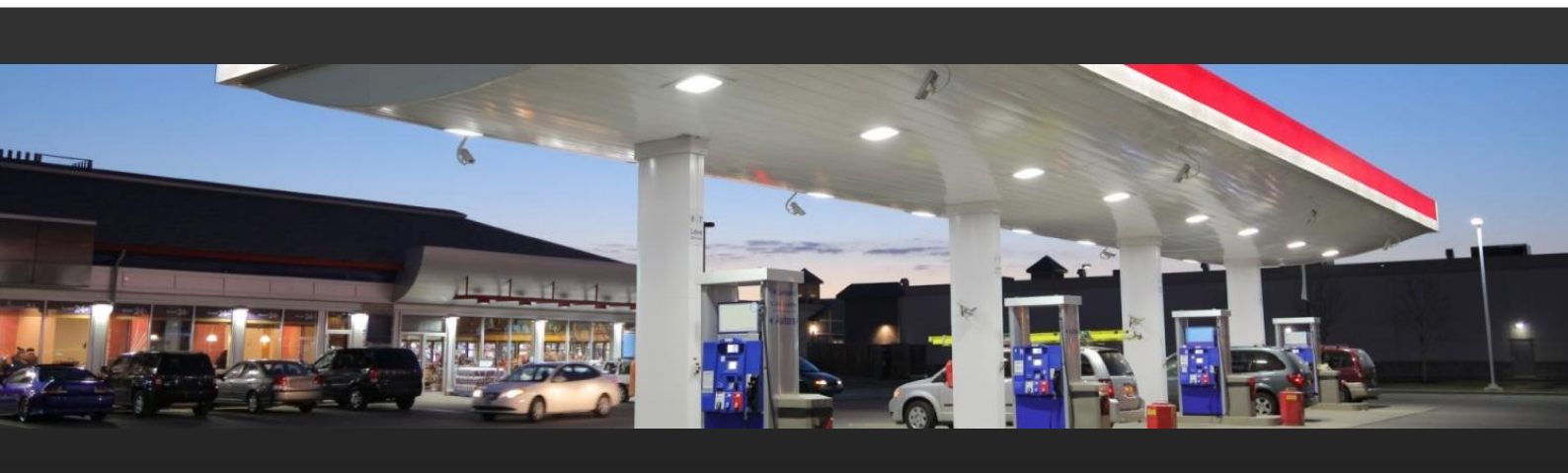


Mortlake Liberty

Transport Impact Assessment



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12 July 2024

onemilegrid

ABN: 79 168 115 679

(03) 9939 8250
Wurundjeri Woiworung Country
56 Down Street
COLLINGWOOD, VIC 3066
www.onemilegrid.com.au



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APPENDICES

APPENDIX A	CONCEPT LAYOUT PLAN
APPENDIX B	SWEPT PATH DIAGRAMS

1 INTRODUCTION

onemilegrid has been requested by Outlook Property Services Pty Ltd to undertake a Transport Impact Assessment of the proposed service station at Lot 1/TP960462, Hopkins Highway, Mortlake.

As part of this assessment the subject site has been inspected with due consideration of the development proposal, traffic data has been sourced, and relevant background information has been reviewed.

2 EXISTING CONDITIONS

2.1 Site Location

The [subject site](#) is parcelled as Lot 1/TP960462 and is located on the northwestern corner of the intersection between Hopkins Highway and Sagnols Lane as shown in Figure 1. The site is trapezoidal in shape, and contains road frontages of approximately 540 m to Hopkins Highway, and 50 m to Sagnols Lane.

Figure 1 Site Location



Source: OpenStreetMap

The site is currently vacant. An unsealed service road to Hopkins Highway is currently situated adjacent the eastern boundary of the site. Vehicular access is currently provided via a service road which circulates one-way between a southern ingress point and a northern egress point.

Land use in the immediate vicinity of the site is typically farmland in nature, and includes some industrial uses to the northwest and residential development and the Mortlake Town Centre to the northeast.

An aerial view of the subject site is provided in Figure 2.

Figure 2 Site Context



Copyright Google Maps

2.2 Planning Zones and Overlays

It is shown in Figure 3 that the site is located within a Farming Zone (FZ). Additionally, the site abuts Hopkins Highway, which is within a Transport Zone (TRZ2), designating the Principal Road Network.

Figure 3 Planning Scheme Zones



2.3 Road Network

2.3.1 Hopkins Highway

Hopkins Highway is a Department of Transport and Planning (DTP) controlled arterial road generally aligned north-south, running between Hamilton Highway in the north, and Cramer Street in the south. Hopkins Highway provides a single traffic lane and paved shoulder in each direction adjacent to the site, across a 7.3 m wide carriageway.

An informal service road for Hopkins Highway is currently provided adjacent the eastern property boundary of the site, and currently provides ingress access from the south, and egress to the north.

An 80 km/h speed limit applies to Hopkins Highway along the northern portion of the site's frontage and increases to a 100 km/h speed limit along the southern portion of the site's frontage.

The cross-section of Hopkins Highway at the frontage of the site is shown in Figure 4.

Figure 4 Hopkins Highway, looking north from adjacent to the subject site



2.3.2 Sagnols Lane

Sagnols Lane is a local road generally aligned east-west, running from Hopkins Highway in the east, and terminating approximately 140 m to the west. Sagnols lane facilitates two-way movements in each direction adjacent to the site, across a 5.5 m wide pavement. Sagnols Lane currently only provides vehicle access to 24 Sagnols Lane.

The default 50 km/h speed limit applies to Sagnols Lane in the vicinity of the site.

The cross-section of Sagnols Lane at the frontage of the site is shown in Figure 5.

Figure 5 Sagnols Lane, looking west from adjacent to the subject site



2.4 Traffic Volumes

Traffic volume, speed and classification surveys were undertaken by Trans Traffic Survey on behalf of **onemilegrid** on Hopkins Highway adjacent the site, for a one-week period from Wednesday 5th June 2024 to Tuesday 11th June 2024 inclusive. The results of the surveys are summarised in Table 1.

Table 1 Traffic Volume and Speed Surveys

<i>Time Period</i>	<i>Direction</i>	<i>Traffic Volume (vpd)</i>	<i>Average Speed (km/h)</i>	<i>85th Percentile Speed (km/h)</i>
Weekday Average	Northbound	1,016	74.3	81.9
	Southbound	1,032	77.5	86.3
	Both Directions	2,048	75.7	83.7
7 Day Average	Northbound	936	75.1	82.6
	Southbound	959	78.3	86.7
	Both Directions	1,895	76.7	84.7
Weekday AM Peak Hour (11:00am)	Northbound	89		
	Southbound	69		
	Both Directions	158		
Weekday PM Peak Hour (3:00pm)	Northbound	85		
	Southbound	108		
	Both Directions	193		
Weekend Peak Hour (11:00am)	Northbound	75		
	Southbound	80		
	Both Directions	154		

2.5 Sustainable Transport

It is shown that public transport in the area is limited to the following bus services, shown below in Table 2. SmartBus routes provide high-frequency and high-speed services, with bus priority measures along the route, and real-time information at bus stops.

Table 2 Public Transport Provision

<i>Route</i>	<i>Nearest Stop</i>
Mortlake-Warrnambool via Ballangeich, Ellerslie	Dunlop Street
Ballarat – Warrnambool via Skipton	
Casterton – Melbourne via Warrnambool	

3 PROPOSAL

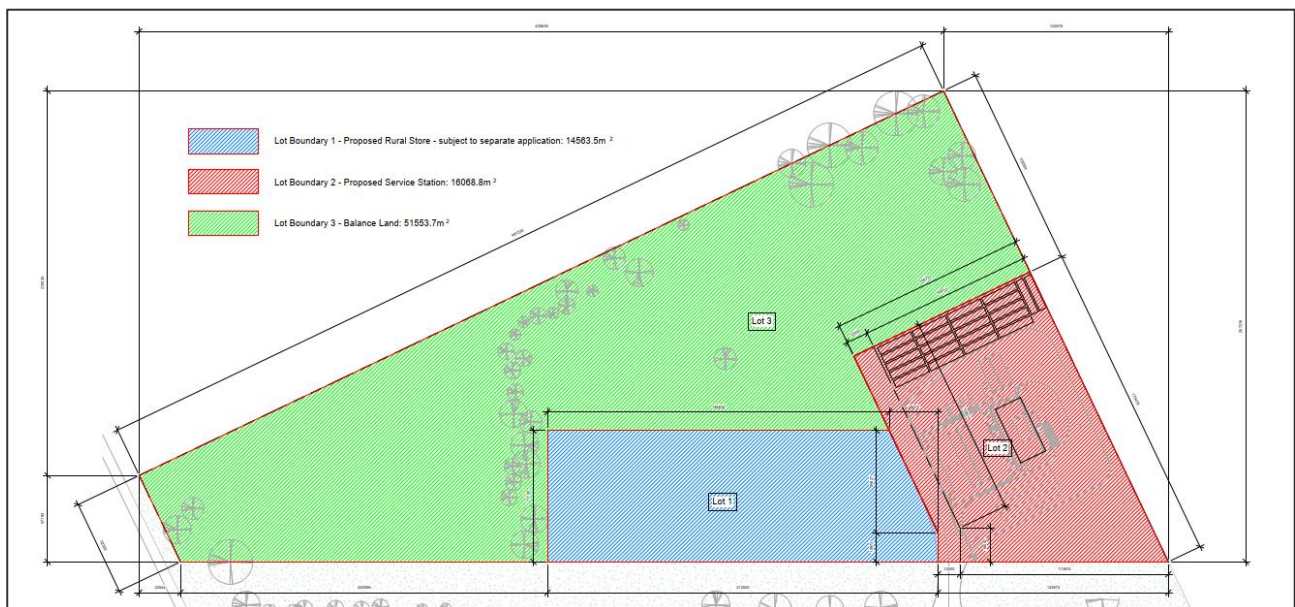
3.1 General

As part of the masterplan for the overall site, the site is broken up into 3 separate areas for the purpose of separate development of each area. The area boundary plan summarised in Table 3, and illustrated in Figure 6.

Table 3 Area Summary

Area	Proposed
Area 1 (Blue)	Rural Store (subject to separate application)
Area 2 (Red)	Liberty Petrol Station (this application)
Area 3 (Green)	Vacant

Figure 6 Area Boundary Plan



As part of this application, it is proposed to develop Area 2 for the purposes of a Liberty service station and an associated convenience shop/truckers lounge, as shown in Table 4.

Table 4 Proposed Development – Area 2 (this application)

Use	Component	No.	Area
Service Station	Fuelling	Capacity for 16 cars to fuel concurrently Capacity for 4 trucks to fuel concurrently	-
Convenience Shop and Trucker's Lounge		1	360 m ²

3.2 Car Parking and Vehicular Access

The car parking provision for the site is shown in Table 5 below.

Table 5 Car Parking Provision

Component	Spaces	Comments
Service Station	16 car fuelling spaces 4 truck fuelling spaces	Filling spaces are only utilised by customers using the fuel pump
Convenience Shop	13 car parking spaces 4 truck parking spaces	Includes 1 x air and water space and 1 x accessible spaces
Total Parking	16 car fuelling spaces 4 truck fuelling spaces 13 car parking spaces 4 truck parking spaces	

Vehicular access is proposed via a fully directional access point from Hopkins Highway, and a 12 m wide two-way internal roadway.

The proposed vehicle access for the subject site will be provided via the 12 m wide roadway, with separate access opportunities for passenger vehicles and trucks.

Passenger vehicles will be provided access via two centrally located 6 m wide access points, with the westernmost access restricted to entry movements, and the easternmost access restricted to exit movements only. Vehicles will be able to circulate between these access points and gain access to the car fuelling canopy and the car parking area adjacent the store.

Trucks will be provided access via a 17.7 m wide entry only access point, and a 12.7 m wide exit only access point. Trucks will be able to circulate between these access points and gain access to truck fuelling canopy and the Truckstop area.

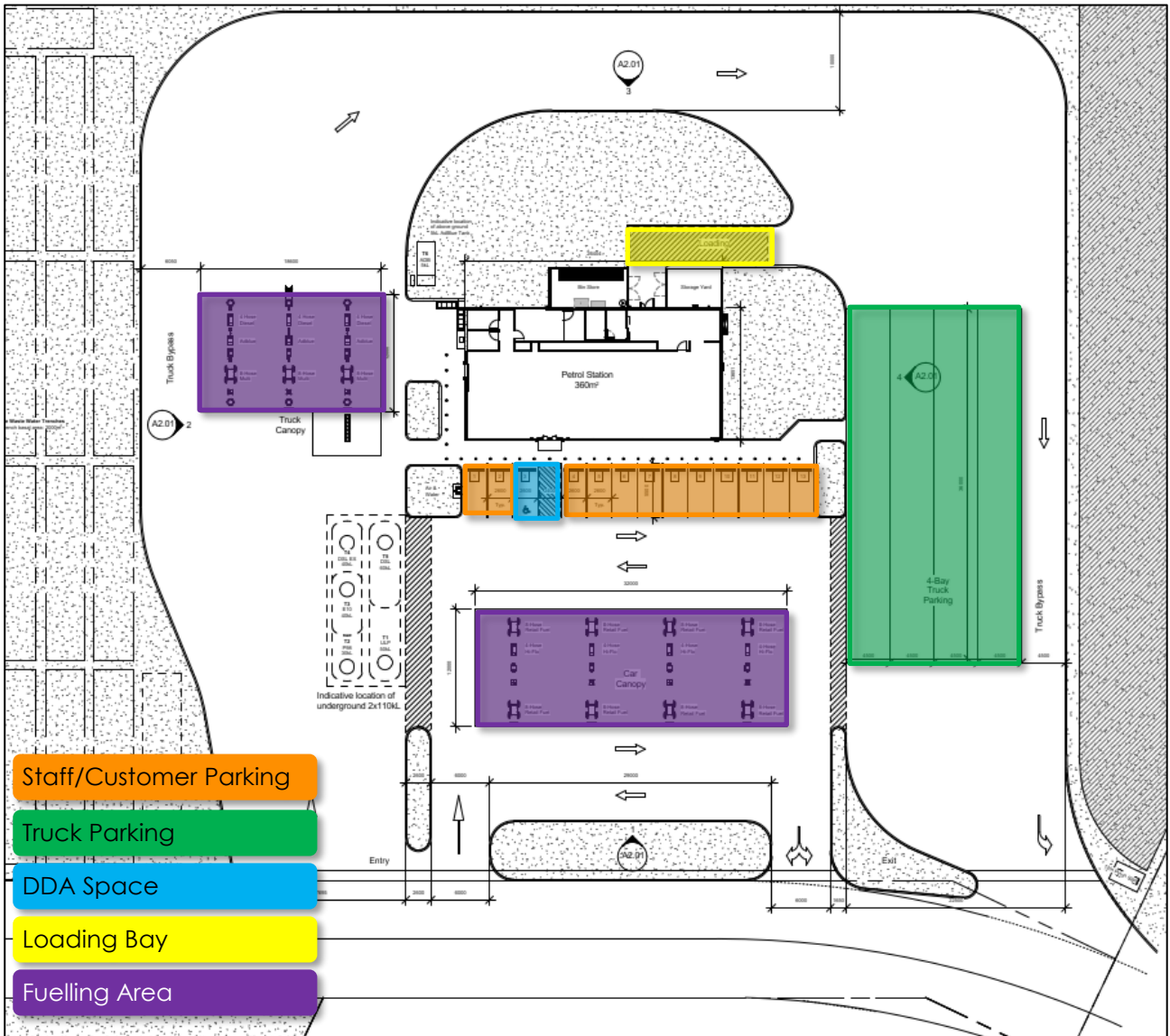
A concept plan illustrating the proposed access arrangements is attached Appendix A, and they are also shown in Figure 7 below.

3.3 Loading

A loading bay is located on the north side of the convenience shop. All delivery and waste collection services will be accommodated within the loading bay.

A view of the proposed site layout is shown in Figure 7.

Figure 7 Proposed Site Layout



4 DESIGN ASSESSMENT

4.1 Moyne Planning Scheme – Clause 52.06

onemilegrid has undertaken an assessment of the car parking layout and access for the proposed development with due consideration of the Design Standards detailed within Clause 52.06-9 of the Planning Scheme. A review of those relevant Design Standards is provided in the following sections.

4.1.1 Design Standard 1: Accessways

A summary of the assessment for Design Standard 1 is provided in Table 6.

Table 6 Clause 52.06-9 Design Assessment – Design Standard 1

Requirement	Comments
Be at least 3 metres wide.	Satisfied – minimum width of accessway is 6.0 metres
Have an internal radius of at least 4 metres at changes of direction or intersection or be at least 4.2 metres wide.	Satisfied
Allow vehicles parked in the last space of a dead-end accessway in public car parks to exit in a forward direction with one manoeuvre.	Satisfied
Provide at least 2.1 metres headroom beneath overhead obstructions, calculated for a vehicle with a wheel base of 2.8 metres.	Satisfied
If the accessway serves four or more car spaces or connects to a road in a Transport Zone 2 or Transport Zone 3, the accessway must be designed so that cars can exit the site in a forward direction.	Satisfied
Provide a passing area at the entrance at least 6.1 metres wide and 7 metres long if the accessway serves ten or more car parking spaces and is either more than 50 metres long or connects to a road in a Transport Zone 2 or Transport Zone 3.	Satisfied
Have a corner splay or area at least 50 per cent clear of visual obstructions extending at least 2 metres along the frontage road from the edge of an exit lane and 2.5 metres along the exit lane from the frontage, to provide a clear view of pedestrians on the footpath of the frontage road. The area clear of visual obstructions may include an adjacent entry or exit lane where more than one lane is provided, or adjacent landscaped areas, provided the landscaping in those areas is less than 900 mm in height.	N/A – No pedestrian footpath is provided along the frontage of Area 2, however satisfied
If an accessway to four or more car parking spaces is from land in a Transport Zone 2 or Transport Zone 3, the access to the car spaces must be at least 6 metres from the road carriageway.	Satisfied

4.1.2 Design Standard 2: Car Parking Spaces

All standard car spaces on-site are proposed with a minimum width of 2.6 m, length of 5.5 m and are provided with an aisle width of greater than 6.4 m. The Planning Scheme requires parking spaces to be a minimum 4.9 m in length, therefore, car parks adjacent convenience shop are essentially accessed from a 10 m aisle. In this regard, all spaces are in accordance with Design Standard 2 of the Planning Scheme.

The accessible bay is provided with a length of 5.4 m and a width of 2.6 m, and an adjacent shared area of the same dimensions, which exceeds the requirements of the Australian Standard for Parking facilities, Part 6: Off-street parking for people with disabilities (AS 2890.6:2022).

4.2 Truck Parking Bays

The four truck parking bays are provided with 4.5 m widths and 36 m lengths.

Swept path diagrams have been prepared, which are attached Appendix B, demonstrating that access to the truck parking bays with a 35.4 m B-triple.

4.3 Fuel Tanker Access

The service station fill point to the underground tanks will be located within the western portion of the site. Tankers will enter the site from the westernmost access point and prop at the fill point, allowing vehicles to safely and conveniently pass a stationary fuel tanker.

Swept paths are provided in Appendix B, illustrating the swept path of a 35.4 m B-triple through the site. Furthermore, a 35.4 m B-triple can pass along the accessway while all truck fuelling and parking spaces are occupied.

It is therefore considered that fuel tankers can safely and conveniently access the site to deliver fuel while maintaining access to the fuelling canopies.

4.4 Loading and Garbage

The site has been designed to accommodate vehicles up to 35.4 m B-triple trucks entering and exiting Hopkins Highway and circulating between the access points to the service station. Swept paths have been prepared illustrating a 35.4 m B-triple circulating throughout the site and between the access points and trucks up to an 8.8 m medium rigid vehicle (MRV) accessing the loading bay for loading and waste collection. These swept paths are provided in Appendix B.

4.5 Clause 52.29 – Land Adjacent to the Principal Road Network

The development proposal is subject to the requirements of Clause 52.29 of the Moyne Planning Scheme which applies to land adjacent to the Principal Road Network (Hopkins Highway) and aims to ensure appropriate access is provided to identified roads.

Relevant to the proposed development, the Clause states that a permit is required to create or alter access to, or subdivide land adjacent to, a road in a Transport Zone 2, and that the proposal is to be referred to the relevant referral authority (in this case the Department of Transport and Planning (VicRoads)).

Before deciding on the appropriateness or otherwise of an application to create or alter access to the Principal Road Network, the responsible authority must consider the following:

- *The Municipal Planning Strategy and the Planning Policy Framework.*

- *The views of the relevant road authority.*
- *The effect of the proposal on the operation of the road and on public safety.*
- *Any policy made by the relevant road authority pursuant to Schedule 2, Clause 3 of the Road Management Act 2004 regarding access between a controlled access road and adjacent land.*

The proposal seeks to provide a new access to Hopkins Highway. The proposal will provide an auxiliary left turn lane and a channelised right-turn from Hopkins Highway as part of the development, in accordance with turn lane warrants for *Austrroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings* (refer to Section 8.6).

In relation to traffic, as detailed in Section 8, the level of traffic anticipated to be generated is expected to be readily accommodated by the nearby road network.

With regard to public safety, again with the provision of appropriate turn lanes, the proposal suitably addresses road safety considerations.

In light of the above, it is considered that the proposed development will satisfy the requirements of Clause 52.29.

5 LOADING

Clause 65 (Decision Guidelines) of the Moyne Planning Scheme identifies that “*Before deciding on an application or approval of a plan, the responsible authority must consider, as appropriate: The adequacy of loading and unloading facilities and any associated amenity, traffic flow and road safety impacts.*”

The proposed service station development provides both a fuel fill point and a loading area on-site, both of which are located appropriately to allow safe and convenient loading/unloading. As mentioned, the fill point is located on the western portion of the site and allows vehicles to pass a stationary fuel tanker safely and conveniently.

The proposed dedicated loading area is located to the rear of the convenience store and will be utilised for loading/unloading associated with all uses, in addition to waste collection. The loading area has been designed for the specific uses, with the swept path diagrams included in Appendix B demonstrating suitable accessibility for an appropriate loading and waste collection vehicle using an 8.8 m medium rigid vehicle (MRV).

For smaller deliveries which can be expected from time to time, they will have the option to use the car spaces or the loading bay.

The provision for loading is therefore considered appropriate.

6 BICYCLE PARKING

The bicycle parking requirements for the subject site are identified in Clause 52.34 of the Moyne Planning Scheme. The Planning Scheme does not specifically refer to parking requirements for the fuel station or the ancillary convenience shop, and as such there is no bicycle parking requirement for them.

7 CAR PARKING

7.1 Statutory Car Parking Requirements

The car parking requirements for the subject site are identified in Clause 52.06 of the Moyne Planning Scheme. For a service station, there is no specific parking provision rate under Clause 52.06. In such cases, Clause 52.06-6 states that:

'Where a use of land is not specified in Table 1 or where a car parking requirement is not specified for the use in another provision of the planning scheme or in a schedule to the Parking Overlay, before a new use commences or the floor area or site area of an existing use is increased, car parking spaces must be provided to the satisfaction of the responsible authority.'

With regard to the convenience shop component of the service station, it is considered an ancillary use to the primary service station use, with the "selling of food, drinks and other convenience goods" being incorporated into the Clause 73.03 land use definition.

Therefore, the car parking provision for whole development is to be the satisfaction of Council.

The proposed car parking provision for the site is shown in Table 7 below.

Table 7 Car Parking Provision

Component	Spaces	Comments
Service Station	16 car fuelling spaces 4 truck fuelling spaces	Filling spaces are only utilised by customers using the fuel pump
Convenience Shop	13 car parking spaces 4 truck parking spaces	Includes 1 x air and water space and 1 x accessible spaces
Total Parking	16 car fuelling spaces 4 truck fuelling spaces 13 car parking spaces 4 truck parking spaces	

In order to verify the suitability of the proposed parking provision and confirm that sufficient car parking is also available for the service station use, an assessment of anticipated parking demands has been undertaken.

7.2 Car Parking Demand Assessment

The proposed service station functions primarily as a petrol outlet rather than a shop and is unlikely to attract a significant number of shoppers beyond those already purchasing fuel and potentially drivers resting on their journey. Notably, the use comprises only 360 m² floor area and will provide a limited range of convenience goods for sale.

Based on the above, the vast majority of the service station patronage will be that of motorists purchasing fuel and resting. These patrons typically proceed to the kiosk to pay for the fuel without moving their vehicles from the position occupied during refuelling and therefore do not require a separate parking space. In effect 16 car parking spaces, and 4 truck parking spaces are provided at the fuel bowsers for this type of parking demand.

On occasion, noting the location of the site, the use may generate parking demands associated with customers visiting the store and amenities. For the purposes of this assessment, it is assumed that this demand is equal to 10 spaces. Furthermore, there may be a demand for truck parking for truck drivers who wish to break their journey. It is proposed to provide 4 truck bays which is considered appropriate to accommodate the likely demands generated.

In addition to customer parking demands, the use will also attract regular demands associated with employees who operate the kiosk, and the parking of additional employees during the changeover of shifts. This may comprise up to 2 additional spaces.

As such, when assessing the car parking demands of the service station, it is estimated that a demand of up to 12 car spaces and 4 truck spaces will be generated.

The provision of 13 car parking spaces plus 4 truck parking spaces in addition to the fuelling spaces is thus considered appropriate to accommodate all development-generated parking demands.

7.3 Accessible Car Parking

The National Construction Code specifies the minimum requirements for provision of accessible car parking.

The proposed service station, classified as a Class 6 building, requires provision of one accessible car space for every 50 car parking spaces or part thereof for the first 1,000 spaces, and then 1 space per 100 car parking spaces or part thereof in excess of 1,000 spaces.

Noting the proposed provision of 13 car spaces on-site, the National Construction Code (NCC) requires at least one accessible car space on-site.

The proposed provision of one accessible space thus satisfies the NCC requirements.

8 TRAFFIC

8.1 Traffic Generation

8.1.1 Area 2 - Service Station (Subject Application)

8.1.1.1 Overview

The volume of traffic generated by a service station depends on the location of the site, time of day, surrounding traffic volumes, and whether a convenience store or other uses are included in the development.

Other traffic engineering firms have conducted surveys of traffic movements generated by similar service station developments at several locations including sites on major urban arterial roads. These surveys show traffic generation typically varies between 100 and 180 movements during the weekday commuter peak hours.

Considering the location of the site in proximity to arterial routes and ongoing development in the area, it will be assumed the site generates 100 movements during both peak hours, equally split between inbound and outbound movements as summarised in Table 8 below.

Table 8 Service Station Traffic Generation

	AM Peak	PM Peak
Inbound	50	50
Outbound	50	50
Total	100	100

8.1.1.2 Diverted Trips

It is commonly acknowledged that a high proportion of vehicle trips to a petrol station are as a result of diverted trips, resulting from a vehicle which is already on the road network as part of another trips (i.e. a vehicle diverting to a service station on the way from work to home).

In order to ascertain the proportion of unique trips versus diverted trips generated by the proposed development, data collected as part of the most recently available Victorian Integrated Survey of Travel and Activity (VISTA) data was analysed specifically for petrol stations, with the results shown in Table 9 below.

Table 9 Diverted Trips Proportion – VISTA 2013

Use	Daily	Peak
Petrol Station	86%	91%

It is shown above that a high proportion of daily trips generated to a petrol station are diverted trips, and further, during the peak hours, the percentage of diverted trips increases. Consequently, the number of unique vehicles trips generated by the proposed development will be much lower than the total traffic generation of the site.

8.1.1.3 Unique Traffic Generation

As noted in the previous section, a significant proportion of traffic generated by the service station are trips diverted from an existing trip or undertaken as part of a linked trip to a separate destination.

For the purposes of this assessment and in consistence with generally accepted rates, it will be assumed that 80% of service station traffic movements are diverted from already existing trips along

Hopkins Highway. The remainder of unique trips are assumed to be distributed in equal proportion to existing traffic flows in the vicinity. It should be noted that this represents a conservative assessment compared with the diverted trips proportion surveyed for petrol stations by VISTA in 2013.

Table 10 outlines the unique traffic movements generated by the site.

Table 10 Unique Traffic Generation – Service Station

<i>Direction</i>	<i>Weekday AM Peak</i>	<i>Weekday PM Peak</i>
Inbound	10	10
Outbound	10	10
Total	20	20

8.1.2 Area 1 – Restricted Retail Facility (Separate Application)

As discussed above, as part of a separate application, it is proposed to develop Area 1 for the purposes of a Restricted Retail Premises. It is understood that the leasable floor area of that use will be in the order of 944 m².

To allow for a robust assessment of the operations of the proposed intersection with Hopkins Highway, this assessment will consider the traffic volumes expected to be generated by both the petrol station that forms this application, and the restricted retail premises which will also ultimately share the access but itself is subject to a separate application.

To this end reference is made to the RTA Guide to Traffic Generating Developments, which suggests an average PM peak hour traffic generation rate of 1.51 vehicle movements per 100 m² of floor area for restricted retail uses in non-metropolitan locations. For the AM peak hour it is assumed that traffic volumes would be limited to staff members driving to the site. A rate of 0.25 movements per 100 m² of floor area has been adopted.

The anticipated weekday peak hour volumes for the neighbouring application (Area 1) is detailed in Table 11.

Table 11 Anticipated Traffic Generation – Restricted Retail (Area 1)

<i>Direction</i>	<i>Weekday AM Peak</i>	<i>Weekday PM Peak</i>
Inbound	2	4
Outbound	0	11
Total	2	15

8.1.3 Total Anticipated Traffic Generation

Based on the above, the total anticipated traffic generated by both Areas 1 & 2 is shown in Table 12.

Table 12 Total Anticipated Traffic Generation

<i>Direction</i>	<i>Weekday AM Peak</i>	<i>Weekday PM Peak</i>
Inbound	52	54
Outbound	50	61
Total	102	115

8.1.4 Total Unique Traffic Generation

Based on the above, the total unique traffic generated by both Areas 1 & 2 is shown in Table 13.

Table 13 Total Unique Traffic Generation

<i>Direction</i>	<i>Weekday AM Peak</i>	<i>Weekday PM Peak</i>
Inbound	12	14
Outbound	10	21
Total	22	35

8.2 Traffic Distribution

Considering the location of the site in relation to the arterial road network, and the expected origin/destinations for site generated traffic, the directional distribution shown in Table 14 has been adopted.

Table 14 Adopted Directional Traffic Distribution

<i>Origin/Destination</i>	<i>Percentage</i>
Hamilton Highway – Northwest	30%
Hamilton Highway – East	30%
Hopkins Highway - South	40%

8.3 Site Generated Traffic Volumes

Based on the anticipated traffic distribution, the following traffic volumes shown in Figure 8 and Figure 9 are expected to be generated by Areas 1 & 2 at the intersection of Hopkins Highway and the proposed Site Access Road.

Figure 8 Site Generated Traffic Volumes – AM Peak Hour

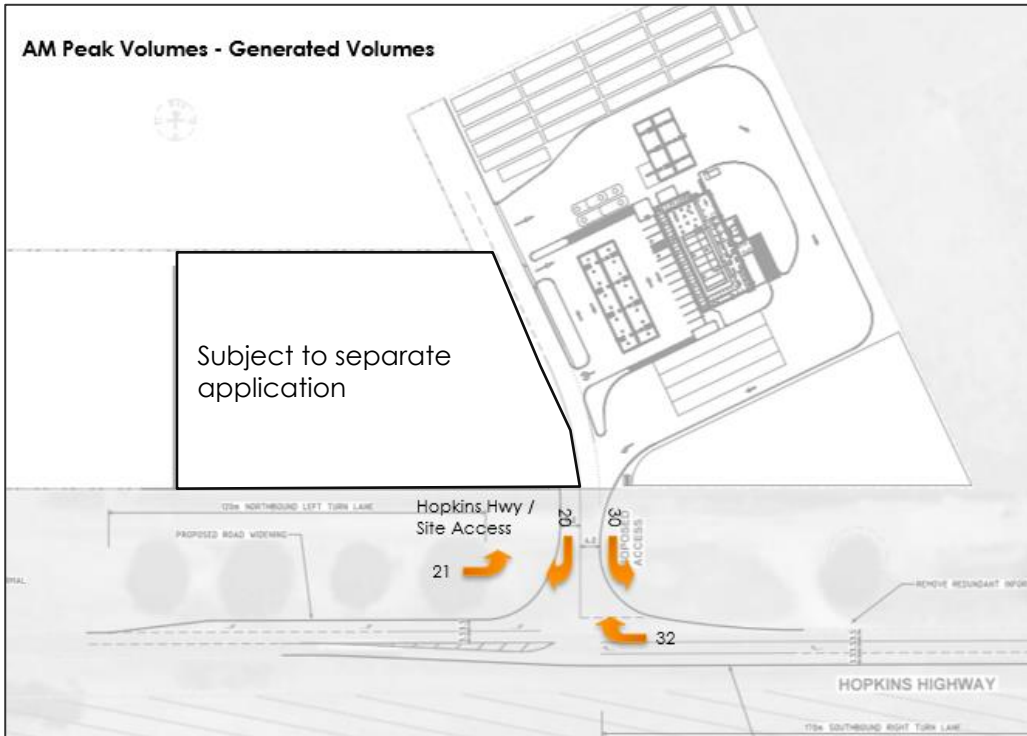
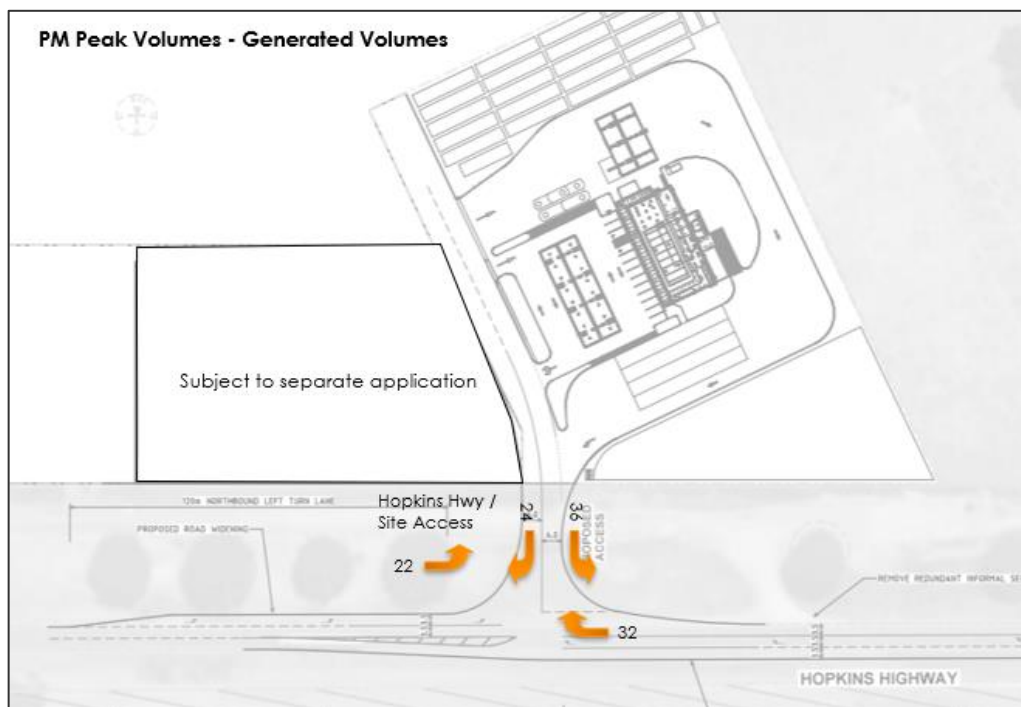


Figure 9 Site Generated Traffic Volumes – PM Peak Hour



8.4 Post-Development Traffic Volumes

Based on the above, the post-development intersection volumes at the intersection of Hopkins Highway and the proposed Site Access Road can be calculated by superimposing the traffic anticipated to be generated by both Areas to the existing through traffic volumes along Hopkins Highway.

The post-development peak hour traffic volumes are shown in Figure 10 and Figure 11.

Figure 10 Post-development Traffic Volumes – AM Peak Hour

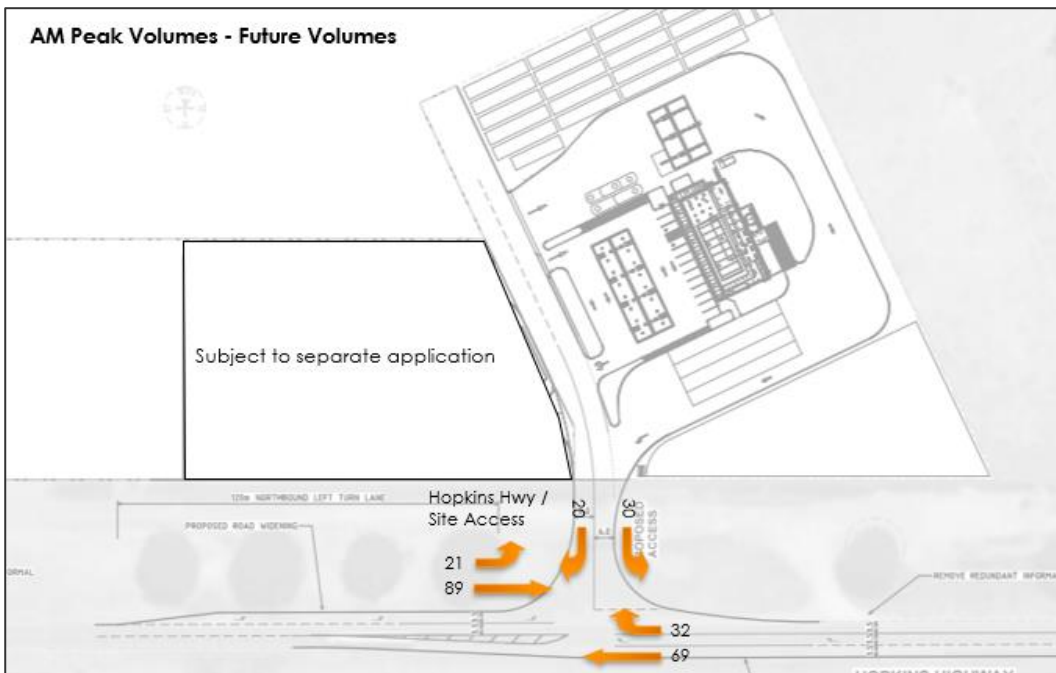
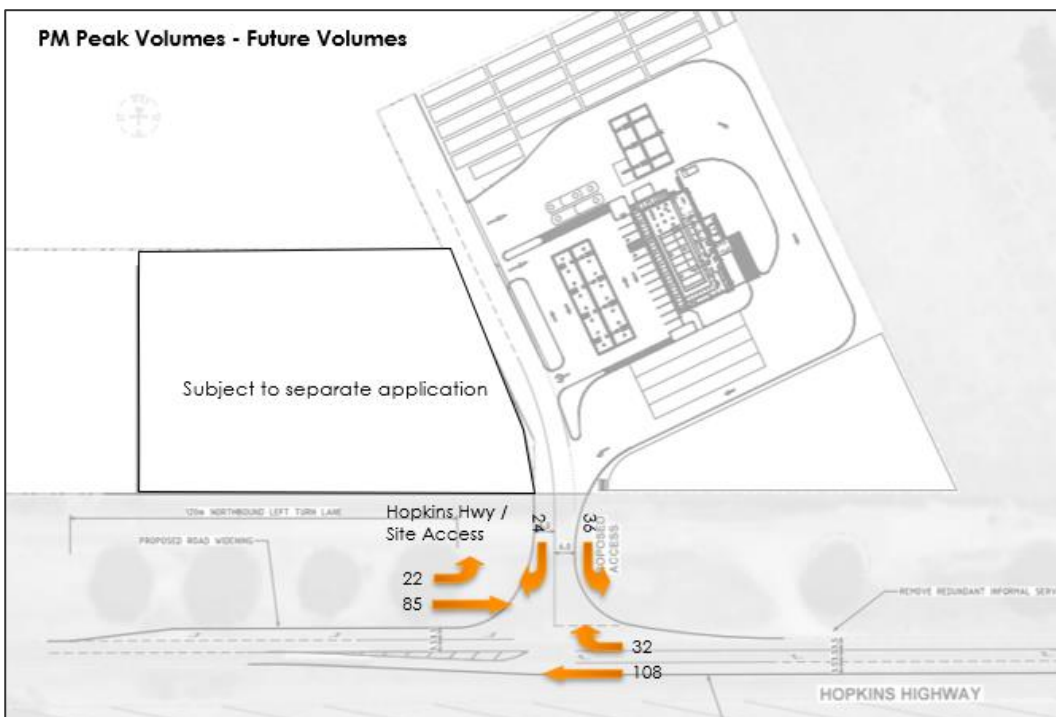


Figure 11 Post-development Traffic Volumes – PM Peak Hour



8.5 Traffic Impact

The unique traffic generation for the proposed development is generally low in traffic engineering terms and equates to approximately 1 movement every 3 minutes during the peak periods. This highlights that the proposed development will have a negligible impact to Hopkins Highway or the surrounding road network.

Based on the above, the level of traffic generated by the proposed development and the neighbouring application are not expected to create significant impact on the surrounding road network.

Notwithstanding, to assess the operation of the proposed intersection, the traffic volumes have been input into SIDRA intersection, a traffic modelling software package.

The SIDRA Intersection software package has been developed to provide information on the capacity of an intersection with regard to a number of parameters. Those parameters considered relevant are, Degree of Saturation (DoS), 95th Percentile Queue, and Average Delay, and Level of Service (LoS), as described in Table 15 below.

Table 15 SIDRA Intersection Parameters

Parameter	Description														
Degree of Saturation (DoS)	The DoS represents the ratio of the traffic volume making a particular movement compared to the maximum capacity for that particular movement. The value of the DoS has a corresponding rating depending on the ratio as shown below.														
	<table border="1"> <thead> <tr> <th>Degree of Saturation</th> <th>Rating</th> </tr> </thead> <tbody> <tr> <td>Up to 0.60</td> <td>Excellent</td> </tr> <tr> <td>0.61 – 0.70</td> <td>Very Good</td> </tr> <tr> <td>0.71 – 0.80</td> <td>Good</td> </tr> <tr> <td>0.81 – 0.90</td> <td>Fair</td> </tr> <tr> <td>0.91 – 1.00</td> <td>Poor</td> </tr> <tr> <td>Above 1.00</td> <td>Very Poor</td> </tr> </tbody> </table>	Degree of Saturation	Rating	Up to 0.60	Excellent	0.61 – 0.70	Very Good	0.71 – 0.80	Good	0.81 – 0.90	Fair	0.91 – 1.00	Poor	Above 1.00	Very Poor
	Degree of Saturation	Rating													
	Up to 0.60	Excellent													
	0.61 – 0.70	Very Good													
	0.71 – 0.80	Good													
	0.81 – 0.90	Fair													
0.91 – 1.00	Poor														
Above 1.00	Very Poor														
It is noted that whilst the range of 0.91 – 1.00 is rated as 'poor', it is acceptable for critical movements at an intersection to be operating within this range during high peak periods, reflecting actual conditions in a significant number of suburban signalised intersections.															
Average Delay (seconds)	Average delay is the time delay that can be expected for all vehicles undertaking a particular movement in seconds. This includes time taken to accelerate or decelerate, time taken to undertake the manoeuvre, and delay at a hold line or stop line.														
95th Percentile (95thile) Queue	95thile queue represents the maximum queue length in metres that can be expected in 95% of observed queue lengths in the peak hour.														
Level of Service (LoS)	A qualitative measure of sign-controlled intersection performance, based on the average delay experienced by a driver. A LoS of A, B, C or D suggests acceptable intersection performance. A LoS of E or F suggests mitigation measures or upgrades may be warranted.														

The value of the average delay and Level of Service for a sign-controlled intersection has a corresponding rating, as shown in Table 16 below.

Table 16 Rating of Delay and V/C Ratio, and Level of Service

<i>Rating</i>	<i>Delay & V/C Ratio</i>	<i>Level of Service</i>
Excellent	≤ 10 seconds	A
Very Good	10 – 15 seconds	B
Good	15 – 25 seconds	C
Fair	20 – 35 seconds	D
Poor	30 – 50 seconds	E
Very Poor	50+ seconds	F

The results of the analysis are provided in Table 17.

Table 17 Proposed Hopkins Highway / Site Access Intersection

<i>Approach</i>	<i>DoS</i>	<i>Avg. Delay (sec)</i>	<i>Queue (m)</i>	<i>Level of Service</i>
AM Peak				
Hopkins Highway South – Left Turn	0.013	5.7	0.0	A
Hopkins Highway South - Through	0.051	0.0	0.0	A
Hopkins Highway North – Through	0.039	0.0	0.0	A
Hopkins Highway North – Right Turn	0.028	6.1	0.8	A
Site Access – Left Turn	0.054	6.1	1.5	A
Site Access - Right	0.054	7.4	1.5	A
PM Peak				
Hopkins Highway South – Left Turn	0.013	5.7	0.0	A
Hopkins Highway South - Through	0.048	0.0	0.0	A
Hopkins Highway North – Through	0.061	0.0	0.0	A
Hopkins Highway North – Right Turn	0.028	6.1	0.8	A
Site Access – Left Turn	0.067	6.1	1.9	A
Site Access - Right	0.067	7.8	1.9	A

As shown above the proposed Hopkins Highway / Site Access intersection is expected to operate under excellent conditions during both the AM and PM peak hours with minimal queues and delays experienced by motorists. In view of the foregoing, the proposed arrangement is considered satisfactory.

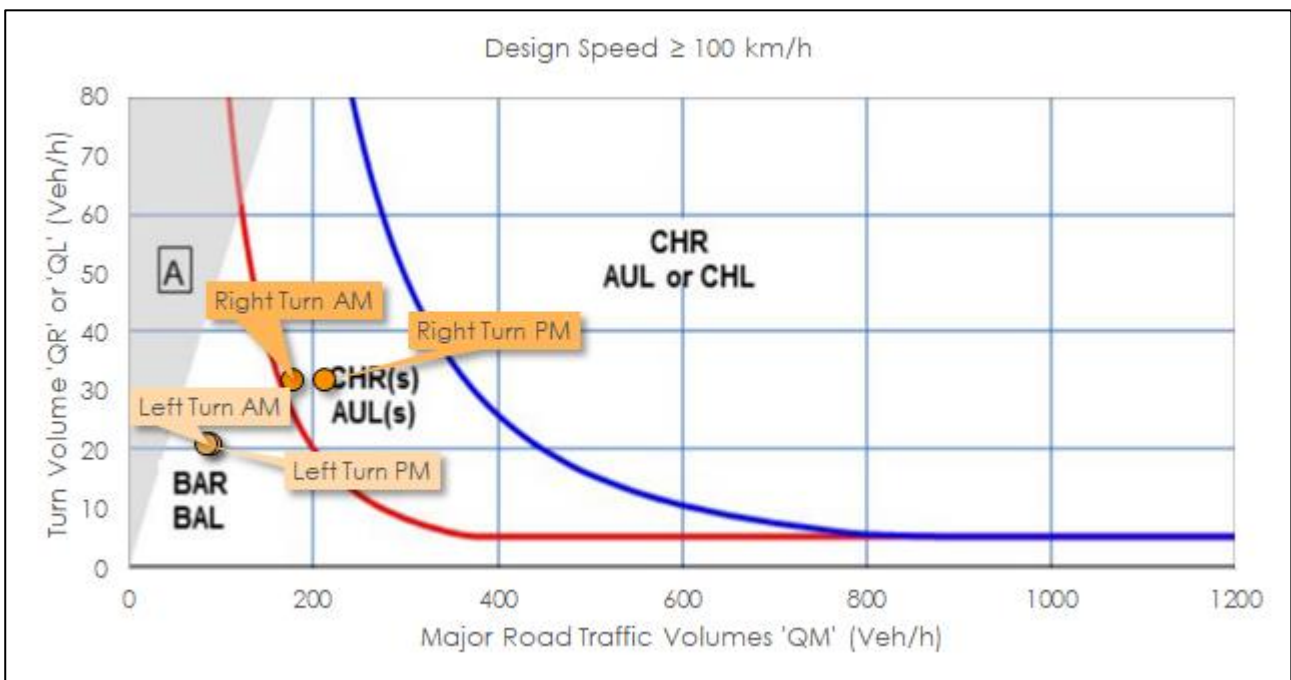
8.6 Austroads Turn Lane Warrants

In determining an appropriate intersection configuration, the anticipated post-development peak hour volumes were assessed against the turn lane treatment warrants specified in the *Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings*.

Noting the low post-development traffic volumes against the Austroads turn lane warrants suggests, a review of the warrants suggest that the proposed development requires a basic left-turn (BAL) and a short channelised right-turn (CHR(s)) provision on Hopkins Highway.

Based on the anticipated post-development traffic volumes (as shown Figure 8 and Figure 9), the turn lane requirements for the Hopkins Highway access are demonstrated in Figure 12.

Figure 12 Austroads Turn Treatment Warrants



It is proposed to provide an auxiliary left-turn lane (AUL) and a channelised right-turn lane (CHR) along Hopkins Highway, which satisfies the above requirements.

Concept layout plans have been prepared and is attached in Appendix A.

9 CONCLUSIONS

It is proposed to develop the subject site for the purposes of a service station with associated convenience store and trucker's lounge. The site has a total provision of 13 car parking spaces (including one accessible space), as well as 4 truck parking bays.

Considering the analysis presented above, it is concluded that:

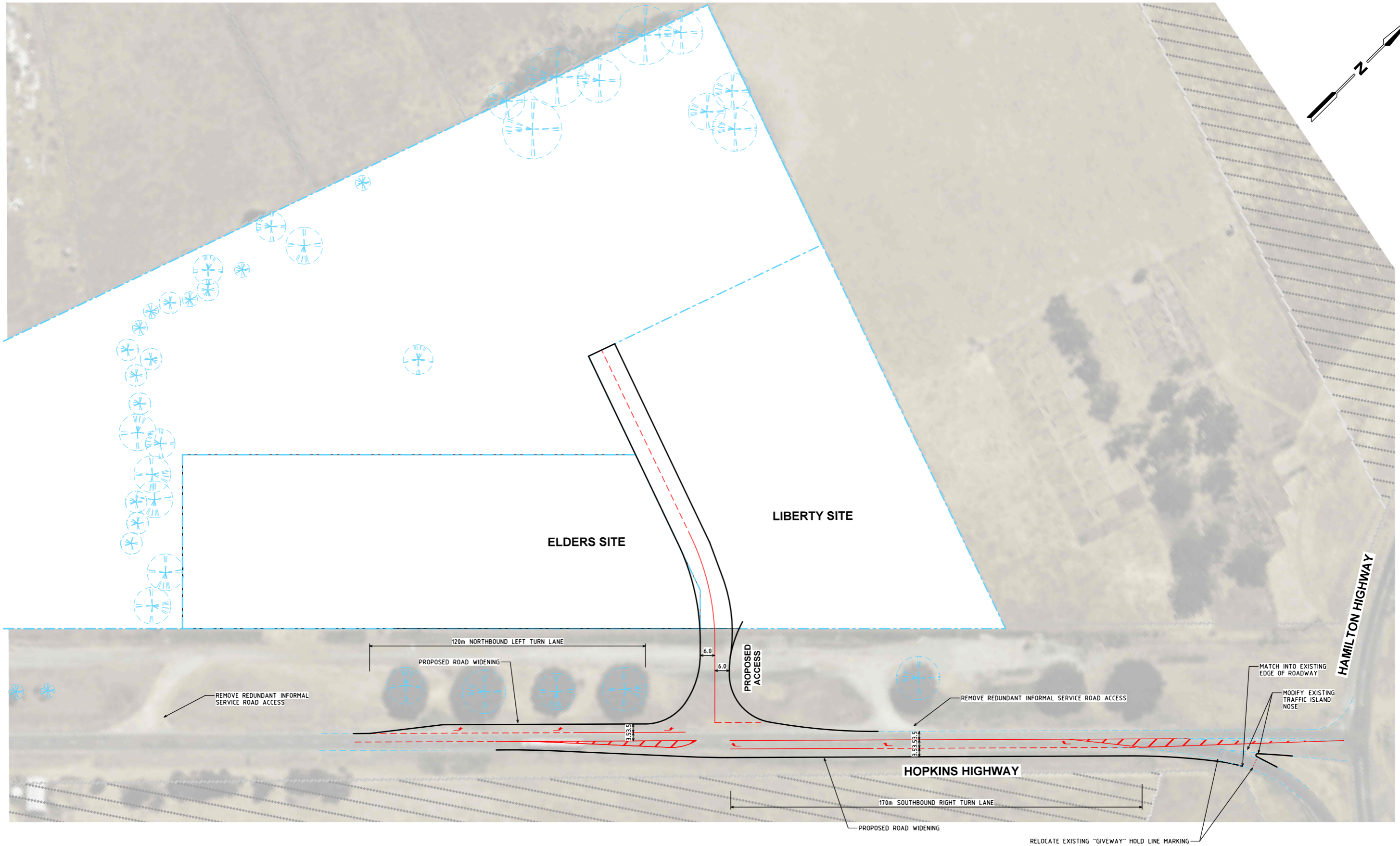
- The car parking layouts and accesses have been designed generally in accordance with the requirements of the Planning Scheme and are considered appropriate;
- Swept path diagrams demonstrate appropriate site circulation and access to the truck parking bays with a 35.4 m B-triple and trucks up to an 8.8 m medium rigid vehicle (MRV) accessing the loading bay for loading and waste collection;
- Fuel tankers can safely and conveniently access the site to deliver fuel while maintaining access to the fuelling canopies;
- Due to the low level of traffic and provision of turn lanes, it is considered that the proposed development will satisfy the requirements of Clause 52.29;
- The provision for loading arrangements are considered appropriate;
- The Planning Scheme does not specifically refer to parking requirements for the fuel station or the ancillary convenience shop, and as such there is no bicycle parking requirement for them;
- The provision of 13 car parking spaces plus 4 truck parking spaces in addition to the fuelling spaces is considered appropriate to accommodate all development-generated parking demands;
- The proposed provision of one accessible space satisfies the NCC requirements;
- The level of traffic generated by the proposed development and the neighbouring application are not expected to create significant impact on the surrounding road network;
- The proposed Hopkins Highway / Site Access intersection is expected to operate under excellent conditions during both the AM and PM peak hours with minimal queues and delays experienced by motorists;
- It is proposed to provide an auxiliary left-turn lane (AUL) and a channelised right-turn lane (CHR) along Hopkins Highway, which satisfies the Austroads Turn Lane requirements; and
- There are no traffic engineering reasons which would preclude a permit from being issued for this proposal.

Appendix A Concept Layout Plan



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Wurundjeri Woiwurrung Country
56 Down Street, Collingwood, VIC 3066
Email: info@onemilegrid.com.au Web: www.onemilegrid.com.au
Phone (03) 9939 8250

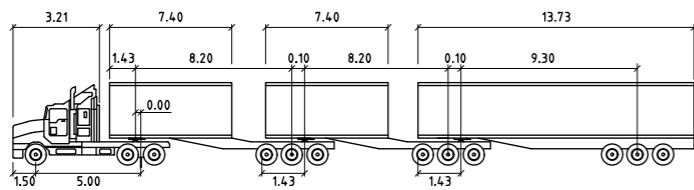
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Appendix B Swept Path Diagrams

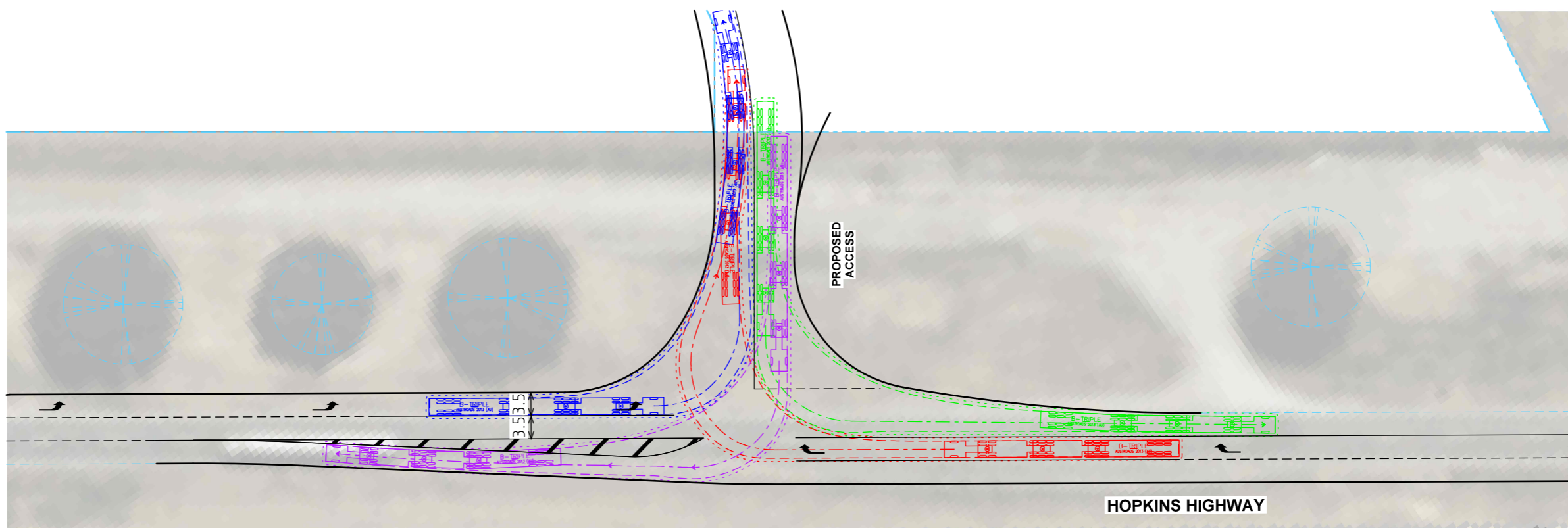
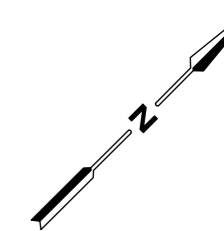




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Trailer Width	: 2.50	Steering Angle	: 21.2
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

SWEPT PATH LEGEND

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- 300mm CLEARANCE ENVELOPE SHOWN DOTTED



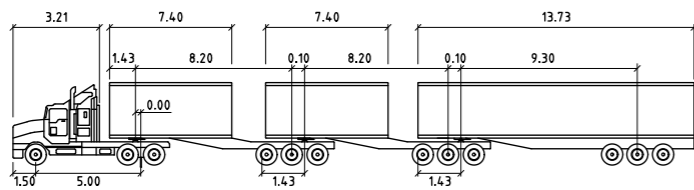
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Email: info@onemilegrid.com.au Web: www.onemilegrid.com.au
Phone (03) 9939 8250

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Project Number 240326	Drawing Number SPA100	Revision E

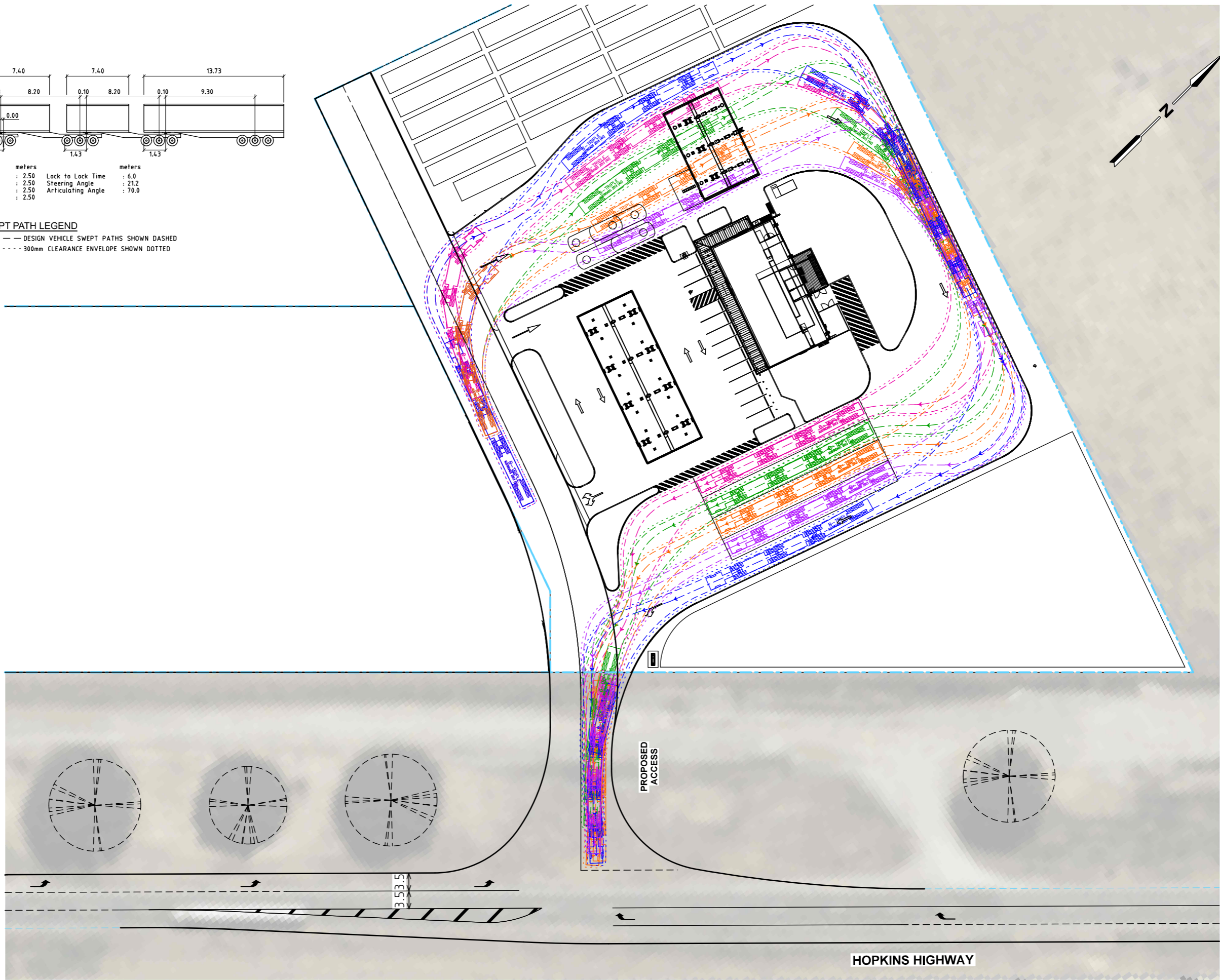


B-TRIPLE

	metres		metres
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 21.2
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

SWEPT PATH LEGEND

- - - - - DESIGN VEHICLE SWEPT PATHS SHOWN DASHED
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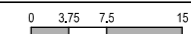
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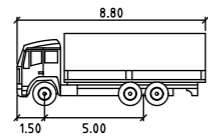
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Drawing Title
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HOPKINS HIGHWAY ACCESS TREATMENT
SWEPT PATH ANALYSIS**

Designed	Approved	Melway Ref
TCW	VG	

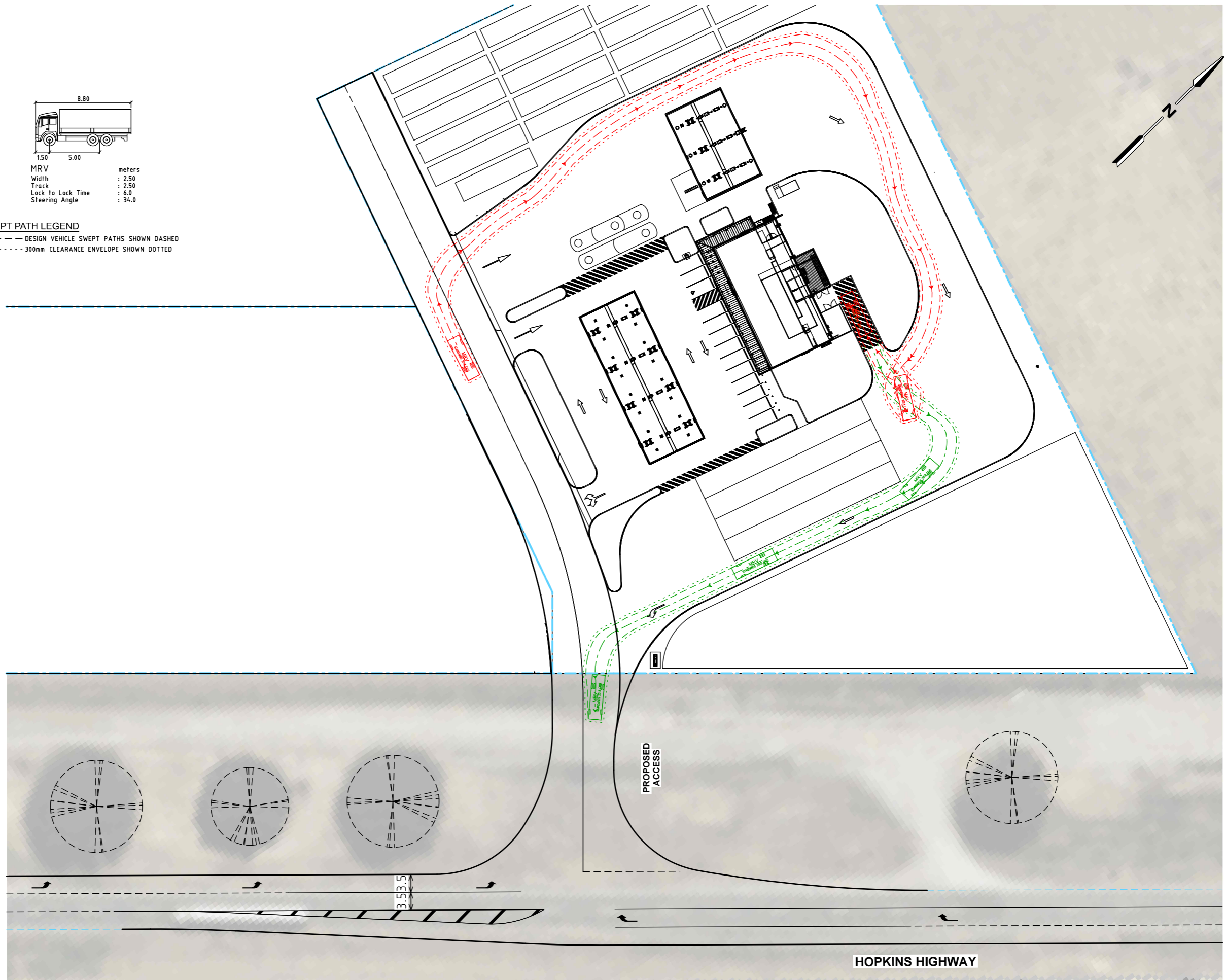
Project Number	Drawing Number	Revision
240326	SPA101	E



MRV meters
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 Track : 2.50
 Lock to Lock Time : 6.0
 Steering Angle : 34.0

SWEPT PATH LEGEND

- - - - - DESIGN VEHICLE SWEEP PATHS SHOWN DASHED
- 300mm CLEARANCE ENVELOPE SHOWN DOTTED



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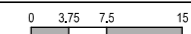
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 SWEEP PATH ANALYSIS**

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Project Number 240326	Drawing Number SPA102	Revision E
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