



Department of Infrastructure,  
Local Government and Planning

Our reference: 1710-1925 SRA  
Your reference: D/114-2017

30 October 2017

The Chief Executive Officer  
Rockhampton Regional Council  
PO Box 1860  
Rockhampton Qld 4700  
enquiries@rrc.qld.gov.au

Attention: Brandon Diplock

Dear Sir/Madam

**Referral agency response—with conditions**

(Given under section 56 of the *Planning Act 2016*)

The development application described below was properly referred to the Department of Infrastructure, Local Government and Planning on 12 October 2017.

**Applicant details**

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Applicant name:	Mr Peter Sparkes
Applicant contact details:	PO Box 1000 BUDDINA QLD 4575 aspen@astpd.com.au

**Location details**

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Street address:	23 Albert Street, Rockhampton City; 40 Alma Street, Rockhampton City
Real property description:	2SP195031; 1RP606047
Local government area:	Rockhampton Regional Council

**Application details**

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Development permit	Material change of use for Service Station
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**Referral triggers**

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The development application was referred to the department under the following provisions of the Planning Regulation 2017:

- 10.9.4.2.4.1 State transport corridors and future State transport corridors

**Conditions**

Under section 56(1)(b)(i) of the *Planning Act 2016* (the Act), the conditions set out in Attachment 1 must be attached to any development approval.

**Reasons for decision to impose conditions**

The department must provide reasons for the decision to impose conditions. These reasons are set out in Attachment 2.

**Advice to the assessment manager**

Under section 56(3) of the Act, the department offers advice about the application to the assessment manager—see Attachment 3.

**Approved plans and specifications**

The department requires that the plans and specifications set out below and enclosed must be attached to any development approval.

Drawing/report title	Prepared by	Date	Reference no.	Version/issue
<b>Aspect of development: Material change of use</b>				
Site Plan	Leffler Simes Architects	August 2017	DA-102	A
Engineering Services Report	Davey Engineering Solutions Pty Ltd	16 September 2017	-	B

A copy of this response has been sent to the applicant for their information.

For further information please contact Haidar Etemadi, Planning Officer, on 49242915 or via email [RockhamptonSARA@dilgp.qld.gov.au](mailto:RockhamptonSARA@dilgp.qld.gov.au) who will be pleased to assist.

Yours sincerely



Anthony Walsh  
Manager Planning

cc Mr Peter Sparkes, [aspen@astpd.com.au](mailto:aspen@astpd.com.au)

enc Attachment 1—Conditions to be imposed  
Attachment 2—Reasons for decision to impose conditions  
Attachment 3—Advice to the assessment manager  
Approved plans and specifications

**Attachment 1—Conditions to be imposed**

No.	Conditions	Condition timing
<b>Material change of use (Service station)</b>		
State-controlled road—The chief executive administering the <i>Planning Act 2016</i> nominates the Director-General of Department of Transport and Main Roads to be the enforcement authority for the development to which this development approval relates for the administration and enforcement of any matter relating to the following condition(s):		
1.	<p>The road accesses must be carried out generally in accordance with the following plan:</p> <ul style="list-style-type: none"> <li>• Site Plan compiled by Leffler Simes Architects, dated August 2017, reference DA-102, revision A.</li> </ul>	At all times.
2.	<p>The development must be carried out generally in accordance with the Engineering Services Report prepared by Davey Engineering Solutions Pty Ltd dated 16 September 2017, revision B, in particular:</p> <ul style="list-style-type: none"> <li>• Provision of a minimum 9,500 litre on site detention tank including a throttled outlet to ensure post development flows to the State-controlled Road are not increased above pre-development runoff rates.</li> </ul>	Prior to the commencement of use.

**Attachment 2—Reasons for decision to impose conditions**

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The reasons for this decision are to ensure:

- the development is carried out generally in accordance with the plans of development submitted with the application;
- that the impacts of stormwater events associated with development are minimised and managed to avoid creating any adverse impacts on the state-transport corridor; and

### Attachment 3—Advice to the assessment manager

#### General advice

1. **Road access works approval:** Under sections 62 and 33 of the *Transport Infrastructure Act 1994*, written approval is required from the Department of Transport and Main Roads to carry out road works that are road access works (including driveways) on a state-controlled road. Please contact the Department of Transport and Main Roads (Fitzroy District / Central Queensland Region) at [FitzroyDistrict@tmr.qld.gov.au](mailto:FitzroyDistrict@tmr.qld.gov.au) or (07) 4931 1500 to make an application for road works approval. This approval must be obtained prior to commencing any works on the state-controlled road reserve. The approval process may require the approval of engineering designs of the proposed works, certified by a Registered Professional Engineer of Queensland (RPEQ). Please contact the Department of Transport and Main Roads as soon as possible to ensure that gaining approval does not delay construction.



Department of Infrastructure,  
Local Government and Planning

## Department of Infrastructure, Local Government and Planning

### Statement of reasons for application 1710-1925 SRA

(Given under section 56 of the *Planning Act 2016*)

Departmental role: Referral agency

#### Applicant details

Applicant name: Mr Peter Sparkes  
Applicant contact details: PO Box 1000  
BUDDINA QLD 4575  
aspen@astpd.com.au

#### Location details

Street address: 23 Albert Street, Rockhampton City; 40 Alma Street, Rockhampton City  
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#### Development details

Development permit Material change of use for service station

#### Assessment matters

Aspect of development requiring code assessment	Applicable codes
1. Material change of use	State Development Assessment Provisions, version 2.1 <ul style="list-style-type: none"> <li>State code 1: Development in a state-controlled road environment</li> </ul>

#### Reasons for the department's decision

- The development complies with State Code 1: Development in a state-controlled road environment (SDAP) (v2.1), and relevant provisions under table 1.2.1 and table 1.2.2.

#### Decision

- The development application is for a material change of use for a service station.
- The proposed development has direct access to the state-controlled road (Albert Street) and access to Alma Street.
- The development can be conditioned to ensure compliance with SDAP to ensure:
  - the development is carried out generally in accordance with the plans of development submitted with the application;
  - that the impacts of stormwater events associated with development are minimised and managed to avoid creating any adverse impacts on the state-transport corridor.

#### Relevant material

- Planning Act 2016*;

Fitzroy/Central regional office  
Level 2, 209 Bolsover Street,  
Rockhampton  
PO Box 113, Rockhampton QLD 4700

- Planning Regulation 2017;
- State Development Assessment Provisions (Version 2.1);
- State Assessment and Referral Agency – Model Conditions (Version 3.1);
- Development application material; and
- Technical agency response.

PLANS AND DOCUMENTS  
referred to in the REFERRAL  
AGENCY RESPONSE

SARA ref: 1710-1925 SRA

Date: 30/10/2017

NOTE:

ALL ROADS, CARPARKING, PAVEMENTS & LINEMARKING TO COMPLY WITH TRAFFIC ENGINEERS SPECIFICATIONS AND AUSTRALIAN STANDARDS.

ENTRIES, EXITS & CARPARKING LAYOUTS ARE SUBJECT TO TRAFFIC ENGINEER'S DESIGN.

SITE BOUNDARIES & SITE AREAS ARE INDICATIVE ONLY & SUBJECT TO CONFIRMATION BY LICENSED SURVEYOR.

ALL SETBACKS, PLOT RATIOS, LANDSCAPE AREAS, CARPARKING NUMBERS & THE LIKE ARE SUBJECT TO LOCAL AUTHORITY APPROVAL.

ALL SERVICES, LIGHTING, ETC ARE PRELIMINARY ONLY & SUBJECT TO ENGINEER'S DESIGN.

ALL DOOR LOCATIONS ARE PRELIMINARY AND SUBJECT TO SURVEYOR'S ASSESSMENT.

ALL TRAFFIC CONSIDERATIONS INCLUDING TRUCK TURNING AND ACCESS/EGRESS ARE TO BE AS PER TRAFFIC ENGINEER'S REPORT.

SURROUNDING ROAD DESIGN AND SITE ACCESS/EGRESSES IS TO BE AS PER TRAFFIC ENGINEER'S DRAWINGS.

ALL REDUNDANT VEHICLE CROSSINGS SHALL BE REMOVED AND REPLACED WITH KERB & CHANNEL.

SITE AREA & CARPARK

SUBJECT SITE AREA:	2018 m <sup>2</sup>
TOTAL BUILDING AREA:	183 m <sup>2</sup>
TOTAL PAVEMENT:	1517 m <sup>2</sup>
CAR SPACES:	9 CS
CAR PARK RATIO:	1 CS / 20.3m <sup>2</sup>
BICYCLE SPACES:	2

**NOTE:**  
TOTAL OF 6 CAR SPACES REMOVED OUTSIDE OF  
SUBJECT SITES BOUNDARY.

SITE PLAN

LEFFLER SIMES ARCHITECTS

1 PROPOSED SITE PLAN

Scale: 1:200





# Engineering Services Report

23 Alma Street, Rockhampton

Proposed Service Station

For Gondor Investments Pty Ltd



Artists Impression prepared by Leffler Simes Architects

**PLANS AND DOCUMENTS  
referred to in the REFERRAL  
AGENCY RESPONSE**



**SARA ref:**

1710-1925 SRA

**Date:**

30/10/2017



**Davey Engineering Solutions Pty Ltd**

23 Dune Circle, Lammermoor, QLD 4703

(07) 49 33 69 61 - [Jeff@daveyes.com.au](mailto:Jeff@daveyes.com.au)



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### Revision History

A – 15 September 2017

B – 16 September 2017

### Jeff Davey

*B.Eng (Hons), RPEQ 8386, JP (Qual)*

### COMMERCIAL IN CONFIDENCE

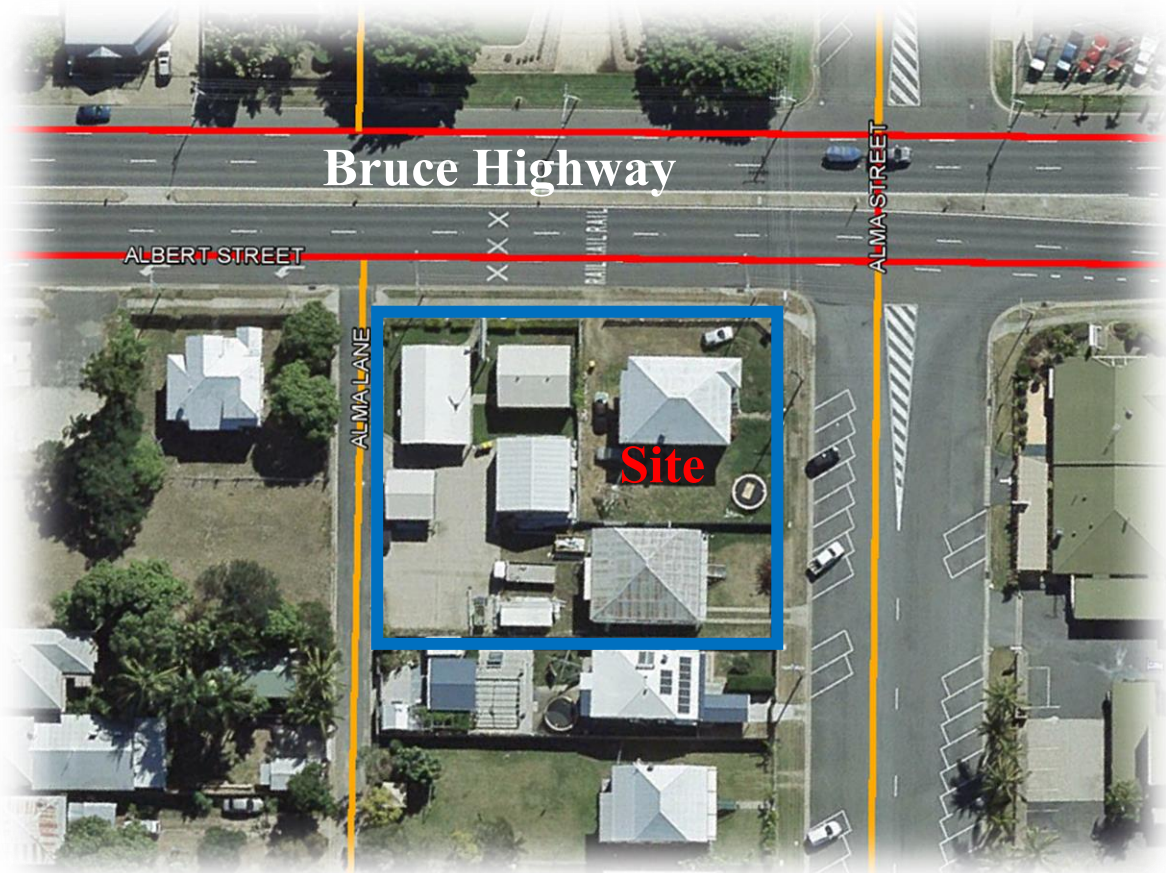
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## 1.0 INTRODUCTION

Davey Engineering Solutions Pty Ltd has prepared the following report to address the engineering services and issues associated with the Material Change of Use & Reconfiguration of Lot.

The development is located on the corner of Albert Street and Alma Street on Lot 1 on RP606047 & Lot 2 on SP195031. The locality of the subject development site can be seen in the below Site Locality Image.



### Site Locality

## 2.0 SITE WORKS / EROSION CONTROL / GROUND CONDITIONS

Siteworks for the proposed development will be relatively minor as the site naturally falls from its south-western boundary towards its north-eastern boundary. The site has a number of slab on ground buildings and two two-story dwellings which are all slightly elevated from the surrounding ground. The existing fall across the majority of the site is less than 0.5% and ranges from ~10.53m AHD down to ~10.26m AHD.

The site works will consist of the following stages:

- Removal of current buildings within the proposed development area, this includes a business and associated 3 sheds, a carport, and two residential houses.
- Minor earthworks involving shaping of the proposed carpark and accesses and building pads. The proposed buildings pad will be slightly elevated (250mm) from the site to create positive fall for stormwater drainage and to improve the ground foundation for the buildings.
- Underground services installation.
- Roadworks and stormwater drainage works
- Building construction works
- Final detailed works

All stockpiles are to be segregated into topsoil, pavements, sand/gravels and protected with appropriate silt traps and fences. All stockpiles are to be accessed from the upstream side to reduce erosion and need to be maintained consistently throughout the project construction phase. Erosion control measures are to be implemented during construction in accordance with Rockhampton Regional Council requirements. The principal contractor is to reinstate all erosion control measures after all rain events and any vandalism during the construction period.

From site inspection and having previous knowledge of the surrounding area, the natural material below the existing buildings would be representative of the clayey soils typically found in the lower lying areas of the Rockhampton. The material on the site are expected to have a high clay content and subject of movement as the ground varies with moisture content. To overcome these issues it is proposed the car parking and circulation areas will constructed out of a ridged pavement material (concrete) to minimise the potential moisture ingress into the subgrade. The objective of the building and car park design will be to maintain as close as possible a constant moisture content in the surrounding ground to reduce potential infrastructure damage sustained as clays expand and contract due to moisture variances.

### 3.0 SEWER

A 150mm sewer and manhole terminates three metres inside the southern boundary. It is possible to service the development via the existing main which has an invert of 8.73m AHD. The furthest section of the building is 35 metres and at 1 in 40 requires less than 900mm fall. With a proposed floor level of 10.750m AHD, there is sufficient level difference to service the site via the existing manhole onsite. A jump-up into this manhole will be used to service the development.

#### Demand Calculations

The CMDG Sewer Network Design & Construction Guideline states that 1 ET (Equivalent Tenements) within the Rockhampton Regional Council is 540L/day, and the Typical Loadings Per Development Type, as per Table D12.C.01, are:

- 2 Bedroom Dwelling - Sewer Flow is 0.8ET per unit
- Commercial Business – Sewer Flow is 0.8ET per 100sqm of GFA
- Service Station – Sewer Flow is 0.8ET per 100sqm of GFA

Based on the above guidelines the table below outlines the net difference in loading the proposed development will have on the sewer network.

<b><u>Existing loadings to be demolished</u></b>	
2 Bedroom Dwelling	-432 L/day
2 Bedroom Dwelling	-432 L/day
229m <sup>2</sup> of Commercial Business (GFA)	-989 L/day
<b>Sub Total</b>	<b>-1,853 L/day</b>
<b><u>Proposed Development</u></b>	
185m <sup>2</sup> of Service Station (GFA)	799 L/day
<b>Total</b>	<b>-1,054 L/day</b>

Therefore it can be seen that the net sewer flow for the development site will be less than the predeveloped case, overall reducing the demand on the existing sewer network.

## 4.0 WATER

A 150mm watermain is located along the road frontage of Albert Street and a 100mm main is located off the sites' Alma Street frontage. The service to the development will be via a short connection into the 150mm on Albert Street. As the Council watermain is located directly adjacent to this development there will be no problems obtaining a connection as required for the proposed development. Council records indicate that hydrants exist on both road frontages. A hydrant will be installed (if required) in accordance with the National Construction Code of Australia at a located nominated during the detailed design phase.

### Demand Calculations

The Water and Sewerage Planning Guidelines\* states that indicative averages are:

- Home Unit - Water demand is between 550 - 750 liters per day (2 bedroom)
- Commercial Premises - Water demand is between 500 - 800 liters per day per 100m<sup>2</sup> GFA
- Service Station – Water demand is between 500 - 700 liters per day per 100m<sup>2</sup> GFA

*\*Reference QLD Gov - Planning Guidelines for Water Supply and Sewerage April 2010 Chapter 6 amended March 2014*

### Existing loadings to be demolished

2 Bedroom Dwelling	-650 L/day
2 Bedroom Dwelling	-650 L/day
229m <sup>2</sup> of Commercial Business (GFA)	-1,488 L/day
<b>Sub Total</b>	<b>-2,788 L/day</b>

### Proposed Development

185m <sup>2</sup> of Service Station (GFA)	1,110 L/day
<b>Total</b>	<b>-1,678 L/day</b>

Based on the planning guidelines it is estimated the proposed development demand will reduced by approximately 1,678 liters per day.

*Davey Engineering Solutions* does not have access to a calibrated hydraulic model of the existing water infrastructure for the area.



## **5.0 ELECTRICAL / COMMUNICATIONS**

Existing overhead electrical and underground communications / Telstra are available to the property. There will be further discussions with Ergon Energy regarding the existing connection arrangements.

## **6.0 STORMWATER MANAGEMENT (QUANTITY)**

The intent of this Stormwater Management section is to provide guidelines and recommendations to be incorporated into the future Operational Works design to minimise the impact this development has on the surrounding environment, infrastructure and nearby properties.

The subject site allotments for part of an existing larger external catchment that extends from Talford Lane and that discharges towards the Fitzroy River. The distance from the upper catchment to its discharge location in the River is 1.5km. The site is located only 300 meters from the Fitzroy River or within the bottom 20% of the catchment.

The digital survey contours completed by Capricorn Survey Group, show the sites' catchment having two discrete catchments, one of which flows to the Bruce Highway and the other flows towards Alma Lane. The existing site catchments and site flow directions are shown on the image in Section 6.1.

Two (2) scenarios have been investigated to establish if peak flow mitigation measures are required as a result of this development. The first scenario (1) is comparing pre development situation and the second (2) scenario is the post situations of the development site.

### ***6.1 – SCENARIO 1 EXISTING STORMWATER QUANTITY ASSESSMENT***

The existing development site is split over two catchments that both discharge Council stormwater network that ultimately discharge to the Fitzroy River as shown below.

The total area of the existing overall catchment is as follows:

CATCHMENT	AREA
A	518m <sup>2</sup>
B1	1,250m <sup>2</sup>
B2	250m <sup>2</sup>

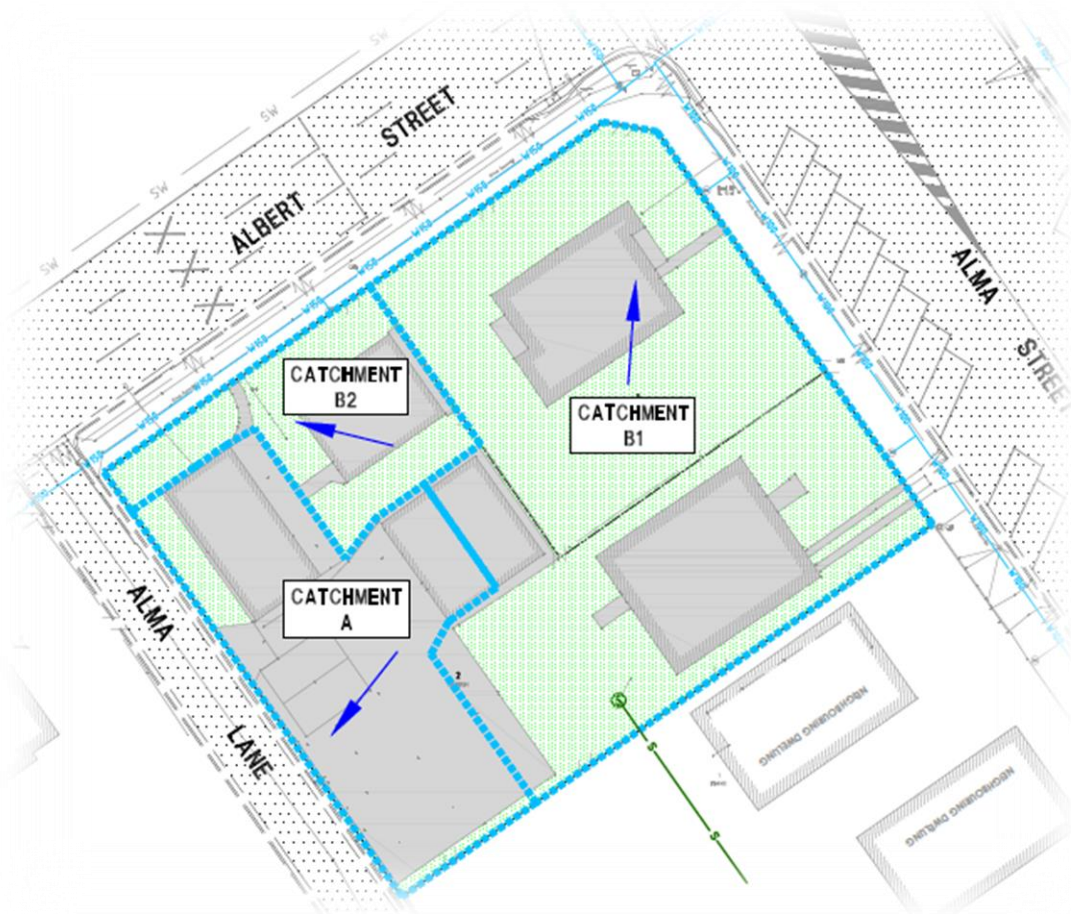
Existing catchment flows have been prepared in accordance with the Rational Method outlined in the Queensland Urban Drainage Manual (QUDM) and the Capricorn Municipal Development Guidelines (CMDG).

The time of concentration of 5 minutes has been adopted due to small site area and is also based on QUMD Table 4.06.2.

In accordance with Australian Rainfall and Runoff (AR&R), Rockhampton Regional Council's stormwater intensity charts, the rainfall intensity for  $Q_1$  to  $Q_{100}$  storm events are as follows:

Stormwater Event	Rainfall Intensity
$Q_1$	117mm/hr
$Q_2$	151mm/hr
$Q_5$	194mm/hr
$Q_{10}$	220mm/hr
$Q_{20}$	256mm/hr
$Q_{50}$	304mm/hr
$Q_{100}$	342mm/hr

In accordance with the Digital Terrain Model completed by Capricorn Survey Group and onsite inspection the fraction impervious for the onsite catchments are: A ~91% and B is ~30%.



Pre-Development Catchment Plan



The calculated  $Q_1$  to  $Q_{100}$  flow rates discharging from existing Catchment A are as follows:

Stormwater Event	Flow Rate
$Q_1$	$0.012\text{m}^3/\text{s}$
$Q_2$	$0.016\text{m}^3/\text{s}$
$Q_5$	$0.023\text{m}^3/\text{s}$
$Q_{10}$	$0.028\text{m}^3/\text{s}$
$Q_{20}$	$0.034\text{m}^3/\text{s}$
$Q_{50}$	$0.044\text{m}^3/\text{s}$
$Q_{100}$	$0.049\text{m}^3/\text{s}$

For this development, catchment B1 and B2 have been treated as the one catchment. While each catchment discharges to different sections of Albert St, the two road gully pits that are capturing the water are connected in to the same trunk stormwater main running down Albert Street, and ultimately discharging to the Fitzroy River. The calculated  $Q_1$  to  $Q_{100}$  flow rates discharging from existing Catchment B1 & B2 combined are as follows:

Stormwater Event	Flow Rate
$Q_1$	$0.030\text{m}^3/\text{s}$
$Q_2$	$0.041\text{m}^3/\text{s}$
$Q_5$	$0.058\text{m}^3/\text{s}$
$Q_{10}$	$0.070\text{m}^3/\text{s}$
$Q_{20}$	$0.085\text{m}^3/\text{s}$
$Q_{50}$	$0.111\text{m}^3/\text{s}$
$Q_{100}$	$0.130\text{m}^3/\text{s}$

Refer to Appendix 2 for Stormwater Calculations.

## ***6.2 – SCENARIO 2 PROPOSED STORMWATER QUANTITY ASSESSMENT***

The proposed developed site is designed with two catchments, similar to the existing scenario, as shown in the image below. Catchment A is designed to discharge to back of kerb in Alma lane, and Catchment B to discharge directly to the stormwater infrastructure in Albert street.



### Post Development Catchment Plan

The pre and post situations fraction impervious and the area of the catchments were altered to match the post development layout. For Catchment A, the impervious area decreased from 91% to 86%, and the area also decreased by 118m<sup>2</sup>. Catchment B increased by 62% impervious and catchment increased by 118m<sup>2</sup>.

Post Development catchments are:

CATCHMENT	AREA
A	400m <sup>2</sup>
B	1,618m <sup>2</sup>

Incorporating these changes, the calculated  $Q_1$  to  $Q_{100}$  flow rates discharging from proposed Catchment A are as follows:

Stormwater Event	Flow Rate
Q <sub>1</sub>	0.009m <sup>3</sup> /s
Q <sub>2</sub>	0.012m <sup>3</sup> /s
Q <sub>5</sub>	0.018m <sup>3</sup> /s
Q <sub>10</sub>	0.021m <sup>3</sup> /s
Q <sub>20</sub>	0.026m <sup>3</sup> /s
Q <sub>50</sub>	0.033m <sup>3</sup> /s
Q <sub>100</sub>	0.038m <sup>3</sup> /s

The calculated Q<sub>1</sub> to Q<sub>100</sub> flow rates discharging from proposed Catchment B are as follows:

Stormwater Event	Flow Rate
Q <sub>1</sub>	0.037m <sup>3</sup> /s
Q <sub>2</sub>	0.051m <sup>3</sup> /s
Q <sub>5</sub>	0.073m <sup>3</sup> /s
Q <sub>10</sub>	0.087m <sup>3</sup> /s
Q <sub>20</sub>	0.106m <sup>3</sup> /s
Q <sub>50</sub>	0.137m <sup>3</sup> /s
Q <sub>100</sub>	0.154m <sup>3</sup> /s

Refer to Appendix 2 for Stormwater Calculations.

Developed stormwater drainage calculations have been completed comparing the post developed scenario against the pre developed for the both site catchments.

### ***6.3 – PROPOSED STORMWATER CONTROL SYSTEMS***

To ensure that existing and proposed infrastructure is protected throughout the development, the stormwater concept is usually to maintain the site discharge towards the existing discharge points of both Albert Street and Alma Lane kerb and channel. Developed stormwater control system calculations have been completed comparing the post developed scenario against the pre developed scenario for the both site catchments.

The concept for catchment A entitles directing the down pipes from the proposed building, half of the covered walkway and the bin enclosure to kerb adaptors to Alma Lane. The landscaped section with in this catchment will have gentle fall to top of kerb. The comparison between the pre development flow and the post development flow for this catchment has resulted in a reduction of approximately 24% of the peak flow, this means that the proposed development will improve the existing stormwater drainage situation in Alma Lane, and no further mitigation will be implemented.

For catchment B, a network of pit and pipes collects shallow sumps across the site will drain to the existing Council stormwater infrastructure in Albert Street. The comparison between the pre

development flow from catchment B1 and B2, against the post development flow of catchment B, has resulted in a net increase of approximately 26 litres per second during a 1 in 50 year event and 24 litres per second during a 1 in 100 year event.

Detailed external catchment modelling has not been undertaken as part of this assessment, however due to the site being located within the lower 1/3 of the catchment it is believed any detention may have a detrimental impact on the peak flow through the system. Refer Table 5.2.2 in the Queensland Urban Drainage Manual. Should Council advise otherwise based on an assessment of their stormwater modelling of the external catchment, onsite detention could be provided. Should detention be required by Council, the peak runoff could be detained in an underground tank with throttled outlet to ensure that the existing infrastructure is not adversely impacted. Using a preliminary estimation method for sizing the detention basins a volume of 9,500L was calculated, this volume will ensure that there is no increase to the flow entering the existing infrastructure at the time of the peak discharge for the subject site. Note the site peak and catchment peak are likely not to coincide.

Refer to Appendix 1 illustrating the proposed conceptual stormwater layout and Appendix 2 for Stormwater Calculations.

As shown on the plans the stormwater from the below Retail & Diesel Canopy's is bunded and any runoff or fuel spills will be directed to an oily water separating device. The fuel delivery and take-off point area is bunded with an automatic diversion valves to an underground tank which will be engaged when delivery is underway.

## **7.0 CONCLUSION**

There appears to be no engineering infrastructure difficulties with the proposed service station located on the corner of Albert Street & Alma Street, Rockhampton. A review of the services proposed for this development and their impact on existing services indicated that there is no impediment to development.

Detailed external stormwater catchment modelling has not been undertaken as part of this assessment, however due to the site being located within the lower 1/3 of the catchment it is believed any detention may have a detrimental impact on the peak flow through the system. Council's regional stormwater model should be reviewed to confirm onsite detention is not warranted.

There is a workable design strategy for access and sewer, stormwater management, water supply, electricity and telecommunication. Minor alterations in design may eventuate from future operational works applications, however the fundamentals of the design strategy ensures that service provisions will not pose a serious constraint to development.

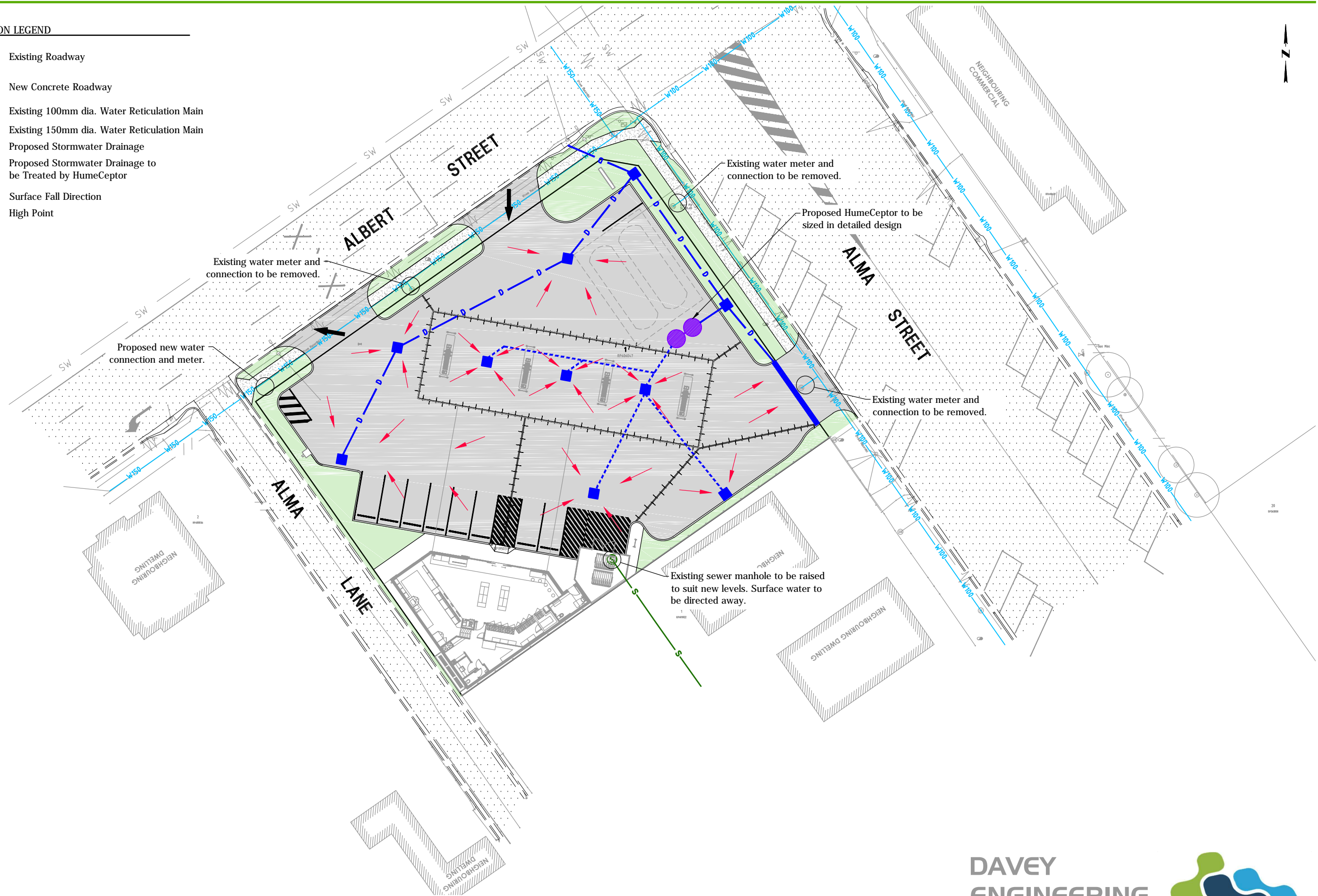
## APPENDIX 1

### Development Plans- Perspectives & Engineering Plan



WATER RETICULATION LEGEND

- Existing Roadway
- New Concrete Roadway
- Existing 100mm dia. Water Reticulation Main
- Existing 150mm dia. Water Reticulation Main
- Proposed Stormwater Drainage
- Proposed Stormwater Drainage to be Treated by HumeCeptor
- Surface Fall Direction
- High Point

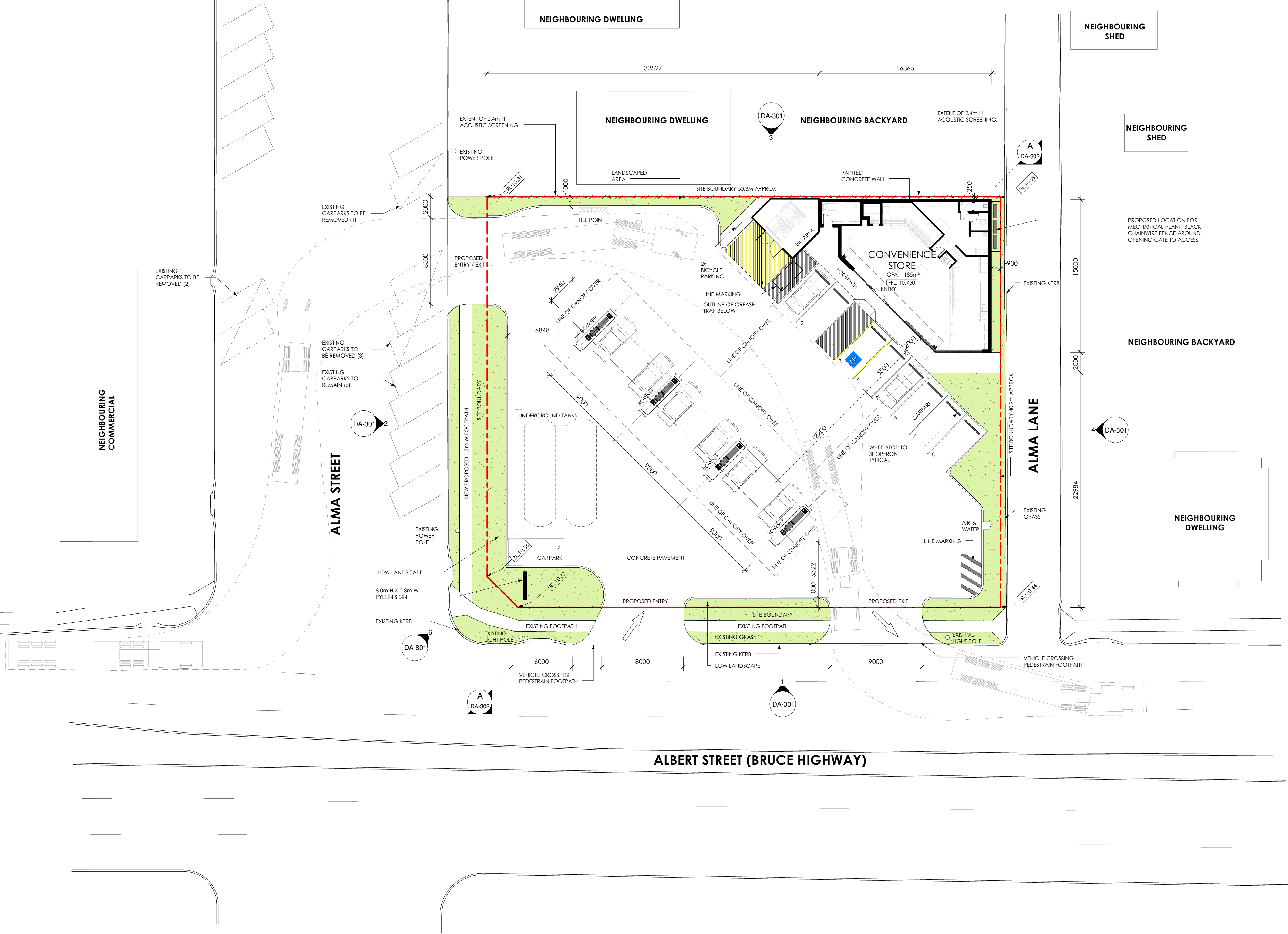


**PROPOSED SERVICE STATION**  
**23 ALBERT STREET, ROCKHAMPTON**  
SCALE 1:400 (A3) (REV 1 14/09/17)

**DAVEY**  
**ENGINEERING**  
**SOLUTIONS**

Telephone: +61 419 872 040  
Email: jeff@daveyes.com.au





**NOTE:**  
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SITE AREA & CARPARK	
SUBJECT SITE AREA:	2018 m²
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CAR SPACES:	9 CS
CAR PARK RATIO:	1 CS / 20.3m²
BICYCLE SPACES:	2

**NOTE:**  
TOTAL OF 6 CAR SPACES REMOVED OUTSIDE OF SUBJECT SITES BOUNDARY.

SITE PLAN

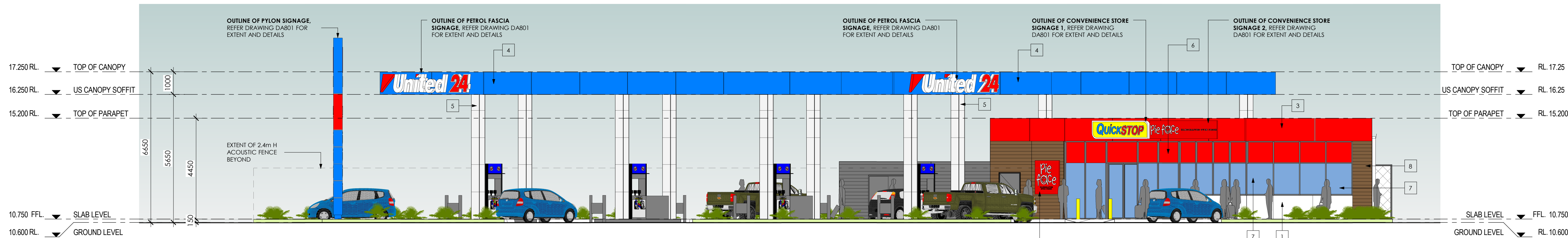
LEFFLER SIMES ARCHITECTS

1 PROPOSED SITE PLAN

Scale: 1:200

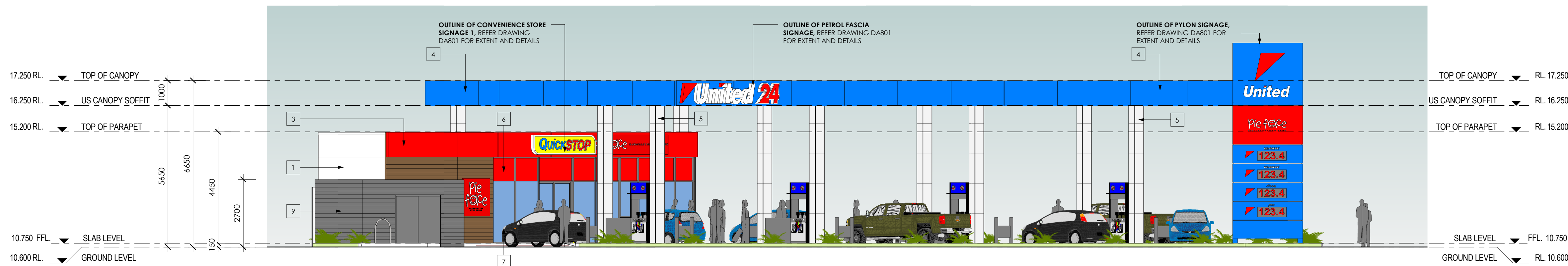




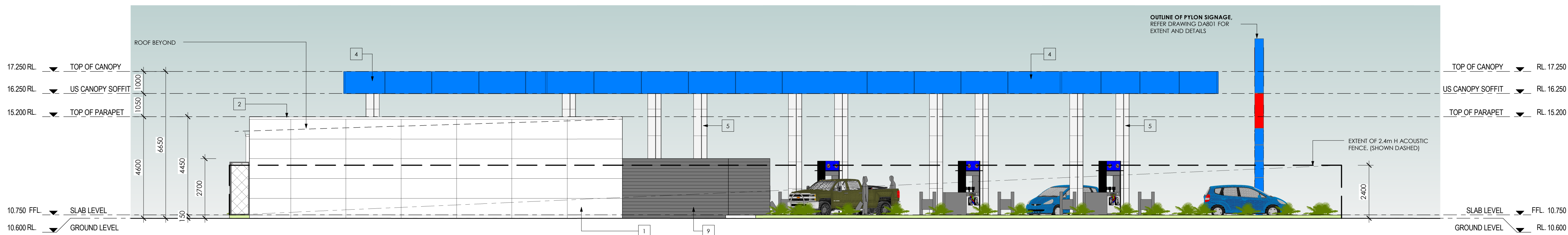


1 NORTH WEST ELEVATION - ALBERT STREET  
DA-102 Scale: 1 : 100

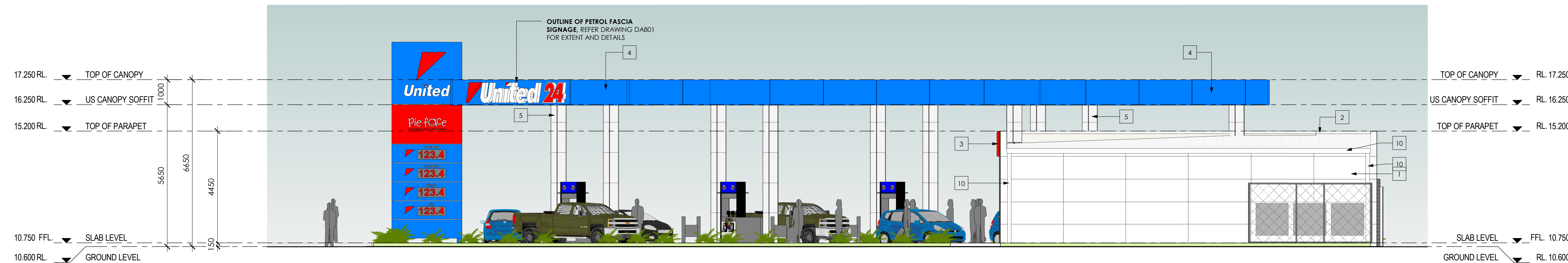
EXTERNAL FINISHES	
CODE	DESCRIPTION
1	CONCRETE PANEL WITH GROOVES. PAINTED COLOUR (DULUX - VIVID WHITE)
2	POWDERCOATED METAL CAPPING COLOUR (WHITE TO MATCH WALL)
3	COMPOSITE METAL PANEL COLOUR (ALUCOBOND UNITED RED)
4	COMPOSITE METAL PANEL COLOUR (ALUCOBOND UNITED BLUE)
5	COMPOSITE METAL PANEL COLOUR (ALUCOBOND UNITED WHITE CLADDING)
6	COLOUR-BACK GLAZING FINISH (RED TO MATCH METAL PANEL)
7	POWDERCOATED ALUMINIUM WITH CLEAR GLAZING (BLACK POWDERCOAT)
8	HORIZONTAL ALUMINIUM CLADDING (NATURAL TEAK)
9	METAL SLATS
10	POWDERCOATED METAL GUTTER & DOWNPIPE COLOUR (WHITE TO MATCH WALL)



2 NORTH EAST ELEVATION - ALMA STREET  
DA-102 Scale: 1 : 100



3 SOUTH EAST ELEVATION  
DA-102 Scale: 1 : 100

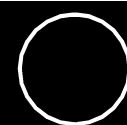
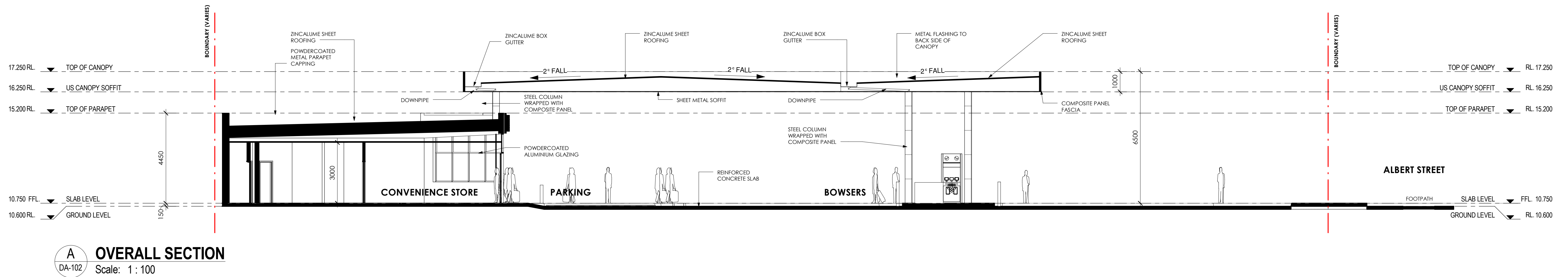


4 SOUTH WEST ELEVATION- ALMA LANE  
DA-102 Scale: 1 : 100

## ELEVATIONS



ISSUE	AMENDMENT	DATE	CHK'D
P 1	ISSUE FOR INFORMATION	29.08.17	SJE
P 2	ISSUE FOR INFORMATION	01.09.17	SJE
P 3	ISSUE FOR INFORMATION	12.09.17	SJE



## APPENDIX 2

### Stormwater Calculations

23 ALBERT STREET  
ROCKHAMPTON CITY, QLD, 4701  
*Rational Method*

Job No: 1711  
Date: 15-Sep-17

Time of Concentration - Friends Equation for Overland Sheet Flow	
Overland Length (m):	0
Average Grade %:	1.0%
Horton's Roughness (n): (From Table 4.6.5)	0.035
tc = 0.0 mins	

Time of Concentration - Channel Flow	
Overland Length (m):	0
Average Grade %:	1.0%
Assumed Stream Velocity (m/s): (From Table 4.6.6)	0.3
tc = 0.0 mins	

Catchment Time of Concentration (QUDM) = 5 mins

Fraction Impervious (fi) From Table 4.5.1	0.91
1hr Intensity Q10 (mm/hr)	71.9
C 10 Values From Tables 4.5.3 & Table 4.5.4	0.88
Area of Catchment (ha)	0.0518

EAST ROCKHAMPTON (CMDG)

Common Rain Fall Events							
ARI (years)	Q1	Q2	Q5	Q10	Q20	Q50	Q100
Frequency Factor (fy) From Table 4.5.2	0.8	0.85	0.95	1	1.05	1.15	1.2
Intensity (mm/hr) @ 5 min From IFD tables	117	151	194	220	256	304	342
Cy Values	0.70	0.75	0.84	0.88	0.92	1.00	1.00
Q (m³/sec)	0.012	0.016	0.023	0.028	0.034	0.044	0.049

23 ALBERT STREET  
ROCKHAMPTON CITY, QLD, 4701  
*Rational Method*

Job No: 1711  
Date: 15-Sep-17

Time of Concentration - Sheet Flow	
Overland Length (m):	0
Average Grade %:	1.0%
Horton's Roughness (n): (From Table 4.6.5)	0.02
tc = 0.0 mins	

Time of Concentration - Channel Flow	
Overland Length (m):	0
Average Grade %:	1.0%
Assumed Stream Velocity (m/s): (From Table 4.6.6)	0.3
tc = 0.0 mins	

Catchment Time of Concentration (QUDM) = 5 mins

Fraction Impervious (fi) From Table 4.5.1	0.86	<b><u>EAST ROCKHAMPTON (CMDG)</u></b>
1hr Intensity Q10 (mm/hr)	71.9	
C 10 Values From Tables 4.5.3 & Table 4.5.4	0.86	
Area of Catchment (ha)	0.040	

Common Rain Fall Events							
ARI (years)	Q1	Q2	Q5	Q10	Q20	Q50	Q100
Frequency Factor (fy) From Table 4.5.2	0.8	0.85	0.95	1	1.05	1.15	1.2
Intensity (mm/hr) @ 5 min From IFD tables	117	151	194	220	256	304	342
Cy Values	0.69	0.73	0.82	0.86	0.90	0.99	1.00
Q (m³/sec)	<b>0.009</b>	<b>0.012</b>	<b>0.018</b>	<b>0.021</b>	<b>0.026</b>	<b>0.033</b>	<b>0.038</b>



23 ALBERT STREET  
ROCKHAMPTON CITY, QLD, 4701  
*Preliminary Detention*

Job No: 1711  
Date: 15-Sep-17

	Pre Development	Post Development	% Increase
<b>Q1</b> ( $m^3/sec$ )	0.01	0.01	-25%
<b>Q2</b> ( $m^3/sec$ )	0.02	0.01	-25%
<b>Q5</b> ( $m^3/sec$ )	0.02	0.02	-25%
<b>Q10</b> ( $m^3/sec$ )	0.03	0.02	-25%
<b>Q20</b> ( $m^3/sec$ )	0.03	0.03	-25%
<b>Q50</b> ( $m^3/sec$ )	0.04	0.03	-24%
<b>Q100</b> ( $m^3/sec$ )	0.05	0.04	-23%

	r	V in
<b>Q1</b> ( $m^3/sec$ )	-0.325	3.58
<b>Q2</b> ( $m^3/sec$ )	-0.325	4.91
<b>Q5</b> ( $m^3/sec$ )	-0.325	7.05
<b>Q10</b> ( $m^3/sec$ )	-0.325	8.42
<b>Q20</b> ( $m^3/sec$ )	-0.325	10.28
<b>Q50</b> ( $m^3/sec$ )	-0.309	13.37
<b>Q100</b> ( $m^3/sec$ )	-0.295	15.21

	Culp Method	Boyd Method	Carroll Method	Basha Method
<b>Q1</b> ( $m^3$ )	-0.14	-1.16	-0.20	-0.65
<b>Q2</b> ( $m^3$ )	-0.19	-1.60	-0.27	-0.89
<b>Q5</b> ( $m^3$ )	-0.27	-2.29	-0.39	-1.28
<b>Q10</b> ( $m^3$ )	-0.32	-2.74	-0.47	-1.53
<b>Q20</b> ( $m^3$ )	-0.39	-3.34	-0.57	-1.87
<b>Q50</b> ( $m^3$ )	-0.53	-4.14	-0.75	-2.33
<b>Q100</b> ( $m^3$ )	-0.61	-4.49	-0.86	-2.55

As per 'Preliminary Estimation Methods for Sizing  
Detention Basins in Queensland (Griffith  
University)'

Condition	Method
$0.00 < r < 0.25$	Boyd Method
$0.25 < r < 0.45$	Basha Method
$0.45 < r < 0.60$	Carroll Method
$0.60 < r < 1.00$	Culp Method

**Q100**

<b>V Storage</b>	0.000	$m^3$
<b>V Storage</b>	0	L

Time of Concentration - Friends Equation for Overland Sheet Flow	
Overland Length (m):	0
Average Grade %:	1.0%
Horton's Roughness (n): (From Table 4.6.5)	0.035
tc = 0.0 mins	

Time of Concentration - Channel Flow	
Overland Length (m):	0
Average Grade %:	1.0%
Assumed Stream Velocity (m/s): (From Table 4.6.6)	0.3
tc = 0.0 mins	

**Catchment Time of Concentration (QUDM) = 5 mins**

Fraction Impervious (fi) From Table 4.5.1	30	<b><u>EAST ROCKHAMPTON (CMDG)</u></b>
1hr Intensity Q10 (mm/hr)	71.9	
C 10 Values From Tables 4.5.3 & Table 4.5.4	0.76	
Area of Catchment (ha)	0.15	

Common Rain Fall Events							
ARI (years)	Q1	Q2	Q5	Q10	Q20	Q50	Q100
Frequency Factor (fy) From Table 4.5.2	0.8	0.85	0.95	1	1.05	1.15	1.2
Intensity (mm/hr) @ 5 min From IFD tables	117	151	194	220	256	304	342
Cy Values	0.61	0.65	0.72	0.76	0.80	0.87	0.91
Q (m³/sec)	<b>0.030</b>	<b>0.041</b>	<b>0.058</b>	<b>0.070</b>	<b>0.085</b>	<b>0.111</b>	<b>0.130</b>

23 ALBERT STREET  
ROCKHAMPTON CITY, QLD, 4701  
*Rational Method*

Job No: 1711  
Date: 15-Sep-17

Time of Concentration - Sheet Flow	
Overland Length (m):	0
Average Grade %:	1.0%
Horton's Roughness (n): (From Table 4.6.5)	0.02
tc = 0.0 mins	

Time of Concentration - Channel Flow	
Overland Length (m):	0
Average Grade %:	1.0%
Assumed Stream Velocity (m/s): (From Table 4.6.6)	0.3
tc = 0.0 mins	

Catchment Time of Concentration (QUDM) = 5 mins

Fraction Impervious (fi) From Table 4.5.1	0.92	<b><u>EAST ROCKHAMPTON (CMDG)</u></b>
1hr Intensity Q10 (mm/hr)	71.9	
C 10 Values From Tables 4.5.3 & Table 4.5.4	0.88	
Area of Catchment (ha)	0.1618	

Common Rain Fall Events							
ARI (years)	Q1	Q2	Q5	Q10	Q20	Q50	Q100
Frequency Factor (fy) From Table 4.5.2	0.8	0.85	0.95	1	1.05	1.15	1.2
Intensity (mm/hr) @ 5 min From IFD tables	117	151	194	220	256	304	342
Cy Values	0.70	0.75	0.84	0.88	0.92	1.00	1.00
Q (m³/sec)	<b>0.037</b>	<b>0.051</b>	<b>0.073</b>	<b>0.087</b>	<b>0.106</b>	<b>0.137</b>	<b>0.154</b>



23 ALBERT STREET  
ROCKHAMPTON CITY, QLD, 4701

Job No: 1711  
Date: 15-Sep-17

*Preliminary Detention*

	Pre Development	Post Development	% Increase
<b>Q1</b> ( $m^3/sec$ )	0.03	0.04	25%
<b>Q2</b> ( $m^3/sec$ )	0.04	0.05	25%
<b>Q5</b> ( $m^3/sec$ )	0.06	0.07	25%
<b>Q10</b> ( $m^3/sec$ )	0.07	0.09	25%
<b>Q20</b> ( $m^3/sec$ )	0.09	0.11	25%
<b>Q50</b> ( $m^3/sec$ )	0.11	0.14	23%
<b>Q100</b> ( $m^3/sec$ )	0.13	0.15	18%

	r	V in
<b>Q1</b> ( $m^3/sec$ )	0.199	14.82
<b>Q2</b> ( $m^3/sec$ )	0.199	20.32
<b>Q5</b> ( $m^3/sec$ )	0.199	29.18
<b>Q10</b> ( $m^3/sec$ )	0.199	34.83
<b>Q20</b> ( $m^3/sec$ )	0.199	42.56
<b>Q50</b> ( $m^3/sec$ )	0.190	54.70
<b>Q100</b> ( $m^3/sec$ )	0.155	61.53

	Culp Method	Boyd Method	Carroll Method	Basha Method
<b>Q1</b> ( $m^3$ )	1.38	2.95	1.48	2.17
<b>Q2</b> ( $m^3$ )	1.89	4.05	2.02	2.97
<b>Q5</b> ( $m^3$ )	2.71	5.82	2.91	4.26
<b>Q10</b> ( $m^3$ )	3.24	6.94	3.47	5.09
<b>Q20</b> ( $m^3$ )	3.96	8.48	4.24	6.22
<b>Q50</b> ( $m^3$ )	4.77	10.38	5.12	7.58
<b>Q100</b> ( $m^3$ )	4.15	9.51	4.48	6.83

As per 'Preliminary Estimation Methods for Sizing  
Detention Basins in Queensland (Griffith  
University)'

Condition	Method
$0.00 < r < 0.25$	Boyd Method
$0.25 < r < 0.45$	Basha Method
$0.45 < r < 0.60$	Carroll Method
$0.60 < r < 1.00$	Culp Method

**Q100**

<b>V Storage</b>	9.508	$m^3$
<b>V Storage</b>	9508	L