

Site B Foreshore Road, Port Kembla Transport Impact Assessment

Prepared for:
Manildra Group

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The Transport Planning Partnership

Site B Foreshore Road, Port Kembla

Transport Impact Assessment

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V01	02/07/21	Ashwini Uthishtran	Jessica Ng	Ken Hollyoak	Ken Hollyoak
V02	20/08/21	Ashwini Uthishtran	Jessica Ng	Ken Hollyoak	Ken Hollyoak
V03	10/03/22	Ashwini Uthishtran	Oasika Faiz	Ken Hollyoak	Ken Hollyoak
V04	26/04/22	Ashwini Uthishtran	Oasika Faiz	Ken Hollyoak	

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1 Introduction

1.1 Overview

This report relates to the traffic and parking aspects of a proposed bulk liquids storage facility to receive, store and export ethanol at Site B Foreshore Road, Port Kembla. The proposal also includes two related pipelines from the facility location at Site B, Foreshore Road to the existing Berth 206.

This report has been prepared by The Transport Planning Partnership (TPPP) on behalf of Manildra Group. It has been prepared to accompany a State Significant Development Application (SSDA) seeking approval for the proposed development.

1.2 Report Structure

This report sets out an assessment of the anticipated transport impacts of the proposed development, including the following:

- existing site conditions, and the surrounding road and transport context
- car parking requirements
- the traffic generating characteristics of the proposed development
- suitability of the proposed access arrangements for the site, and
- the traffic impact of the development on the surrounding road network.

1.3 Purpose of this Report

This TIA supports the EIS for the Proposal and has been prepared as part of an SSD Application for which approval is sought under Part 4, Division 4.7 of the EP&A Act.

This report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) (SSD- 33042483) for the Proposal, issued by NSW Department of Planning, Industry and Environment, now Department of Planning and Environment (DPE) on 1 October 2021. Table 1.1 provides a summary of the relevant SEARs which relate to traffic and transport, and where these have been addressed in this report.

Notably, Transport for NSW (TfNSW) and Wollongong City Council (Council) were consulted by DPE for their input into the draft SEARs. Each agency's input into the SEARs has been included in Table 1.2.

Table 1.1: SEAR's and Relevant Report Sections

SEARs Item	Addressed In
Traffic and Transport – a quantitative traffic impact assessment addressing both construction and operation prepared in accordance with relevant Transport for NSW and Austroads guidelines, that includes:	-
details of all daily and peak traffic volumes likely to be generated, including a description of key access / haul routes, vehicle types, sizes and carrying capacity and potential queuing impacts	Sections 3.3, 4.2, 5.1 & 6.4
an assessment of the predicted impacts of this traffic on road safety and the capacity of the road network, including consideration of cumulative traffic impacts at key intersections using SIDRA or similar traffic model	Section 5
details and plans of any proposed the internal road network, site access and circulation arrangements and on-site parking provisions in accordance with the relevant Australian Standards	Sections 3, 4
swept path diagrams depicting the largest vehicles entering, exiting and manoeuvring throughout the site	Appendix C
draft construction and operational traffic management plans	Section 4.2, 6 & CTMP Report
details of road or shipping infrastructure upgrades, infrastructure works or new roads or access points required for the development if necessary.	Section 3.2

Table 1.2: Local and State Authority Requirements and Relevant Report Sections

TfNSW Input to SEARs	Addressed in
<p>Traffic Impact Study (TIS): A TIS is required to examine any potential transport related implications of the development. As a guide Table 2.1 of the RTA's Guide to Traffic Generating Developments outlines the key issues that should be considered in preparing a TIS. In addition, regard should be had for the Austroads publications, particularly the Austroads Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments and Part 3: Traffic Studies and Analysis Methods.</p> <p>Noting the above, the TIS also needs to address, but not be limited to, the following:</p>	As per this report
<p>a) TfNSW considers that the traffic related issues relevant to the development should be considered and addressed in 2 distinct stages as follows:</p> <p>i- Construction phase – The transport of materials and equipment/components for the establishment of the facility, ancillary infrastructure and the movement and parking of construction related vehicles including workers vehicles;</p> <p>ii- Operational phase – The ongoing traffic generation due to the operation, maintenance and servicing of the various elements of the project.</p>	Section 5 & 6
<p>b) Noting the above stages the following need to be addressed for each stage:</p>	-

Details of all traffic types (both heavy and light vehicles) and volumes, for each, likely to be generated by the proposed development during operation, including a description of heavy vehicle types and haul route origins and destinations;	Section 3.3, 4.2, 5.1 & 6.4 & CTMP Report- Section 3.5, 3.6 & 4.1
For heavy vehicles, details are required on their size and their associated carrying capacity for the receipt of materials;	Section 5.1 & CTMP Report- Section 3.6
Daily inbound and outbound traffic profile by time of day and day of week broken down per vehicle types. This includes a summary of the peak hour movements and maximum daily movements for both heavy and light vehicles, including how these numbers correlate to the daily and annual limits for which approval is being sought;	Section 5.1 & CTMP Report- Section 4.1
Details on how maximum vehicle numbers will be monitored to ensure ongoing compliance;	Section 5.1
Road safety assessment including the impact of truck movements on public transport, pedestrian connectivity and cycling;	Section 5 & CTMP Report- Section 4
Intersection performance impacts for times of peak construction activity	Section 5.4
c) An assessment of the cumulative impact of traffic from this development and nearby developments that use the same access to and from Five Islands Road/Old Port Road.	Section 5.2
d) An assessment of the suitability of the local road connections with the state road network at each access point being investigated as well as details on any works required (e.g. intersections of Old Port Road/Five Islands Road). This is including a schedule/timeframe for their provision;	Section 3.3 & 5.3
e) Traffic management plan on how to manage the number of vehicles likely to be generated during operation and awaiting loading, unloading or servicing that can be accommodated on the site to avoid queuing in the surrounding road network. This to demonstrate how internal and external traffic can be managed in conjunction with the operations on site;	Section 4.2, 5.1
f) A site layout to demonstrate that the site will be able to accommodate the most productive vehicle types and parking on site is in accordance with the relevant Australian Standard and Council's Development Control Plan;	Appendix A
g) Swept path diagrams to demonstrate the largest vehicles that will be using the classified road network where it connects with the local road network can undertake all required manoeuvres to enable access to and from the development site.	Appendix C
h) A clearly illustrated site access and circulation plan, including swept paths, loading, storage and handling facilities and lines of sight for heavy vehicles	Appendix C
i) Details of options for emergency services vehicles, with details on dangerous goods handling and storage areas.	Section 3.4, 3.5
j) Proposed fuels and other dangerous goods required, their sources and vehicles to be used	Section 3.4, 3.5

k) Plans for the proposed storage and handling facilities for dangerous goods within site.	Appendix B
Wollongong City Council Input SEARs	Addressed in
The applicant should refer to Chapter E3 – Car Parking, Access, Servicing/ Loading Facilities and Traffic Management of the Wollongong Development Control Plan 2009.	Section 4
A Traffic Impact Assessment needs to be prepared by a suitably qualified consultant in accordance with Table 2.1 of the RTA Guide to Traffic Generating Development.	Section 5.1
<u>Construction</u> The applicant will need to provide an assessment of the proposed traffic generation based on the expected construction/delivery requirements, vehicle capacities etc. The different types of heavy vehicle and passenger vehicles need to be identified and quantified as part of the assessment.	Section 6 CTMP Report- Section 4.1
<u>Internal Layout</u> All internal access dimensions on the site plan, including grades, access widths, parking aisle widths should comply with AS2890.1 and AS2890.2.	Appendix A
Car parking, bicycle parking and motorcycle parking must be in accordance with Schedule 1 of Chapter E3 of the Wollongong City Council DCP.	Section 4
Disabled car parking also needs to be provided in accordance with BCA requirements and the design specification must meet the requirements of AS2890.6.	Section 4.4
A series of vehicle movement plans will be required to demonstrate that the internal road network is able to accommodate all sizes of vehicles likely to enter the site and access all areas with forward ingress and egress. As per the requirements of AS2890.1, a B99 vehicle must be shown passing a B85 vehicle on all critical corners. A service vehicle must also be shown passing a B85 vehicle throughout the development.	N/A
Emergency access arrangements need to be clarified.	Section 3.4
<u>Loading, Servicing and Waste Collection</u> Loading and servicing arrangements must comply with Chapter E3 of the Wollongong City Council DCP.	Section 4.2
AS2890.2 requires a maximum grade of 15.4% for service vehicles which should also be taken into consideration.	Appendix A & C

2 Existing Conditions

2.1 Site Description

The subject site is located at Foreshore Road, Port Kembla and falls within the local government area of Wollongong City Council.

Land in the vicinity of the site predominantly comprises industrial use and commercial/residential use to the west of Military Road and south of Marne Street.

The proposed site location is shown in Figure 2.1

Figure 2.1: Proposed Development Site



2.2 Abutting Road Network

The subject site fronts Foreshore Road along the southern boundary of the site. This road provides connectivity to the wider arterial road network via Old Port Road. A brief description of these roads is provided below.

Foreshore Road functions as a two-way local road, generally aligned in an east-west direction. It connects to Old Port Road in the west and The Port Kembla Outer Harbour Boat ramp in the east. The width of the road carriageway is approximately 10m with kerbside parking on the southern side of the road. There is a separated off-road shared path on the northern side of the road. Foreshore Road has a sign-posted speed limit of 50km/h.

Old Port Road is classified two-way state road, generally aligned in a north to south direction and connects to Flinders Street in the north and Darcy Road in the south. The width of the road carriageway is approximately 12.2m with kerbside parking along some sections of the road near the site. The road has a posted speed limit of 60km/h.

2.3 Traffic Volumes

2.3.1 Tube Counts (Foreshore Road)

TTPP has commissioned tube counts between 6 May 2021 and 12 May 2021 (total period of seven days). The tube counter was installed on Foreshore Road to record the total volume of traffic experienced near the site.

The location of the tube counter is shown in Figure 2.2.

Figure 2.2: Tube Count Location



The results of the traffic survey are summarised in Figure 2.3, with full results enclosed in Appendix A.

Figure 2.3: Summary of Traffic Volumes

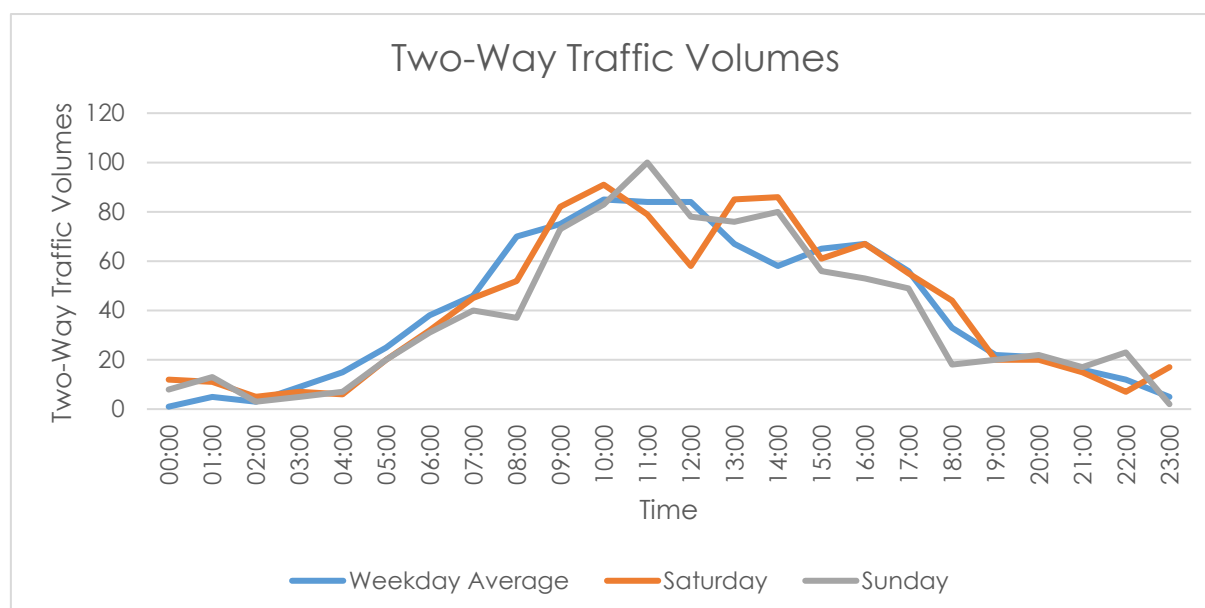


Figure 2.3 indicates that up to 100 two-way vehicle movements were recorded along Foreshore Road, during the Sunday midday peak period (11:00am – 12:00pm). This is equivalent to approximately two vehicle movements per minute, which is considered low.

During the weekday AM peak period (10:00am – 11:00am), a total of 85 vehicle movements were recorded and during the PM peak period (12:00pm – 1:00pm), a total of 79 vehicle movements were recorded. This equates to approximately one vehicle movement per minute.

On this basis, existing traffic volumes along Foreshore Road are generally considered low (i.e. 79 to 100 vehicles per hour during peak times).

2.3.2 Intersection Survey (Five Islands Road/ Darcy Road)

TTPP has commissioned a turning movement count survey at Five Islands Road/ Darcy Road intersection during the morning and evening peak periods (6am-9am and 4pm-7pm) on Thursday, 17 February 2021.

The morning peak hour was recorded between 8:00am-9:00am and the afternoon peak hour was recorded between 4:00pm-5:00pm.

Figure 2.4 and Figure 2.5 show the existing peak hour traffic at the surveyed intersection during the AM peak and PM peak respectively.

Figure 2.4: Existing Traffic Volumes (AM Peak)

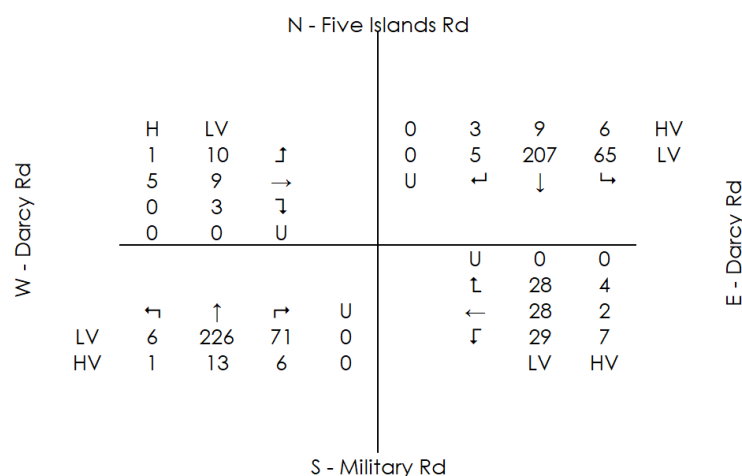
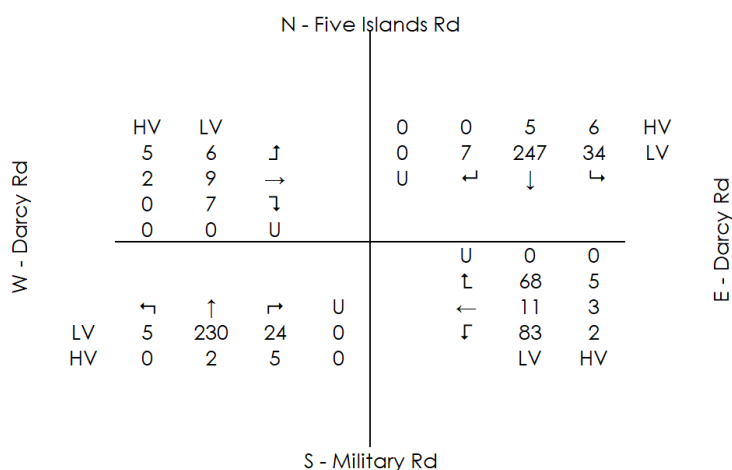


Figure 2.5: Existing Traffic Volumes (PM Peak)



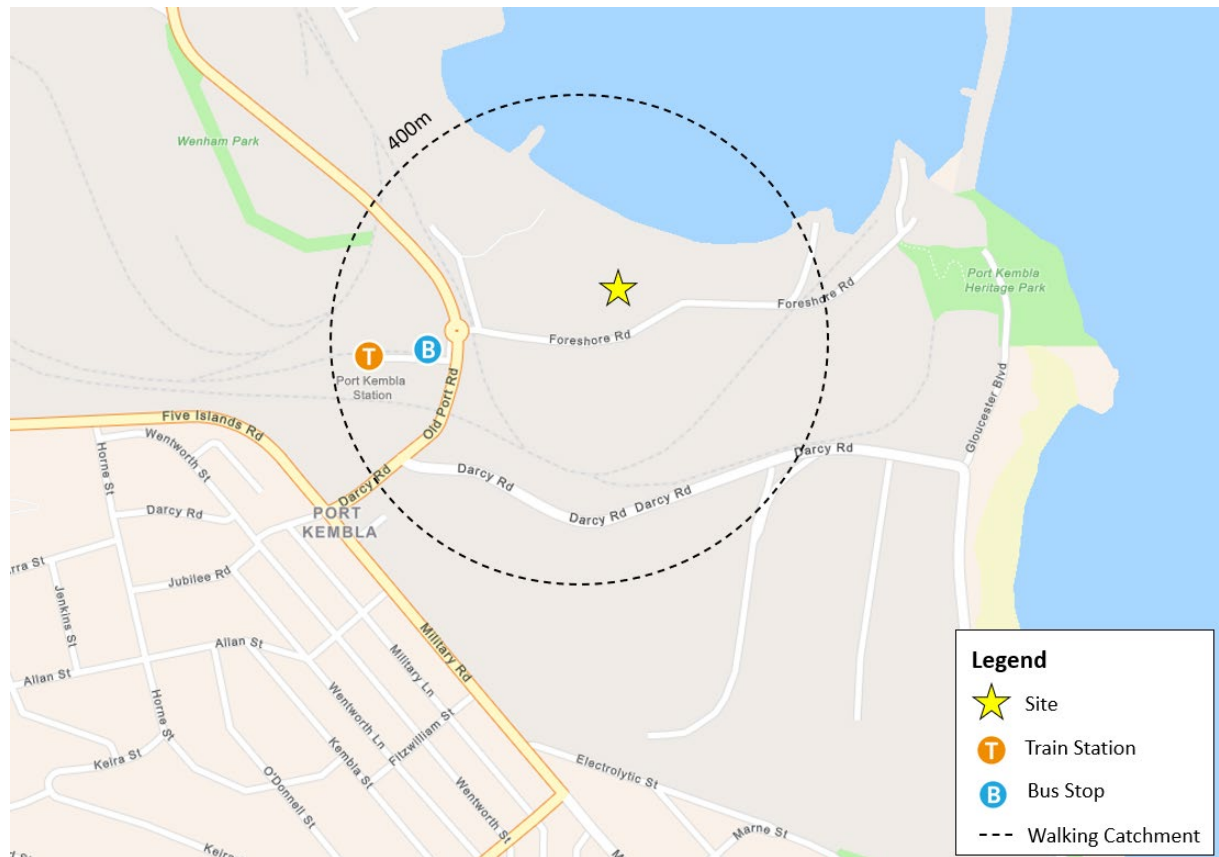
2.4 Public Transport Facilities

The closest train station to the site is Port Kembla Station which is serviced by the south-coast line every hour. It is located 350m or a 4-minute walk from the site.

The closest bus stop to the site is located off Old Port Road which is 220m or a 3-minute walk from the site. It is serviced by the bus routes Route 43 and Route 65 every hour.

The public transport facilities within 400m radial distance of the site are shown in Figure 2.4

Figure 2.6: Nearby Public Transport Facilities

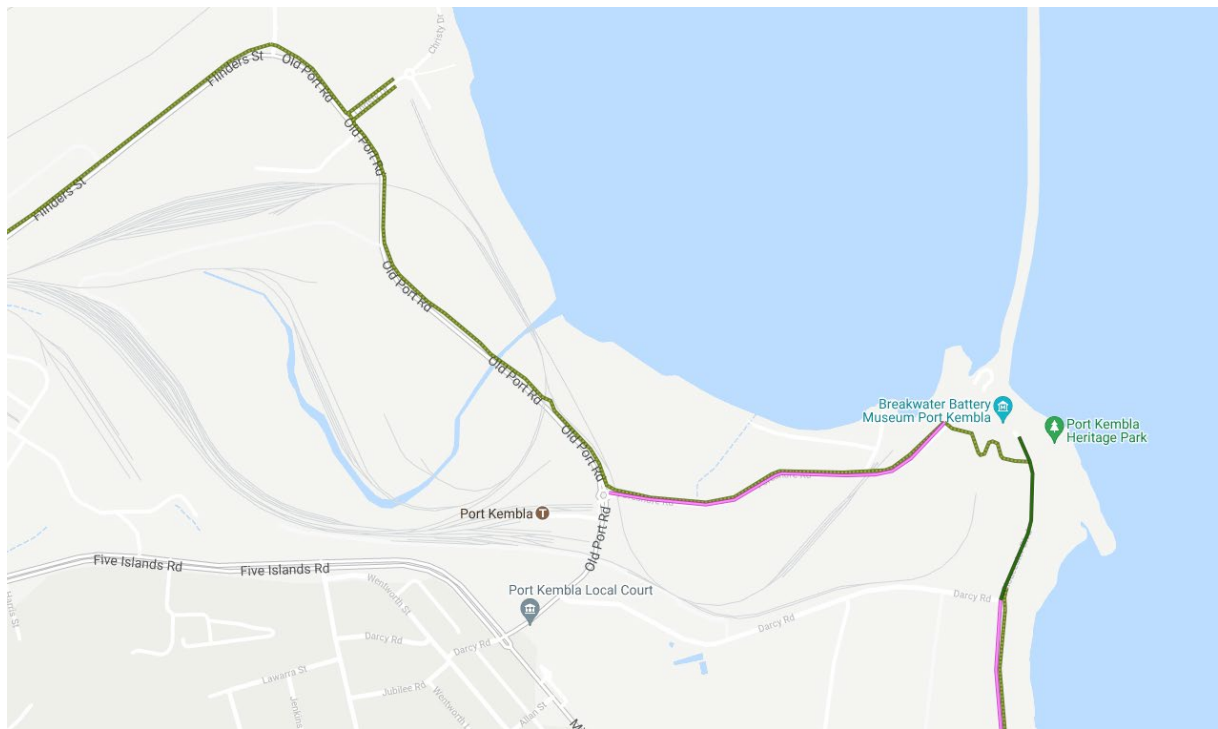


2.5 Pedestrian and Cycle Infrastructure

There are sealed pedestrian footpaths along Foreshore Road and Old Port Road. There is also a separated off-road shared path along the northern side of Foreshore Road.

There are available cycling routes near the site on Old Port Road and Foreshore Road which are shown in Figure 2.5.

Figure 2.7: Nearby Cycling Route



3 Proposed Development

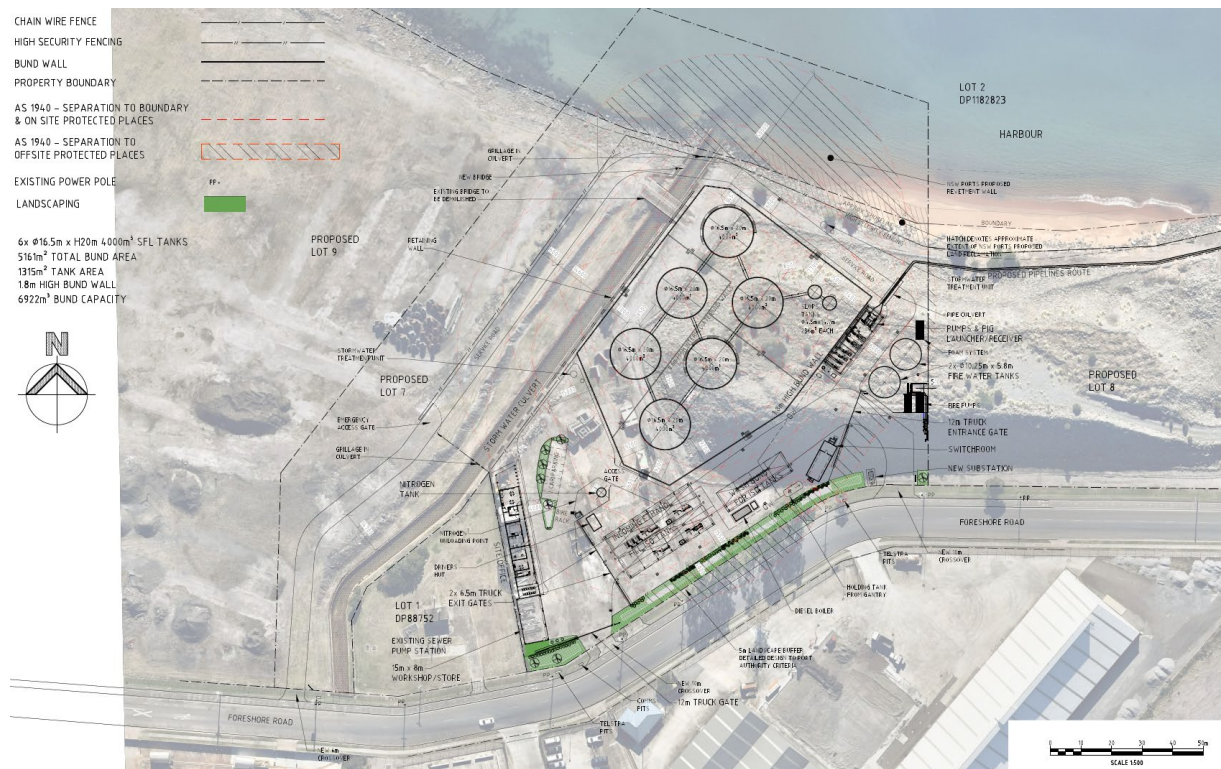
3.1 Proposed Site Description

The proposed development is to provide a bulk liquids storage facility to receive, store and export ethanol product at Site B, Foreshore Road. It also includes two related pipelines from the facility location at Site B, Foreshore Road to the existing Berth 206.

The site is expected to operate 24 hours a day.

The proposed site layout is shown in Figure 3.1, with full architectural layout plans provided in Appendix B.

Figure 3.1: Proposed Site Layout



3.2 Vehicle Access

As part of the proposed development, two driveways are to be constructed off Foreshore Road. The eastern driveway will be utilised for ingress movements and the western driveway will be utilised for egress movements.

Vehicle access has been designed to facilitate vehicles up to and including a 25m B-double and a 33m A-double dedicated to ethanol transport.

Swept path analysis has been undertaken, which demonstrates appropriate access to/from the site. All vehicles will enter and exit the site in a forward direction. This swept path analysis is provided in Appendix C.

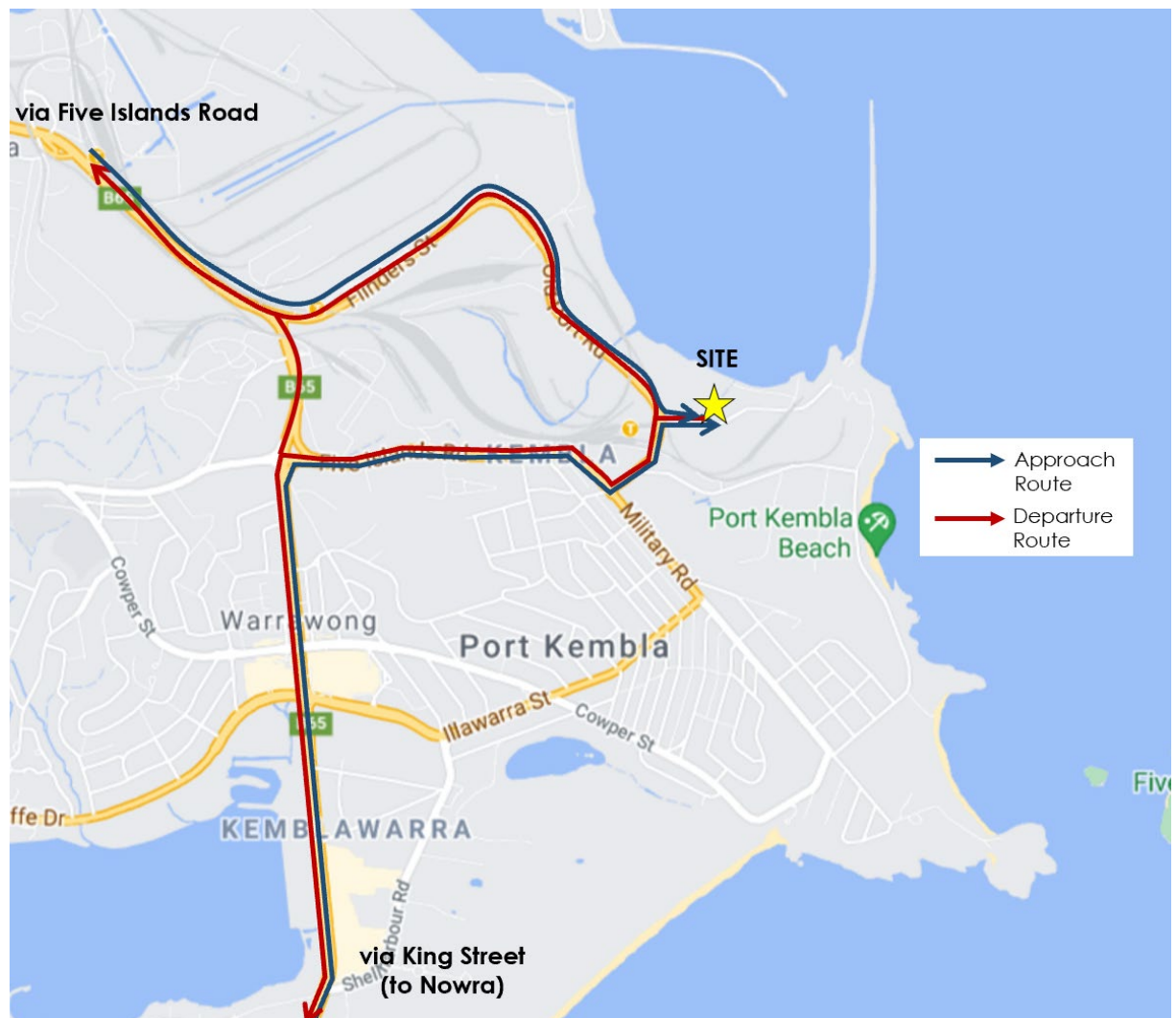
3.3 Access Route Study

Generally, vehicles would have origins and destinations throughout Sydney. There will however be several major deliveries to the site from Nowra (i.e. tank deliveries). Dedicated truck vehicle routes have been developed to provide the shortest distances to/from the arterial road network, whilst minimising the impact of traffic on local streets within the vicinity of the site.

All truck drivers will be advised of the designated truck routes and be recommended to use the nominated routes to travel to the site.

On a local level, the designated truck routes to/from the site shall be provided off Foreshore Road in order to travel to/from the wider arterial road network via Old Port Road and Five Islands Road as shown in Figure 3.2 and Figure 3.4.

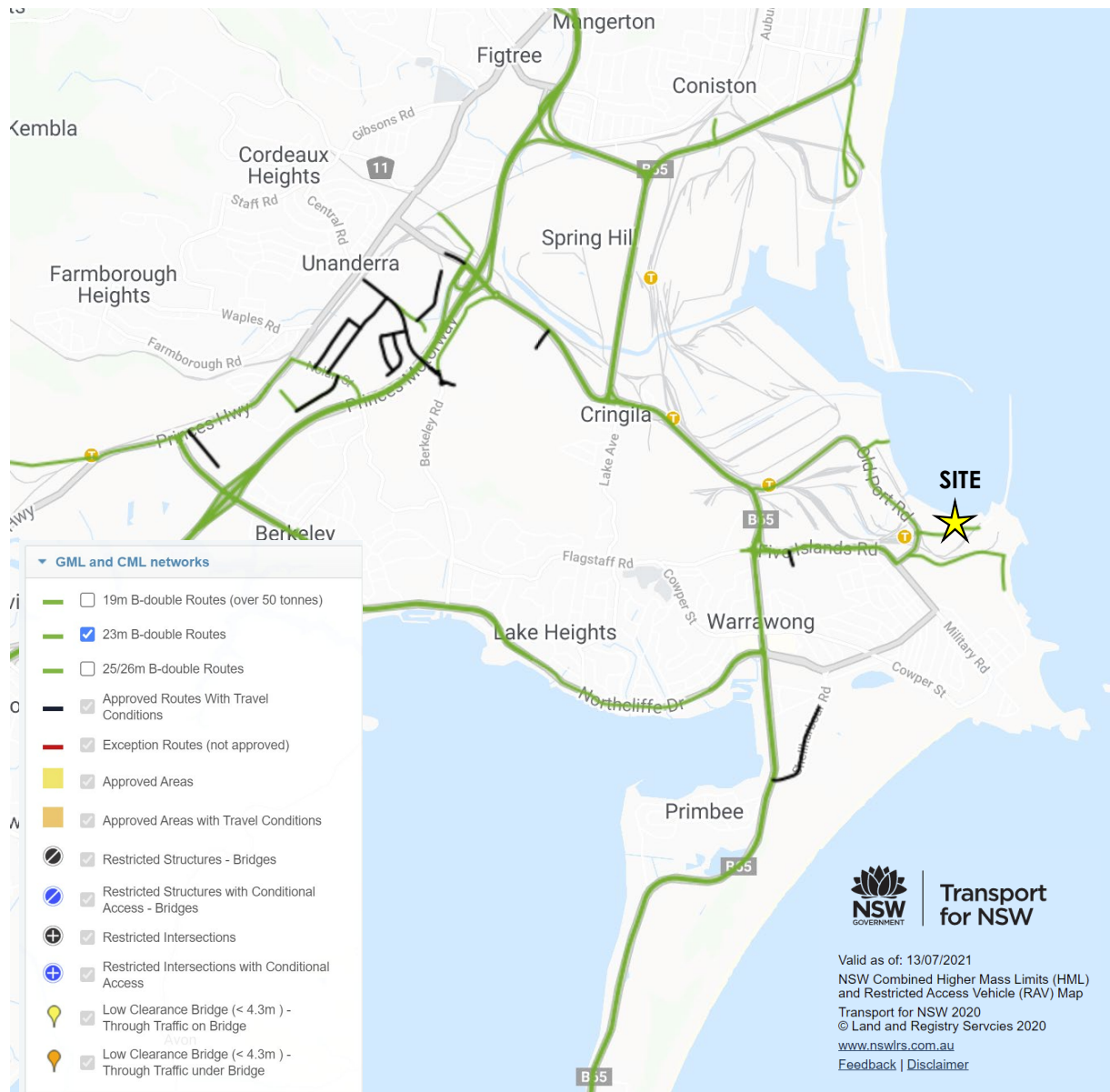
Figure 3.2: Nominated Construction Truck Routes (B-Doubles Routes)



Base Map Source: Google Maps

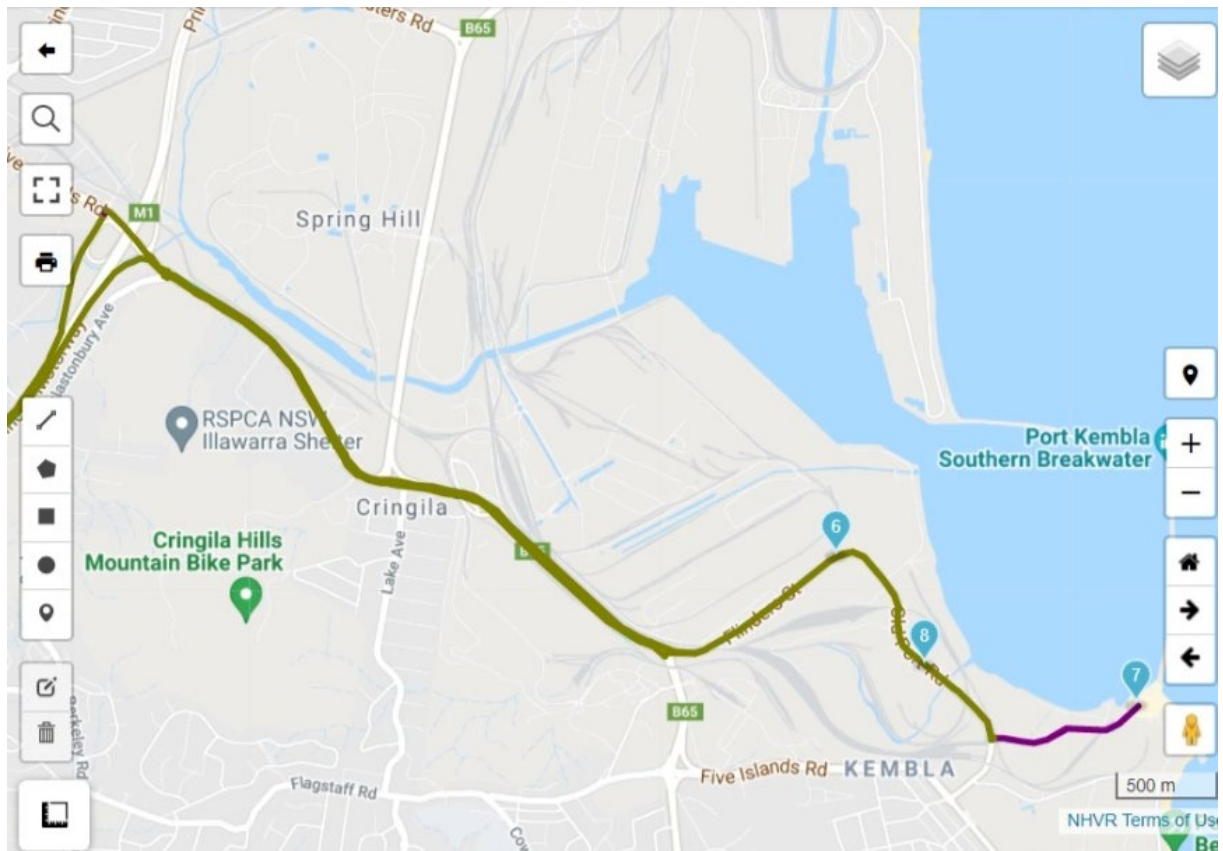
The nominated truck routes are consistent with the approved B-double routes set out by TfNSW in accordance with the NSW Combined Higher Mass Limits (KML) and Restricted Access Vehicle (RAV) Map, as shown in Figure 3.3.

Figure 3.3: TfNSW Approved B-Double Routes



The approved National Heavy Vehicle Regulator (NHVR) A-Double route is shown in Figure 3.4.

Figure 3.4: NHVR A-Double Approved Route



It's further noted that Foreshore Road provides access to an industrial area. Therefore, the adjoining roads are designed to accommodate predominantly heavy vehicles and would be able to accommodate development traffic.

3.4 Emergency Vehicle Access

Emergency vehicle access would be permitted at all times. The site access and surrounding road network accommodates vehicles up to A-double vehicles. Therefore, access for emergency vehicles would be easily accommodated.

An access road is provided around the facility for fire safety access. Refer to Section 4.3.

3.5 Materials and Handling

All dangerous goods will be stored wholly on site, within close proximity to internal circulation areas. This will provide easy access for emergency vehicles such as fire trucks and ambulances.

Ethanol is to be stored within the site. In addition, nitrogen and LPG be stored to support the handling of ethanol. These goods are to be supplied by reputable suppliers (such as BOC etc.) and therefore will be appropriately handled.

LPG will be stored in five 210 kg bottles located beside the truck driveway, providing ready access for emergency services. The LPG storage system will be installed and maintained in accordance with Australian Standards.

4 Parking Assessment

4.1 Car Parking Requirements

4.1.1 Port Kembla Development Code 2016

Car parking standards for the proposed development are contained within the Port Kembla Development Code 2016. A review of the car parking requirements for the proposed development with three to five staff members on site at any given time (generally during site peak operations) is shown in Table 4.2.

Table 4.1: Port Kembla Development Code 2016 Car Parking Requirements

Land Use	Minimum DCP Parking Rate (3-5 staff)	Car Parking Requirement
Employee	1 parking space per staff member and contractor plus 10% ¹	4 to 6 spaces
Visitor	1 visitor parking space	1 space
Total Car Parking Requirement		5 to 7 spaces

¹calculation to be based on the maximum number of staff members and/ or contractors on site at any one time.

Table 4.2 indicates that the proposed development would require five to seven car spaces to serve the proposed development. It is proposed to provide seven car parking spaces to serve the proposed development. This is considered satisfactory based on the car parking requirements of the Port Kembla Development Code 2016.

4.1.2 Wollongong DCP

Car parking standards for the proposed development are also contained within the Wollongong City Council's Development Control Plan (DCP) 2009. A review of the car parking requirements for the proposed development is shown in Table 4.2.

Table 4.2: DCP Car Parking Requirements

Land Use	DCP Parking Rate	Proposed Development	
		Size (GFA)	Car Parking Requirement
Warehouse/ Distribution	1 car parking space per 75m ² GFA	120 m ²	2
Office	1 car parking space per 40m ² GFA	180 m ²	5
Total Car Parking Requirement			7

Table 4.2 indicates that the proposed development would require seven car spaces to serve the proposed development. It is noted that the DCP does not specify this car parking requirement as a minimum or maximum.

As indicated previously, it is proposed to provide seven car parking spaces to serve the proposed development. These spaces will generally service staff and is considered satisfactory based on the anticipated use of the site (i.e. being a low car parking generator) and is consistent with DCP car parking requirements.

On this basis, the proposed car parking provision is satisfactory and complies with the Port Kembla Development Code and Council DCP requirements.

4.2 Loading Trucks and Truck Parking

It is proposed to provide two loading docks to service the proposed development. These loading docks have been designed to cater for vehicles up to and including a 25m B-double truck and a 33m A-double truck.

Servicing of the site would operate as a one-way system, with vehicles entering the site using the ingress driveway (eastern driveway) to access the loading bays before exiting via the egress driveway (western driveway) off Foreshore Road.

The dedicated areas are to operate as the unloading area for ethanol shipments from Manildra's Nowra facility.

A swept path assessment was undertaken which indicates that there is sufficient space to accommodate the manoeuvring movement of a 25m B-Double and a 33 A-double truck into and out of the site and loading spaces. All vehicles will enter and exit the site in a forward direction at all times. This is shown in Appendix B.

4.3 Perimeter Roadway Design

TPPP has reviewed the perimeter roadway in accordance with Part 10 of the development code in relation to Safety, Risk and Hazard Management and confirms that the following is provided:

- 6m clear road width
- Corners designed to accommodate the turning of emergency vehicles / trucks
- Connected to main roadway (Foreshore Road) at the front of the site by an internal site road no less than 6m wide, and
- Unobstructed access along the full length of the road.

TPPP's swept path assessment along the internal perimeter roadway is provided in Appendix C.

4.4 Accessible Parking

The Port Kembla Development Code 2016 provides car parking requirements for people with disabilities. A minimum of one accessible parking space is required.

The Wollongong City Council DCP 2009 also provides car parking requirements for people with disabilities. One accessible car parking space for every 100 spaces or part thereof is required. Therefore, for the five car spaces provided, one accessible space is required.

It is proposed to comply with car parking requirements from both the above-mentioned standards and allocate one space as an accessible parking space. This accessible space shall be designed as a 2.4m wide by 5.4m long space, with an adjacent shared space of the same dimensions, as per AS2890.6:2009 design requirements.

4.5 Bicycle Parking

The Port Kembla Development Code 2016 mentions that bicycle parking spaces must be provided but there is no specific rate given. Therefore, the bicycle parking requirements for the proposed development has been assessed based on the Wollongong City Council DCP 2009 as shown in Table 4.3.

Table 4.3: DCP Bicycle Parking Requirements

Land Use	DCP Parking Rate	Proposed Development	
		Size (GFA)	Bicycle Parking Requirement
Warehouse/ Distribution	1 bicycle space per 200m ² GFA	120	1
Office	1 bicycle space per 200m ² GFA for staff plus 1 bicycle space per 750m ² GFA for visitors	180	2
Total Bicycle Parking Requirement			3

Table 4.3 indicates that the proposed development requires three bicycle parking spaces. It is proposed to comply with these bicycle parking requirements and provide a bicycle parking area, suitable for four bicycle parking spaces (i.e. two bicycle parking rails). Therefore, the proposed bicycle parking provision is considered satisfactory.

5 Traffic Impact Assessment

5.1 Traffic Generation

The TfNSW Guide to Traffic Generating Developments (2002) guideline does not provide traffic generation rates for a bulk liquids storage facility.

However, Manildra has provided truck delivery information for the proposed development, which includes truck movements and employees/service vehicles movements as summarised in Table 5.1.

Table 5.1: Estimated Vehicle Movements

	Litres	Truck Payload (litres)	Trucks per Annum	Trucks per Week	Trucks per Day	Trucks per Hour	Vehicle Movements per Hour
Export	250,000,000	74,000	3,380	65	13	1.6 (2)	3.2 (4)
Iso tanks & trucks out loading	50,000,000	50,000	1,000	20	4	0.5 (1)	2
Employees and service vehicles	-	-	-	-	-	-	7
Total	300,000,000	124,000	4,380	85	17	3	8

Table 5.1 indicates that there will be a total of three trucks per hour and eight vehicle movements per hour. Assuming that the trucks will enter and exit the site within the same hour, this could equate to up to six truck movements per hour on a typical day, which is considered low. This level of development traffic can be accommodated on site and will not cause any queuing on the local road network. Therefore, the development is not expected to generate any discernible traffic impact on the surrounding road network.

In addition to this, the proposed development is well below the road traffic volume limits set out in Condition 2.7 of the Port Kembla Outer Harbour Development approval, shown in Table 5.2.

The trucks per annum is based on the capacity of the facility. Therefore, it is not expected that the truck movements would exceed the above estimate. Notwithstanding, the plant control system will be able to produce a report of the number of truck deliveries to the terminal in any given time. This would be used to monitor operations and ensure compliance with the above maximum vehicle numbers. Authorities will be able to request this information if required.

Table 5.2: Comparison of Proposed Development Traffic Volumes and Road Limits

Element	Road Limit		Total Proposed Development Traffic	Compliance (Y/N)
	Bulk	General		
Trucks per year	60,714	64,000	4,100	Y
Trucks per day (average)	166	175	17	Y
Trucks per hour (peak)	10	11	3	Y
Two-way peak hour truck movements	21	22	6	Y
Two-way vehicle movements per hour	121 vehicle movements per hour (102 trucks + 19 employee vehicles)		13 vehicle movements per hour (6 trucks + 7 employee vehicles)	Y

Given that these traffic volumes are well below the threshold limits for the Port Kembla Outer Harbour Development, the proposed development is considered satisfactory.

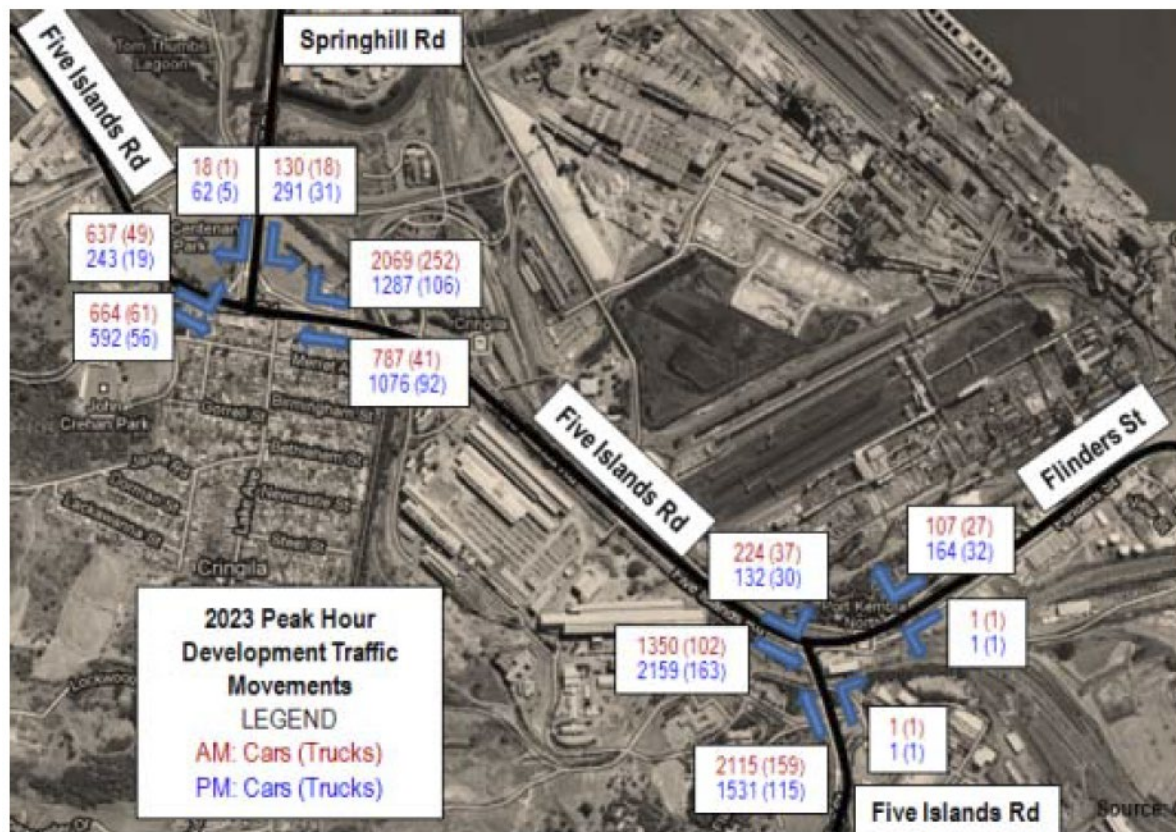
The proposed development is not expected to generate a substantial amount of traffic (i.e. represents three to 15 per cent of the total traffic road limits for the Port Kembla Outer Harbour Development) and could not be expected to generate any adverse traffic impacts on the surrounding road network, nor any safety or operational issues.

5.2 Cumulative Traffic Generation

The cumulative traffic generation of the Port Kembla Outer Harbour Development has been sourced from other previous traffic generation studies undertaken within the area. Specifically, the Port Kembla Grinding Mill traffic generation assessment for Cement Australia, which was subsequently approved on 26 September 2019.

Reference to the Port Kembla Grinding Mill Traffic Impact Assessment (Bitzios, 2011) indicates that the future traffic volumes in the area with background growth and Port Kembla Grinding Mill traffic would be as shown in Figure 5.1.

Figure 5.1: Port Kembla Anticipated Background Traffic Growth



Map Source: Google 2010

Figure 4.5: 2023 Traffic Volumes with Development

Source: Port Kembla Grinding Mill Traffic Impact Assessment prepared by Bitzios Consulting (dated 21 January 2011)

It is also noted that the anticipated traffic generation associated with the Port Kembla Grinding Mill site is expected to be in the order of 42 trips in the peak hour when the site is operating at maximum capacity, as summarised in Table 5.3.

Table 5.3: Traffic Generation – Grinding Mill

Trip Generation	Raw Material (Truck Trips per day)	Raw Material (Truck Trips per hour) ¹	Finished Product (Truck Trips per day)	Finished Product (Truck Trips per hour) ²
21 Area to Site	116	9	0	0
Site to 21 Area (note: raw material returning empty)	116	9	0	0
Site to F6 (note: raw material returning empty)	8	1	230	10
F6 to Site (note: finished product returning empty)	8	1	230	10
Site to Five Islands South (note: raw material returning empty)	16	1	2	0
Five Islands South to Site (note: finished product returning empty)	16	1	2	0
Total	280	22	464	20

¹ Daily movement divided by 13 hours per day

² Daily movement divided by 24 hours per day

Further to this, SIDRA Intersection analysis was undertaken as part of the traffic assessment, which demonstrated that the traffic impacts associated with the Grinding Mill site with consideration to the cumulative traffic generation of the wider Outer Harbour Development was minimal in terms of changes in the intersection performance at key intersections.

On this basis, it should be noted that the proposed development is expected to generate 13 trips (6 truck trips and 7 employee vehicle trips) in the peak hour. This level of traffic is low (i.e. one vehicle every 4-5 minutes) and could not be expected to generate any discernible traffic impacts on intersection performance.

Therefore, the proposed development could not be expected to result in any adverse traffic impact on the surrounding network.

On this basis, the proposed development is considered satisfactory.

5.3 Road Capacity Considerations

Austrroads sets out typical mid-block capacities for various types of urban roads with interrupted flow (e.g. from cross and turning traffic at minor intersections) as shown in Table 5.4.

Table 5.4: Austroads Mid-block Capacities for Urban Roads with Interrupted Flow

Type of Lane	One-way mid-block capacity (pc/h)
Median or inner lane	
Divided road	1,000
Undivided road	900
Middle lane (of a 3 lane carriageway)	
Divided lane	900
Undivided road	1,000
Kerb lane	
Adjacent to parking lane	900
Occasional parked vehicles	600
Clearway conditions	900

5.3.1 Foreshore Road

Foreshore Road is generally a divided two-lane two-way road (i.e. one lane in either direction) with kerbside parking available on the southern side of the road. Table 5.4 indicates that this road could have the capacity to accommodate 600 cars per hour.

As detailed in Section 2.3, tube counts were undertaken along the frontage of the site to record traffic volumes on Foreshore Road. These surveys indicate that existing traffic volumes along Foreshore Road are in the order of 100 vehicle movements per hour, which is well below the mid-block capacities as shown in Table 5.4.

Taking the proposed development traffic into consideration (i.e. 13 vehicle movements), Foreshore Road is expected to continue to operate well below its mid-block capacity with 113 vehicle movements per hour during peak periods. On this basis, traffic associated with the proposed development could not be expected to have a detrimental effect to the safety or operation of the surrounding road network.

5.3.2 Old Port Road

Old Port Road is generally a divided two-lane two-way road (i.e. one lane in either direction) with a kerbside parking lane available on the western side of the road. Table 5.4 indicates that this road could have the capacity to accommodate 900 cars per hour.

As detailed in Section 2.3.2, up to 162 vehicles are currently travelling north on Old Port Road and up to 172 vehicles are travelling south on Old Port Road. This equates to two-way flow of 300 vehicles per hour.

Taking the proposed development traffic into consideration (i.e. 13 vehicle movements), and assuming that all development traffic travels to and from the north, via Old Port Road, the development would increase traffic along Old Port Road by 4%, which is a nominal increase in traffic and still within the capacity of the road.

On this basis, traffic associated with the proposed development could not be expected to have a detrimental effect to the safety or operation of the surrounding road network.

Traffic impacts associated with the proposed development is considered satisfactory.

5.4 Intersection Capacity Assessment

Intersection capacity analysis has been conducted using SIDRA Intersection 9 modelling software to ascertain the intersection performance at the key nominated intersection in vicinity of the site.

Roads and Maritime uses the performance measure level of service (LoS) to define how efficient an intersection is operating under given prevailing traffic conditions. Level of service is directly related to the delays experienced by traffic travelling the intersection. Level of service ranges from LoS A to LoS F. LoS A indicates the intersection is operating with spare capacity, while LoS F indicates the intersection is operating above capacity. LoS D is the long-term desirable level of service.

Level of service is directly related to the average delay experienced by vehicles travelling through the intersection. At signalised intersections, the average delay is the volume weighted average of all movements. For roundabouts and priority-controlled intersections (give way and stop sign), the average delay relates to the worst movement.

Table 5.5 shows the criteria that SIDRA Intersection adopts in assessing the level of service.

Table 5.5: Level of Service Criteria for Intersection Operation

Level of Service	Average Delay (seconds per vehicle)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays	Near capacity and accident study required
F	Greater than 71	Unsatisfactory with excessive queuing	Unsatisfactory with excessive queuing; requires other control mode

Source: TfNSW Guide to Traffic Generating Developments, 2002

The intersection of Five Islands Road/ Darcy Road has been reassessed using SIDRA Intersection, with added development traffic. The following scenarios have been assessed:

- Existing Conditions (2022)
- Post Development (2022 + Development).

The traffic has been distributed such that all vehicles travel to/from this intersection.

5.4.1 Operation Stage

During the operational stage, the development is expected to generate 13 vehicles per hour. The result of the SIDRA analysis of the existing conditions and the post development scenarios are presented in Table 5.6 with full results contained in **Appendix D**.

Table 5.6: Intersection Operation at Five Islands Rd/ Darcy Rd

Scenarios	AM Peak		PM Peak	
	Delay (sec/veh)	Level of Service	Delay (sec/veh)	Level of Service
Existing Conditions	26	B	24	B
Post Development	28	B	25	B

Table 5.6 indicates that under the post development scenario, the intersection would continue to operate at similar levels of service to existing conditions, that is level of service B.

5.4.2 Construction Stage

As mentioned in the Construction Traffic Management Plan (CTMP), the development is only expected to generate 6 light vehicle movements per hour and 3 truck movements per hour during the construction stage. This is lower than the expected traffic generation during the operation stage (7 light vehicle trips per hour and 6 truck trips per hour).

Therefore, the road network would also operate satisfactorily during the construction stage.

6 Construction Management

6.1 Construction Description

The construction of the proposed development is anticipated to involve the following key activities:

- Relocation of stockpile from the site and construction of a retaining wall adjacent to the canal, concurrent with drainage design form works
- Excavation for draining and piling works for tank pedestals and other structures
- Construction of concrete tank footings and other foundations, including concrete bund walls and floors
- Erection of storage tanks and transportation of slops tanks fully assembled and placed on their footings
- Construction of piping, electrical, fire fighting, services, roadways and other finishing works
- Installation of pipelines to berth 206 will be constructed concurrently.

The extent of the work site shall generally be wholly contained within the site boundary, with minimal impact on the surrounding road network.

A Construction Traffic Management Plan has also been prepared to accompany the State Significant Development (SSD) documentation. A preliminary review of construction traffic management requirements is however set out below.

6.2 Construction Programme

The construction is expected to commence in September 2022 for a total period of twelve months, with an estimated completion date in September 2023.

6.3 Work Hours

Construction works shall be carried out in accordance with the approved work hours specified in the conditions of consent for the development. It is envisaged that construction activities associated with the project (except blasting and dredging activities) and which are audible at sensitive receivers, shall only be undertaken during the following hours:

- Monday to Friday: 7am-6pm
- Saturday: 8am-1pm
- No work is to be undertaken on Sundays or Public Holidays.

It is also expected that low noise works shall be permitted to occur in accordance with noise management levels as specified in the conditions of consent for the development.

6.4 Construction Vehicle Type

Construction vehicle likely to be generated by the proposed construction activities would range from small rigid vehicles to 25m long B-double vehicles for large deliveries. It may also be necessary to use 32m A-doubles for other larger deliveries to/from the works site (e.g. delivery of plant equipment and tanks).

The traffic generated by construction activities is further detailed in the Construction Traffic Management Plan, however given the size of the proposed development and low traffic conditions of the surrounding road network, the construction traffic generation is expected to have a negligible impact on existing traffic conditions.

6.5 Site Access and Vehicle Routes

Vehicle access to the site will be provided directly off Foreshore Road. All construction vehicles will be required to enter and exit the site in a forward direction at all times.

To minimise the impact of construction traffic on local streets, dedicated construction routes will be developed to provide the shortest distances to/from the arterial road network. These routes are detailed construction traffic management plan.

All construction vehicles are to radio or call on approach to ensure adequate access arrangement to the works site is made available. It should be noted that priority will be given to all construction truck movements entering the site rather than truck movements exiting the site to minimise the impact on the adjacent road network. If there are any materials spilt on the road, site personnel will rectify the issue accordingly, subject to appropriate OH&S provision.

No special provisions for emergency service vehicles are required as part of the proposed construction works. Emergency vehicle access shall be maintained at all times during the course of construction.

6.6 Parking

Employee vehicle parking will be provided on site on the western side of the canal during construction, as well as some on-site car parking. All workers will however be encouraged and expected to use public transport and/or carpool to travel to/from the site. This will be incorporated in the workers induction program to ensure minimal parking impact on surrounding streets.

6.7 Heavy Vehicle Loads Requirement

All drivers will be required to adhere to the posted vehicle load limits on all roads and not overload vehicles beyond its maximum load limits and/or relevant approvals.

6.8 Worker Induction

All workers and subcontractors engaged on site will be required to undergo a site induction.

The induction will include permitted access routes to and from the construction site for all vehicles, as well as standard environmental, OH&S, driver protocols and emergency procedures.

Any workers required to undertake works or traffic control within the public domain shall be suitably trained and will be covered by adequate and appropriate insurances. All traffic control personnel will be required to hold Transport for NSW (Roads and Maritime Services) accreditation.

6.9 Traffic Control Plan

A Traffic Control Plan (TCP) would be prepared by and submitted to Council / NSW Ports to appropriately manage the use of the designated construction routes. The TCP would outline how potential construction vehicle manoeuvres could be accommodated in and out of the construction site and detailed location of temporary roadside signage. This is detailed in the Construction Traffic Management Plan.

6.10 Construction Traffic Management Plan

A Construction Traffic Management Plan (CTMP) would be required to be prepared and submitted to Council / NSW Ports for approval, prior to the commencement of any works. The CTMP will provide further details on the construction activities and their impacts, if any.

7 Conclusion

This report examines the traffic and parking implications of the proposed bulk storage facility to receive, store and export ethanol at Site B, Foreshore Road, Port Kembla.

The key findings of the report are provided below:

- The proposed site will be accessed off Foreshore Road via separate ingress and egress site access points.
- Vehicle access to the site has been designed to cater vehicles up to and including a 25m long B-double vehicle and 33m A-double vehicle.
- It is proposed to provide seven car parking spaces to serve the proposed development, which is consistent with the parking requirements in the Port Kembla Development Code 2016. Appropriate bicycle parking will also be provided in accordance with DCP parking requirements.
- The car park layout and its elements are proposed to be designed in accordance with AS2890.1:2004, AS2890.2:2018 and AS2890.6:2009.
- The proposed development is expected to generate an additional 13 vehicle movements per hour (6 trucks + 7 employee vehicles) during the peak periods, which is considered low.
- The proposed traffic generation associated with the site is expected to be well below the traffic road limits as set out in Condition 2.7 of the Port Kembla Outer Harbour Development approval, as well as below the existing road capacity of Foreshore Road.
- Intersection assessment results indicate that the Five Islands Road/ Darcy Road intersection would continue operate at similar levels of service to existing conditions, that is at level of service B.

Overall, the traffic and parking aspects associated with the proposed development are considered satisfactory. The proposed development is not expected to generate any discernible traffic impacts on the surrounding road network from a traffic capacity perspective.

Appendix A

Traffic surveys

TRANS TRAFFIC SURVEY

trafficsurvey.com.au

T. 1300 82 88 82 - F. 1300 83 88 83 - E. traffic@trafficsurvey.com.au - W. www.trafficsurvey.com.au

AUTOMATIC COUNT SUMMARY

Street Name :	Foreshore Rd	Location :	Outside Property 7
Suburb :	Port Kembla	Start Date :	00:00 Thu 06/May/2021
Tubecounter ID	EE41F10V	Finish Date :	00:00 Thu 13/May/2021
Site ID Number :	1648	Speed Zone :	50 km/h
Prepared By :	Vo Son Binh	Email:	binh@trafficsurvey.com.au

GPS information		Lat	34° 28' 34.99 South	Direction of Travel		
		Long	150° 54' 30.54 East	Both directions	Westbound	Eastbound
Traffic Volume : (Vehicles/Day)		Weekdays Average		958	477	481
		7 Day Average		956	476	480
Weekday	AM	10:00		85	44	41
Peak hour start	PM	12:00		84	46	37
Speeds : (Km/Hr)		85th Percentile		56.8	56.3	57.2
		Average		49.6	48.6	50.5
Classification % :		Light Vehicles up to 5.5m		81.3%	81.3%	81.7%

Location

GPS Information [Load Google Map \(internet required\)](#)

(Latitude, Longitude) -34.476385, 150.908484



[Speed Data](#) [Speed Graph](#) [Speed Bin](#)
[Volume Data](#) [Volume Graph](#) [Classification](#)



QUALITY ASSURED COMPANY BY ISO 9001:2015

OH&S SYSTEM CERTIFIED TO ISO 4801:2001

ENVIRONMENT MANAGEMENT SYSTEM CERTIFIED TO ISO14001:2015



Site Foreshore Rd

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Direction Both directions ▼

Day 7 Days ▼

Note: #N/A "Modal Speed" means too few data points

Hour Start	Total Vehicles	Average Speed	85th percentile	Modal Speed	Minimum Speed	Maximum Speed	Standard Deviation
00:00	3	55.8	59.6	57	31.4	73.7	3.9
01:00	6	50.3	54.4	51	29.1	70.2	4.0
02:00	2	49.8	51.5	49	18.2	66.5	2.4
03:00	8	47.5	51.8	47	27.3	71.0	4.7
04:00	11	50.0	56.8	52	27.4	75.0	5.9
05:00	22	48.7	56.9	52	15.9	76.6	6.5
06:00	34	48.7	57.6	50	15.8	73.1	7.0
07:00	43	48.9	57.6	50	14.6	73.7	6.8
08:00	62	47.3	56.3	48	11.6	75.2	6.7
09:00	75	46.7	55.6	47	13.5	75.4	7.1
10:00	85	47.9	55.9	49	13.6	76.7	7.3
11:00	86	48.6	56.6	50	12.3	75.9	7.5
12:00	79	48.9	56.9	50	11.4	75.3	7.7
13:00	72	48.4	56.8	49	13.4	74.9	7.6
14:00	63	48.8	57.3	50	14.3	76.8	7.1
15:00	63	49.8	57.8	51	12.5	76.6	7.3
16:00	63	49.5	58.3	50	11.5	77.2	7.2
17:00	55	50.1	59.8	51	18.2	76.1	6.9
18:00	33	51.2	59.4	53	22.0	77.9	7.1
19:00	20	51.0	58.0	52	29.1	73.5	6.9
20:00	20	52.4	59.2	53	32.8	71.8	7.0
21:00	15	53.5	60.7	54	30.0	75.4	7.0
22:00	11	50.3	56.8	49	29.3	73.8	5.9
23:00	5	45.9	50.6	46	22.1	79.6	4.8
Summary	936	49.6	56.8	50	11.4	79.6	6.3

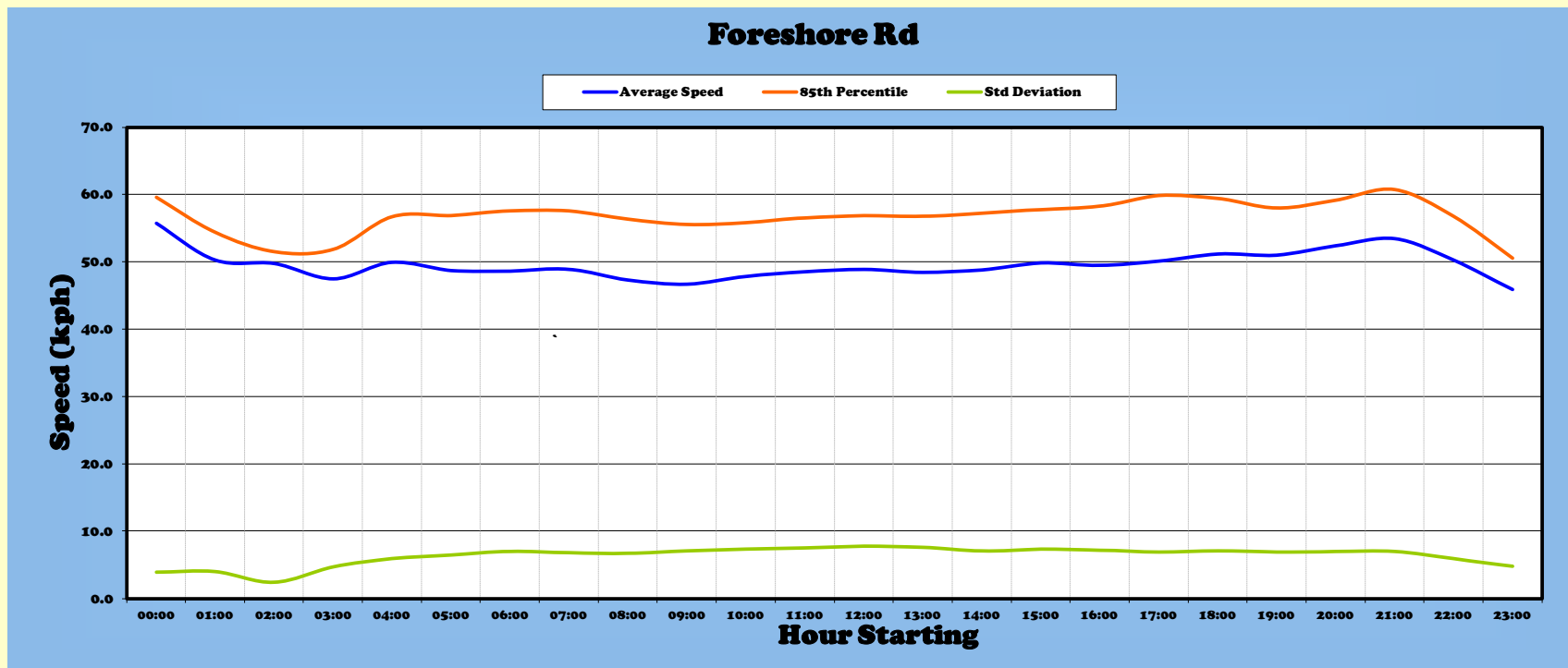


Site Foreshore Rd

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Direction Both directions ▼

Day 7 Days ▼





Site Foreshore Rd

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Direction Both directions

Day 7 Days

10km/h Speed Bin	
> 40 km/hr	84.73%
> 50km/hr	46.88%
> 60 km/hr	10.24%
> 70 km/hr	1.20%
> 80 km/hr	0.00%
> 90 km/hr	0.00%
> 100 km/hr	0.00%
> 110 km/hr	0.00%

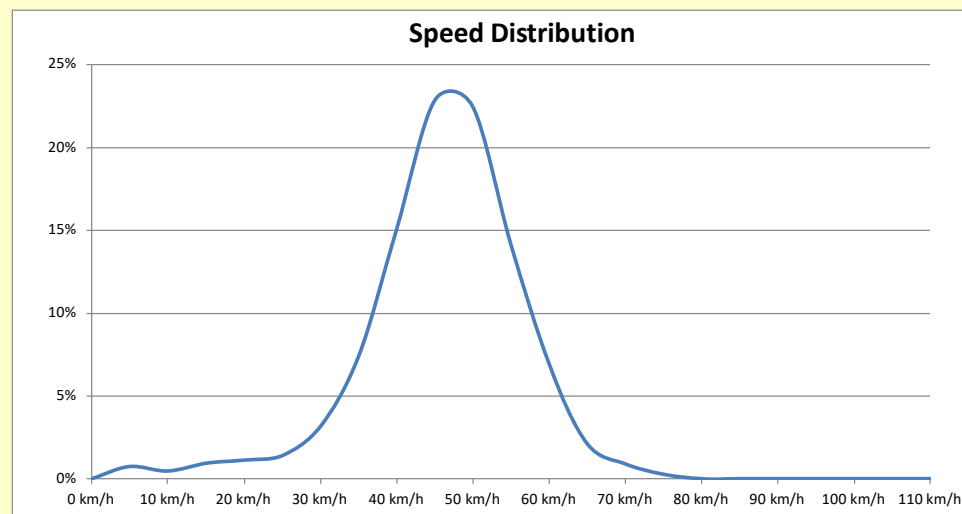
Ave Traffic Composition	
Cars	82.71%
Trucks	9.18%
Heavy Trucks	8.11%

Ave Speed Data	
85% P'tile	56.8 km/h
Mean Speed	50.4 km/h
Min. Speed	11.4 km/h
Max. Speed	79.6 km/h
Deviation	6.3 km/h

Recommended Speed Zone	
60 km/h	

5km/h Speed Bin	
> 0 km/h	100.00%
> 5 km/h	100.00%
> 10 km/h	99.27%
> 15 km/h	98.80%
> 20 km/h	97.85%
> 25 km/h	96.70%
> 30 km/h	95.28%
> 35 km/h	92.12%
> 40 km/h	84.73%
> 45 km/h	69.72%
> 50 km/h	46.88%
> 55 km/h	24.39%
> 60 km/h	10.24%
> 65 km/h	3.32%
> 70 km/h	1.20%
> 75 km/h	0.28%
> 80 km/h	0.00%
> 85 km/h	0.00%
> 90 km/h	0.00%
> 95 km/h	0.00%
> 100 km/h	0.00%
> 105 km/h	0.00%
> 110 km/h	0.00%

Speed Range Distribution (5km/h bin)	
> 0 km/h & ≤ 5 km/h	0.00%
> 5 km/h & ≤ 10 km/h	0.73%
> 10 km/h & ≤ 15 km/h	0.46%
> 15 km/h & ≤ 20 km/h	0.96%
> 20 km/h & ≤ 25 km/h	1.15%
> 25 km/h & ≤ 30 km/h	1.42%
> 30 km/h & ≤ 35 km/h	3.15%
> 35 km/h & ≤ 40 km/h	7.40%
> 40 km/h & ≤ 45 km/h	15.01%
> 45 km/h & ≤ 50 km/h	22.84%
> 50 km/h & ≤ 55 km/h	22.49%
> 55 km/h & ≤ 60 km/h	14.15%
> 60 km/h & ≤ 65 km/h	6.92%
> 65 km/h & ≤ 70 km/h	2.12%
> 70 km/h & ≤ 75 km/h	0.91%
> 75 km/h & ≤ 80 km/h	0.28%
> 80 km/h & ≤ 85 km/h	0.00%
> 85 km/h & ≤ 90 km/h	0.00%
> 90 km/h & ≤ 95 km/h	0.00%
> 95 km/h & ≤ 100 km/h	0.00%
> 100 km/h & ≤ 105 km/h	0.00%
> 105 km/h & ≤ 110 km/h	0.00%
> 110 km/h	0.00%





Site Foreshore Rd

Direction Both directions ▼

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Day Date	Monday 10/05/2021	Tuesday 11/05/2021	Wednesday 12/05/2021	Thursday 6/05/2021	Friday 7/05/2021	Saturday 8/05/2021	Sunday 9/05/2021	7 days		Weekday		Weekend	
	10:00	09:00	10:00	10:00	11:00	10:00	11:00	Total	Average	Total	Average	Total	Average
AM Peak	10:00	09:00	10:00	10:00	11:00	10:00	11:00	N/A	10:00	N/A	10:00	N/A	11:00
PM Peak	12:00	12:00	16:00	12:00	12:00	14:00	14:00	N/A	12:00	N/A	12:00	N/A	14:00
00:00	2	4	0	0	0	12	8	26	4	6	1	20	10
01:00	0	10	7	7	2	11	13	50	7	26	5	24	12
02:00	2	2	3	4	2	5	3	21	3	13	3	8	4
03:00	8	12	18	6	2	7	5	58	8	46	9	12	6
04:00	20	19	20	8	7	6	7	87	12	74	15	13	7
05:00	46	19	28	18	14	20	20	165	24	125	25	40	20
06:00	39	37	53	34	26	32	31	252	36	189	38	63	32
07:00	54	44	64	33	34	45	40	314	45	229	46	85	43
08:00	62	73	73	69	73	52	37	439	63	350	70	89	45
09:00	77	104	66	69	61	82	73	532	76	377	75	155	78
10:00	88	101	104	71	62	91	83	600	86	426	85	174	87
11:00	88	79	99	62	92	79	100	599	86	420	84	179	90
12:00	93	86	72	77	90	58	78	554	79	418	84	136	68
13:00	71	61	55	72	74	85	76	494	71	333	67	161	81
14:00	60	63	69	50	49	86	80	457	65	291	58	166	83
15:00	84	67	67	58	47	61	56	440	63	323	65	117	59
16:00	67	84	83	53	48	67	53	455	65	335	67	120	60
17:00	85	48	58	45	45	55	49	385	55	281	56	104	52
18:00	38	37	31	39	22	44	18	229	33	167	33	62	31
19:00	28	14	33	16	19	20	20	150	21	110	22	40	20
20:00	24	23	19	18	20	20	22	146	21	104	21	42	21
21:00	11	17	22	16	16	15	17	114	16	82	16	32	16
22:00	12	6	13	8	19	7	23	88	13	58	12	30	15
23:00	6	6	8	1	5	17	2	45	6	26	5	19	10
Total	1065	1016	1065	834	829	977	914	6700	958	4809	962	1891	950
% Heavy	20.09%	26.97%	23.10%	24.70%	17.97%	8.50%	7.00%	18.45%		22.65%		7.77%	



Site

Foreshore Rd

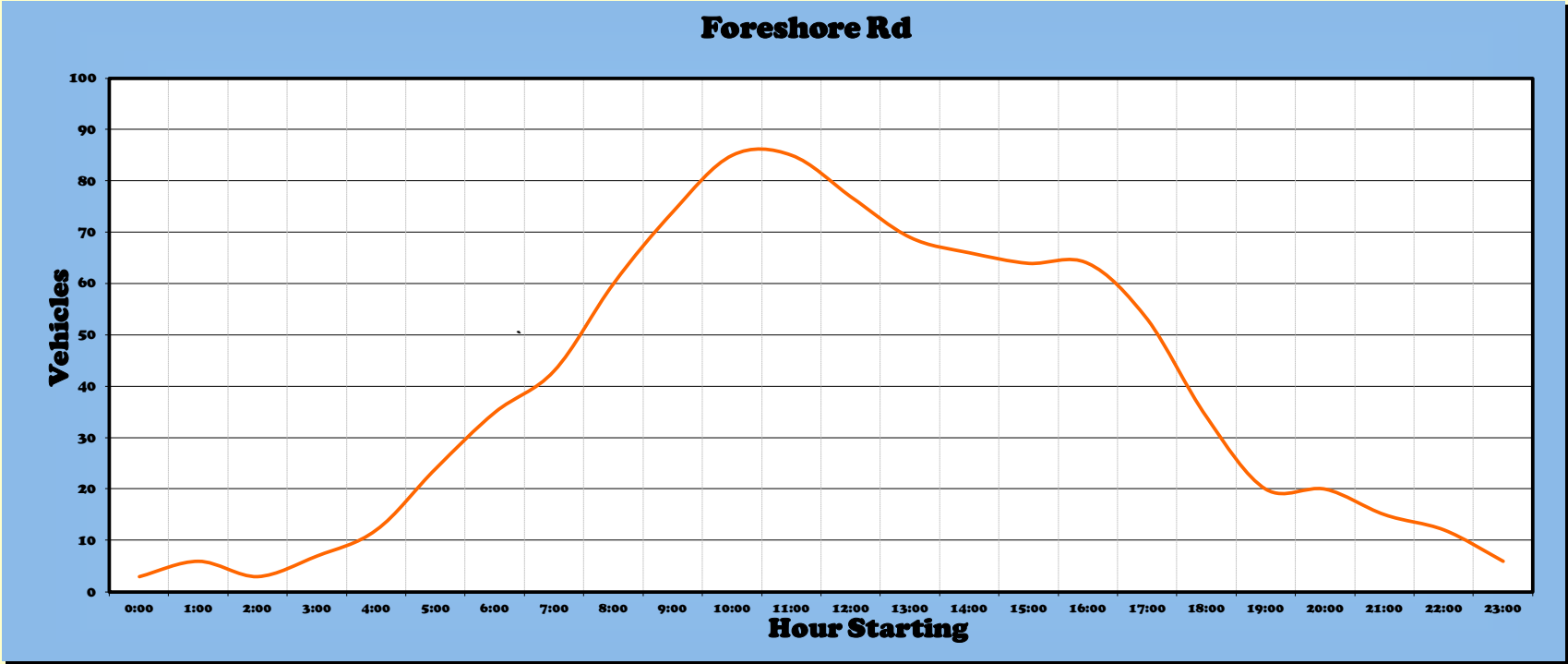
Direction

Both directions

Day

7 Days

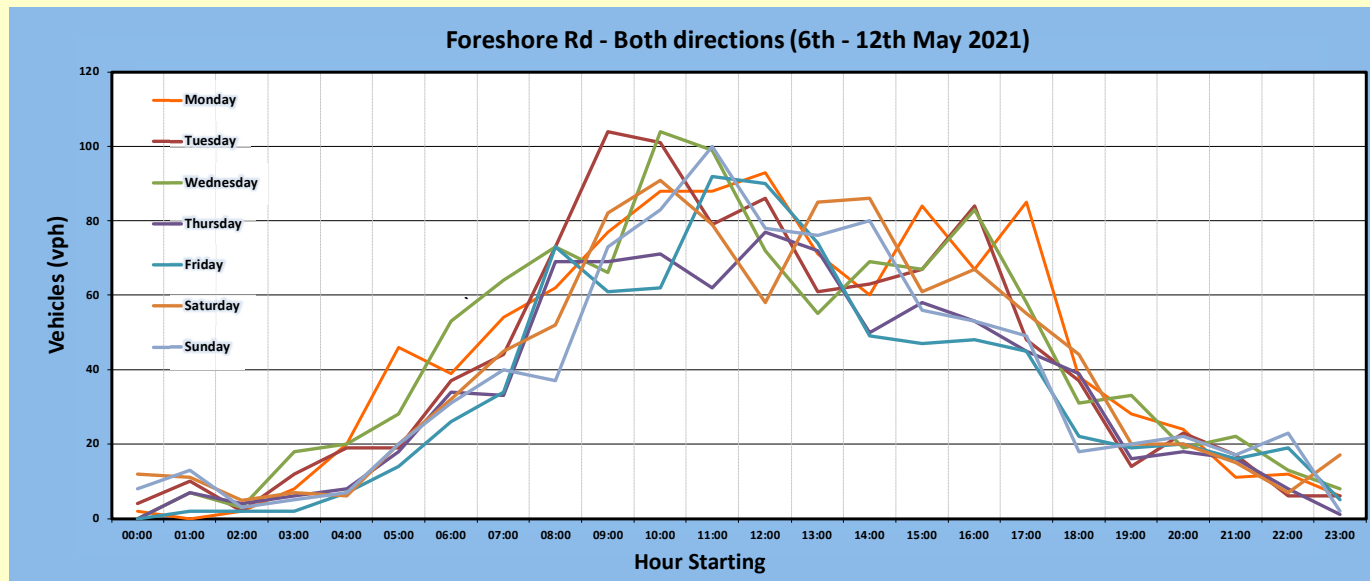
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Direction



Volume Summary

Day Date	Monday 10/05/2021	Tuesday 11/05/2021	Wednesday 12/05/2021	Thursday 6/05/2021	Friday 7/05/2021	Saturday 8/05/2021	Sunday 9/05/2021
AM Peak 10:00 12:00	10:00 12:00	09:00 12:00	10:00 16:00	10:00 12:00	11:00 12:00	10:00 14:00	11:00 14:00
00:00	2	4	0	0	0	12	8
01:00	0	10	7	7	2	11	13
02:00	2	2	3	4	2	5	3
03:00	8	12	18	6	2	7	5
04:00	20	19	20	8	7	6	7
05:00	46	19	28	18	14	20	20
06:00	39	37	53	34	26	32	31
07:00	54	44	64	33	34	45	40
08:00	62	73	73	69	73	52	37
09:00	77	104	66	69	61	82	73
10:00	88	101	104	71	62	91	83
11:00	88	79	99	62	92	79	100
12:00	93	86	72	77	90	58	78
13:00	71	61	55	72	74	85	76
14:00	60	63	69	50	49	86	80
15:00	84	67	67	58	47	61	56
16:00	67	84	83	53	48	67	53
17:00	85	48	58	45	45	55	49
18:00	38	37	31	39	22	44	18
19:00	28	14	33	16	19	20	20
20:00	24	23	19	18	20	20	22
21:00	11	17	22	16	16	15	17
22:00	12	6	13	8	19	7	23
23:00	6	6	8	1	5	17	2
Total	1065	1016	1065	834	829	977	914
% Heavy	20.09%	26.97%	23.10%	24.70%	17.97%	8.50%	7.00%



Site Foreshore Rd

Direction Both directions ▼

Day 7 Days ▼

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Hour Start	Vehicles Classifications												
	SV	SVT	TB2	TB3	T4	ART3	ART4	ART5	ART6	BD	DRT	TRT	UC
	1	2	3	4	5	6	7	8	9	10	11	12	13
12:00 AM	3	0	0	0	0	0	0	0	0	0	0	0	0
01:00 AM	6	0	0	0	0	0	0	0	0	0	0	0	0
02:00 AM	2	0	1	0	0	0	0	0	0	0	0	0	0
03:00 AM	5	0	0	0	0	0	0	0	1	1	0	0	0
04:00 AM	7	0	1	0	1	0	0	0	2	1	0	0	0
05:00 AM	17	2	2	1	0	0	0	1	1	0	0	0	0
06:00 AM	29	2	2	0	0	0	0	0	2	0	0	0	0
07:00 AM	35	1	5	0	0	0	0	0	1	1	0	0	0
08:00 AM	46	1	5	0	0	0	0	0	3	5	0	0	0
09:00 AM	53	1	8	1	0	0	0	1	5	5	0	0	0
10:00 AM	64	1	9	1	0	0	0	1	4	5	0	0	0
11:00 AM	69	1	8	1	0	0	0	1	3	2	0	0	0
12:00 PM	62	2	6	1	0	0	0	0	4	2	0	0	0
01:00 PM	54	1	9	0	0	0	0	1	3	1	0	0	0
02:00 PM	52	1	7	0	0	0	0	1	4	1	0	0	0
03:00 PM	51	2	6	1	0	0	0	0	2	2	0	0	0
04:00 PM	57	1	3	0	0	0	0	0	2	1	0	0	0
05:00 PM	48	2	2	0	0	0	0	0	1	0	0	0	0
06:00 PM	28	0	2	0	0	0	0	1	2	1	0	0	0
07:00 PM	18	0	1	0	0	0	0	0	1	0	0	0	0
08:00 PM	19	0	1	0	0	0	0	0	0	0	0	0	0
09:00 PM	15	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	11	0	1	0	0	0	0	0	0	0	0	0	0
11:00 PM	6	0	0	0	0	0	0	0	0	0	0	0	0
Summary	757	18	79	6	1	0	0	7	41	28	0	0	0

AUTOMATIC COUNTER SUMMARY AND DATA SHEET



Site Foreshore Rd

Direction Both directions ▼

Day 7 Days ▼

[Back to Site Summary Page](#)

AM Peak 10:00 AM

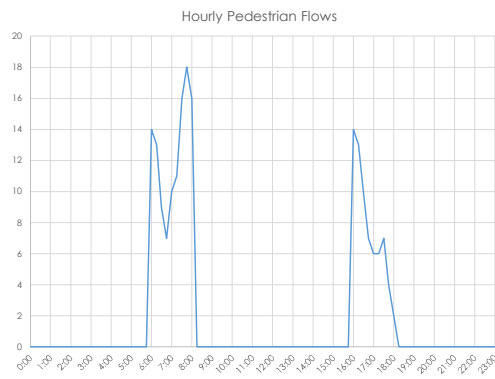
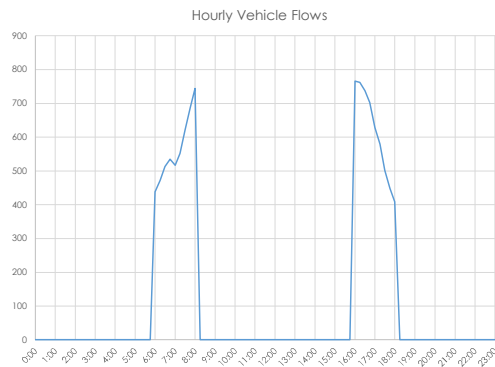
PM Peak 12:00 PM

Vehicle Classification Summary						
Hour Start	Light Vehicles (1-2)	Small Trucks (3)	Medium Trucks (4-5)	Large Trucks (6-12)	Unclassified (13)	Hour Total
0:00	3	0	0	0	0	3
1:00	6	0	0	0	0	6
2:00	2	1	0	0	0	3
3:00	5	0	0	2	0	7
4:00	7	1	1	3	0	12
5:00	19	2	1	2	0	24
6:00	31	2	0	2	0	35
7:00	36	5	0	2	0	43
8:00	47	5	0	8	0	60
9:00	54	8	1	11	0	74
10:00	65	9	1	10	0	85
11:00	70	8	1	6	0	85
12:00	64	6	1	6	0	77
13:00	55	9	0	5	0	69
14:00	53	7	0	6	0	66
15:00	53	6	1	4	0	64
16:00	58	3	0	3	0	64
17:00	50	2	0	1	0	53
18:00	28	2	0	4	0	34
19:00	18	1	0	1	0	20
20:00	19	1	0	0	0	20
21:00	15	0	0	0	0	15
22:00	11	1	0	0	0	12
23:00	6	0	0	0	0	6
Summary	775	79	7	76	0	937



transport planning

Job Number 21173
Intersection Five Islands Rd / Darcy Rd
Weather Fine + Overcast
Date Thursday, 17 February 2022
AM Peak 8:00 AM
PM Peak 4:00 PM



AM PEAK

Traffic Flows (Separate Classes)

W - Darcy Rd				E - Darcy Rd			
N - Five Islands Rd				S - Military Rd			
HV	1	10	↓	0	3	9	6
LV	5	9	↓	0	5	207	65
0	0	3	↓	U	↓	↓	↓
0	0	0	U	U	U	U	U
↓	↑	↑	↑	↓	↓	↓	↓
LV	6	226	71	0	0	0	0
HV	1	13	6	0	0	0	0
Total				Total			
7	239	77	0	0	0	0	0

Traffic Flows (Totals)

W - Darcy Rd				E - Darcy Rd			
N - Five Islands Rd				S - Military Rd			
11	↓	0	8	216	71	0	0
14	↓	U	↓	↓	↓	0	0
3	↓	U	↓	↓	↓	32	4
0	U	U	U	↓	↓	30	2
↓	↑	↑	↑	↓	↓	36	7
7	239	77	0	0	0	0	0

Traffic Flows (Totals + Heavies)

W - Darcy Rd				E - Darcy Rd			
N - Five Islands Rd				S - Military Rd			
HV	1	11	↓	0	3	9	6
Total	5	11	↓	0	8	216	71
HV	0	14	↓	U	↓	↓	↓
0	0	3	↓	U	↓	↓	↓
0	0	0	U	U	U	U	U
↓	↑	↑	↑	↓	↓	↓	↓
Total	7	239	77	0	0	0	0
HV	1	13	6	0	0	0	0
Total				Total			
7	239	77	0	0	0	0	0

PM PEAK

Traffic Flows (Separate Classes)

W - Darcy Rd				E - Darcy Rd			
N - Five Islands Rd				S - Military Rd			
HV	5	6	↓	0	0	5	6
LV	2	9	↓	0	7	247	34
0	0	7	↓	U	↓	↓	↓
0	0	0	U	U	U	U	U
↓	↑	↑	↑	↓	↓	↓	↓
LV	5	230	24	0	0	0	0
HV	0	2	5	0	0	0	0
Total				Total			
5	232	29	0	0	0	0	0

Traffic Flows (Totals)

W - Darcy Rd				E - Darcy Rd			
N - Five Islands Rd				S - Military Rd			
11	↓	0	7	252	40	0	0
11	↓	U	↓	↓	↓	0	0
7	↓	U	↓	↓	↓	73	5
0	U	U	U	↓	↓	14	3
↓	↑	↑	↑	↓	↓	85	2
5	232	29	0	0	0	0	0













Traffic Flows (Totals + Heavies)

W - Darcy Rd				E - Darcy Rd			
N - Five Islands Rd				S - Military Rd			
HV	5	11	↓	0	0	5	6
Total	5	11	↓	0	7	252	40
HV	0	11	↓	U	↓	↓	↓
0	0	7	↓	U	↓	↓	↓
0	0	0	U	U	U	U	U
↓	↑	↑	↑	↓	↓	↓	↓
Total	5	232	29	0	0	0	0
HV	0	2	5	0	0	0	0
Total				Total			
5	232	29	0	0	0	0	0

AustRoads94

Austroroads94 replaced NAASRA in Australia in 1994. It is an improved system using information from the spacings of the first three axles, the total number of axles and the number of axle groups. There are 13 classes.

- **Units:** Metric (m)
- **Car class:** 1
- **Unclassifiable vehicle class:** 13

Axles	Groups	Description	Class		Parameters	Dominant Vehicle	Aggregate
2	1 or 2	Short - Sedan, Wagon, 4WD, Utility, Light Van	SV	1	$d(1) \geq 1.7\text{m}$, $d(1) \leq 3.2\text{m}$ & axles=2		1 (Light)
3, 4 or 5	3	Short Towing - Trailer, Caravan, Boat, etc.	SVT	2	groups=3, $d(1) \geq 2.1\text{m}$, $d(1) \leq 3.2\text{m}$, $d(2) \geq 2.1\text{m}$ & axles=3,4,5		
2	2	Two axle truck or Bus	TB2	3	$d(1) > 3.2\text{m}$ & axles=2		2 (Medium)
3	2	Three axle truck or Bus	TB3	4	axles=3 & groups=2		
>3	2	Four axle truck	T4	5	axles>3 & groups=2		
3	3	Three axle articulated vehicle or Rigid vehicle and trailer	ART3	6	$d(1) > 3.2\text{m}$, axles=3 & groups=3		3 (Heavy)
4	>2	Four axle articulated vehicle or Rigid vehicle and trailer	ART4	7	$d(2) < 2.1\text{m}$ or $d(1) < 2.1\text{m}$ or $d(1) > 3.2\text{m}$ & axles = 4 & groups>2		
5	>2	Five axle articulated vehicle or Rigid vehicle and trailer	ART5	8	$d(2) < 2.1\text{m}$ or $d(1) < 2.1\text{m}$ or $d(1) > 3.2\text{m}$ & axles=5 & groups>2		
>=6	>2	Six (or more) axle articulated vehicle or Rigid vehicle and trailer	ART6	9	axles=6 & groups>2 or axles>6 & groups=3		
>6	4	B-Double B-Double or Heavy truck and trailer	BD	10	groups=4 & axles>6		
>6	5 or 6	Double road train or Heavy truck and two trailers	DRT	11	groups=5 or 6 & axles>6		
>6	>6	Triple road train or Heavy truck and three trailers	TRT	12	groups>6 & axles>6		

Appendix B

Architectural Layout Plan

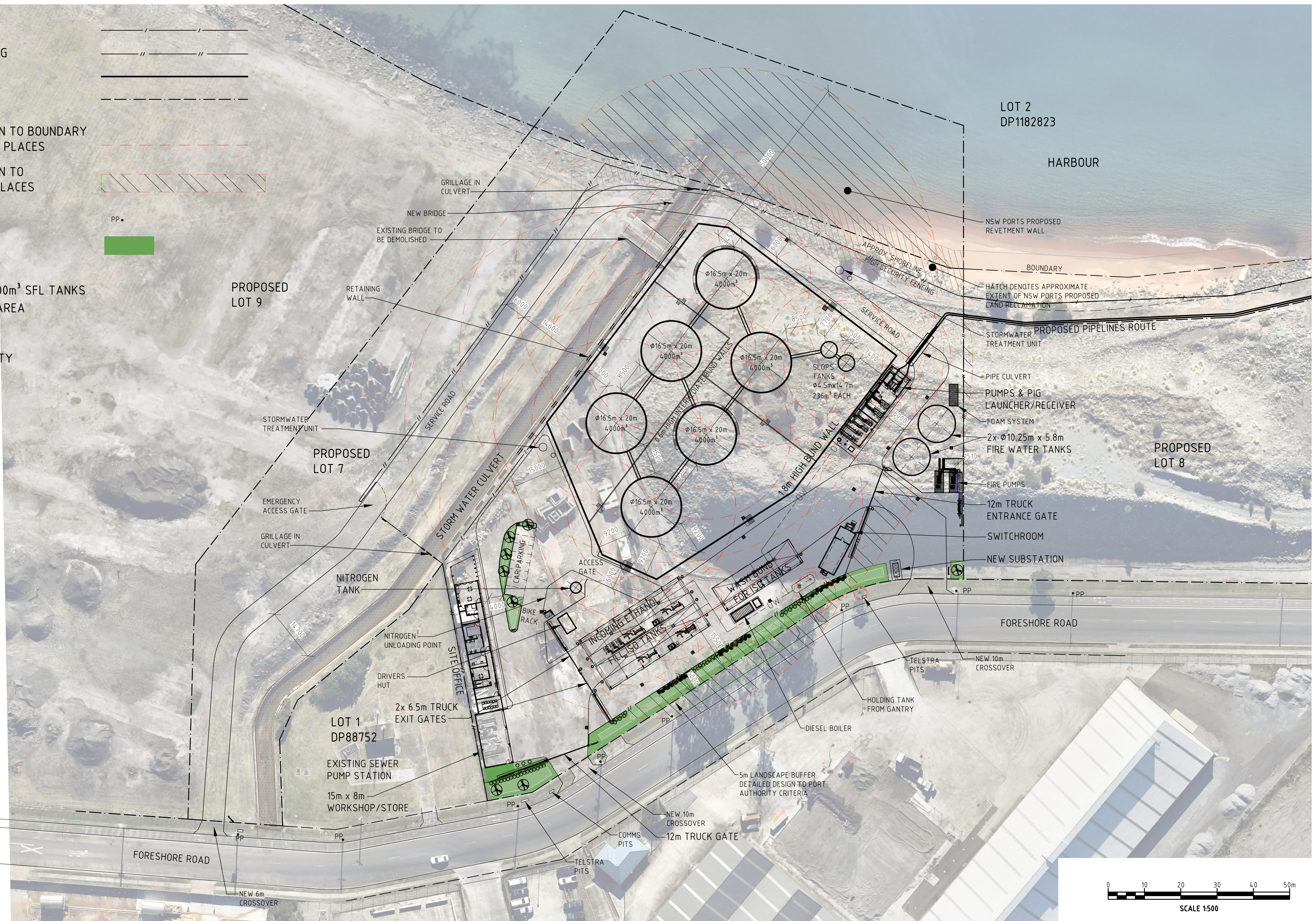
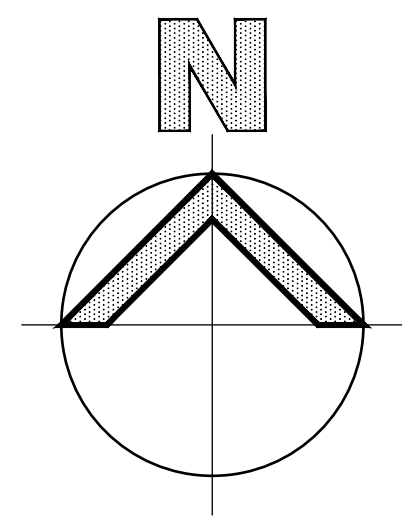
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pp. •

11

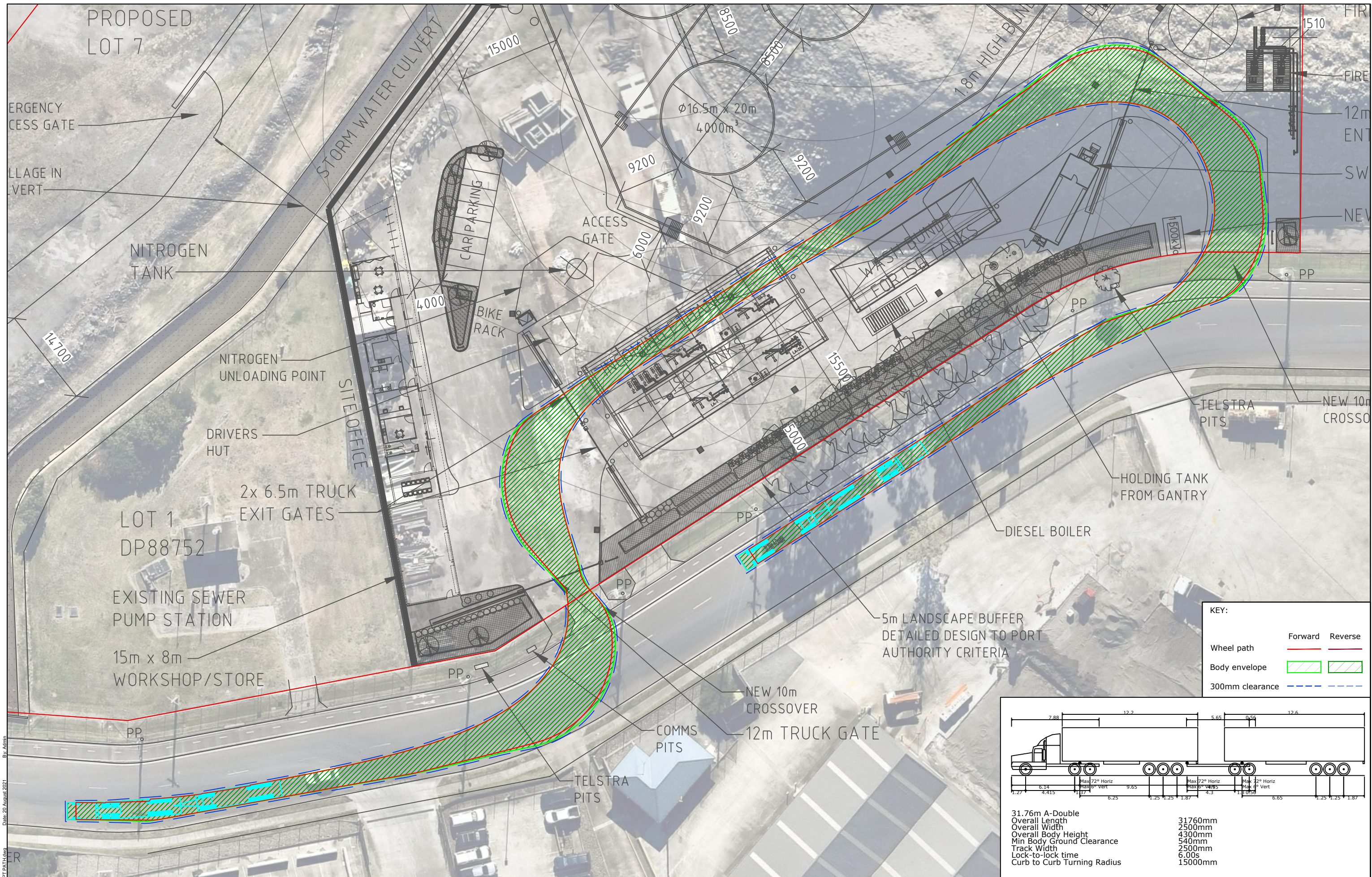
PROPOSED
LOT 9



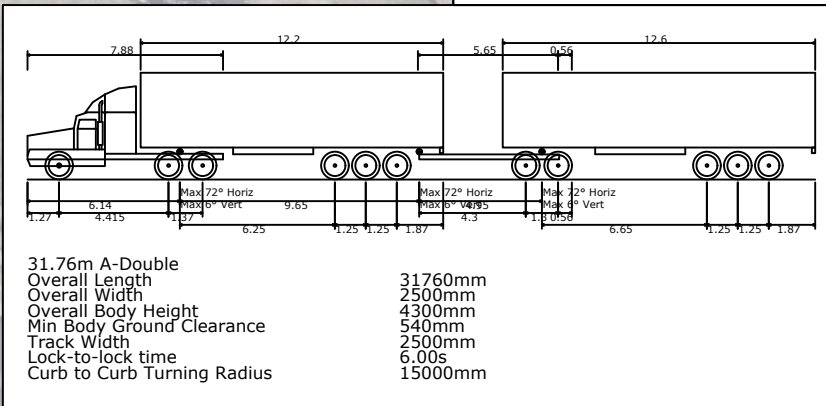
PROJECT MANAGERS PLANNERS DESIGNERS ENGINEERS		REV	DATE	BY	DESCRIPTION	CHK	APP	PROJECT CLIENT	PROJECT DETAILS	DRAWING TITLE	STATUS	
<div><div>TFA</div><div>Project Group</div></div> <div>Copyright: TFA Group Pty Ltd This drawing including design & information is covered by Copyright and all rights are reserved. This document may not be copied, reproduced, retained or disclosed to any unauthorised person, either wholly or in part, without prior consent in writing from TFA Group Pty Ltd. ACN 612 132 235 Ph: 617 3854 2900 Aust Wide: 1300 794 300 Email: enquiry@tfa.com.au Web: www.tfa.com.au</div>	A	24.06.21	LCC	PRELIMINARY ISSUE			<div><div></div><div>MANILDRA GROUP</div><div>100% AUSTRALIAN OWNED</div></div>	<div>MANILDRA GROUP</div> <div>PORT KEMBLA</div> <div>BULK LIQUIDS FACILITY</div> <div>FORESHORE ROAD</div> <div>PORT KEMBLA, NSW</div>	<div>PROPOSED SITE LAYOUT</div>	D.A. ISSUE		
	B	26.07.21	LCC	PRELIMINARY ISSUE						DATE CREATED	ORIGINAL SCALE	SHEET
	C	29.07.21	LCC	D.A. ISSUE						24.06.21	1:500	A1
	DO NOT SCALE THIS DRAWING. CONFIRM ALL DIMENSIONS ON SITE.											
								DRAWING NO		REV		
								20399-DA-A01		C		

Appendix C

Swept Path Assessment



KEY:		
Wheel path	Forward	Reverse
Body envelope		
300mm clearance		

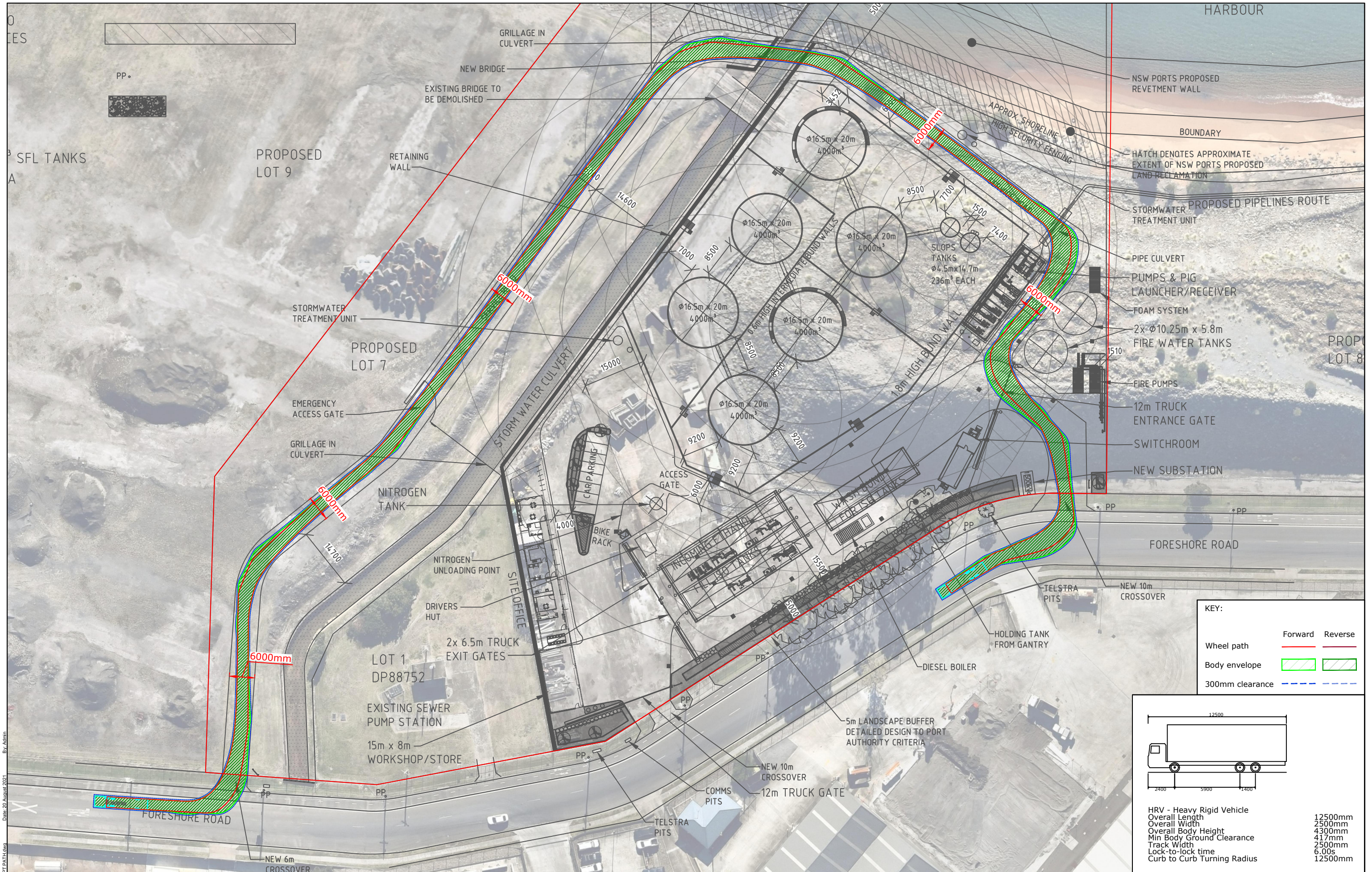


REV.	DESCRIPTION	DRAWN	CHECK	APP'D	DATE
A	ISSUE FOR DISCUSSION	KM	JN	KH	20/08/21



PROJECT	SITE B FORESHORE ROAD, PORT KEMBLA		
TITLE	SWEPT PATH ANALYSIS 31.76m A-DOUBLE		

DWG No.	21173CAD004 FIGURE 1		
DATE STAMP	20 AUGUST 2021		
PROJECT No.	21173	SCALE	1:500 @A3
REV.	A		



REV.	DESCRIPTION	DRAWN	CHECK	APP'D	DATE
A	ISSUE FOR DISCUSSION	KM	JN	KH	20/08/21



PROJECT	SITE B FORESHORE ROAD, PORT KEMBLA		
TITLE	SWEPT PATH ANALYSIS 12.5m NSW SPECIALIST FIRE APPLIANCE		

DWG No.	21173CAD004 FIGURE 3		
DATE STAMP	20 AUGUST 2021		
PROJECT No.	21173	SCALE	1:800 @A3
REV.	A		

Appendix D

SIDRA Results

MOVEMENT SUMMARY

 **Site: 101v [Ex AM (Site Folder: General)]**

New Site

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Military Road (S)														
1	L2	7	1	7	14.3	0.037	5.7	LOS A	0.0	0.0	0.00	0.06	0.00	57.1
2	T1	239	13	252	5.4	0.183	0.7	LOS A	0.8	5.7	0.22	0.16	0.22	57.8
3	R2	77	6	81	7.8	0.183	7.3	LOS A	0.8	5.7	0.29	0.19	0.29	55.2
Approach		323	20	340	6.2	0.183	2.4	NA	0.8	5.7	0.23	0.17	0.23	57.1
East: Darcy Road (E)														
4	L2	36	7	38	19.4	0.046	10.3	LOS A	0.2	1.3	0.35	0.90	0.35	50.5
5	T1	30	2	32	6.7	0.257	21.1	LOS B	1.0	7.4	0.74	1.03	0.84	43.8
6	R2	32	4	34	12.5	0.257	24.8	LOS B	1.0	7.4	0.74	1.03	0.84	43.4
Approach		98	13	103	13.3	0.257	18.3	LOS B	1.0	7.4	0.60	0.98	0.66	45.9
North: Five Islands Road (N)														
7	L2	71	6	75	8.5	0.043	5.6	LOS A	0.0	0.0	0.00	0.57	0.00	53.3
8	T1	216	9	227	4.2	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	8	3	8	37.5	0.009	7.4	LOS A	0.0	0.3	0.38	0.56	0.38	51.2
Approach		295	18	311	6.1	0.121	1.6	NA	0.0	0.3	0.01	0.15	0.01	57.9
West: Darcy Road (W)														
10	L2	11	1	12	9.1	0.011	9.0	LOS A	0.0	0.3	0.15	0.91	0.15	51.4
11	T1	14	5	15	35.7	0.084	25.9	LOS B	0.3	2.5	0.74	1.00	0.74	42.4
12	R2	3	0	3	0.0	0.084	20.1	LOS B	0.3	2.5	0.74	1.00	0.74	43.1
Approach		28	6	29	21.4	0.084	18.6	LOS B	0.3	2.5	0.51	0.96	0.51	45.6
All Vehicles		744	57	783	7.7	0.257	4.8	NA	1.0	7.4	0.20	0.30	0.21	55.1

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

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

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Queue Model: SIDRA Standard.

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

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

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Project: C:\Users\61425\Documents\21173\21173-220221.sip9

MOVEMENT SUMMARY

 **Site: 101v [PD AM (Site Folder: General)]**

New Site

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Military Road (S)														
1	L2	7	1	7	14.3	0.037	5.7	LOSA	0.0	0.0	0.00	0.06	0.00	57.1
2	T1	239	13	252	5.4	0.184	0.8	LOSA	0.8	5.8	0.22	0.16	0.22	57.8
3	R2	77	6	81	7.8	0.184	7.4	LOSA	0.8	5.8	0.29	0.19	0.29	55.1
Approach		323	20	340	6.2	0.184	2.4	NA	0.8	5.8	0.24	0.17	0.24	57.1
East: Darcy Road (E)														
4	L2	36	7	38	19.4	0.046	10.3	LOSA	0.2	1.3	0.35	0.90	0.35	50.5
5	T1	30	2	32	6.7	0.293	22.0	LOS B	1.1	9.0	0.76	1.04	0.90	42.8
6	R2	36	7	38	19.4	0.293	27.5	LOS B	1.1	9.0	0.76	1.04	0.90	42.3
Approach		102	16	107	15.7	0.293	19.8	LOS B	1.1	9.0	0.62	0.99	0.70	45.1
North: Five Islands Road (N)														
7	L2	80	9	84	11.3	0.049	5.7	LOSA	0.0	0.0	0.00	0.57	0.00	53.1
8	T1	216	9	227	4.2	0.121	0.0	LOSA	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	8	3	8	37.5	0.009	7.4	LOSA	0.0	0.3	0.38	0.56	0.38	51.2
Approach		304	21	320	6.9	0.121	1.7	NA	0.0	0.3	0.01	0.17	0.01	57.7
West: Darcy Road (W)														
10	L2	11	1	12	9.1	0.011	9.0	LOSA	0.0	0.3	0.15	0.91	0.15	51.4
11	T1	14	5	15	35.7	0.086	26.3	LOS B	0.3	2.5	0.74	1.00	0.74	42.2
12	R2	3	0	3	0.0	0.086	20.1	LOS B	0.3	2.5	0.74	1.00	0.74	43.0
Approach		28	6	29	21.4	0.086	18.9	LOS B	0.3	2.5	0.51	0.96	0.51	45.5
All Vehicles		757	63	797	8.3	0.293	5.1	NA	1.1	9.0	0.21	0.31	0.22	54.8

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

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

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Queue Model: SIDRA Standard.

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

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

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Project: C:\Users\61425\Documents\21173\21173-220221.sip9

MOVEMENT SUMMARY

 **Site: 101v [Ex PM (Site Folder: General)]**

New Site

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Military Road (S)														
1	L2	5	0	5	0.0	0.027	5.6	LOS A	0.0	0.0	0.00	0.06	0.00	57.8
2	T1	232	2	244	0.9	0.136	0.4	LOS A	0.4	2.5	0.12	0.08	0.12	58.9
3	R2	29	5	31	17.2	0.136	7.5	LOS A	0.4	2.5	0.15	0.08	0.15	56.0
Approach		266	7	280	2.6	0.136	1.3	NA	0.4	2.5	0.12	0.08	0.12	58.5
East: Darcy Road (E)														
4	L2	85	2	89	2.4	0.101	9.6	LOS A	0.4	2.6	0.37	0.90	0.37	51.1
5	T1	14	3	15	21.4	0.344	23.6	LOS B	1.5	11.0	0.75	1.06	0.94	43.2
6	R2	73	5	77	6.8	0.344	23.1	LOS B	1.5	11.0	0.75	1.06	0.94	43.4
Approach		172	10	181	5.8	0.344	16.5	LOS B	1.5	11.0	0.56	0.98	0.66	46.9
North: Five Islands Road (N)														
7	L2	40	6	42	15.0	0.025	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	53.0
8	T1	252	5	265	2.0	0.138	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	7	0	7	0.0	0.007	6.5	LOS A	0.0	0.2	0.33	0.54	0.33	52.8
Approach		299	11	315	3.7	0.138	0.9	NA	0.0	0.2	0.01	0.09	0.01	58.7
West: Darcy Road (W)														
10	L2	11	5	12	45.5	0.013	10.6	LOS A	0.0	0.4	0.14	0.96	0.14	50.0
11	T1	11	2	12	18.2	0.070	20.2	LOS B	0.2	1.8	0.68	1.00	0.68	44.9
12	R2	7	0	7	0.0	0.070	20.0	LOS B	0.2	1.8	0.68	1.00	0.68	45.2
Approach		29	7	31	24.1	0.070	16.5	LOS B	0.2	1.8	0.48	0.99	0.48	46.8
All Vehicles		766	35	806	4.6	0.344	5.1	NA	1.5	11.0	0.19	0.32	0.21	55.0

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

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

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Queue Model: SIDRA Standard.

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

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

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MOVEMENT SUMMARY

 **Site: 101v [PD PM (Site Folder: General)]**

New Site

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Military Road (S)														
1	L2	5	0	5	0.0	0.027	5.6	LOS A	0.0	0.0	0.00	0.06	0.00	57.8
2	T1	232	2	244	0.9	0.136	0.4	LOS A	0.4	2.5	0.12	0.08	0.12	58.8
3	R2	29	5	31	17.2	0.136	7.6	LOS A	0.4	2.5	0.15	0.08	0.15	56.0
Approach		266	7	280	2.6	0.136	1.3	NA	0.4	2.5	0.12	0.08	0.12	58.5
East: Darcy Road (E)														
4	L2	85	2	89	2.4	0.101	9.6	LOS A	0.4	2.6	0.37	0.90	0.37	51.1
5	T1	14	3	15	21.4	0.392	24.7	LOS B	1.7	13.4	0.77	1.08	1.02	42.5
6	R2	82	8	86	9.8	0.392	24.8	LOS B	1.7	13.4	0.77	1.08	1.02	42.6
Approach		181	13	191	7.2	0.392	17.7	LOS B	1.7	13.4	0.58	0.99	0.72	46.2
North: Five Islands Road (N)														
7	L2	44	9	46	20.5	0.029	5.8	LOS A	0.0	0.0	0.00	0.57	0.00	52.8
8	T1	252	5	265	2.0	0.138	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	7	0	7	0.0	0.007	6.5	LOS A	0.0	0.2	0.33	0.54	0.33	52.8
Approach		303	14	319	4.6	0.138	1.0	NA	0.0	0.2	0.01	0.10	0.01	58.6
West: Darcy Road (W)														
10	L2	11	5	12	45.5	0.013	10.6	LOS A	0.0	0.4	0.14	0.96	0.14	50.0
11	T1	11	2	12	18.2	0.071	20.4	LOS B	0.2	1.8	0.69	1.00	0.69	44.9
12	R2	7	0	7	0.0	0.071	20.0	LOS B	0.2	1.8	0.69	1.00	0.69	45.2
Approach		29	7	31	24.1	0.071	16.5	LOS B	0.2	1.8	0.48	0.99	0.48	46.8
All Vehicles		779	41	820	5.3	0.392	5.6	NA	1.7	13.4	0.20	0.33	0.23	54.6

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

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

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

Queue Model: SIDRA Standard.

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

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

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The Transport Planning Partnership
Suite 402 Level 4, 22 Atchison Street
St Leonards NSW 2065

P.O. Box 237
St Leonards NSW 1590

02 8437 7800

info@tpp.net.au

www.tpp.net.au