.4.2 Peak Hour Impacts on Intersections

As discussed previously the key intersections of the Pacific Highway / Old Punt Road and the Pacific Highway / Tomago Road are controlled by traffic signals, which offer the highest level of road safety and control for drivers. In the future, the M12RT project would see significant improvements in the operational efficiency of these intersections having removed significant through traffic.

The predicted hourly traffic flows associated with the project is shown below.

Collection vehicle type - in-bound waste collection vehicles	Approx time of departure from depot	Approx time return to depot
Front lift trucks (30 trucks)	2:00 (10%); 4:00 to 5:00 (90%)	14:00 to 15:00 (10%); 15:00 to 17:00 (90%)
Hook lift trucks (3 with dog trailers which if connected become 19m) (60 trucks)	5:00-6:00	16:00-18:00
Rear lift trucks (9 trucks)	2:00 (33%); 4:00 to 6:00 (67%)	14:00 (33%); 16:00 to 18:00 (67%)
Tanker trucks (1 x tanker dog/trailer to be connected to 1 HRV (20 trucks)	5:00 to 6:00	16:00 to 18:00
SuperVac trucks (includes transfer of liquids offsite) (9 trucks)	5:00 to 7:00	16:00 to 18:00
Walking floor trucks (6 trucks)	6:00	18:00
Tautliner trucks (includes hazardous waste transfers off-site) (2 trucks)	5:00	18:00
Hiab trucks (4 trucks)	6:00	17:00
Merrell trucks (10 trucks)	5:00 to 6:00	16:00 to 18:00
Workshop truck (1 truck)	5:00	18:00
TOTAL		
Collection vehicle type - out-bound vehicles transporting product and waste off site	**Approx. arrival times during day**	
Cardboard bale trucks - semi-trailers (10 trucks)	6:00 to 6:00	
Food from depackaging plant and Garden Organics (4 trucks)	8:00 to 5:00	

Note – the truck numbers above are for one-way movements only, with an equivalent number of trucks then being inbound later in the day.

From the above, it can be seen that nearly all of the trucks leave the site between 4 and 6 AM, when the background traffic flows are relatively low along Tomago Road as well as the arterial road network. Less than 10 trucks are expected to leave the site between 6 and 7 AM. For the returning trucks, the peak period is between 3 to 6 PM.

Seca Solution have previously completed traffic surveys at the intersection of the Pacific Highway / Old Punt Road on 20th February 2020, during the morning (6-9am) and afternoon (3-5pm). The AM peak hour was determined as 7:30-8:30am, whilst the PM peak was determined as 3:15-4:15pm.

This intersection was modelled using Sidra for the existing situation and the results of this assessment are provided below.

Table 4-2 outlines the Sidra results for the existing traffic flows recorded at the intersection of the Pacific Highway and Old Punt Road.

Table 4-2 – SIDRA results Pacific Highway and Old Punt Road 2020 - AM/PM peak

Approach	Movement	LoS	Degree of Saturation	Average Delay (seconds)	95% Back of Queue (metres)
Pacific Highway (northbound)	Right turn	E / D	0.438 / 0.149	67.8 / 43.8	18.8 / 6.2
Old Punt Road	Left turn	A / A	0.022 / 0.015	6.5 / 5.7	0 / 0
	Right turn	E / C	0.476 / 0.650	66.1 / 39.7	20.5 / 38.8
Pacific Highway (southbound)	Left turn	A / A	0.055 / 0.028	8.8 / 9.8	5.4 / 2.4
	Through	A / A	0.489 / 0.653	6.7 / 12.8	110.6 / 117.7
All Vehicles		A / B	0.489 / 0.653	9.5 / 15.5	110.6 / 117.7

Per the Sidra results above, the signalised intersection of the Pacific Highway and Old Punt Road is currently operating at overall LoS A in the AM peak and LoS B in the PM peak.

The operation of this intersection sees the majority of green time given to the southbound movements on the Pacific Highway, given this leg sees the highest demands. The survey data indicates a range of cycle times across the AM in the order of 55 seconds to almost 5 minutes, with the phase allowing for the right turn onto Old Punt Road and the separate phase allowing for the right turn out being vehicle actuated and only occurring when there is demand for these. Cycle times also vary in the PM, however the higher demands on the side road see the phases allowing turn movements to occur more frequently.

As outlined above, the cycle time varies depending on the demands at this intersection. For the purpose of this modelling, the cycle time was determined via the 'Optimum Cycle Time' function in Sidra, with a minimum of 60 seconds and a maximum of 150 seconds applied. The modelling determined a 110 second cycle time for the AM existing scenario, with the PM modelling applying a 70 second cycle time.

It can be seen that the delays on Old Punt Road can be relatively high, due to the bias in the operation of these traffic signals. However, the queues provided by Sidra reflect the queues observed on site, with the low flows providing a of less than 40 metres. It is considered that the minor increase in trucks exiting this intersection to head north on the Pacific Highway associated with the project shall have a minor and acceptable impact upon the overall operation of this intersection.

For the signal controlled intersection of Tomago Road and the Pacific Highway, observations on site show that there is a high right turn demand into Tomago Road in the morning period, associated with inbound staff movements to the various industrial sites in the Tomago area. At this time, the left turn out of Tomago is low and the trucks associated with the project would be able to turn out at the same time as this heavy right turn into Tomago Road and have no impact upon the operation of this intersection in the morning period.

Similarly, in the afternoon period, there is a heavy left turn demand out of Tomago Road associated with the staff movements leaving the Tomago area in the afternoon. The traffic signals stop the southbound movements on the Pacific Highway to allow for this heavy left turn demand as well as permit the right turn into Tomago Road at the same time. The increased demands associated with the project site on this right turn movement in the PM peak is relatively low and shall not impact upon the overall operation of this intersection.

Of greater note, the proposed upgrade of the Pacific Highway at this location allows for the removal of the majority of through traffic movements at this location, which will significantly increase the capacity at these traffic signals. Recent community consultation indicates that this project could commence in 3 years time. Until this upgrade is completed, it is considered that the additional truck movements associated with this project shall have a minor and acceptable impact upon the overall operation of this signal controlled intersection.

4.4.2.1 *Sidra modelling – McIntyre Road and Tomago Road*

Sidra modelling has been completed for the T intersection of McIntyre Road and Tomago Road to assess its capacity to support the increased traffic demands associated with the proposed development. Three scenarios were considered in the modelling:

- Existing situation
- Allowing for the additional traffic associated with the proposed operations
- Future design year allowing for 2.5% annual growth along Tomago Road over 10 years.

Table 4-3 – Existing 2020 operation, McIntyre Road and Tomago Road (AM / PM results)

Approach	Level of service	Delay (seconds)	Queue (metres)
Tomago Road (east)	A / A (through movements) A / A (right turn)	0.1 / 0.1 7.9 / 12.1	0.7 / 0.9 0.7 / 0.9
McIntyre Road	A / A (left turn) B / B (right turn)	8.6 / 9.3 15.1 / 20.2	3.8 / 10.5 3.8 / 10.5
Tomago Road (west)	A / A (left turn) A / A (through movements)	5.6 / 5.7 0.0 / 0.0	0.0 / 0.0 0.0 / 0.0

NOTE : AM / PM results

The above results confirm the observations on site, with minor delays for all road users. Note that whilst there is no dedicated right turn lane for vehicles turning into McIntyre Road, drivers westbound on Tomago Road slow and pass any vehicle propped waiting to turn right into McIntyre Road and accordingly experience a minor delay only associated with slowing down.

Table 4-4 – Base flows 2030 McIntyre Road and Tomago Road (AM / PM results)

Approach	Level of service	Delay (seconds)	Queue (metres)
Tomago Road (east)	A / A (through movements) A / B (right turn)	0.2 / 0.3 8.6 / 15.7	1.1 / 1.9 1.1 / 1.9
McIntyre Road	A / B (left turn) B / C (right turn)	9.4 / 19.2 20.0 / 38.6	6.2 / 23.5 6.2 / 23.5
Tomago Road (west)	A / A (left turn) A / A (through movements)	5.7 / 5.7 0.0 / 0.0	0.0 / 0.0 0.0 / 0.0

NOTE : AM / PM results

The above results of the modelling for the future design year allowing for 2.5% annual growth for all traffic movements and demonstrate that the intersection will continue to operate to a satisfactory standard.

The predicted traffic flows for the project show that the vast majority of the trucks have left the site by 7 AM and as such do not impact on the operation of this intersection. In the afternoon peak, there will however be some trucks returning to the site, with these being a left turn into the site only. There would also be some staff leaving at this time. In the PM peak there is the potential for 58 trucks to be returning to the site – for the AM peak, to ensure a robust assessment, a value of 30 trucks has been assumed to be leaving the site (50% of the PM) to ensure the right turn out of McIntyre Road can operate satisfactorily. In the AM, there will be no staff movements whilst in the PM peak it has been assumed that 30 staff could be leaving the site.

Figure 4-1 – Assumed traffic generation at Tomago Road / McIntyre Road (AM/PM)

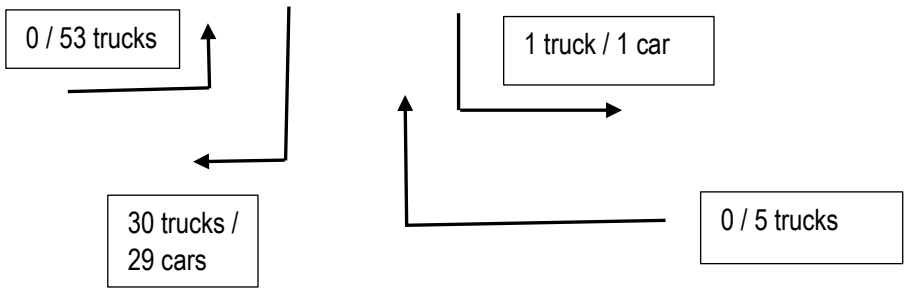


Table 4-5 – Sidra results, 2020 McIntyre Road / Tomago Road with development traffic (AM / PM results)

Approach	Level of service	Delay (seconds)	Queue (metres)
Tomago Road (east)	A / A (through movements) A / B (right turn)	0.1 / 0.5 7.9 / 14.8	0.7 / 3.0 0.7 / 3.0
McIntyre Road	A / A (left turn) B / B (right turn)	9.5 / 11.4 19.6 / 24.0	11.1 / 15.9 11.1 / 15.9
Tomago Road (west)	A / A (left turn) A / A (through movements)	5.6 / 6.1 0.0 / 0.0	0.0 / 0.0 0.0 / 0.0

NOTE : AM / PM results

Table 4-6 - Sidra results, 2030 McIntyre Road / Tomago Road with development traffic (AM / PM results)

Approach	Level of service	Delay (seconds)	Queue (metres)
Tomago Road (east)	A / A (through movements) A / B (right turn)	0.2 / 0.3 8.6 / 15.7	1.1 / 1.9 1.1 / 1.9
McIntyre Road	A / C (left turn) C / E (right turn)	13.0 / 19.2 28.6 / 38.6	17.9 / 23.5 17.9 / 23.5
Tomago Road (west)	A / A (left turn) A / A (through movements)	5.7 / 5.7 0.0 / 0.0	0.0 / 0.0 0.0 / 0.0

NOTE : AM / PM results

The above results show that for the current design year of 2020 the intersection will perform well with minor increases in delays, mainly for the traffic turning right out of McIntyre Road in the PM peak. For the future design of 2030, the Sidra modelling shows a potential issue for the right turn out of McIntyre Road in the PM peak. However, there has been no adjustment for the gap acceptance for this right turn out from the default of 7 seconds. Adjusting this gap acceptance to 6 seconds, which is a valid assumption, the level of service for this right turn out improves to B.

From this modelling, it is considered that the existing controls at this intersection will continue to allow for safe access to the site and the overall operation of this intersection will remain good. Whilst the background growth on Tomago Road may increase delays over the next 10 years, driver behaviour at this location will allow for safe turning movements and acceptable delays and queues. The Sidra modelling indicates the queues on McIntyre Road in 2030 may be in the order of 23.5m. School Drive is some 26m back from the hold line on McIntyre Road and as such these queues will not impact vehicles wishing to turn right into School Drive in the afternoon peak period.

The intersection of McIntyre Road and School Drive has also been modelled for the current traffic flows and shows that the current delays and queues are minor. It is currently operating at a level of service of A for all approaches in the AM and PM peak periods. An issue that has been raised by Transport for NSW is the potential impact of the additional traffic and the potential for the right turn into School Drive to become increased and block back to the intersection of McIntyre Road and Tomago Road. The Sidra modelling shows that this right turn queue is currently

1.4 metres in the AM peak and 0.5 in the PM peak. The Sidra has been modelled using the values above in Figure 4-1 and the results are provided below.

Table 4-7 - Sidra results, 2020 McIntyre Road / School Drive with development traffic (AM / PM results)

Approach	Level of service	Average Delay (seconds)	Queue (metres
McIntyre Road (south)	A / A	3.1 / 3.3 (right turn)	1.4 / 3.8
School Drive	A / A	6.5 / 5.7 (left turn)	2.0 / 2.9
McIntyre Road (north)	A / A	5.5 / 5.5 (left turn)	0.0 / 0.0

Note: AM / PM results

The above results show that the intersection of McIntyre Road and School Drive will continue to operate well with minor delays and queues. The right turn queue into School Drive is predicted to be upto 3.8 metres in the PM peak and the distance between this intersection and Tomago Road is 25 metres, which can cater for a truck and dog combination to be propped waiting to turn here.

A review of the traffic data shows that the traffic using School Drive is slightly higher than the traffic on McIntyre Road to the north of this side road. It is considered that the priority of this intersection could be reviewed with Council (as the road authority) to alter the priority to allow traffic entering School Drive to have priority over the southbound movement on McIntyre Road. However, based on the Sidra modelling this is not required due the traffic demands associated with the project site.

The other key intersection potentially impacted upon is the roundabout controlled intersection of Tomago Road and Old Punt Road. This intersection has been modelled with Sidra for the current 2018 flows as well as the future design year of 2028 allowing for 2.5% growth per annum on all traffic movements. The results for the future design year are shown below (Table 7) and demonstrate that the roundabout will continue to operate well. It is therefore considered that the additional traffic demands associated with the project shall have a minor impact upon the overall operation of this roundabout.

It is noted that the road network in this location will also alter with the construction of the M1 to Raymond Terrace road upgrade, with a new link road provided that will allow for traffic from the subject site to bypass this roundabout when heading north or towards Maitland.

Table 4-8 : Sidra Results - 2028 design year with 25% growth along Tomago Road (AM)

Approach	Movement	Level of Service	Average Delay (s)	95% Queue (m)
Tomago Road (West of Old Punt Road)	Left	A	4.5	7.2
	Through	A	4.9	14.9
	Right	A	11.4	14.9
Old Punt Road (North of Tomago Road)	Left	A	17.9	22.3
	Through	A	17.0	
	Right	B	24.7	
Tomago Road (East of Old Punt Road)	Left	A	3.8	17.9
	Through	A	4.3	57.6
	Right	A	11.3	57.6
Old Punt Road (South of Tomago Road)	Left	A	5.9	1.5
	Through	A	5.3	
	Right	A	9.8	

Overall, the intersection of Tomago Road and Old Punt Road provides sufficient spare capacity to support the proposed development.

4.4.3 Background traffic and other developments

As discussed previously, the proposed extension of the M1 to Raymond Terrace by TfNSW would see significant changes to the flow of traffic in the Tomago area, with a Tomago Interchange included as part of the preferred option. Traffic flows along the Pacific Highway would decrease as a result of this project, which would see improvements and additional capacity in the operation of the signalised intersections at both Old Punt Road and Tomago Road. This would provide capacity for the ongoing growth in traffic over time through this area.

Whilst there is on-going funding for this project, there is no timeframe for the construction of these works to commence.

4.4.4 Impact of Construction Traffic

The construction traffic associated with the project will be low and as such will have a minor impact upon the operation of the local road network.

All construction work would be contained within the site with parking associated with construction staff to be managed within the site, given the large site area. The site will require the movement of heavy vehicles in and out of the site which would need to be safely managed.

4.5 Public Transport

4.5.1 Options for improving services

It is considered that the development would not require the provision of any upgrade of public transport.

4.5.2 Pedestrian Access to Bus Stops

No upgrade is required as a result of this development given the minimal local demand for bus services in the area.

5. Conclusions

From the site survey work undertaken and the review of the proposed development and associated plans against the requirements of the Guide to Traffic Generating Developments and Austroads Guide to Traffic Management, it is considered that this project is acceptable with regards to traffic, parking and access.

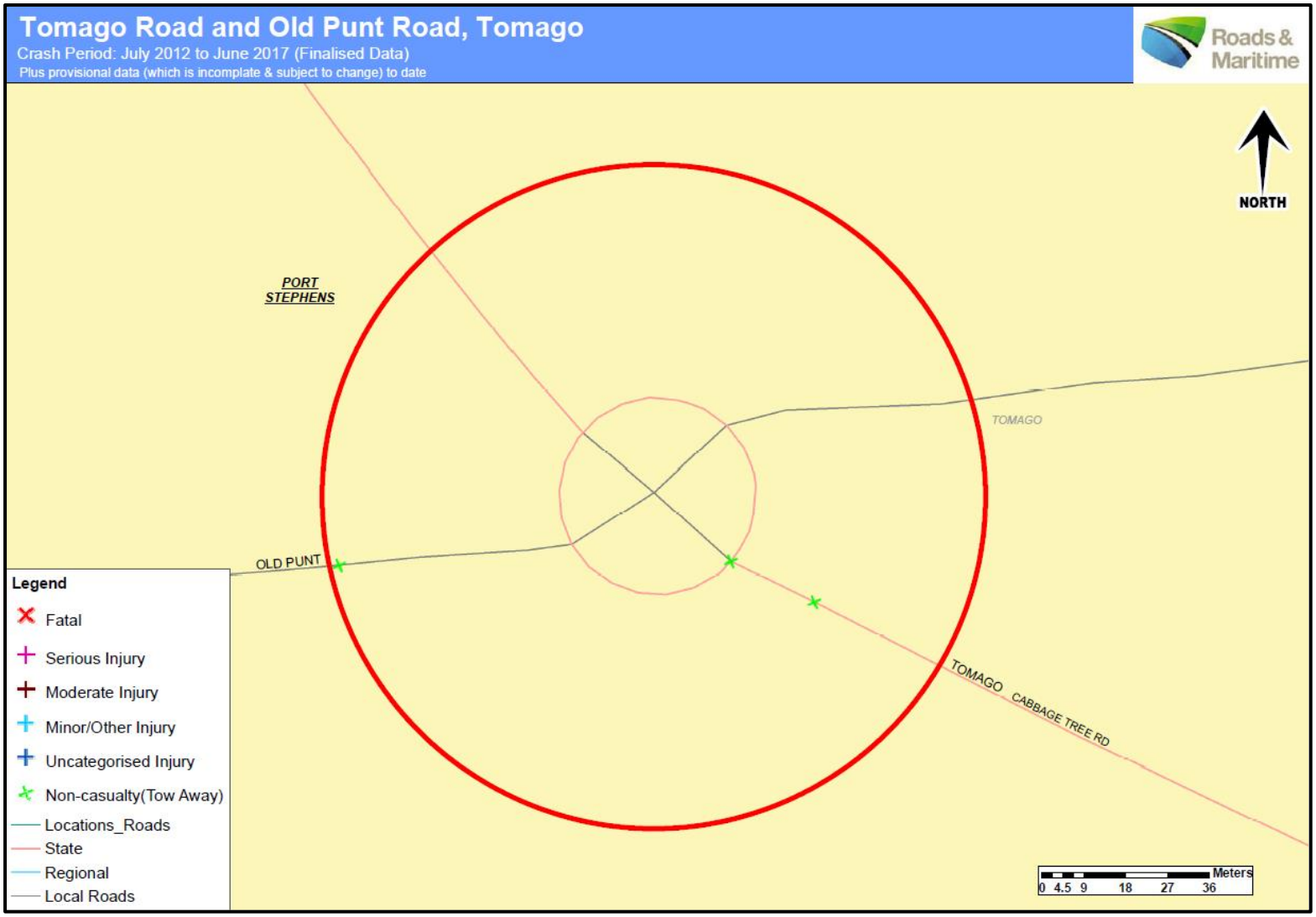
The project will allow for a re-use of an existing industrial building and will allow for the development of a waste resource management centre. Traffic flows that will be generated by the project have been determined based upon similar sites operated by Remondis and this report has assessed the impact of this additional traffic on the local road network. The key intersection that could be impacted upon by the project is that connecting McIntyre Road to Tomago Road. Sidra modelling has been completed for this intersection and shows that whilst some delays may occur in 2030, driver behaviour will continue to allow for safe traffic movements and acceptable delays and minor queues.

The other intersections impacts include the roundabout controlled intersection of Tomago Road and Old Punt Road and the Sidra modelling demonstrates that this will continue to operate very well with minor delays / congestion for the future design year of 2028 and beyond. It is noted that the planned upgrade to provide the M1 to Raymond Terrace Road link will significantly alter the traffic patterns in this location, with new grade separated links and a new link road from Tomago Road that will bypass the roundabout at Tomago Road / Old Punt Road. Whilst no timeframe is confirmed for this road upgrade planning is well advanced and partial funding has been provided.

Parking for the project will utilise the existing on-site provision and will satisfy the demands associated with staff. A dedicated parking area will be provided for the trucks to park on site overnight and has been assessed with Autoturn to ensure that these vehicles can safely enter and exit the layover area. The operation of this area will be enforced through an on-site traffic management plan.

Overall, it is concluded that the project shall have an acceptable impact upon the road network.

Appendix A Accident Data



Detailed Crash Report - sorted

Transport for NSW — Centre for Road Safety

Crash No. / Data Source	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash	Killed	Injured	Factors
Natural Lighting																				S F
Hunter Region			**Port Stephens LGA**				**Tomago**							**Old Punt Rd**						
1035397 P	31/07/2014	Thu	07:00	50 m S	TOMAGO RD	2WY	STR	Fine	Dry	60	2	CAR	M37	W in OLD PUNT RD	15 Pull out opposite		N	0	0	
E55119044			Daylight			RUM:	53	Overtake turning				WAG	F42	W in OLD PUNT RD	5 Turning right					
Hunter Region			**Port Stephens LGA**				**Tomago**							**Tomago Rd**						
1042025 P	05/08/2014	Tue	15:00	at	OLD PUNT RD	RDB	STR	Fine	Dry	60	2	CAR	M65	W in TOMAGO RD	Unk Proceeding in lane		N	0	0	
E55840477			Daylight			RUM:	10	Cross traffic				CAR	M23	S in OLD PUNT RD	Unk Proceeding in lane					
Hunter Region			**Port Stephens LGA**				**Tomago**							**Tomago Rd**						
1075528 S	17/07/2015	Fri	06:30	20 m S	OLD PUNT RD	2WY	STR	Overcast	Dry	60	2	TRK	M20	N in TOMAGO RD	Unk Proceeding in lane		N	0	0	
E253286294			Dawn			RUM:	32	Right rear				CAR	M33	N in TOMAGO RD	Unk Turning right					

Report Totals: Total Crashes: 3 Fatal Crashes: 0 Injury Crashes: 0 Killed: 0 Injured: 0

Crashid dataset Tomago Road and Old Punt Road, Tomago - July 2012 to 2018*

Note: *Ordered by: Crash Date.*

Crash self reporting, including self reported injuries began in Oct 2014. Trends from 2014 are expected to vary from previous years. More unknowns are expected in self reported data. For further information refer to Data Manual or report provider.

Summary Crash Report

Transport for NSW — Centre for Road Safety

# Crash Type		
Car Crash	3	100.0%
Light Truck Crash	1	33.3%
Rigid Truck Crash	0	0.0%
Articulated Truck Crash	0	0.0%
'Heavy Truck Crash	*(0)*	*(0.0%)*
Bus Crash	0	0.0%
"Heavy Vehicle Crash	*(0)*	*(0.0%)*
Emergency Vehicle Crash	0	0.0%
Motorcycle Crash	0	0.0%
Pedal Cycle Crash	0	0.0%
Pedestrian Crash	0	0.0%

' Rigid or Artic. Truck " Heavy Truck or Heavy Bus
These categories are NOT mutually exclusive

Location Type		
*Intersection	1	33.3%
Non intersection	2	66.7%

* Up to 10 metres from an intersection

Collision Type		
Single Vehicle	0	0.0%
Multi Vehicle	3	100.0%

Road Classification		
Freeway/Motorway	0	0.0%
State Highway	0	0.0%
Other Classified Road	2	66.7%
Unclassified Road	1	33.3%

Contributing Factors		
Speeding	0	0.0%
Fatigue	0	0.0%

Weather		
Fine	2	66.7%
Rain	0	0.0%
Overcast	1	33.3%
Fog or mist	0	0.0%
Other	0	0.0%

Road Surface Condition		
Wet	0	0.0%
Dry	3	100.0%
Snow or ice	0	0.0%

Natural Lighting		
Dawn	1	33.3%
Daylight	2	66.7%
Dusk	0	0.0%
Darkness	0	0.0%

Crash Movement		
Intersection, adjacent approaches	1	33.3%
Head-on (not overtaking)	0	0.0%
Opposing vehicles; turning	0	0.0%
U-turn	0	0.0%
Rear-end	1	33.3%
Lane change	0	0.0%
Parallel lanes; turning	0	0.0%
Vehicle leaving driveway	0	0.0%
Overtaking; same direction	1	33.3%
Hit parked vehicle	0	0.0%
Hit railway train	0	0.0%
Hit pedestrian	0	0.0%
Permanent obstruction on road	0	0.0%
Hit animal	0	0.0%
Off road, on straight	0	0.0%
Off road on straight, hit object	0	0.0%
Out of control on straight	0	0.0%
Off road, on curve	0	0.0%
Off road on curve, hit object	0	0.0%
Out of control on curve	0	0.0%
Other crash type	0	0.0%

Speed Limit					
40 km/h or less	0	0.0%	80 km/h zone	0	0.0%
50 km/h zone	0	0.0%	90 km/h zone	0	0.0%
60 km/h zone	3	100.0%	100 km/h zone	0	0.0%
70 km/h zone	0	0.0%	110 km/h zone	0	0.0%

~ 07:30-09:30 or 14:30-17:00 on school days	~ 40km/h or less		~ School Travel Time Involvement		
	0	0.0%		1	33.3%

Day of the Week												
Monday	0	0.0%	Wednesday	0	0.0%	Friday	1	33.3%	Sunday	0	0.0%	WEEKEND	0	0.0%
Tuesday	1	33.3%	Thursday	1	33.3%	Saturday	0	0.0%	WEEKDAY	3	**********			

CRASHES	3	
Fatal	0	0.0%
Serious inj.	0	0.0%
Moderate inj.	0	0.0%
Minor/Other inj.	0	0.0%
Uncategorised inj.	0	0.0%
Non-casualty	3	100.0%

Self Reported Crash	1	33.33%

Time Group			% of Day
00:01 - 02:59	0	0.0%	12.5%
03:00 - 04:59	0	0.0%	8.3%
05:00 - 05:59	0	0.0%	4.2%
06:00 - 06:59	1	33.3%	4.2%
07:00 - 07:59	1	33.3%	4.2%
08:00 - 08:59	0	0.0%	4.2%
09:00 - 09:59	0	0.0%	4.2%
10:00 - 10:59	0	0.0%	4.2%
11:00 - 11:59	0	0.0%	4.2%
12:00 - 12:59	0	0.0%	4.2%
13:00 - 13:59	0	0.0%	4.2%
14:00 - 14:59	0	0.0%	4.2%
15:00 - 15:59	1	33.3%	4.2%
16:00 - 16:59	0	0.0%	4.2%
17:00 - 17:59	0	0.0%	4.2%
18:00 - 18:59	0	0.0%	4.2%
19:00 - 19:59	0	0.0%	4.2%
20:00 - 21:59	0	0.0%	8.3%
22:00 - 24:00	0	0.0%	8.3%

Street Lighting Off/Nil		% of Dark
0	of 0	in Dark 0.0%

CASUALTIES	0	
Killed	0	0.0%
Seriously inj.	0	0.0%
Moderately inj.	0	0.0%
Minor/Other inj.	0	0.0%
Uncategorised inj.	0	0.0%
^ Unrestrained	0	0.0%

^ Belt fitted but not worn, No restraint fitted to position OR No helmet worn

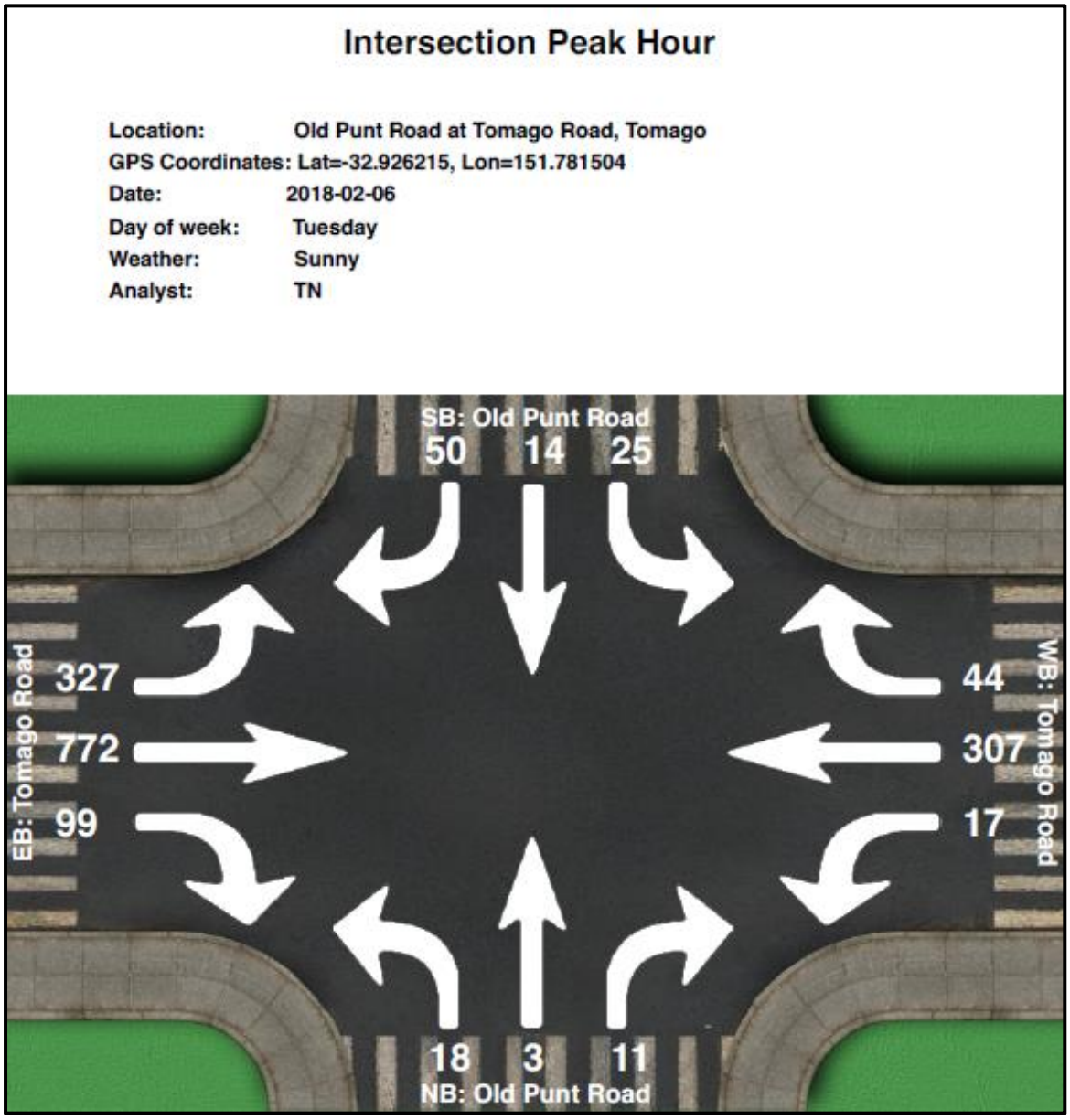
Crashes		Casualties
1	2015	0
2	2014	0

McLean Periods			% Week
A	2	66.7%	17.9%
B	0	0.0%	7.1%
C	0	0.0%	17.9%
D	0	0.0%	3.5%
E	0	0.0%	3.6%
F	1	33.3%	10.7%
G	0	0.0%	7.1%
H	0	0.0%	7.1%
I	0	0.0%	12.5%
J	0	0.0%	10.7%

#Holiday Periods																		
New Year	0	0.0%	Easter	0	0.0%	Queen's BD	0	0.0%	Christmas	0	0.0%	Easter SH	0	0.0%	Sept./Oct. SH	0	0.0%	
Aust. Day	0	0.0%	Anzac Day	0	0.0%	Labour Day	0	0.0%	January SH	0	0.0%	June/July SH	0	0.0%	December SH	0	0.0%	

Appendix B Traffic Data

AM Peak



Intersection Peak Hour

06:00 - 07:00

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	25	14	50	17	307	44	18	3	11	327	772	99	1687
Factor	0.62	0.50	0.66	0.71	0.83	0.79	0.56	0.75	0.69	0.70	0.87	0.63	0.94
Approach Factor	0.74			0.86			0.62			0.88			

Peak Hour Vehicle Summary

Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	17	12	10	16	245	38	8	2	8	318	728	90	1492
Truck	8	2	40	1	62	6	10	1	3	9	44	9	195

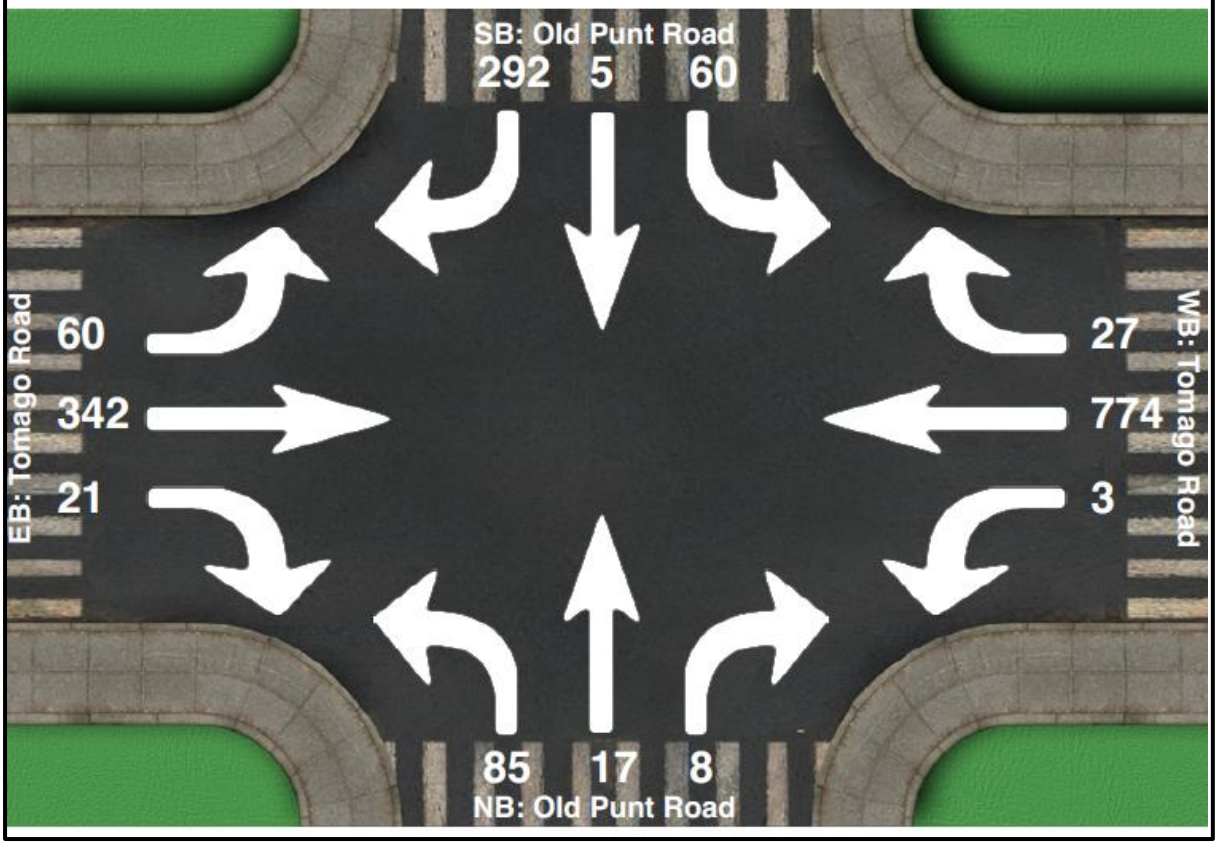
Peak Hour Pedestrians

	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0

PM Peak

Intersection Peak Hour

Location: Old Punt Road at Tomago Road, Tomago
GPS Coordinates: Lat=-32.926215, Lon=151.781504
Date: 2018-02-06
Day of week: Tuesday
Weather: Sunny
Analyst: TN



Intersection Peak Hour

16:00 - 17:00

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	60	5	292	3	774	27	85	17	8	60	342	21	1694
Factor	0.75	0.62	0.82	0.75	0.94	0.75	0.62	0.71	0.67	0.71	0.99	0.66	0.91
Approach Factor	0.81			0.94			0.65			0.93			

Peak Hour Vehicle Summary

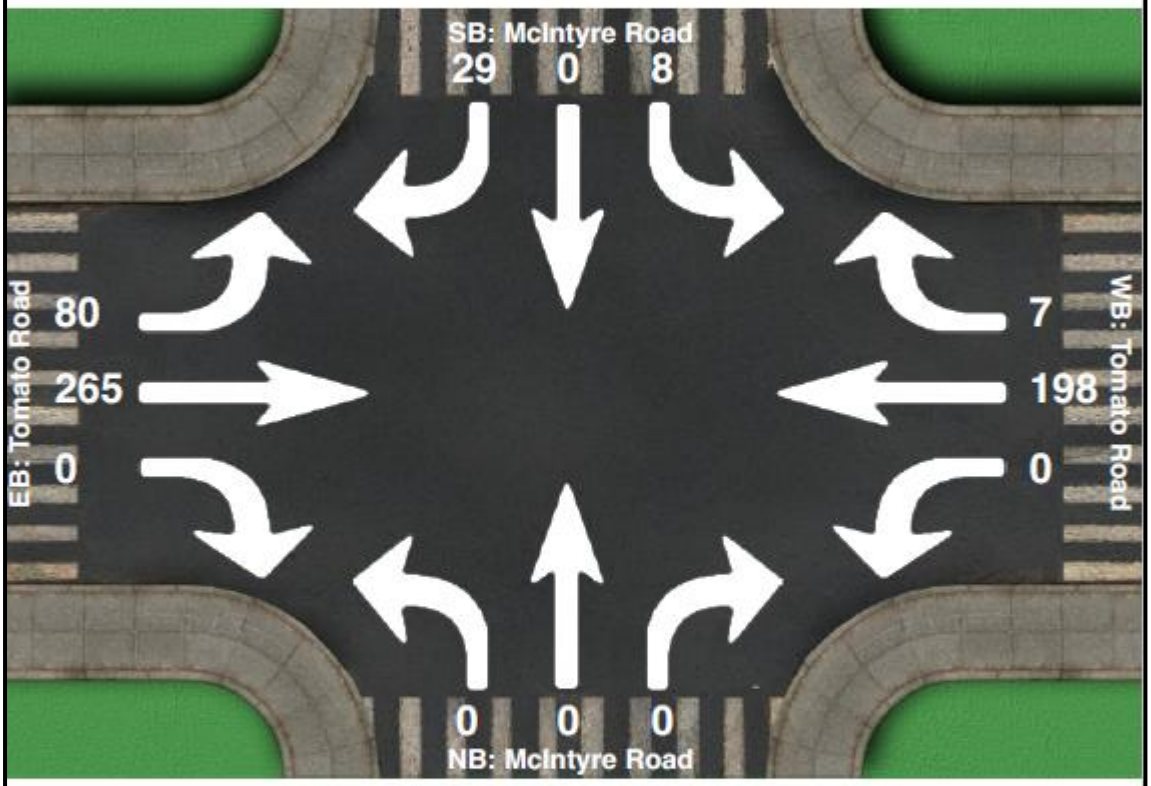
Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	52	4	278	3	733	21	83	16	8	34	308	14	1554
Truck	8	1	14	0	41	6	2	1	0	26	34	7	140

Peak Hour Pedestrians

	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Peak Hour

Location: McIntyre Road at Tomato Road, Tomago
GPS Coordinates:
Date: 2020-07-06
Day of week: Monday
Weather: Clear Sunny Cold
Analyst: Jenny M



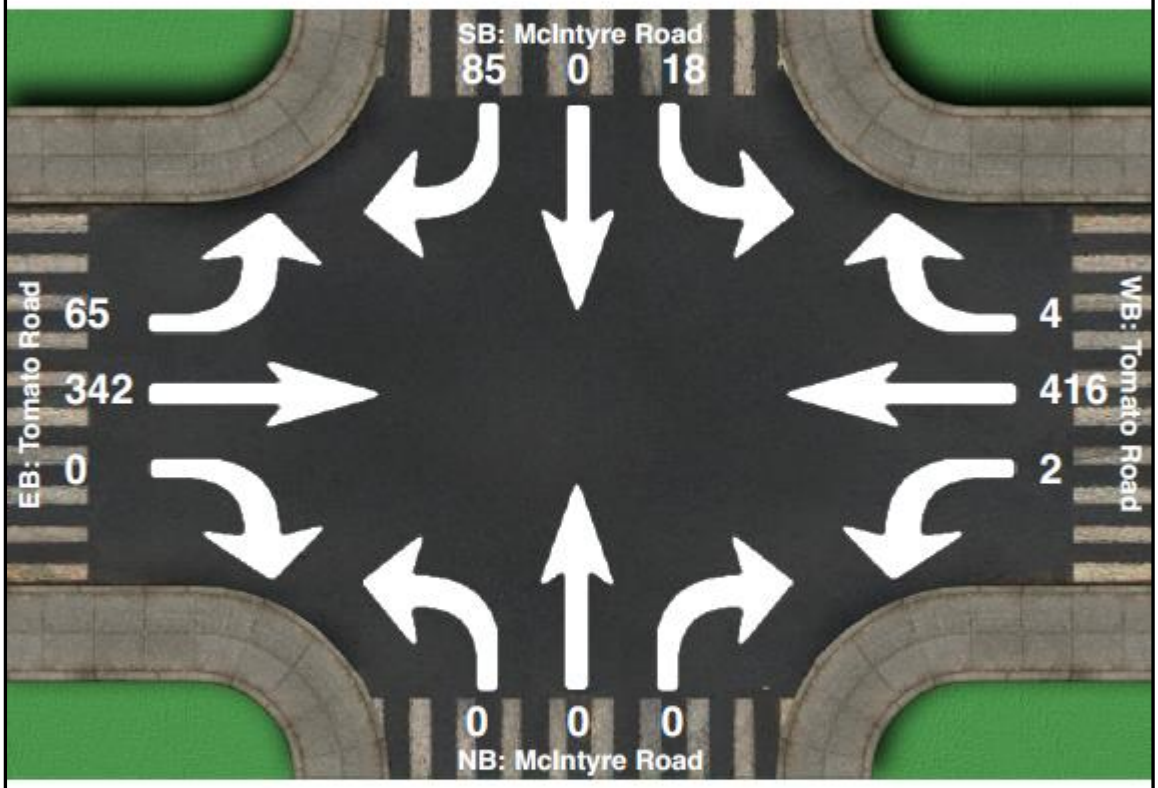
Intersection Peak Hour

07:30 - 08:30

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	8	0	29	0	198	7	0	0	0	80	265	0	587
Factor	0.40	0.00	0.72	0.00	0.76	0.58	0.00	0.00	0.00	0.91	0.88	0.00	0.86
Approach Factor	0.71			0.78			0.00			0.89			

Intersection Peak Hour

Location: McIntyre Road at Tomato Road, Tomago
GPS Coordinates:
Date: 2020-07-06
Day of week: Monday
Weather: Clear Sunny
Analyst: Jenny M



Intersection Peak Hour

15:30 - 16:30

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	18	0	85	2	416	4	0	0	0	65	342	0	932
Factor	0.75	0.00	0.76	0.25	0.86	0.33	0.00	0.00	0.00	0.71	0.85	0.00	0.94
Approach Factor	0.80			0.87			0.00			0.83			

Appendix C SIDRA Analysis

Interpreting SIDRA Results:

1-Level of Service (LoS)

LoS	Traffic Signals and Roundabouts	Give Way and Stop Signs
A	Good	Good
B	Good, with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	Satisfactory	Satisfactory, but requires accident study
D	Operating near capacity	Near capacity and requires accident study
E	At capacity, excessive delay: roundabout requires other control method	At capacity, requires other control mode
F	Unsatisfactory, requires other control mode or additional capacity	Unsatisfactory, requires other control mode

2-Average Vehicle Delay (AVD)

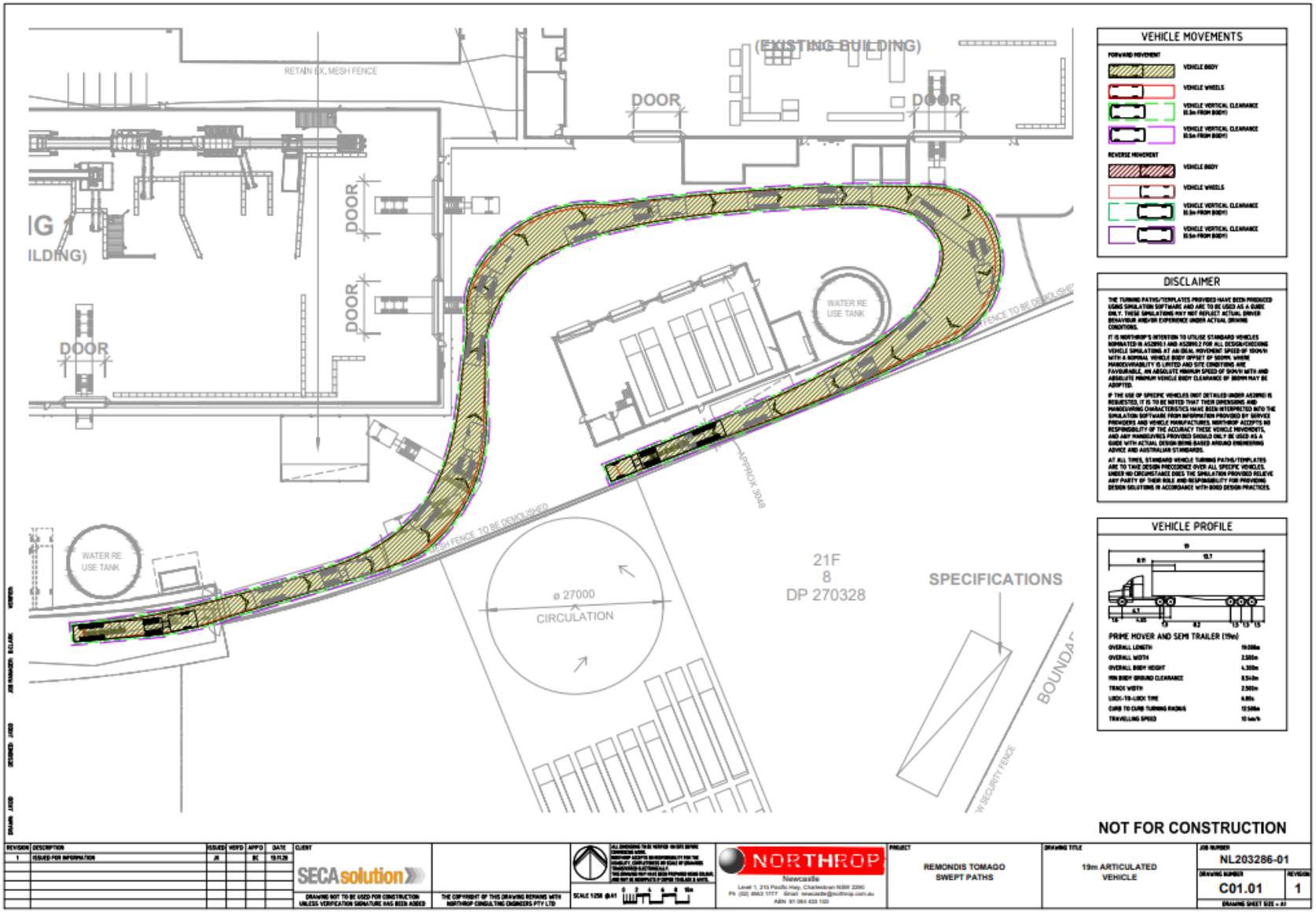
The AVD is a measure of operational performance of an intersection relating to its LoS. The average delay should be taken as a guide only for an average intersection. Longer delays may be tolerated at some intersections where delays are expected by motorists (e.g. those in inner city areas or major arterial roads).

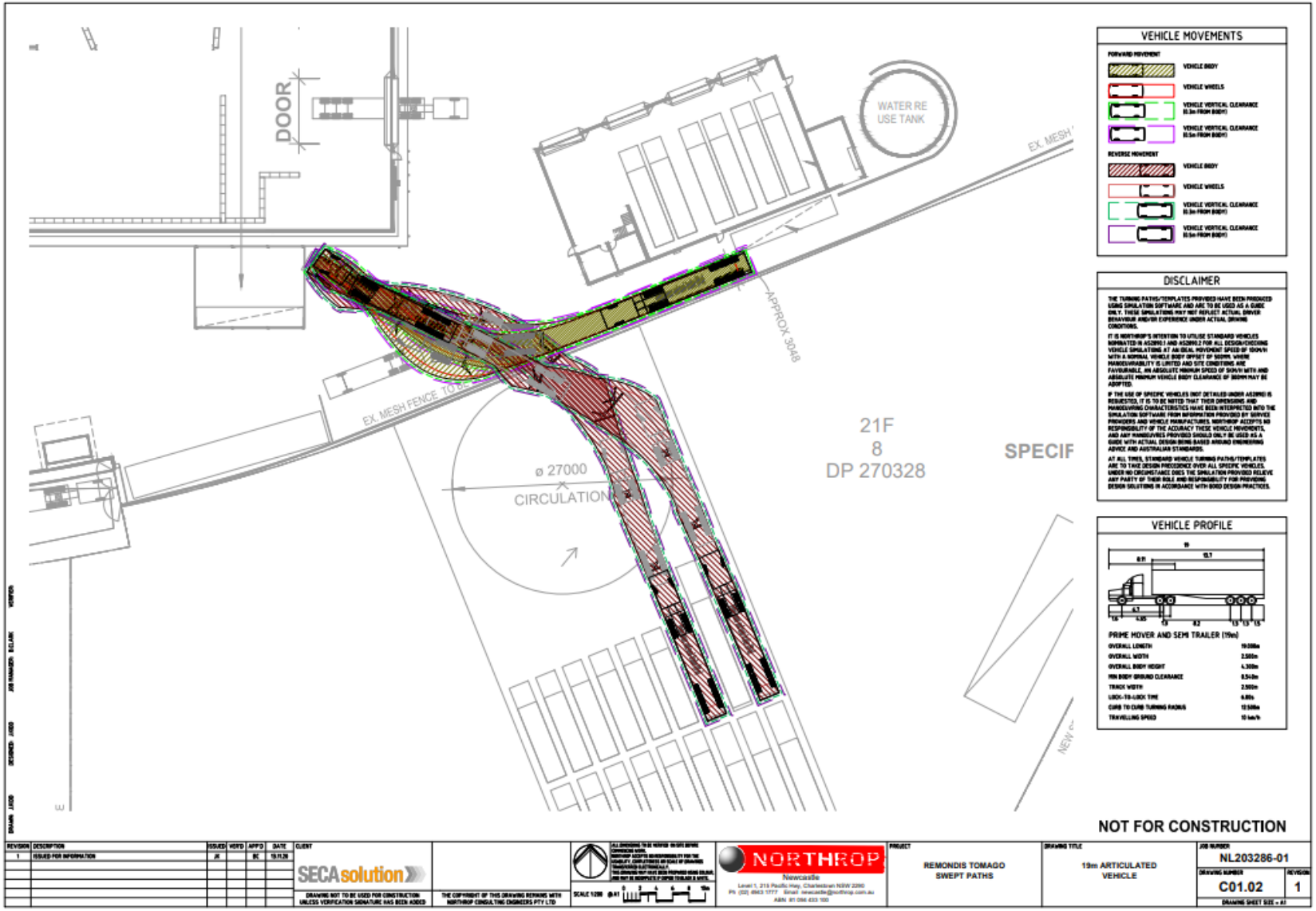
LoS	Average Delay / Vehicle (secs)	Traffic Signals and Roundabouts	Give Way and Stop Signs
A	Less than 15	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	28 to 42	Satisfactory	Satisfactory but accident study required
D	42 to 56	Operating near capacity	Near capacity, accident study required
E	56 to 70	At capacity, excessive delays: roundabout requires other control mode	At capacity; requires other control mode
F	Exceeding 70	Unsatisfactory, requires additional capacity	Unsatisfactory, requires other control mode

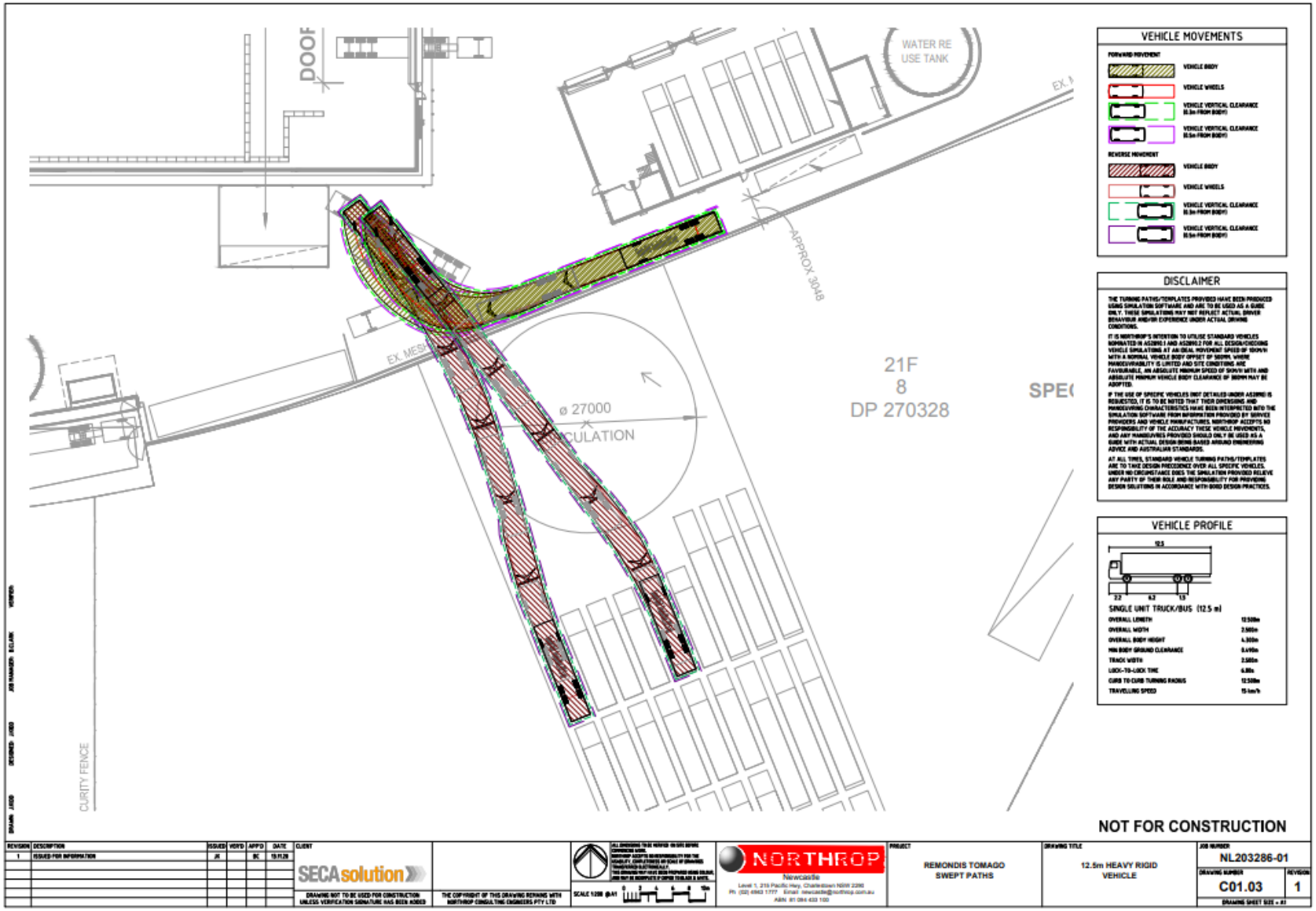
3-Degree of Saturation (D/S)

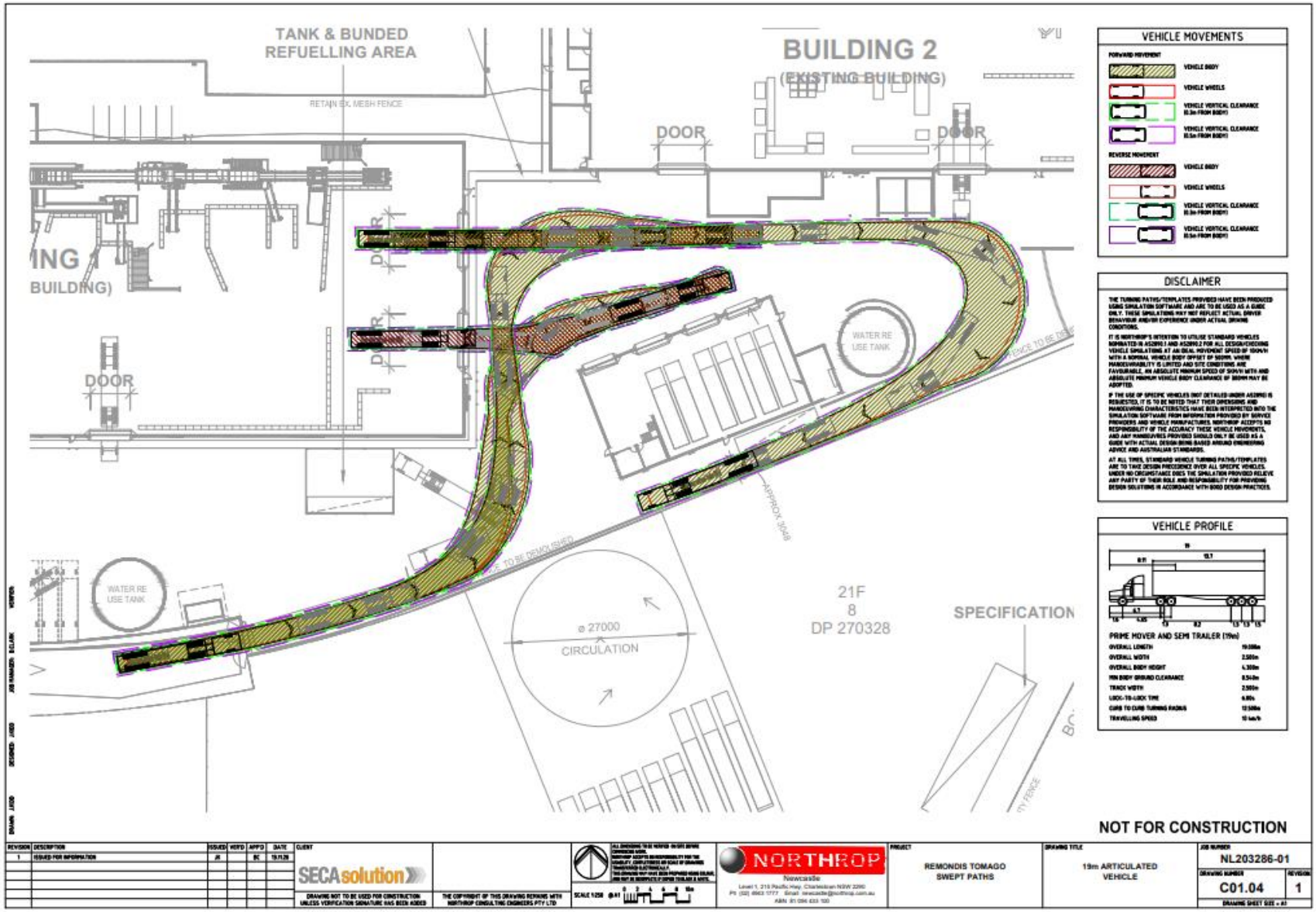
The D/S of an intersection is usually taken as the highest ratio of traffic volumes on an approach to an intersection compared with the theoretical capacity and is a measure of the utilisation of available green time. For intersections controlled by traffic signals, both queues and delays increase rapidly as DS approaches 1.0. An intersection operates satisfactorily when its D/S is kept below 0.75. When D/S exceeds 0.9, queues are expected.

Appendix D – Autoturn simulation




DOOR
WATER RE USE TANK
EX. MESH
APPROX 3048
EX. MESH FENCE TO
ø 27000
CIRCULATION
21F
8
DP 270328
SPECIF
VEHICLE MOVEMENTS
FORWARD MOVEMENT
VEHICLE BODY
VEHICLE WHEELS
VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)
VEHICLE VERTICAL CLEARANCE (0.5m FROM BODY)
REVERSE MOVEMENT
VEHICLE BODY
VEHICLE WHEELS
VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)
VEHICLE VERTICAL CLEARANCE (0.5m FROM BODY)
DISCLAIMER
THE TURNING PATHS/TEMPLATES PROVIDED HAVE BEEN PRODUCED USING SIMULATION SOFTWARE AND ARE TO BE USED AS A GUIDE ONLY. THESE SIMULATIONS MAY NOT REFLECT ACTUAL DRIVER BEHAVIOUR AND/OR EXPERIENCE UNDER ACTUAL DRIVING CONDITIONS.
IT IS NORTHROP'S INTENTION TO UTILISE STANDARD VEHICLES NOMINATED IN AS2890.1 AND AS2890.2 FOR ALL DESIGN/CHECKING VEHICLE SIMULATIONS AT AN IDEAL MOVEMENT SPEED OF 10KM/H WITH A NORMAL VEHICLE BODY OFFSET OF 500MM, WHERE MANOEUVRABILITY IS LIMITED AND SITE CONDITIONS ARE FAVOURABLE, AN ABSOLUTE MINIMUM SPEED OF 5KM/H WITH AND ABSOLUTE MINIMUM VEHICLE BODY CLEARANCE OF 300MM MAY BE ADOPTED.
IF THE USE OF SPECIFIC VEHICLES (NOT DETAILED UNDER AS2890) IS REQUESTED, IT IS TO BE NOTED THAT THEIR DIMENSIONS AND MANOEUVRING CHARACTERISTICS HAVE BEEN INTERPRETED INTO THE SIMULATION SOFTWARE FROM INFORMATION PROVIDED BY SERVICE PROVIDERS AND VEHICLE MANUFACTURERS. NORTHROP ACCEPTS NO RESPONSIBILITY OF THE ACCURACY THESE VEHICLE MOVEMENTS, AND ANY MANOEUVRES PROVIDED SHOULD ONLY BE USED AS A GUIDE WITH ACTUAL DESIGN BEING BASED AROUND ENGINEERING ADVICE AND AUSTRALIAN STANDARDS.
AT ALL TIMES, STANDARD VEHICLE TURNING PATHS/TEMPLATES ARE TO TAKE DESIGN PRECEDENCE OVER ALL SPECIFIC VEHICLES. UNDER NO CIRCUMSTANCE DOES THE SIMULATION PROVIDED RELIEVE ANY PARTY OF THEIR ROLE AND RESPONSIBILITY FOR PROVIDING DESIGN SOLUTIONS IN ACCORDANCE WITH GOOD DESIGN PRACTICES.
VEHICLE PROFILE
PRIME MOVER AND SEMI TRAILER (19m)
OVERALL LENGTH 19.038m
OVERALL WIDTH 2.500m
OVERALL BODY HEIGHT 4.300m
19m BODY GROUND CLEARANCE 0.5+0m
TRACK WIDTH 2.500m
LOCK-TO-LOCK TIME 6.80s
CURB TO CURB TURNING RADIUS 12.500m
TRAVELLING SPEED 10 km/h
NOT FOR CONSTRUCTION
REVISION
DESCRIPTION
ISSUED
VERIFD
APPVD
DATE
1
ISSUED FOR INFORMATION
JR
BC
19.11.20
CLIENT
SECAsolution
DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED
THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD
SCALE 1:200 @ A1
NORTHROP
Newcastle
PROJECT
REMONDIS TOMAGO
SWEPT PATHS
DRAWING TITLE
19m ARTICULATED VEHICLE
JOB NUMBER
NL203286-01
DRAWING NUMBER
C01.02
REVISION
1
DRAWING SHEET SIZE = A1




TANK & BUNDED
REFUELLING AREA
BUILDING 2
(EXISTING BUILDING)
RETAIN EX. MESH FENCE
DOOR
DOOR
ING
BUILDING)
DOOR
WATER RE
USE TANK
WATER RE
USE TANK
APPROX 1048
21F
8
DP 270328
⌀ 27000
CIRCULATION
SPECIFICATION
VEHICLE MOVEMENTS
FORWARD MOVEMENT
VEHICLE BODY
VEHICLE WHEELS
VEHICLE VERTICAL CLEARANCE
VEHICLE VERTICAL CLEARANCE
REVERSE MOVEMENT
VEHICLE BODY
VEHICLE WHEELS
VEHICLE VERTICAL CLEARANCE
VEHICLE VERTICAL CLEARANCE
DISCLAIMER
VEHICLE PROFILE
PRIME MOVER AND SEMI TRAILER (19m)
NOT FOR CONSTRUCTION
SECAsolution
NORTHROP
Newcastle
REMONDIS TOMAGO
SWEPT PATHS
19m ARTICULATED
VEHICLE
NL203286-01
C01.04
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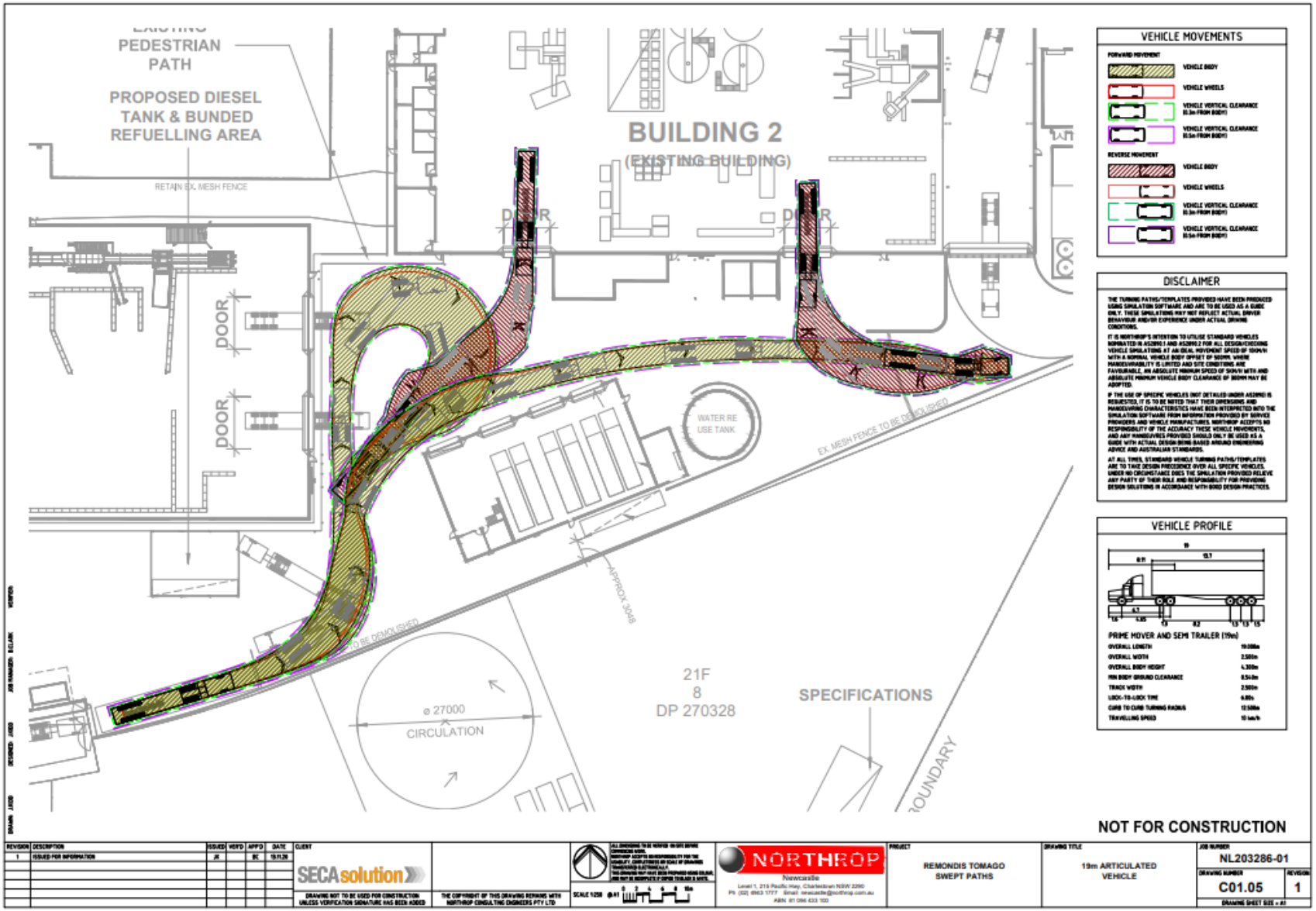

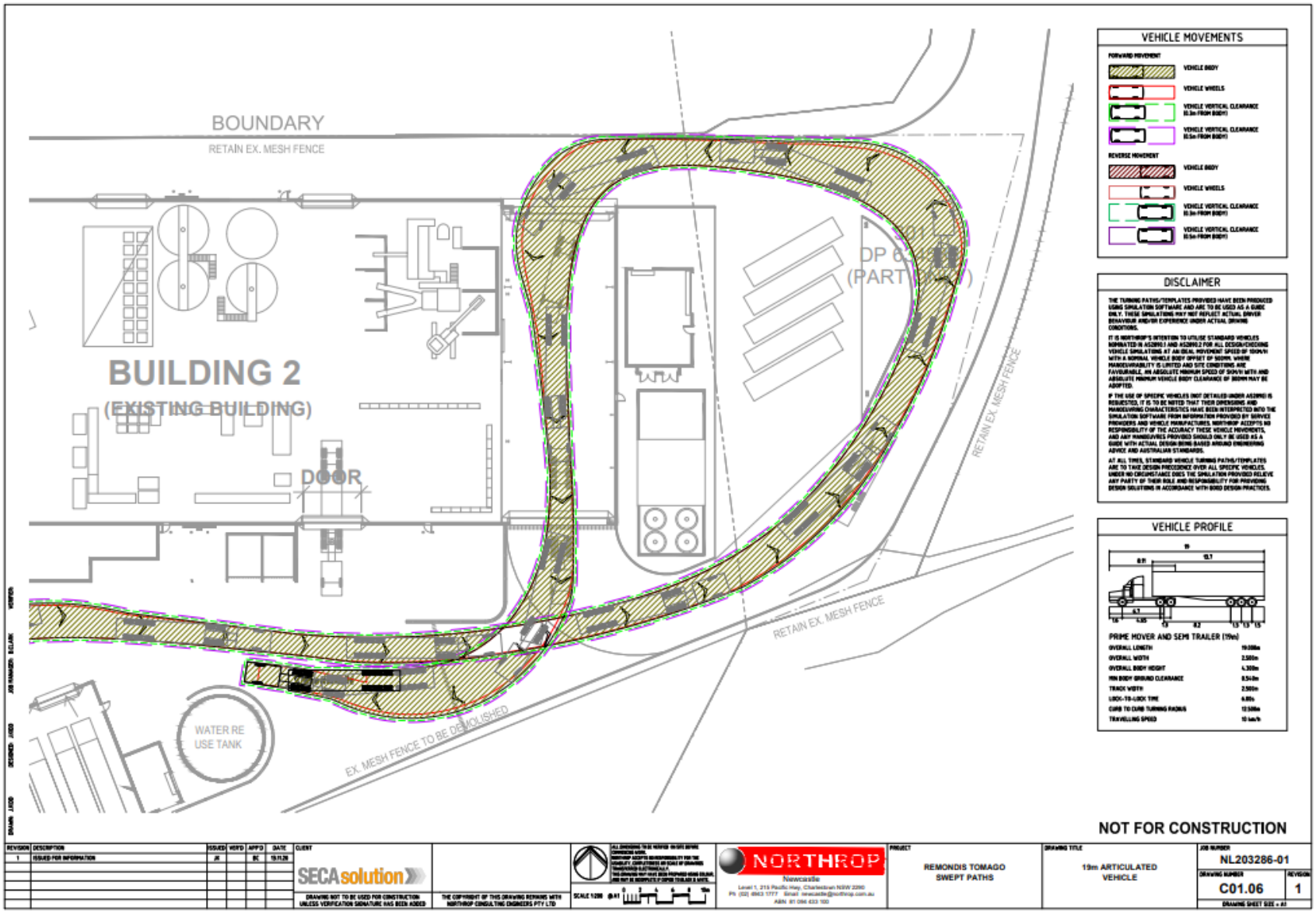
BOUNDARY
RETAIN EX. MESH FENCE
BUILDING 2
(EXISTING BUILDING)
DOOR
WATER RE USE TANK
EX. MESH FENCE TO BE DEMOLISHED
RETAIN EX. MESH FENCE
RETAIN EX. MESH FENCE
VEHICLE MOVEMENTS
FORWARD MOVEMENT
VEHICLE BODY
VEHICLE WHEELS
VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)
VEHICLE VERTICAL CLEARANCE (0.5m FROM BODY)
REVERSE MOVEMENT
VEHICLE BODY
VEHICLE WHEELS
VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)
VEHICLE VERTICAL CLEARANCE (0.5m FROM BODY)
DISCLAIMER
THE TURNING PATHS/TEMPLATES PROVIDED HAVE BEEN PRODUCED USING SIMULATION SOFTWARE AND ARE TO BE USED AS A GUIDE ONLY. THESE SIMULATIONS MAY NOT REFLECT ACTUAL DRIVER BEHAVIOUR AND/OR EXPERIENCE UNDER ACTUAL DRIVING CONDITIONS.
IT IS NORTHROP'S INTENTION TO UTILISE STANDARD VEHICLES NOMINATED IN AS2890.1 AND AS2890.2 FOR ALL DESIGN/CHECKING VEHICLE SIMULATIONS AT AN IDEAL MOVEMENT SPEED OF 15KM/H WITH A NORMAL VEHICLE BODY OFFSET OF 300MM. WHERE MANOEUVRABILITY IS LIMITED AND SITE CONDITIONS ARE FAVOURABLE, AN ABSOLUTE MINIMUM SPEED OF 5KM/H WITH AND ABSOLUTE MINIMUM VEHICLE BODY CLEARANCE OF 200MM MAY BE ADOPTED.
IF THE USE OF SPECIFIC VEHICLES (NOT DETAILED UNDER AS2890) IS REQUESTED, IT IS TO BE NOTED THAT THEIR DIMENSIONS AND MANOEUVRING CHARACTERISTICS HAVE BEEN INTERPRETED INTO THE SIMULATION SOFTWARE FROM INFORMATION PROVIDED BY SERVICE PROVIDERS AND VEHICLE MANUFACTURES. NORTHROP ACCEPTS NO RESPONSIBILITY OF THE ACCURACY THESE VEHICLE MOVEMENTS, AND ANY MANOEUVRES PROVIDED SHOULD ONLY BE USED AS A GUIDE WITH ACTUAL DESIGN BEING BASED AROUND ENGINEERING ADVICE AND AUSTRALIAN STANDARDS.
AT ALL TIMES, STANDARD VEHICLE TURNING PATHS/TEMPLATES ARE TO TAKE DESIGN PRECEDENCE OVER ALL SPECIFIC VEHICLES. UNDER NO CIRCUMSTANCE DOES THE SIMULATION PROVIDED RELIEVE ANY PARTY OF THEIR ROLE AND RESPONSIBILITY FOR PROVIDING DESIGN SOLUTIONS IN ACCORDANCE WITH GOOD DESIGN PRACTICES.
VEHICLE PROFILE
PRIME MOVER AND SEMI TRAILER (19m)
NOT FOR CONSTRUCTION
SECAsolution
NORTHROP
Newcastle
REMONDIS TOMAGO SWEPT PATHS
19m ARTICULATED VEHICLE
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