

Convenience Store Development Lot 11 (11) Yanchep Beach Road, Yanchep

Client // Whirlwind Nominees
Office // WA
Reference // W153420
Date // 26/07/18

Convenience Store Development

Lot 11 (11) Yanchep Beach Road, Yanchep

Transport Impact Statement

Issue: A 26/07/18

Client: Whirlwind Nominees
Reference: W153420
GTA Consultants Office: WA

Quality Record


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1. Introduction

1.1 Background & Proposal

GTA Consultants (GTA) has been engaged by *Whirlwind Nominees* to prepare a Transport Impact Statement (TIS) for the development of the site at Lot 11 (11) Yanchep Beach Road in Yanchep.

This report follows the guided methodology of a TIS, prepared in line with the Western Australian Planning Commission publication '*Transport Assessment Guidelines for Development, August 2016*' (WAPC Guidelines). It also considers the City of Wanneroo's (CoW) planning policies and the key elements of the site's integration with the existing transport networks and the potential traffic impact of the proposed redevelopment.

1.2 Context

The redevelopment site is in the northern extremity of the City of Wanneroo at the southern end of Yanchep, situated approximately 57km north of the Perth CBD by road (approximately 50km in a direct line). The proposed redevelopment is within the established and now expanding suburb of Yanchep and so benefits from already being well connected to nearby vehicular, walking, cycling and public transport networks.

WAPC Guidelines provide direction on the level of assessment which is necessary to be carried out with respect to the likely traffic impact of a development proposal. Typically, any development which is expected to have a 'moderate' traffic impact, that is, generating less than 100 trips in the peak hour is satisfied by a TIS. Any development which is expected to generate in excess of 100 trips in the peak hour requires a Transport Impact Assessment (TIA) to be undertaken. Both types of assessment consider the operation and layout of the site, but they differ in their assessment of external traffic impact.

In the context of this redevelopment and its land use proposal, it is expected that there will be less than 100 trips generated in a given peak hour if applying 'typical' traffic generation rates (which represent locations outside of non-major activity corridors). In this case a TIS is appropriate.

1.3 Purpose of this Report

This TIS briefly outlines the transport aspects surrounding the proposed redevelopment. The intent of a TIS, as per the WAPC Guidelines, is to provide the approving authority with sufficient transport information to confirm that the Applicant has adequately considered the transport aspects of the development and that it would not have an adverse transport impact on the surrounding area. Of particular relevance is the accessibility of the development by non-car modes, in accordance with Government's sustainable development objectives, and its integration with the surrounding area.

In accordance with the WAPC Guidelines, this TIS outlines:

- redevelopment proposals
- current vehicle access arrangements and existing traffic conditions proximate to the site
- the traffic generating characteristics of the proposed redevelopment and to any low volume residential roads

- particular intersections or sections of road that may be adversely affected
- the potential for rat-running, especially through existing residential areas
- developments operating outside normal business hours in/near residential areas
- information on the pedestrian, bicycle and public transport access arrangements to the site
- suitability of the proposed parking provision within the site
- any issues associated with the heavy vehicles generated by the development
- the anticipated impact of the proposed redevelopment on the surrounding road network.

1.4 Reference Material

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

- Plans prepared by Vespoli Constructions showing the proposed development
- Liveable Neighbourhoods Guidelines
- WAPC Transport Assessment Guidelines for Development
- Traffic surveys undertaken by GTA Consultants as referenced in the context of this report
- Other documents as nominated.

2. Development Proposal

2.1 Indicative Site Layout & Land Uses

A copy of the proposed development plans is provided at Appendix A as prepared by the project construction contractor, *Vespoli Constructions*. The proposed site access and car parking layouts are discussed in the following sections.

The proposal includes the construction of a 170m² "Convenience Store", 12 refuelling positions, and two units of 75m² each as showrooms. In addition to the 12 refuelling positions, there is proposed to be 15 on-site parking bays including one bay for Persons with a Disability (PWD) and shared area as part of the development.

There is proposed to be a 6m wide right of carriageway over the adjacent site, Lot 12 (3) Newman Road, in the favour of this site, Lot 11. This right of carriageway will connect the proposed crossover on Yanchep Beach Road to a proposed crossover on Newman Road on the southern side of the proposed development site (refer Development Plans at Attachment A).

The 1,806m² development site is currently vacant and is zoned as "Business" under the CoW District Planning Scheme No. 2 (DPS 2).

Table 2.1: Development Schedule

Use	Size
Convenience Store	170m ²
Showrooms (ea, 2 of)	75m ² (150m ² total)
Refuelling Positions	12
Parking Bays	15 on-site including 1 PWD/shared area

2.2 Site Location

The subject site is located at Lot 11 (11) Newman Road in the suburb of Yanchep in CoW. It is located on the south-west corner of the Yanchep Beach Road/Newman Road T-junction. The site has two street frontages, Newman Road to the east and Yanchep Beach Road to the north. The land uses around the site are predominantly residential with the zoning as "Residential" under the CoW DPS 2 with a "Commercial" zoning for the immediate adjacent site of Lot 12 (3) Newman Road and a "Private Clubs and Recreation" zoning for two larger lots further to the south along Newman Road. The site is also approximately 150m east of the intersection of Yanchep Beach Road and Two Rocks Road and 650m west of the intersection of Marmion Avenue and Yanchep Beach Road.

The subject site and its environs are shown in Figure 2.1.

Figure 2.1: Site Location Plan



(Map / Image Reproduced Courtesy of Google)

2.3 Car Parking

It is proposed to provide 15 parking bays on-site all at-grade on the northern side of the site, as well as 12 refuelling positions.

Being a purely commercial development, parking for Persons with a Disability are provisioned with one of the parking bays being for this purpose. This PWD bay also has its associated adjacent shared zone in accordance with Australian Standards.

There is presently no parking provisions provided on the adjacent adjoining roads.

Under the DPS 2, the site should provide a minimum of 17 parking bays with up to 6 of these at the refuelling positions, thus 11 bays in addition to the 6 at the refuelling positions, as summarised below in Table 2.2.

Table 2.2: Parking Required

Use	Size	Required Parking Rate	Parking Required	Parking Provided (Nominally)
Convenience Store	170m ²	7/100m ² (50% allowed at refuelling positions)	6 +6 allowed at refuelling positions	8 +12 refuelling positions
Showrooms (ea, 2 of)	75m ² (150m ² total)	1/30m ²	5	7
Total			11 +6 allowed at refuelling positions	15 +12 at refuelling positions

With 15 on-site parking and 12 refuelling positions proposed, the site meets the minimum parking requirements of DPS 2 and is in surplus by 10 bays on-site.

The development also proposes a service yard for the rubbish collection on the southern side of the site, whilst fuel trucks will stop near the parking bays on the northern side of the site when filling the fuel tanks.

2.4 Vehicle Access

The proposed development includes:

- a 7.2m wide crossover to the on-site car parking, approximately 150m from the intersection of Yanchep Beach Road and Two Rocks Road;
- a 6m wide crossover on Newman Road, approximately 75m south of Yanchep Beach Road (this connecting to the right of carriageway); and
- an exit crossover from the site onto Newman Road located approximately 25m south of the intersection at Yanchep Beach Road.

Access to and from the site via the street network is expected to be predominantly via Yanchep Beach Road via the 7.2m wide crossover in the short to medium term. In the longer term, as traffic volumes increase on Yanchep Beach Road and this road is duplicated into a four-lane dual carriageway, the 7.2m wide crossover is expected to become a left-in/left-out crossover. The intersection of Yanchep Beach Road and Newman Road will then be expected to cater for the right turn movements from the site that would have occurred at the 7.2m wide crossover in the short to medium term.

Newman Road is an Access Road under the functional road hierarchy, whilst Yanchep Beach Road is a Distributor-B road under the functional road hierarchy.

Sight distance for the proposed crossovers meet the requirements of AS/NZS 2890.1:2004 *Parking facilities Part 1: Off-street car parking*. For a development of this nature, a sight distance of 97m in a 60km/h zone (with an assumed 70km/h 85th percentile speed) for a desirable 5 second gap can be achieved with a sight distance of approximately 150m to the west towards the intersection at Two Rocks Road and 250m to the east to the roundabout intersection at Wilkie Avenue. Given the proximity of the crossover to both Two Rocks Road and the Wilkie Avenue roundabout and the speeds of vehicles exiting these intersections, this sight distance is considered appropriate.

Service vehicles will be able to enter the site via the Yanchep Beach Road crossover and then exit via the right of carriageway onto Newman Road as shown at Appendix B.

Fuel delivery trucks will be able to enter the site via the same crossover, but the exit onto Newman Road will require an apron to allow for the trailer sweep. This is also shown at Appendix B.

2.5 Pedestrian Access & Facilities

There is currently no access to the site for pedestrians. There are no footpaths on any roads in the vicinity of the site. Pedestrian access is proposed to be upgraded on the immediate site frontage with a footpath connecting the crossover on Newman Road to the crossover on Yanchep Beach Road. There will be direct access to the site from the footpath on the Newman Road frontage.

2.6 Bicycle Access & Facilities

No specific provision is to be made for cycling for the development.

2.7 Loading Areas

Loading for the proposed development is proposed to occur to and from the proposed loading bay located on the southern side of the building, north of the right of carriageway. A 10.5m long rubbish collection truck can drive into a service bay on the southern side of the site, north of the right of carriageway and then reverse out and exit onto Newman Road via the right of carriageway. Semi-trailer sized fuel delivery trucks can enter via the Yanchep Beach Road crossover and then exit onto Newman Road via an exit only crossover. This will require modification of the crossover to allow an apron area to cater for the swept path of the trailer as it exits the site. Swept path assessments are shown at Attachment B.

3. Accessibility Review

3.1 Introduction

This chapter outlines the outcome of a baseline accessibility assessment that was undertaken to establish the transport provision serving the site and its surrounds. It also recognises that walking and cycling are encouraged modes of transport and are also secondary modes of travel for public transport users.

3.2 Access by Road

The development site abuts one Access Road, as classified in the Main Roads WA (MRWA) Functional Road Hierarchy and one Distributor-B road. Due to the site's good connections to the external road network, rat-running the right of carriageway is highly unlikely.

3.2.1 Local Roads

Newman Road is an Access Road bordering the development site to the east and is of a single carriageway standard, providing one lane for travel in each direction. This road provides direct driveway access to residential properties with a general urban speed limit of 50km/h and a capacity of up to 3,000 vehicles a day (indicative). Newman Road is approximately 7.2m wide between kerbs.

Traffic volumes on Newman Road was estimated based on the number of properties fronting the road and is estimated at approximately 200 vehicles per day (vpd).

3.2.2 Arterial Roads

Yanchep Beach Road

Yanchep Beach Road runs in an east-west direction with a posted speed limit of 60km/hr. It is classified as a Distributor-B road according to the MRWA Functional Road Hierarchy, and it is presently configured as a single carriageway two-lane road with a traffic volume of approximately 6,950 vpd (from 2016 CoW traffic counts), but the 40m road reserve width suggests that it will be ultimately configured as a four-lane dual-carriageway carrying around 21,000 vpd in 2031. This suggests an annual traffic growth of approximately 7.6%. Yanchep Beach Road is approximately 8.4m wide between kerbs, thus providing a 4.2m wide lane in each direction of travel. The current two-lane format should be able to cater for up to approximately 15,000 vpd.

Vehicles traveling to/from the site will likely use predominantly the Yanchep Beach Road crossover in the short to medium term until such time as Yanchep Beach Road is duplicated, at which time the crossover is expected to become left-in/left-out with the right turn movements shifted to the intersection of Yanchep Beach Rd/Newman Rd.

3.2.3 Key Intersections

There are two nearby intersections which may be affected by the proposed development. These are discussed below.

Yanchep Beach Rd/Newman Rd

These two roads intersect as a three-way T-junction with Yanchep Beach Road the priority road and Newman Road the terminating road. The sight distances on all approaches were considered appropriate during the site visit and acceptable for the road environment and abutting land-uses/property boundaries. There is no sign control, hazard board or holding line on the Newman Road approach to the intersection.

Newman Rd/Yanchep Beach Rd Service Rd

These two roads intersect as a three-way T-junction with Newman Road the priority road and the Yanchep Beach Road service road the terminating road. The sight distances on all approaches were considered appropriate during the site visit and acceptable for the road environment and abutting land-uses/property boundaries. There is no sign control, hazard board or holding line on the Yanchep Beach Road service road approach to the intersection.

3.3 Public Transport

It is considered that access to the site via public transport is applicable to all users including residents and visitors. The nearest bus stops are located within a short walking distance for both directions of travel to and from Perth. As such the site is conducive to public transport usage.

The site is located approximately 150m (approximately a 1 to 2-minute walk) from bus stops located on Yanchep Beach Road, east of the site.

These stops service Route 490 running between Two Rocks and Butler Train Station. These services run approximately every 20 minutes in peak periods in the peak direction.

3.4 Walking and Cycling

The site is located in an area where the walking and cycling infrastructure is either not provided or very limited. No footpaths have been provided on the local road network and thus access to and from the site and to between it and nearby bus stops may be problematic for pedestrians. This is a local area issue for CoW to consider irrespective of the development.

On-site bicycle parking will not be explicitly provided for.

Notwithstanding the above, any Development Application will review and revise the design to ensure it complies with the provision of the necessary pedestrian network upgrade and bicycle parking.

3.5 Crash Statistics

MRWA Crash Analysis Reporting System (CARS) provides detailed crash data and covers all intersections and midblock sections which have had one or more reported road crashes over a 5-year period from 2013 to 2017. It provides detailed crash data for Newman Road, Yanchep Beach Road and nearby intersections over that period.

Crash data has been reviewed and only one crash was recorded along the mid-block sections, this being on Yanchep Beach Road. The crash detail is reviewed in more detail below in Table 3.1.

Table 3.1: Crash Record for Roads and Intersections/Road Sections in the vicinity of the Subject Site

Location	State Ranking		Crash Severity				Total Crashes
	Cost	Frequency	PDO	Medical	Hospital	Fatal	
Yanchep Beach Rd/Newman Rd	N/A [1]		0	0	0	0	0
Newman Rd/Yanchep Beach Rd Service Rd	N/A [1]		0	0	0	0	0
Yanchep Beach Rd/Newman Rd to Two Rocks Rd	N/A [2]		1	0	0	0	1

PDO – property damage only, Medical – roadside medical assistance, Hospital – hospitalisation required

[1] State ranking not considered appropriate for a local access road due to no recorded crashes.

[2] State ranking not considered appropriate for a local access road due to being a road section.

The above summary crashes are discussed below in more detail.

- Yanchep Beach Road - the single recorded crash involved an animal at night.

This crash rate recorded on Yanchep Beach Road is the equivalent to approximately 0.70 crashes per million vehicle kilometre (MVkm). This is less than the network average for roads of similar nature and there does not appear to be an underlying road safety issue which would be exacerbated by this proposal.

The traffic volumes generated by the development during peak hours and over the course of a day are considered to be low at approximately 25 vehicles in any one hour in the short term increasing to approximately 85 in the long term. This traffic is split between in/out vehicle movements and is further dispersed over a number of turning movements at the site access points.

A development of this type, in this location could not be expected to materially alter the existing frequency and severity of road crashes in the area. Further, the low increase in traffic volumes could not be expected to adversely affect pedestrians crossing roads, or any cyclists that travel on-road.

Accordingly, the road safety characteristics of the proposed development are considered acceptable.

4. Trip Generation and Traffic Impact

4.1 Current Traffic Flows

Traffic volumes on the adjacent road network of Yanchep Beach Road and Newman Road were assessed based on the current traffic counts sourced from CoW and from manual spot counts by GTA.

Yanchep Beach Road: 6,950 vpd (from a CoW 2016 count) with 8% heavy vehicles
PM Peak: ~8% of the daily volume 185 eastbound, 370 westbound

Newman Road: estimated at 200 vpd
PM Peak: 7 northbound, 13 southbound

Based on the calculated 7.6% per annum growth in traffic from Section 3.2.2, traffic flows by 2019 the estimated time of the opening of the development, should be approximately 8,650 vpd.

4.2 Expected Traffic Flows

With the surrounding residential development having reached maturity (this being Newman Road), the current traffic volumes are expected to remain relatively unchanged into the near future on the local street network. Traffic volumes on Yanchep Beach Road have been based on traffic numbers sourced from an SKM report for the St Andrews development. This study estimated approximately 21,000 vpd on Yanchep Beach Road near the development site in 2031.

With the forecast increase in traffic volumes, it is expected that Yanchep Beach Road will become a dual carriageway and the proposed crossover onto Yanchep Beach Road will become left-in/left-out. At that time right traffic that would use the crossover in the short term will utilise the intersection of Yanchep Beach Rd/Newman Rd. At this time the peak hour flows expected on Yanchep Beach Road would be in the order of 1,700 vehicles per hour (based on the current 8% of the expected daily traffic flows).

4.3 Vehicle Types

The types of vehicles accessing the site will be mostly private motor vehicles with the exception being the semi-trailer fuel delivery truck and rubbish collection truck. Apart from the above, no traffic to and from the site is expected to be truck type traffic, except for vehicles similar in size to furniture delivery vans.

4.4 Traffic Generation and Traffic Impact

In order to estimate the trip generation associated with the proposed development, reference has been made to trip rates within the *WAPC Guidelines* (which often refer to the *RTA Guidelines, NSW*) and the *Trip Generation 9th edition, 2012 - Institute of Transportation Engineers (ITE)*, Washington, USA. These trip rates are considered to accommodate the general vehicle activity at the site incorporating:

- Convenience Store
- Petrol Pumps
- Show Rooms.

Table 4.1: Estimated Traffic Generation

Land Use	Peak Hour Rates (vph two-way)	Short Term Peak Hour Trip Generation Estimates (vph) (using PM peak for worst case)	Long Term Peak Hour Trip Generation Estimates (vph) (using PM peak for worst case)
Convenience Store with Petrol Pumps	0.04 / passing traffic	35	84

Table 4.2: Estimated Traffic Generation - Total

Trip type	Trips IN	Trips OUT
PM Vehicle (short term)	18	18
PM Vehicle (long term)	42	42

Assumed in/out split is 50%/50% in the in the PM peak as per WAPC Guidelines.

Based on the above, the total traffic generation of the development site is expected to be in the order of 350 vehicular trips in a day in the short-term (at opening in say 2019) with 35 vehicle movements in a typical evening peak hour. As traffic flows increase in the longer term the traffic generated is expected to increase to approximately 840 trips per day with 84 in the peak hour.

With regards to the intersections, Table 2.4 from the Austroads publication, *Guide to Traffic Management Part 6 – Intersections, Interchanges and Crossings* provides advice as to intersection and crossover performance in peak flow conditions about possible further analysis. This is summarised in Table 4.3. If the calculated expected traffic flows for this development exceed those shown in Table 4.3 further assessment is typically required.

Table 4.3: Austroads Guidelines

Major Road Type	Major Road Flow (two-way, vph)	Minor Road Flow (two-way, vph)
Two-lane	400	250
	500	200
	650	100
Four-lane	1,000	100
	1,500	50
	2,000	25

Examining the expected traffic flows at the crossover and nearby affected intersections for the proposed development, Table 4.4 is derived.

Table 4.4: Comparison to Austroads Guidelines

Intersection	Major Road Flow (two-way, vph)	Minor Road Flow (two-way, vph)
Crossover (short term)	555	35
Yanchep Beach Rd/Newman Rd (short term)	555	20
Crossover (long term)	1,700	50
Yanchep Beach Rd/Newman Rd (long term)	1,700	55

From the above it can be seen that in the short-term the Yanchep Beach Rd/Newman Rd intersection and crossover are expected to have traffic volumes significantly less than shown in green in Table 4.3. Thus, there is no need for these to be examined in further detail using analysis

software such as SIDRA Intersection. Under these flow conditions, the level of service is expected to be at A or similar with minimal delays and queues. However, in the long term the intersection and crossover are expected to have traffic flows exceeding these levels as shown in red in Table 4.3. These were therefore assessed utilising SIDRA Intersection with the results shown below for the critical movements for each.

Yanchep Beach Road/Newman Road

The existing performance of this intersection is shown in Table 4.5.

Table 4.5: Yanchep Beach Rd/Newman Rd Intersection – Long Term Intersection Operation in PM Peak

Approach	Critical Turning Movements					
	Mvt.	Short Lane Length	DOS	LOS	Average Delay (sec)	95th Percentile Queue (m)
South	RT	NA	0.11	C	22s	2m (0-1 cars)
West	RT	75m	0.06	C	15s	2m (0-1 cars)

DOS – Degree of Saturation, # - Intersection DOS, LOS – Level of Service

Even with the expected traffic volumes on Yanchep Beach Road there is expected to be minimal delays and queues for the critical turns and thus be acceptable.

Yanchep Beach Road Crossover

The existing performance of this crossover is shown in Table 4.5Table 4.6.

Table 4.6: Yanchep Beach Rd Crossover – Long Term Operation in PM Peak

Approach	Critical Turning Movements					
	Mvt.	Short Lane Length	DOS	LOS	Average Delay (sec)	95th Percentile Queue (m)
South	LT	NA	0.04	A	3s	1m (0-1 cars)

Overall the crossover is expected to operate satisfactorily in the PM peak with minimal delays and queues.

4.5 Internal Vehicle Queues

The internal vehicle queueing at the fuel pumps were checked using an M/M/c queuing model for the 12 fuel pumps and assuming a 10-minute service time at each pump. This was assessed for the rate of the expected short-term arrivals (approximately 18 per hour) and then the rate of the expected long-term arrivals (approximately 42 per hour).

Table 4.7: Queues at Refuelling Positions

Approach	Average Queue (veh)	95 th %ile Queue (veh)	99 th %ile Queue (veh)
Short Term	3	6	8
Long Term	7	12	15

From the above, with the maximum expected arrival rate of 42 vehicles in an hour in the long-term, all the vehicles will be able to be contained on-site, either stopped at the fuel pumps or queued on-site waiting for a free fuel pump. With 12 refuelling positions all vehicles can be catered for most expected arrival patterns, this being the 95th percentile, typically the threshold and which queuing areas are designed to. Even with the highest expected queuing (allowing for 99% of queues in the long-term which is considered higher than designs should reasonably cater

for) there is expected to be approximately 3 cars queued (15 less 12 refuelling) waiting for a free fuel pump and these could fit within the site.

4.6 Level of Service Concepts

The level of service concept describes the quality of traffic service in terms of six levels, designated A to F, with level of service A (LOS A) representing the best operating condition (i.e. at or close to free flow), and level of service F (LOS F) the worst (i.e. forced flow). More specifically:

- *LOS A*: Primarily free flow operations at average travel speeds, usually about 90% of the FFS (free flow speed) for the given street class. Vehicles are completely unimpeded in their ability to manoeuvre within the traffic stream. Control delay at signalised intersections is less than 10 seconds. At non-signalised movements at intersections the average control delay is less than 10 seconds;
- *LOS B*: Reasonably unimpeded operations at average travel speeds, usually about 70% of the FFS for the street class. The ability to manoeuvre within the traffic stream is only slightly restricted, and control delays at signalised intersections are between 10 and 20 seconds. At non-signalised movements at intersections the average control delay is between 10 and 15 seconds;
- *LOS C*: Stable operations; however, ability to manoeuvre and change lanes in mid-block locations may be more restricted than at LOS B, and longer queues, adverse signal coordination, or both may contribute to lower average travel speeds of about 50% of the FFS for the street class. Signalised intersection delays are between 20 and 35 seconds. At non-signalised movements at intersections the average control delay is between 15 and 25 seconds;
- *LOS D*: A range in which small increases in flow may cause substantial increases in delay and decreases in travel speed. LOS D may be due to adverse signal progression, inappropriate signal timing, high volumes, or a combination of these factors. Average travel speeds are about 40% of FFS. Signalised intersection delays are between 35 and 55 seconds. At non-signalised movements at intersections the average control delay is between 25 and 35 seconds;
- *LOS E*: Characterised by significant delays and average travel speeds of 33% of the FFS or less. Such operations are caused by a combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections (between 55 and 80 seconds), and inappropriate signal timing. At non-signalised movements at intersections the average control delay is between 35 and 50 seconds; and,
- *LOS F*: Characterised by urban street flow at extremely low speeds, typically 25% to 33% of the FFS. Intersection congestion is likely at critical signalised locations, with high delays (in excess of 80 seconds), high volumes, and extensive queuing. At non-signalised movements at intersections the average control delay is greater than 50 seconds.

In addition to the above:

- **Average Delay:** is the average of all travel time delays for vehicles through the intersection
- **Queue:** is the queue length below which 95% of all observed queue lengths fall.

Degree of Saturation:

- Ratio of the traffic flow to the capacity for that particular lane/movement, refer to Table 4.8 for a summary.

Table 4.8: DOS & LOS Summary

Level of Service		Intersection Degree of Saturation (DOS)		
		Unsignalised Intersection	Signalised Intersection	Roundabout
A	Excellent	<=0.60	<=0.60	<=0.60
B	Very Good	0.60-0.70	0.60-0.70	0.60-0.70
C	Good	0.70-0.80	0.70-0.90	0.70-0.85
D	Acceptable	0.80-0.90	0.90-0.95	0.85-0.95
E	Poor	0.90-1.00	0.95-1.00	0.95-1.00
F	Very Poor	>=1.0	>=1.0	>=1.0

4.7 Traffic Impact of Development on Local Area

Based on the above, the proposed development could not be expected to have a detrimental impact on the surrounding roads and intersections in terms of capacity or road safety. Accordingly, the traffic impact of the proposed development is considered acceptable.

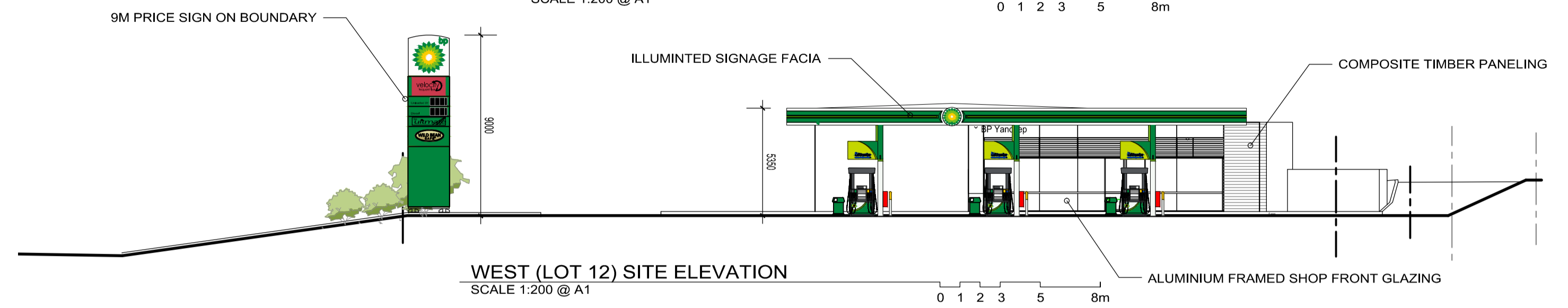
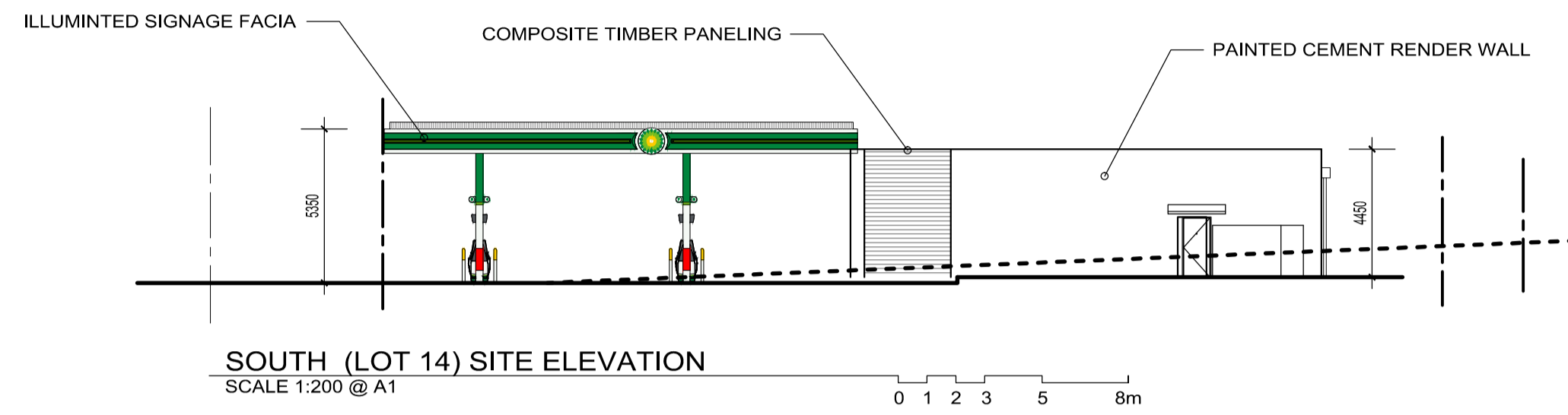
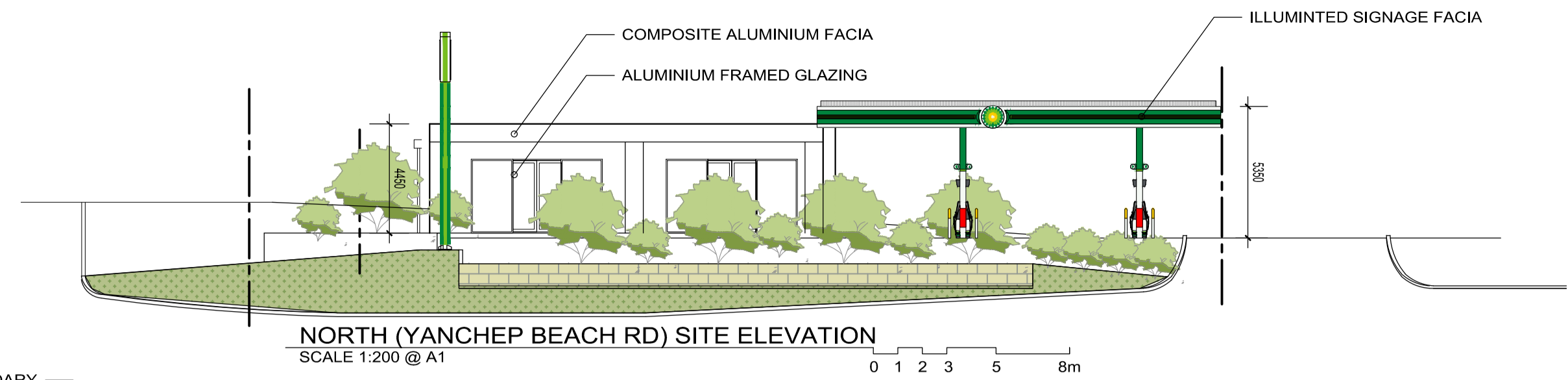
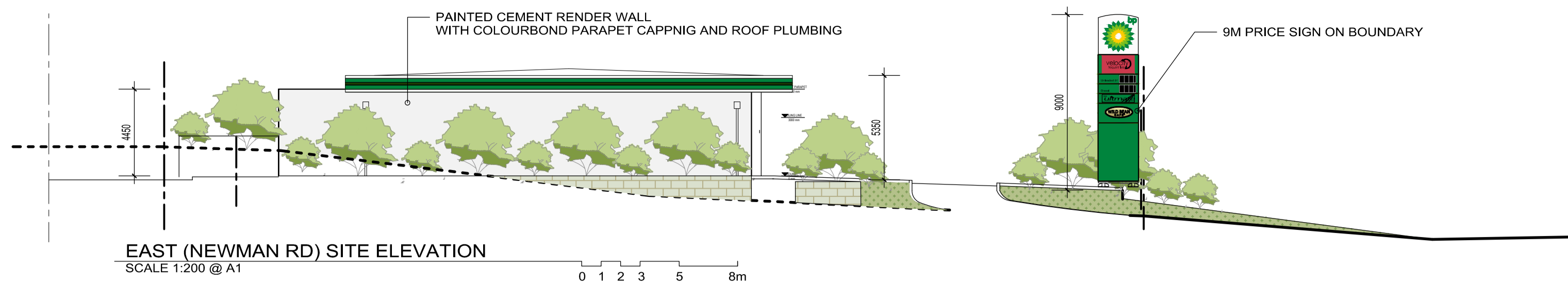
5. Findings, Summary & Conclusions

As a result of the traffic analysis undertaken for the proposed development at Lot 11 (11) Yanchep Beach Road in Yanchep:

- i The impacts of the traffic volumes associated with the development on the road network are considered acceptable now and in the future;
- ii The development should initially generate in the order of 350 vehicular trips per day with 35 of these in the PM peak;
- iii In the longer term the development should generate in the order of 840 vehicular trips per day with 84 of these in the PM peak;
- iv The parking area layout is suitable with an appropriate number of parking bays provided for the demographic use of the development;
- v Fuel trucks and rubbish trucks will be able to enter and exit the site;
- vi The adjacent footpath network is non-existent and is proposed to be upgraded on the immediate site frontage of the proposed development;
- vii There is no requirement for any of the road network to be modified for vehicular movement purposes as a result of this development.

Appendix A

Development Plans



- LANDSCAPE NOTES**
- UNDER GROWTH A COMBINATION OF SYZYGIUM TINY TREV LOMANDRA LITTLE CEN DIANELLA REVOLUTA
 - TIPIJANA TIPU
 - NATIVE GROUND COVER
 - PINBARK MULCH

REV. DATE IN. DESCRIPTION

VESPOLI CONSTRUCTIONS

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PROPOSED CONVENIENCE STORE DEVELOPMENT
LOT 11 YANCHEP BEACH RD
YANCHEP WA

DRAWING TITLE:
SITE & FLOOR PLAN

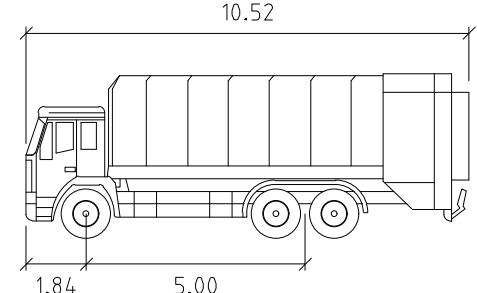
DRAWING No. **A01**
JOB No. **A18000**
Drawn MWS date 23.05.18 PAGE No. 1 OF X
checked GV scale 1:200@A1 REV No. A

ISSUED FOR DEVELOPMENT APPROVAL

Appendix B

Large Vehicle Swept Paths

T:\15300-15399\153420 11 YANCHEP BEACH ROAD, YANCHEP\CAD\W153420-SK01_SK03-P1.DWG PLOTTED BY SIMON PEDRETTI ON 16/07/2018 AT 15:37



#Banyule Front Lift#
 meters
 Width : 2.50
 Track : 2.50
 Lock to Lock Time : 6.0
 Steering Angle : 30.1

SWEPT PATH KEY	
	VEHICLE CENTRE LINE
	VEHICLE TYRE PATH
	VEHICLE BODY PATH
	500mm CLEARANCE FROM VEHICLE BODY
ASSUMED SPEED 5km/h	



Melbourne 03 9851 9600
 Sydney 02 8448 1800
 Brisbane 07 3113 5000
 Canberra 02 6243 9400
 Adelaide 08 8334 3600
 Gold Coast 07 5510 4814
 Townsville 07 4722 2745
 Perth 08 6169 1000

PRELIMINARY PLAN
 FOR DISCUSSION PURPOSES ONLY
 SUBJECT TO CHANGE WITHOUT
 NOTIFICATION

WARNING
 BEWARE OF UNDERGROUND SERVICES
 THE LOCATIONS OF UNDERGROUND SERVICES ARE
 APPROXIMATE ONLY AND THEIR EXACT POSITION
 SHOULD BE PROVEN ON SITE. NO GUARANTEE IS
 GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

DESIGNED
 S.PEDRETTI
 APPROVED BY
 R. DING

DESIGN CHECK
 R. DING
 DATE ISSUED
 16 JULY 2018

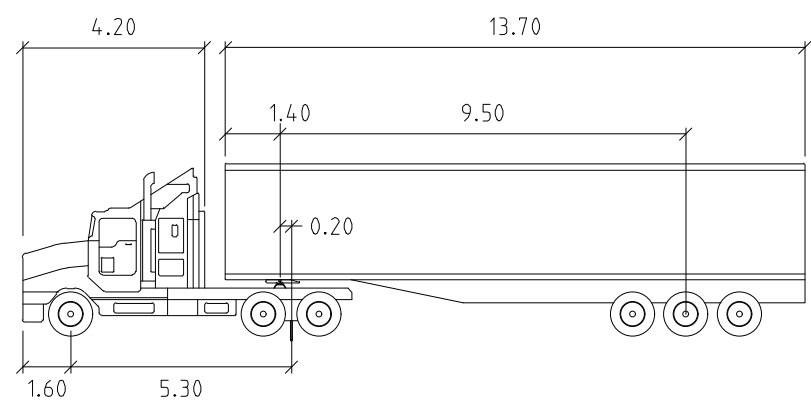
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 CAD FILE NO.
 W153420-SK01_SK03-P1.DWG

CONVENIENCE STORE DEVELOPMENT
 11 YANCHEP BEACH ROAD
 YANCHEP
 SWEEP PATHS - GARBAGE TRUCK ENTERING
 DRAWING NO. W143420-SK01 SHEET 1 OF 3 ISSUE P1

T:\15300-15399\153420 11 YANCHEP BEACH ROAD, YANCHEP\CAD\W153420-SK01_SK03-P1.DWG PLOTTED BY SIMON PEDRETTI ON 16/07/2018 AT 15:37



T:\151300-15399\153420-11 YANCHEP BEACH ROAD - YANCHEP\CAD\W153420-SK01_SK03-P1.DWG PLOTTED BY SIMON PEDRETTI ON 16/07/2018 AT 15:37



PM S 19M

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.8
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

SWEEP PATH KEY	
	VEHICLE CENTRE LINE
	VEHICLE TYRE PATH
	VEHICLE BODY PATH
	500mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

GTA consultants
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DESIGNED
S.PEDRETTI

DESIGN CHECK
R. DING

APPROVED BY
R. DING

DATE ISSUED
16 JULY 2018

SCALE
A3 0 1.25 2.5 5 1250

CAD FILE NO.
W153420-SK01_SK03-P1.DWG

CONVENIENCE STORE DEVELOPMENT
11 YANCHEP BEACH ROAD
YANCHEP
SWEEP PATHS - SEMI TRAILER TRUCK
DRAWING NO. W143420-SK01 SHEET 3 OF 3 ISSUE P1

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