Appendix 4
Traffic Impact Assessment

Proposed Convenience Store Development

Portion of Lot 768 (58) Montana Crescent, Alkimos

Transport Impact Assessment

PREPARED FOR:
Caltex Australia Petroleum Pty Ltd

December 2018

Document history and status

Author	Revision	Approved by	Date approved	Revision type
Tamara Albaz	r01	B Bordbar	31/10/18	Draft
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Client: Caltex Australia Petroleum Pty Ltd

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1.0 Summary

This Transport Impact Assessment (TIA) is prepared by Transcore with respect to the proposed Convenient Store development at the north-east portion of lot 768 (58) Montana Crescent in Alkimos.

The subject site is presently vacant land and located west of Marmion Avenue and south of Sanderling Street at Alkimos, in the City of Wanneroo.

The existing and proposed road network in the immediate locality is in accordance with South Alkimos Local Structure Plan and recent subdivision application, which obtained approval for Sanderling Street to connect to Marmion Avenue and form a left in/left out T-intersection.

Traffic generation of the proposed development is estimated to be approximately 100 and 112 vehicles per hour (vph) during the weekday AM and PM peak hours respectively. This level of traffic generation is relatively minimal and as such would have insignificant impact on the traffic operations of the surrounding road network, particularly considering that the majority of this traffic is passing trade.

The net additional traffic as a result of the proposed development is estimated as 986vpd (daily), 60vph (AM peak hour) and 67vph (PM peak hour) on the surrounding road network.

The site is proposed to have two crossovers on Montana Crescent and no crossovers on Sanderling Street and Marmion Avenue. The dual crossover system proposed for the development is essential to achieve effective circulation particularly for service vehicles and fuel tankers.

The proposed development layout has been assessed with respect to service vehicle access, egress and circulation. Swept path analysis shows that the proposed entry and egress arrangement and site layout facilitate efficient traffic movements and circulation through the site.

2.0 Introduction

This Transport Impact Assessment has been prepared by Transcore on behalf of Caltex Australia Petroleum Pty Ltd. The subject of this report is the proposed Convenient Store at Lot 768 (58) (forming part of the existing lot 768 (58) Montana Crescent, Alkimos).

The subject site is bound by Marmion Avenue to the east, Sanderling Street to the north, Montana Crescent to the west and vacant land to the south as shown in Figure 1.

Key issues that will be addressed in this report include the traffic generation and distribution of the proposed development, traffic assessment, operation of the site crossovers and fuel tanker entry, egress and circulation.

Figure 1: location of the development site

3.0 Existing Situation

3.1 Existing Site Use, Access and Parking

As detailed in **Figure 1**, the subject site is bound by Marmion Avenue to the east, Sanderling Street to the north, proposed new access road to the west (Montana Crescent) and vacant land to the south.

Subject site is currently vacant land.

3.2 Existing Site Traffic Generation

The subject site is presently vacant and does not generate any traffic.

3.3 Surrounding Road Network and Traffic Management on Frontage Roads

Marmion Avenue

As shown in **Figure 2**, Marmion Avenue at this location is constructed to a two-lane undivided carriageway standard with on-street cycle lanes on both sides of the road.

Marmion Avenue is classified as a Distributor A road in the Main Roads WA *Functional Road Hierarchy*. Marmion Avenue is covered by Other Regional Roads (ORR) reservation in the MRS (Blue Road).

Marmion Avenue operates with a speed limit of 80km/h.

Figure 2: Marmion Avenue adjacent to the subject site (looking north)

Sanderling Street

Sanderling Street at present is a cul-de-sac and does not connect to Marmion Avenue, however it is understood that as part of the South Alkimos Local Structure Plan and recent subdivision application, approval has been granted for Sanderling Street to connect to Marmion Avenue and form a left in/ left out T-intersection.

3.4 Existing Traffic Volumes on Roads and Major Intersections

Marmion Avenue

Traffic count data obtained from Main Roads WA indicates that Marmion Avenue carried average weekday traffic flows of approximately 23,000 vehicles per day (vpd) in 2017 North of Romeo Road. The recorded heavy vehicle traffic component was 5% of total weekday traffic volume.

The weekday AM peak hour on Marmion Avenue occurs between 7:45AM and 8:45AM and the PM peak hour occurs between 2:45PM and 3:45PM.

3.5 Operation of Surrounding Intersections

Marmion Avenue / Sanderling Street Intersection

This intersection is presently not constructed. Therefore, observations and analysis of existing intersection performance is not applicable. However, it is understood that as part of a recent subdivision application, approval has been granted for Sanderling Street to connect to Marmion Avenue and form a left in/ left out T-intersection.

Sanderling Street / Montana Crescent Intersection

This intersection is presently not constructed. Therefore, observations and analysis of existing intersection performance is not applicable. However, it is understood that the Montana Crescent will be constructed connect to Sanderling Street and form a T-intersection.

3.6 Heavy Vehicles

Marmion Avenue adjacent to the subject site forms part of RAV Network 1 which permits 19m semi-trailers and 20m B-Doubles to travel on these roads subject to additional mass and size limits.

3.7 Public Transport Access

The subject site has access to two bus services:

- Bus Route No. 490 - Butler Station - Two Rocks via Marmion Avenue.
- Bus Route No. 491 - Butler Station - Yanchep via Marmion Avenue.

Bus services run past the subject site on Marmion Avenue and provide connectivity to the rail network via Butler Train Station, as shown in **Figure 3.**

The service station intends to mainly cater for passing traffic and is primarily motor vehicle oriented. Therefore, the public transport connectivity is not a significant consideration for this development.

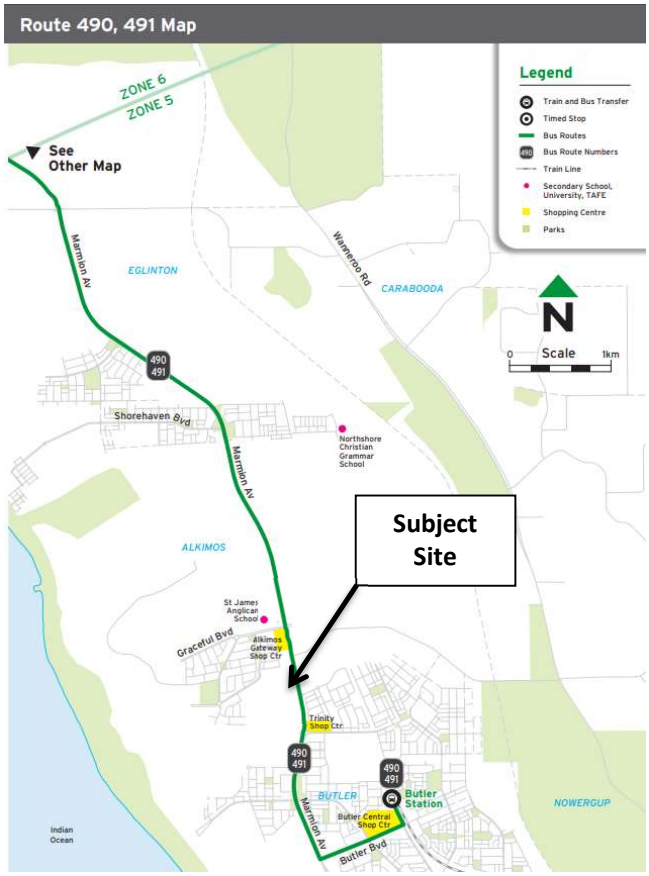


Figure 3: Existing bus routes

3.8 Pedestrian and Cyclist Facilities

Pedestrian paths are currently constructed on Sanderling Street and on western verge of Marmion Avenue in the vicinity of the subject site.

Cycle access to the site is available via on-street cycle lanes on Marmion Avenue on both sides of the road.

4.0 Development Proposal

4.1 Proposed Site Use

The proposed development is for a Convenience Store, comprising:

- Light vehicle canopy with 8 fuelling points for light vehicles;
- Associated convenience store building;
- Service vehicle area / loading bay; and
- 10 car parking spaces including one ACROD bays, plus one air and water bay.

The layout of the proposed development is shown in the site plan included in **Appendix A**.

4.2 Proposed Access for all Modes

Vehicle access to the proposed development is proposed via 9.0m and 11.0m wide full-movement crossovers on Montana Crescent.

The dual crossover system proposed for the development is essential to achieve effective circulation for service vehicles particularly fuel tankers.

Figure 4 shows the location of the proposed development crossovers.

Deliveries and waste collection will be accommodated within the site. Turn path analysis was undertaken for 17.2m fuel tanker to enter, circulate and exit the site.

The analysis undertaken demonstrates satisfactory operations of the access/egress system and effective circulation of traffic within the development.

Truck entry, egress and circulation are discussed in further detail in Section 9.0 of this report.

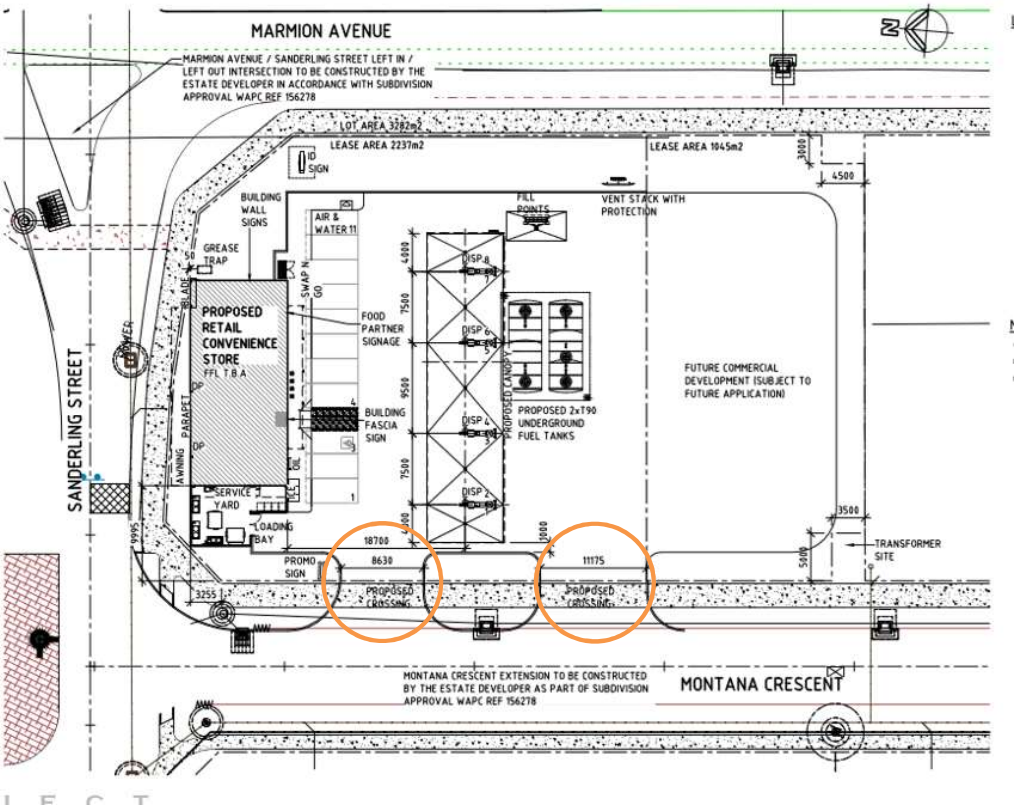


Figure 4: Site plan and proposed development crossover

Intersection of Marmion Avenue / Sanderling Drive

The South Alkimos Local Structure Plan is the document that has set the framework for the road network layout, including Montana Crescent, its intersection with Sanderling Street, Sanderling Street and its intersection with Marmion Avenue. The intersection of Marmion Avenue / Sanderling Street is planned to permit left in movements from Marmion Avenue and left-out movements from Sanderling Street onto Marmion Avenue.

The vast majority of traffic accessing this development will be from Marmion Avenue with about 80% of this patronage being passing trade traffic.

5.0 Changes to Surrounding Transport Networks

In accordance with the South Alkimos Local Structure Plan and the recent subdivision application, approval has been granted for Sanderling Street to connect to Marmion Avenue and form a left in/ left out T-intersection.

Also, in accordance with South Alkimos Local Structure Plan Montana Crescent will also be constructed and connected to Sanderling Street in the form of a T-intersection.

Marmion Avenue is ultimately proposed to be upgraded to dual divided carriageway standard.

6.0 Integration with Surrounding Area

The proposed development is in accordance with the future planning and integrates well with the surrounding road network.

7.0 Traffic Assessment

7.1 Assessment Years and Time Periods

The assessment years that has been adopted for this analysis are immediately post-development for the interim access scenario and 2029 for the 10-year post development scenario.

The proposed development is expected to generate highest traffic movements during the peak hour periods of the adjacent road network.

Review of the Main Roads WA traffic count data indicates that the peak weekday traffic hours on Marmion Avenue are between 7:45AM and 8:45AM and between 2:45PM and 3:45PM.

7.2 Development Traffic Generation and Distribution

The traffic volume that would be generated by the proposed development has been estimated using trip generation rates derived from:

- ITE Trip Generation Manual 10th Edition

The trip rates which were used to estimate the proposed development traffic generation are as following:

Gasoline/Service Station with Convenience Market (945) – Regular Fuelling Points

- AM Peak hour: 12.47 trips per fuelling point.
- PM Peak hour: 13.99 trips per fuelling point.
- Weekday: 205.36 trips per fuelling point.

Accordingly, it is estimated that the proposed development would generate approximately 1,643 vehicular trips per day (both inbound and outbound) with approximately 100 and 112 trips during the weekday AM and PM peak hours respectively.

For this development 60% passing trade is assumed.

The net addition of traffic when accounting for passing trade is +986vpd (daily), +60vph (AM peak hour) and +67vph (PM peak hour) on the surrounding road network.

The directional split of inbound and outbound trips for the proposed development is assumed to be about 50/50 for inbound/outbound trips during the peak hours.

Two traffic distributions were calculated for the weekday AM and PM peak hours:

- Passing trade traffic as detailed in Figure 5.

- Non-passing trade traffic as detailed in Figure 6.

The total proposed development traffic is detailed in Figure 7. The development traffic distribution modelled in this report has been evaluated by considering the catchment area of the proposed development, existing traffic patterns and the identified key traffic routes.

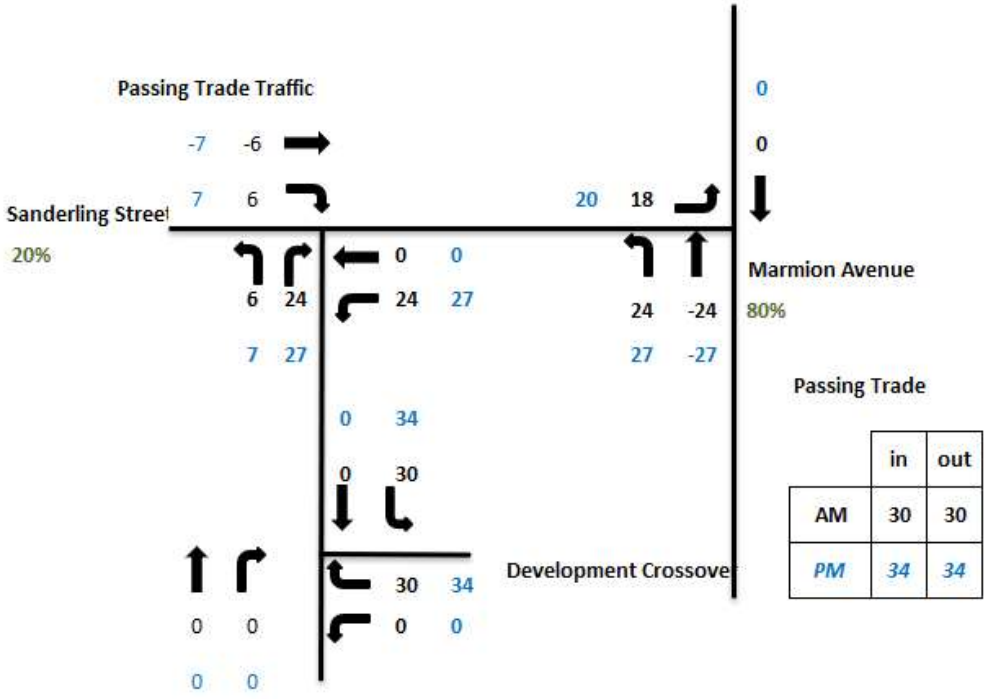


Figure 5: Passing trade component - weekday AM & PM peak hour traffic for the proposed development

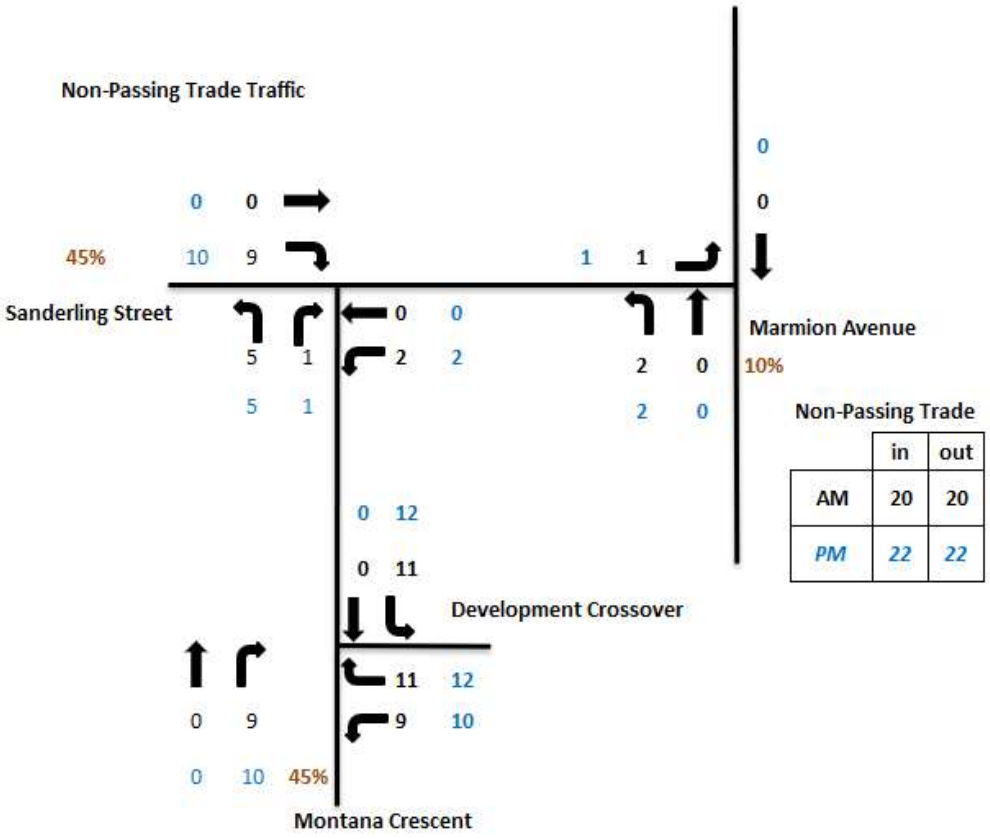


Figure 6: Additional (non-passing trade) component - weekday AM & PM peak hour traffic for the proposed development (interim scenario)

Figure 7: Total peak hour traffic generated by the proposed development – Weekday AM and PM peak hours

7.3 Traffic Flows

The existing traffic flows used as a base for traffic assessment are presented in Figure 8. The existing traffic volumes were derived from Main Roads traffic count data.

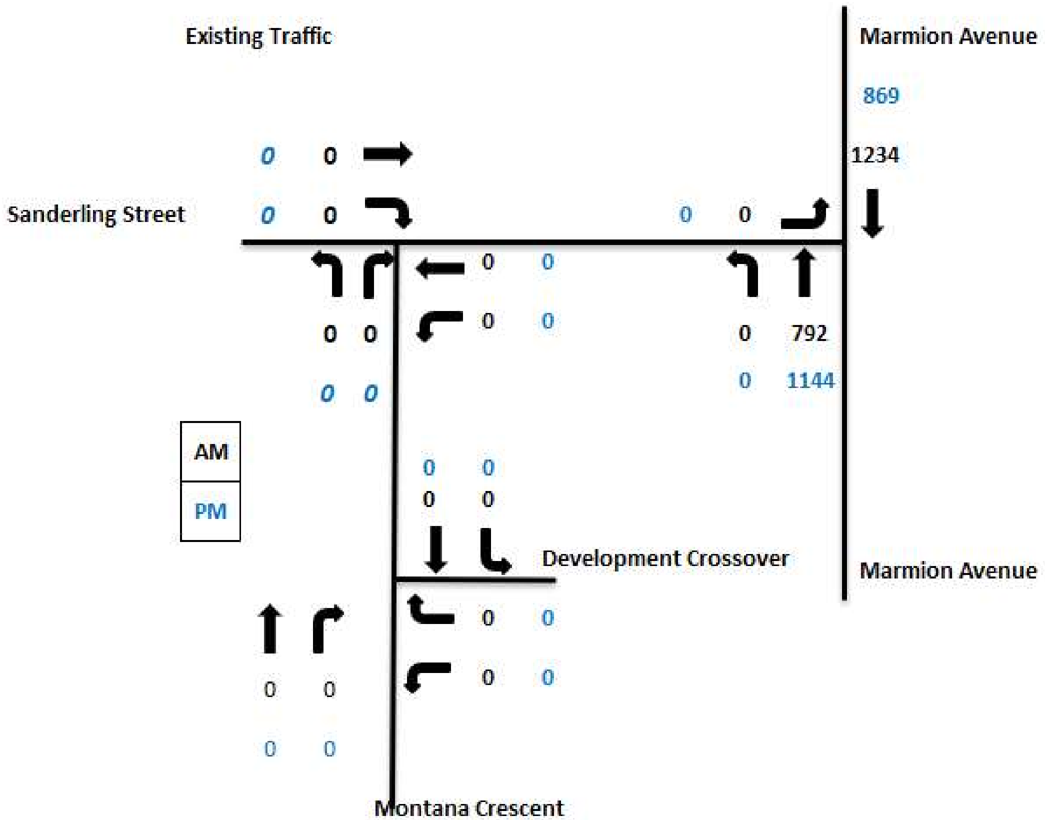


Figure 8: Existing traffic flows near the subject site – Weekday AM & PM peak hours

The combined base and development traffic volumes for the post-development scenario are presented in Figure 9.

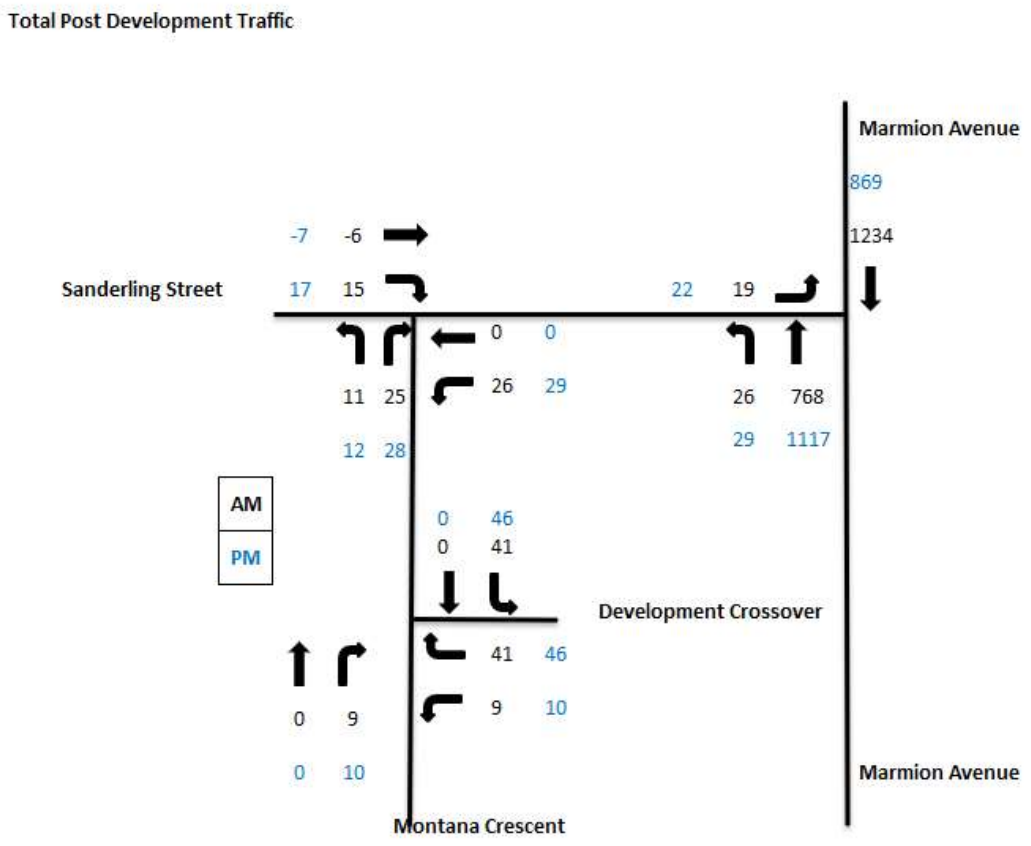


Figure 9: Post-development traffic flows near the subject site – Weekday AM and PM peak hours

To approximate the 10-year post development traffic on relevant roads, a traffic growth of 20% has been applied to through traffic on Marmion Avenue. It is anticipated that by this time Marmion Avenue will be upgraded to dual divided carriageway.

The total ten-year post-development traffic volumes are presented in Figure 10.

It should be noted that for Figures 8, 9 and 10 the additional traffic which will be using Sanderling Street, Montana Crescent and intersections of Sanderling Street with Montana Crescent and Marmion Avenue, following construction of these roads and intersections, is not shown as this level of traffic is not know at this stage. However, as these traffic volumes are unlikely to be high it will not impact on the outcome of this assessment.

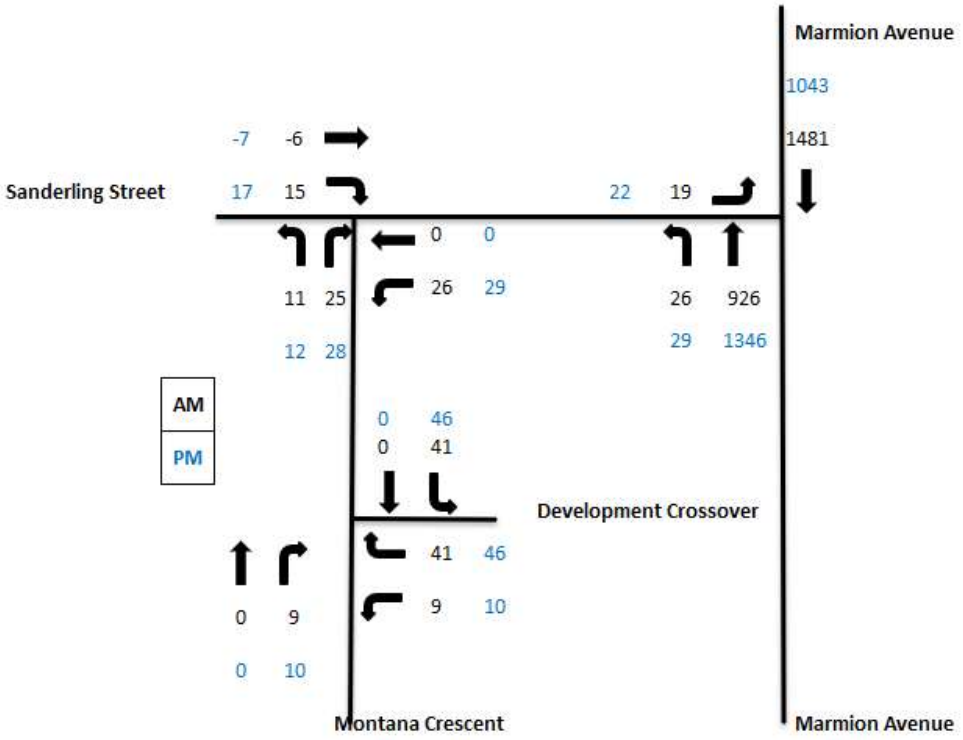


Figure 10: Estimated 10-year total post-development traffic flows near the subject site – Weekday AM and PM peak hours

7.4 Impact on Surrounding Roads

The WAPC Transport Impact Assessment Guidelines (2016) provides guidance on the assessment of traffic impacts:

"As a general guide, an increase in traffic of less than 10 per cent of capacity would not normally be likely to have a material impact on any particular section of road, but increases over 10 per cent may. All sections of road with an increase greater than 10 per cent of capacity should therefore be included in the analysis. For ease of assessment, an increase of 100 vehicles per hour for any lane can be considered as equating to around 10 per cent of capacity. Therefore, any section of road where the structure plan traffic would increase flows by more than 100 vehicles per hour for any lane should be included in the analysis."

The proposed development will not increase traffic flows anywhere near the quoted WAPC threshold on Marmion Avenue to warrant further detailed analysis. Due to the standard and classification of the surrounding road network it is anticipated that the Service Station traffic can be accommodated.

7.5 Impact on Neighbouring Areas

The traffic generated by the proposed development is not expected to significantly affect surrounding areas and the road network has been designed to accommodate this level of traffic.

7.6 Traffic Noise and Vibration

It generally requires a doubling of traffic volumes on a road to produce a perceptible 3dB (A) increase in road noise. The proposed development will not increase traffic volumes on surrounding roads anywhere near this level.

8.0 Parking

The proposed development provides 10 car parking spaces including 1 ACROD bay, plus 1 air and water bay, a delivery bay and 8 fuelling positions.

It is considered that the proposed parking provision is sufficient to accommodate the needs of the proposed development.

9.0 Provision for Heavy Vehicles

The largest service vehicle which is expected to use the site is a 17.2m fuel tanker. Delivery and service trucks will enter and exit the subject site via the proposed crossovers on Montana Crescent.

Turn path analysis was undertaken to assess access, egress and circulation for the proposed development. This analysis shows that the proposed entry and egress arrangements and site layout facilitate efficient vehicle movements including service vehicles and fuel tankers

The turn path diagrams are included in Appendix B.

10.0 Conclusions

This Transport Impact Assessment (TIA) is prepared by Transcore with respect to the proposed Convenient Store development at the north-east portion of lot 768 (58), Montana Crescent in Alkimos.

The site is proposed to have two crossovers on Montana Crescent and no crossovers on Sanderling Street and Marmion Avenue. The dual crossover system proposed for the development is essential to achieve effective circulation particularly for service vehicles and fuel tankers.

Sanderling Street at present is a cul-de-sac and does not connect to Marmion Avenue, however it is understood that as part of South Alkimos Local Structure Plan and the recent subdivision application, approval has been granted for Sanderling Street to connect to Marmion Avenue and form a left in/ left out T-intersection.

Traffic generation of the proposed development is estimated to be 100vph and 112 vph during the weekday AM and PM peak hours respectively. Much of this traffic is related to pass-by trips already passing the site on the surrounding road network.

The net additional traffic as a result of the proposed development is estimated as 986vpd (daily), 60vph (AM peak hour) and 67vph (PM peak hour) on the surrounding road network after allowing for passing trade traffic. The vast majority of traffic accessing this development will be from Marmion Avenue with about 80% of this patronage being passing trade traffic.

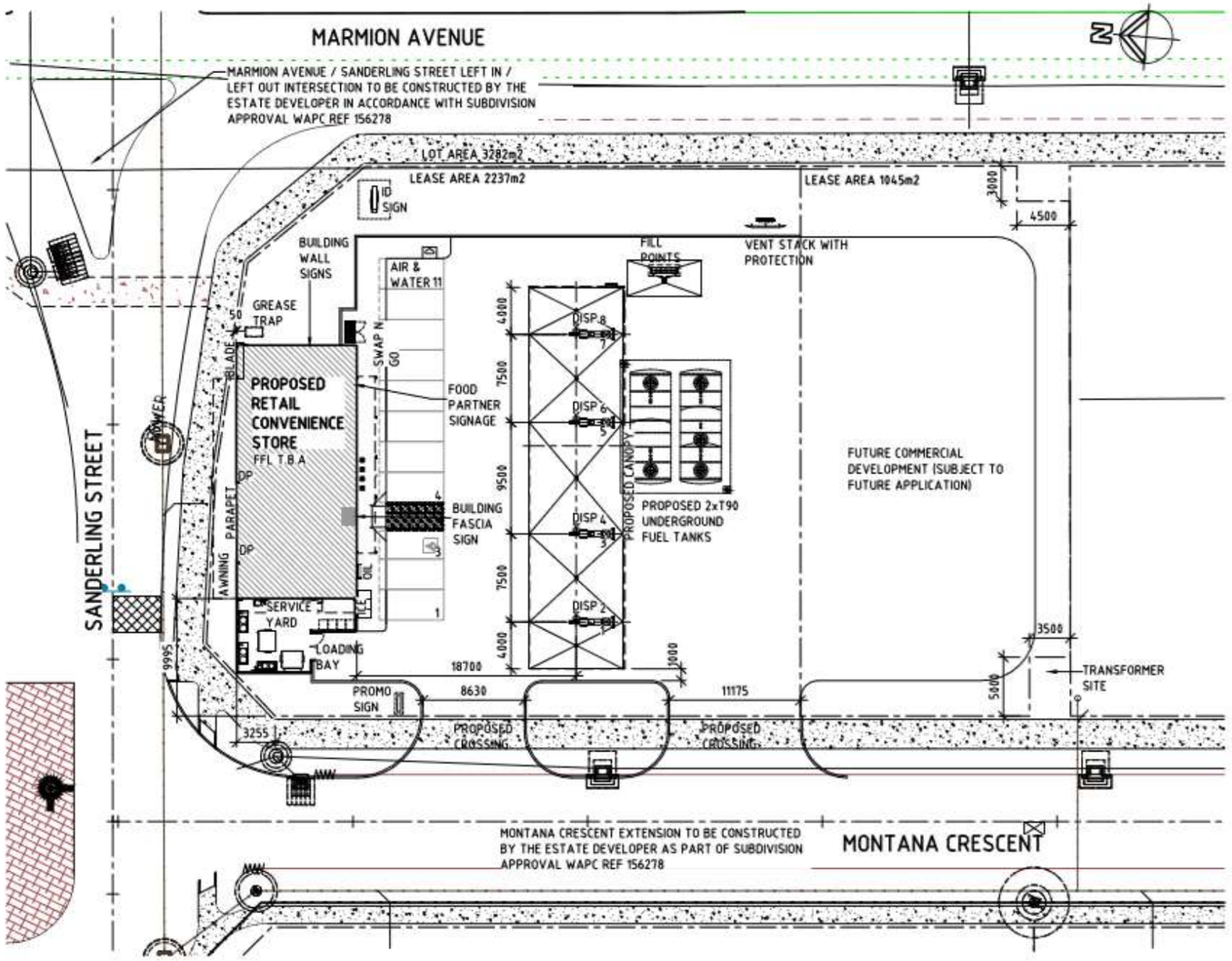
Accordingly, the traffic generation of the proposed development is relatively minimal and as such would have insignificant impact on the surrounding road network.
The proposed development layout has been assessed with respect to service vehicle access, egress and circulation. This analysis shows that the proposed entry and egress arrangements and site layout facilitate efficient vehicle movements including service vehicles and fuel tankers

The operation of the proposed development crossovers, the T-intersection of Sanderling Drive and Montana Crescent and the left in/left out intersection of Sanderling Drive and Marmion Avenue are anticipated to operate satisfactorily during weekday AM and PM peak hours in the post-development and year 2029 scenarios.

In conclusion, the findings of this Transport Impact Assessment are supportive of the proposed development.

Appendix A

PROPOSED SITE PLAN



LEGEND

- NEW YELLOW PAINTED DIRECTIONAL ARROW.
- WHITE 'SYMBOL OF ACCESS' 900 HIGH ON BLUE RECTANGLE 1200 SQ. TO COMPLY WITH AS1428.1
- 100mm WIDE YELLOW PAINTED CAR PARK LINE.
- SINGLE FLOOD LIGHT COMPLETE WITH FOOTING & CONNECTION TO EXTERNAL LIGHTING CIRCUIT.
- FUEL DISPENSER.
- SITE SETOUT POINT.
- EXTENT OF LANDSCAPING
- CONCRETE KERB

NOTES : CONSTRUCTION

C.01 FOR BUILDING DIMENSIONS REFER TO FLOOR PLAN.
C.02 ALL SIGNAGE SHOWN IS INTERNALLY ILLUMINATED UNO.
C.03 CONFIRM EXACT SITE DIMENSIONS PRIOR TO COMMENCING CONSTRUCTION.
C.04 MERGE ALL CURVED SECTIONS OF ROAD INTO STRAIGHT SECTIONS.
C.05 KERB RAMPS SHOWN TO BE AT A MAXIMUM GRADIENT OF 1 IN 8 AND SHALL FULLY COMPLY WITH THE REQUIREMENTS OF A 'KERB RAMP' AS DEFINED IN AS1428.

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CALTEX
Caltex Australia Petroleum Pty Ltd

REV.	BY	DATE	DESCRIPTION OF CHANGE
B	JS	14.08.18	BUILDING REVISED, ROLL OVER KERB REMOVED
C	JS	12.09.18	BOUNDARY REVISED
D	JS	03.10.18	DEVELOPER SITE REVISED BUILDING PARAPET / POSTION REVISED

REVISION

PROJECT
ALKIMOS - WA
MARMION AVENUE
CNR SANDERLING STREET

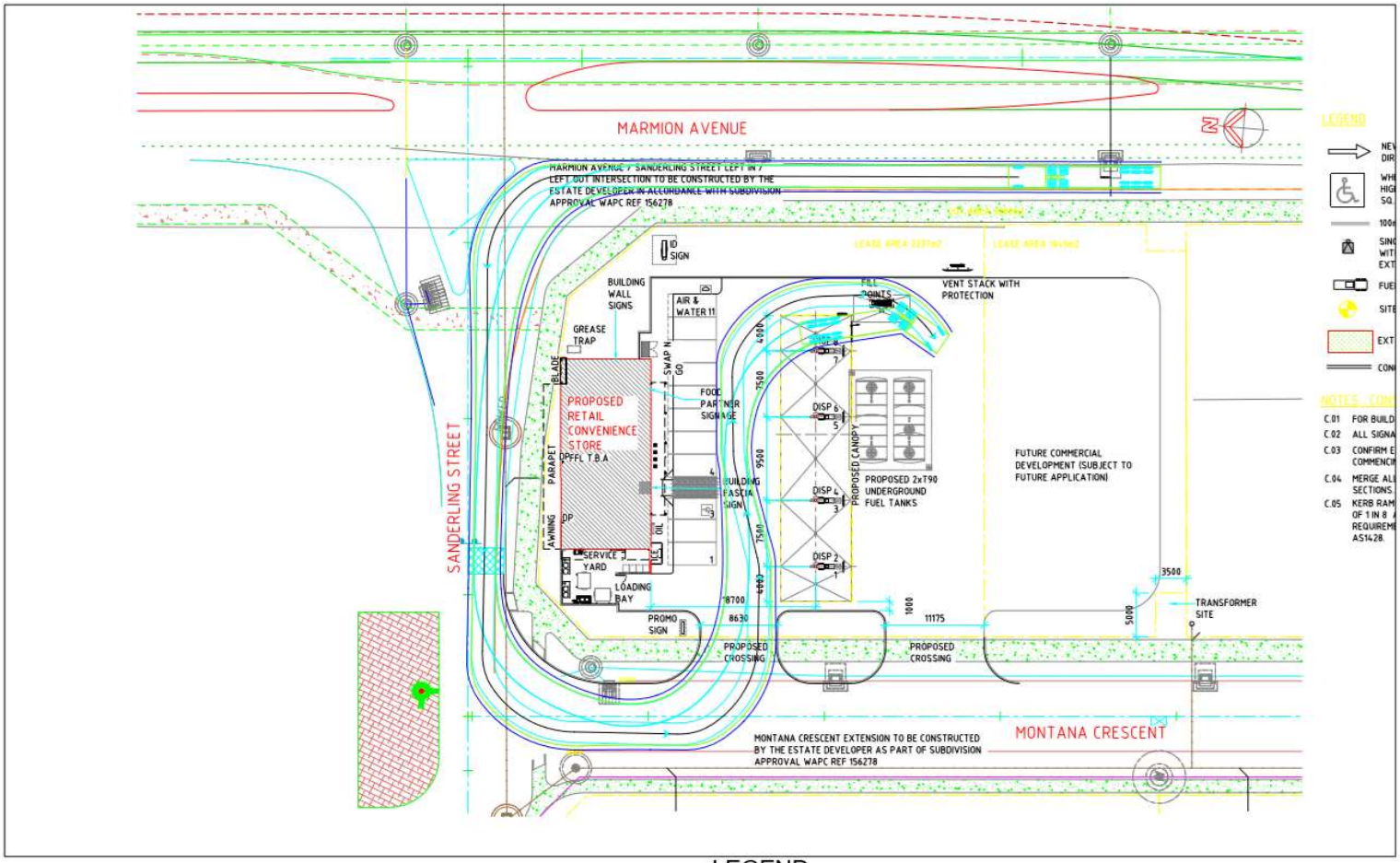
TITLE
SITE; PLAN
PROPOSED

0 4m 8 12 16 20

SCALE 1:400
DEVELOPMENT
APPROVED
DATE
SIZE A3
DRAWING No. P1565-A100
REV. D

Appendix B

SWEPT PATH ANALYSIS



Caltex Alkimos - Marmion Ave & Cnr Sanderling St.

17.2m Truck

Fuel Tanker Entry

LEGEND

Vehicle Body

Wheel Path

500mm Clearance

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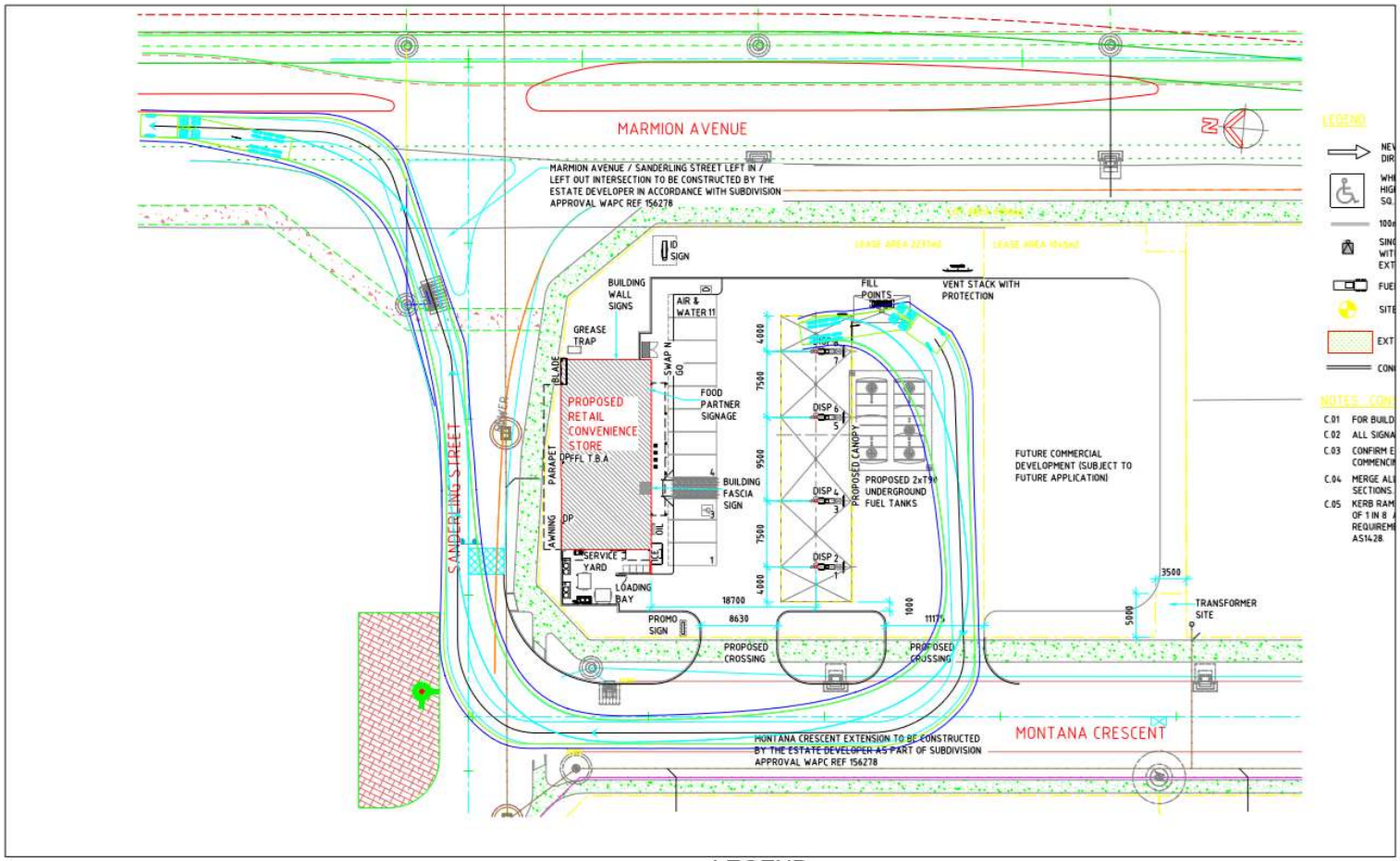
Scale: 1:400 @ A3



Caltex Alkimos - Marmion Ave & Cnr Sanderling St.
17.2m Truck
Fuel Tanker Exit

LEGEND
Vehicle Body
Wheel Path
500mm Clearance

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30/10/2018
Scale: 1:400 @ A3