



**mcmurtrie**  
CONSULTING ENGINEERS

# FLOOD EMERGENCY MANAGEMENT PLAN

19 REANEY STREET, BERSERKER

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*Prepared for:*

**Central Queensland Christian College Ltd t/a Kingsley College**

**PROJECT NUMBER J21081**

**OCTOBER 2021**

**REVISION R2V2**

**ROCKHAMPTON REGIONAL COUNCIL**

**APPROVED PLANS**

These plans are approved subject to the current conditions of approval associated with

**Development Permit No.: D/144-2021**

**Dated: 5 July 2022**

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DOCUMENT CONTROL

Version	Date	Revision	Prepared	Approved
R2V1	8 October 2021	For Submission	L. Allan	R. Dennis
R2V2	10 October 2021	Minor Amendment – For Submission	L. Allan	R. Dennis

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## CONTACTS

Life threatening or time critical emergencies (Ambulance, Fire and Police)		000
ABC (837 AM)	<a href="http://abc.net.au/radio/capricornia/live">abc.net.au/radio/capricornia/live</a>	07 4924 5111
Bureau of Meteorology	<a href="http://bom.gov.au">bom.gov.au</a>	1300 934 034
	Flood Warnings	1300 659 219
Rockhampton Regional Council	<a href="http://rockhamptonregion.qld.gov.au">rockhamptonregion.qld.gov.au</a>	07 4932 9000
Emergency Dashboard	<a href="http://emergency.rockhamptonregion.qld.gov.au">emergency.rockhamptonregion.qld.gov.au</a>	1300 652 659
Energex	<a href="http://energex.com.au">energex.com.au</a>	
	Emergency	131 962
	General enquiries	131 253
	Loss of supply	136 262
Get Ready Queensland	<a href="http://getready.qld.gov.au/homepage">getready.qld.gov.au/homepage</a>	
Harden Up	<a href="http://hardenup.org">hardenup.org</a>	
Local Disaster Coordination Centre		1300 652 659
Police	<a href="http://police.qld.gov.au">police.qld.gov.au</a>	
	Crime Stoppers	1800 333 000
	Police Link	131 444
Queensland Alert	<a href="http://qld.gov.au/alerts">qld.gov.au/alerts</a>	
Queensland Building & Construction Commission	<a href="http://qbcc.qld.gov.au">qbcc.qld.gov.au</a>	139 333
Queensland Disaster Management	<a href="http://disaster.qld.gov.au">disaster.qld.gov.au</a>	
Queensland Health	<a href="http://health.qld.gov.au">health.qld.gov.au</a>	
	Rockhampton Hospital	07 4920 6211
	Non-urgent health advice	13 43 25 84
State Emergency Service	<a href="http://132500.qld.gov.au">132500.qld.gov.au</a>	132 500
Telephone	<a href="http://telstra.com.au">telstra.com.au</a>	132 203
	<a href="http://optus.com.au">optus.com.au</a>	133 937
Translation services	<a href="http://tisonational.gov.au">tisonational.gov.au</a>	131 450
Transport and Main Roads	<a href="http://qldtraffic.qld.gov.au">qldtraffic.qld.gov.au</a>	131 940

## NOMENCLATURE

Abbreviation	Definition
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
ALS	Aerial Laser Survey
ARI	Average Recurrence Interval
ARR	Australia Runoff and Rainfall
BoM	Bureau of Meteorology
Council	Rockhampton Regional Council
DDC	District Disaster Coordinator
DFE	Defined Flood Event (1% AEP)
FEMP	Flood Emergency Management Plan
FFL	Finished Floor Level - For Education Establishments, greater of the DFE + 0.5m or the 0.5% AEP.
HAT	Highest Astronomical Tide
MCE	McMurtrie Consulting Engineers
PMF	Probable Maximum Flood

In-line with the recent implementation of ARR (Ball, et al., 2019) design storm events are described in terms of AEP, the probability of a storm event magnitude exceeded in any given year as a percentage. This terminology was implemented to replace the ARI, of which is commonly misinterpreted, for example, that a 1 in 10 year ARI will occur exactly once in every ten years. The reference equivalency of standard design storm events are presented below:

AEP (%)	ARI (year)	Shorthand
63	1 in 1	Q1
50	1 in 1.44	Q2 (ARR 2016)
39	1 in 2	Q2 (ARR 1987)
20	1 in 4.48	Q5 (ARR 2016)
18	1 in 5	Q5 (ARR 1987)
10	1 in 9.49	Q10
5	1 in 20	Q20
2	1 in 50	Q50
1	1 in 100	Q100
0.5	1 in 200	Q200
0.2	1 in 500	Q500
0.05	1 in 2,000	Q2000
PMF	PMF	PMF

**CONTENTS**

CONTACTS ..... II

NOMENCLATURE ..... III

1.0 INTRODUCTION..... 1

2.0 HAZARD ..... 2

3.0 PREPARATION ..... 4

4.0 RESPONSE ..... 5

5.0 RECOVERY ..... 7

6.0 CONCLUSION ..... 8

7.0 REFERENCES ..... 9

**TABLES**

Table 2-1 Simulated Flood Levels at Site ..... 2

Table 2-2 Access Route Closure ..... 2

Table 2-3 Predicted Stream Gauge Correlation with Site..... 3

**FIGURES**

**APPENDICES**

- Appendix A Access Route Long Sections
- Appendix B Site Inundation Preparation

## 1.0 INTRODUCTION

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### IF A FLOOD EVENT IS FORECAST/OCCURRING - REFER TO SECTION 4.0 (PAGE 5)

This FEMP has been prepared by MCE to support the DA for Lot 179 on CP890747 (the Site). Council has mapped the Site as flood affected. This FEMP details:

- Potential flood hazard of the site and access route(s);
- Available warning systems; and
- Response procedures.

Due to the nature of the potential flood hazards and existing and proposed site use as an education facility catering from early care to secondary school, an early closure strategy is recommended. Following these procedures will minimise the risk to life of children, staff, parents and emergency responders.

### 1.1 PROPOSED DEVELOPMENT

The existing site has elevations ranging from 6.9 to 7.9 mAHD, with a DFE of 8.65 mAHD the FFL for new structures is 9.15mAHD (for education establishments, the greater of DFE + 0.5m, or 0.5% AEP). Access is provided by Reaney Street, with a crest elevation of approximately 7.47 mAHD at the site entrance along Schoolhouse Street.

The existing education facility has 8 classrooms with ancillary administration facilities. The proposed development increases the number of classrooms to 15 along with specific science and music rooms, a library and kindergarten. The proposal also includes additional carparking and drop off areas along with a new oval.

Generally, it is anticipated that the facility will operate between 6.30 am – 6.30 pm, Monday – Friday. Conservative operation will evacuate and close the site prior to storm events, as per directions listed on Section 4.0.

## 2.0 HAZARD

The Site and surrounds are potentially subject to inundation from regional Fitzroy River storm events. This FEMP is based on the following simulated, forecast and observed flood information sources.

### 2.1 SIMULATED

Council's Fitzroy River (2018) flood model was obtained and used to quantify potential inundation of the site and surrounds, for all standard design and extreme flood events up to the PMF.

#### 2.1.1 Site

Table 2-1 lists the peak inundation levels on site, with key flood maps presented in the attached figures.

Table 2-1 Simulated Flood Levels at Site

AEP (%)	Flood Level (mAHD)
39	3.22
18	6.46
10	7.31
5	7.85
2	8.33
1*	8.65
0.5	8.95
0.2	9.30
0.05	9.79
PMF	12.49

\*DFE

#### 2.1.2 Access Routes

Appendix A presents peak flood long section profile of the access routes illustrated in the flood maps, with topography extracted from ALS data. Table 2-2 presents the expected closure flood levels of the access route. Closure is considered >0.3 m flood depth over the road crest.

Table 2-2 Access Route Closure

Route	Distance (m)	Rainfall Closure Event (AEP)	Maximum Site Isolation (days)
North	1450	5%	25
South	2700	5%	25

The lowest point of 7.47 mAHD is adjacent to the site, and hence applicable to both access routes. The maximum isolation time was determined from Council's model simulations.

## 2.2 FORECAST / WARNING

BoM operates a flood warning system for the Fitzroy River and its tributaries based on a rainfall and river height observations network as shown in the reference drawings. BoM issues flood height predictions when it is anticipated to exceed 7.0 mAHD on the Rockhampton gauge, with the objective to provide at least 60 hours warning. Frequent flood warning and river height bulletins issued during flood events, refer to below sources of information:

- bom.gov.au/qld/warnings
- emergency.rockhamptonregion.qld.gov.au
- BoM Flood Warnings 1300 659 219; and
- ABC local radio 837 AM.

## 2.3 OBSERVED

Fitzroy River at Rockhampton (539258), located approximately 800 m downstream, provides the most representative flood conditions for the site, as correlated in Table 2-3.

Table 2-3 Predicted Stream Gauge Correlation with Site

AEP (%) / Classification	Fitzroy River at Rockhampton (mAHD)
39	3.15
18	6.27
<b>Minor</b>	<b>7.0</b>
10	7.06
<b>Moderate</b>	<b>7.5</b>
5	7.60
2	8.09
1	8.41
<b>Major</b>	<b>8.5</b>
0.5	8.71
0.2	9.08
0.05	9.58
PMF	11.83

## 3.0 PREPARATION

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### 3.1 RESPONSIBLE PERSONS

The facility operator shall appoint a manager (with a backup) who will be responsible for directing the FEMP when activated. This position must be held by on-site staff, to ensure effective direction during events. The FEMP manager is responsible for the following:

- Ensure comprehension of FEMP preparation and procedures prior to an event;
- Direction of all affected persons during activation of the FEMP;
- Maintain register of key warnings, information and responses (refer to contacts table), in addition to all staff and parents/guardians;
- Provide Council with contact details for the issuing of warnings and evacuation orders; and
- Ensure maintenance of emergency provisions (see below).

It is recommended that the facility operators setup a SMS push service to provide updates / instructions during FEMP activation. This service generally exists in similar facilities as part normal operations. It is also recommended that all affected parties subscribe to the BoM Queensland weather warning RSS feed here: <http://www.bom.gov.au/rss/?ref=ftt>

Priority is given to instructions issued by the DDC. The DDC is responsible for authorising the directed evacuation and exercising any statutory powers under Sections 76-79 of the Act (Queensland Government, 2017) which are required to give effect to a directed evacuation. During an event requiring evacuation the DDC will activate official shelter locations (such schools, community centres, etc.) and direct flood affected persons to these locations.

### 3.2 PROVISIONS

A site emergency management kit should be maintained in a dedicated storage cupboard of each dwelling. It should at a minimum contain:

- Up-to-date printed copies this FEMP;
- Water containers;
- Mobile phone charger / external batteries;
- Portable radio and spare batteries;
- First Aid kits (including manual/booklet) and common medications;
- Tarpaulin and duct tape;
- Torches / lanterns with spare batteries; and
- Waterproof bags and/or heavy duty plastic garbage bags.

The above provisions should reflect the needs of affected parties in the event of flood isolation and power loss. Thus, minimum provisions require review as part of changes to emergency needs / level of care.

## 4.0 RESPONSE

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### PHONE '000' IF CRITICAL MEDICAL CIRCUMSTANCES EVENTUATE

Due to the nature of the potential flood hazards detailed in Section 2.0, an **early evacuation** and **closure** strategy is recommended. Following the below procedures will minimise the risk to life of children, parents, staff, and emergency responders.

Warnings may not be provided accurately with sufficient notice. Hence, actions may need to be coordinated by the FEMP manager based on recorded and observed information.

Furthermore, discretion is available to the facility/FEMP manager to close the facility prior to an event occurring (based on forecasts, warnings, authority advice, etc.). This is an ideal scenario, prioritising safety and removing the need to enact evacuation.

### 4.1 TRIGGER 1: ADVERSE WEATHER CONDITIONS

#### 4.1.1 Forecast / Observed

- Heavy rainfall.

#### 4.1.2 Action

- Continue as per usual but monitor official instructions, warnings, rainfall and stream gauge levels.

### 4.2 TRIGGER 2: ACCESS RISK OF INUNDATION

#### 4.2.1 Forecast

- BoM forecast **moderate** (or higher) flooding in the Fitzroy River **or greater than 7.5 m** at Rockhampton gauge (forecasts issued **60 hours** prior).

#### 4.2.2 Action

#### IF OCCURRING OUTSIDE OF OPENING HOURS:

- Do not open the facility;
- Inform all parents/guardians and staff to remain at home and not to drop off their children; and
- Cancel any expected visitors / scheduled activities on-site;

#### IF OCCURRING WITHIN OPENING HOURS:

- Advise all parents/guardians to collect children when safe to do so, advising not to enter flood waters.

If safe to do so, prepare external areas for potential inundation, with applicable measures listed in Appendix B. Continue to monitor official instructions, warnings, rainfall and stream gauge levels.

### 4.3 TRIGGER 3: IMMINENT SITE INUNDATION

#### 4.3.1 Observed

In the unlikely scenario that the site has not been evacuated prior to site inundation.

#### 4.3.2 Action

Prior to relocating to the emergency pick up point (Saint Marys Catholic School):

- Advise all remaining parents/guardians of children still in care of the relocation;
- Pack provisions into carry bags and print current lists of children in care;

- Place sign on facility door indicating evacuation to Saint Marys Catholic School;
- Transport children and provisions to the emergency pick up point. Multiple trips may be required, and therefore adequate staff will be required at both locations. Check off list as parents/guardians collect children.

## 5.0 RECOVERY

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Immediately following an event:

- If the buildings have sustained damage and/or assistance is required, contact the SES or Council's Disaster Hotline. Unless critical, do not enter damaged buildings until inspected by qualified personnel and deemed as safe;
- Every source of electricity can be extremely dangerous if / has been submerged. Treat every electrical item with the greatest respect and beware of potential contaminated water, sewage, hazardous debris;
- Check with electricity, gas and water authorities or utility providers to determine whether supplies to your area have been interrupted and are safe to be turned on by you. If the water supply system has been flooded, you must assume it is contaminated; and
- Some roads may still be closed. Beware of damaged power lines, bridges, trees and do not enter any floodwaters.

Council and State Government, partnered with community organisations, coordinate the welfare response following a disaster. This may include temporary shelters, alternative accommodation, financial assistance, counselling and other support. Refer to the Queensland Building and Construction Commission for information and advice including insurance claims, cleaning, contractors etc.

Once the facility has recovered from the event, replenish and restock the site emergency management kit with all items that may have been used. If required, changes should be made to this FEMP to improve management of future emergency events.

## 6.0 CONCLUSION

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This plan was prepared by MCE and specifically to support the DA of the site. This FEMP assesses the potential flood hazard of the site, identifies available warning systems and provides response procedures.

Due to the nature of the potential flood hazards, proposed development uses, and the anticipated warning time, an early closure strategy is recommended. Following these procedures will minimise the risk to life of children, staff, parents and emergency responders.

The analysis and overall approach was specifically catered for the particular site requirements, and may not be applicable beyond this scope. For this reason, any other third parties are not authorised to utilise this report without further input and advice from MCE.

The report is based on flood predictions by others. The accuracy of this plan is dependent upon the accuracy of this information. Inundation maps are based on simulated storms, but actual observed inundation may vary from those predicted herein.

Links contained within this publication are correct at the time of release.

This FEMP should be reviewed and updated in line with needs or as part of the annual review process. It is the responsibility of the manager to be fully aware of the FEMP procedures.

## 7.0 REFERENCES

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- Ball, J., Babister, M., Nathan, R., Weeks, W., Weinmann, E., Retallick, M., & Testoni, I. (Eds.). (2019). *Australian Rainfall and Runoff: A Guide to Flood Estimation*. Commonwealth of Australia (Geoscience Australia).
- BoM. (2018). *Service Level Specification for Flood Forecasting and Warning Services for Queensland*. Commonwealth Bureau of Meteorology.
- Pilgrim, D. H. (Ed.). (1987). *Australian Rainfall & Runoff – A Guide to Flood Estimation – Volume 1*. The Institution of Engineers, Australia.
- Queensland Government. (2017). *Disaster Management Act 2003*.

## FIGURES

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- LEGEND**
- Site Boundary
  - Cadastre
  - ▲ River Gauge
  - Access**
  - North
  - South
  - Flood Depth (m)**
  - 0.00 - 0.10
  - 0.10 - 0.25
  - 0.25 - 0.50
  - 0.50 - 1.00
  - 1.00 - 1.50
  - 1.50 - 2.00
  - 2.00 - 2.50
  - 2.50 - 3.00
  - 3.00 - 4.00
  - Above 4.00
  - Water Level Contour (mAHD)

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**FIGURE 1**  
**FITZROY RIVER FLOOD MAP - 39% AEP (RRC)**  
 19 Reaney Street, Berserker  
 Flood Emergency Management Assessment  
 Central Queensland Christian College Ltd t/a Kingsley College



**LEGEND**

- Site Boundary
- Cadastre
- ▲ River Gauge
- Access**
- North
- South
- Flood Depth (m)**
- 0.00 - 0.10
- 0.10 - 0.25
- 0.25 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 4.00
- Above 4.00
- Water Level Contour (mAHD)

**FIGURE 2**

**FITZROY RIVER FLOOD MAP - 18% AEP (RRC)**

19 Reaney Street, Berserker  
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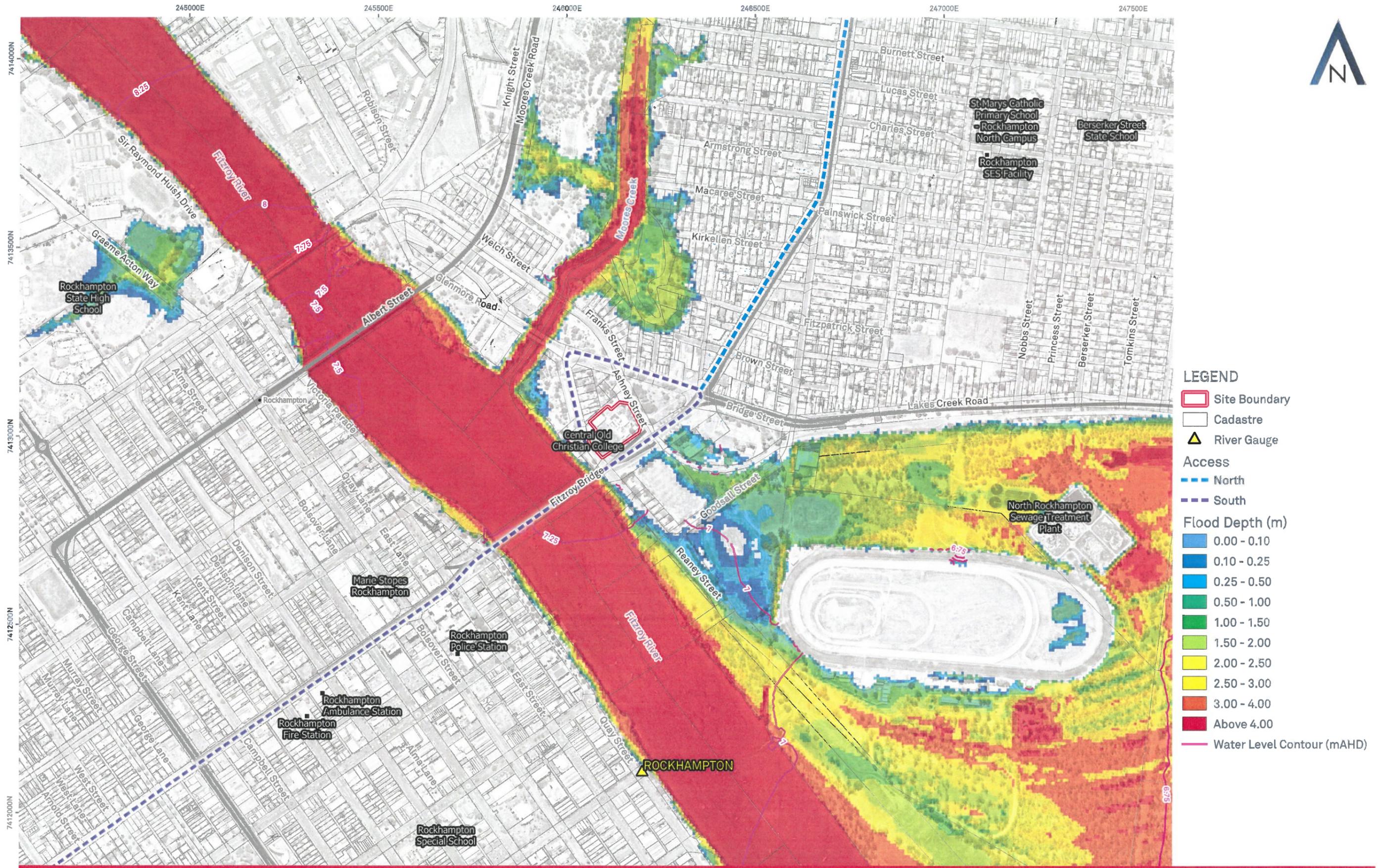
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**FIGURE 3**

**FITZROY RIVER FLOOD MAP - 10% AEP (RRC)**

19 Reaney Street, Berserker  
 Flood Emergency Management Assessment  
 Central Queensland Christian College Ltd t/a Kingsley College

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**REFERENCE**  
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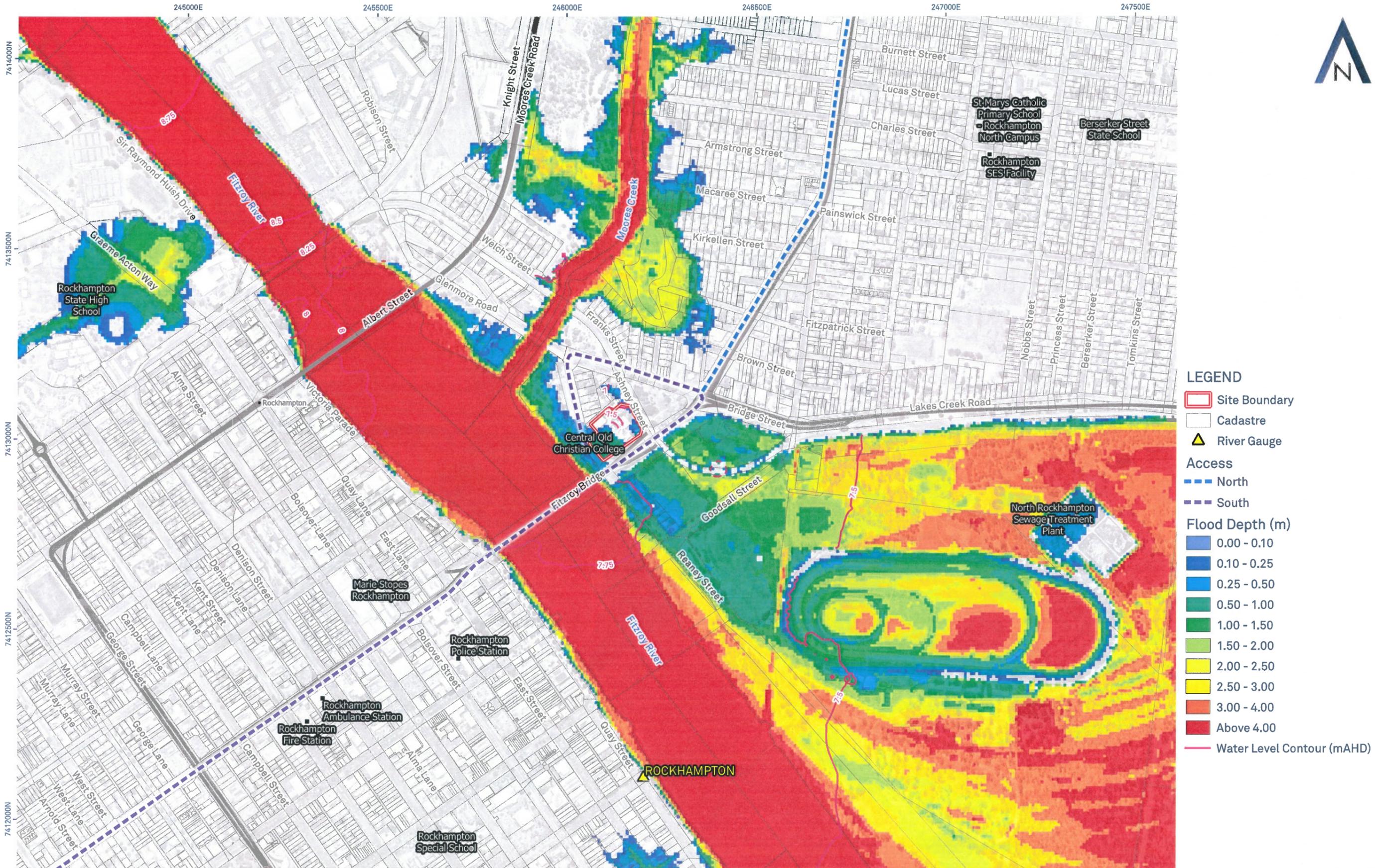
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- LEGEND**
- Site Boundary
  - Cadastre
  - ▲ River Gauge
  - Access**
  - North
  - South
  - Flood Depth (m)**
  - 0.00 - 0.10
  - 0.10 - 0.25
  - 0.25 - 0.50
  - 0.50 - 1.00
  - 1.00 - 1.50
  - 1.50 - 2.00
  - 2.00 - 2.50
  - 2.50 - 3.00
  - 3.00 - 4.00
  - Above 4.00
  - Water Level Contour (mAHD)

**FIGURE 4**

**FITZROY RIVER FLOOD MAP - 5% AEP (RRC)**

19 Reaney Street, Berserker  
 Flood Emergency Management Assessment  
 Central Queensland Christian College Ltd t/a Kingsley College

**DATE**  
07 October 2021

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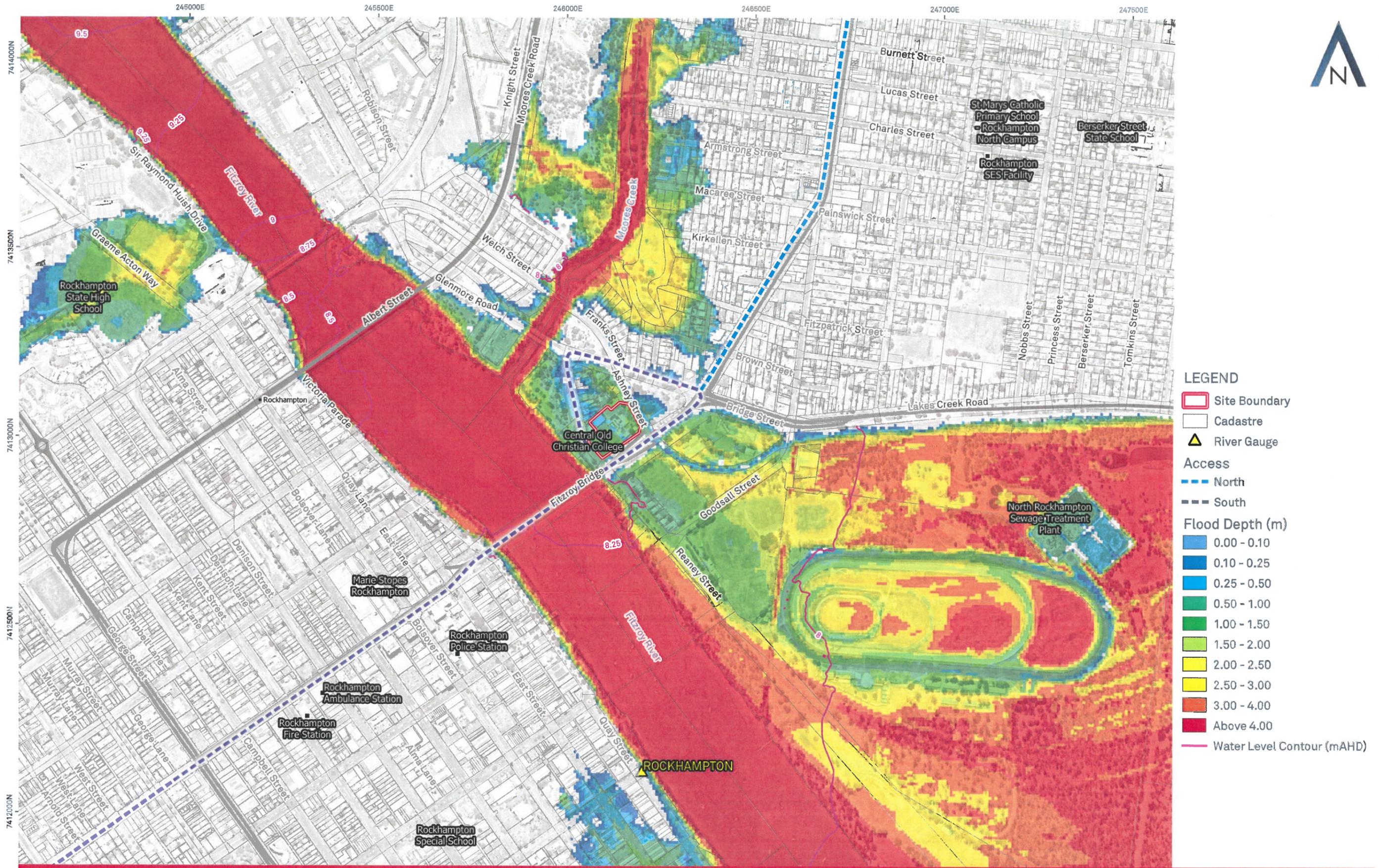
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- LEGEND**
- Site Boundary
  - Cadastre
  - ▲ River Gauge
  - Access**
  - North
  - South
  - Flood Depth (m)**
  - 0.00 - 0.10
  - 0.10 - 0.25
  - 0.25 - 0.50
  - 0.50 - 1.00
  - 1.00 - 1.50
  - 1.50 - 2.00
  - 2.00 - 2.50
  - 2.50 - 3.00
  - 3.00 - 4.00
  - Above 4.00
  - Water Level Contour (mAHD)

**FIGURE 5**

**FITZROY RIVER FLOOD MAP - 2% AEP (RRC)**

19 Reaney Street, Berserker  
 Flood Emergency Management Assessment  
 Central Queensland Christian College Ltd t/a Kingsley College

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07 October 2021

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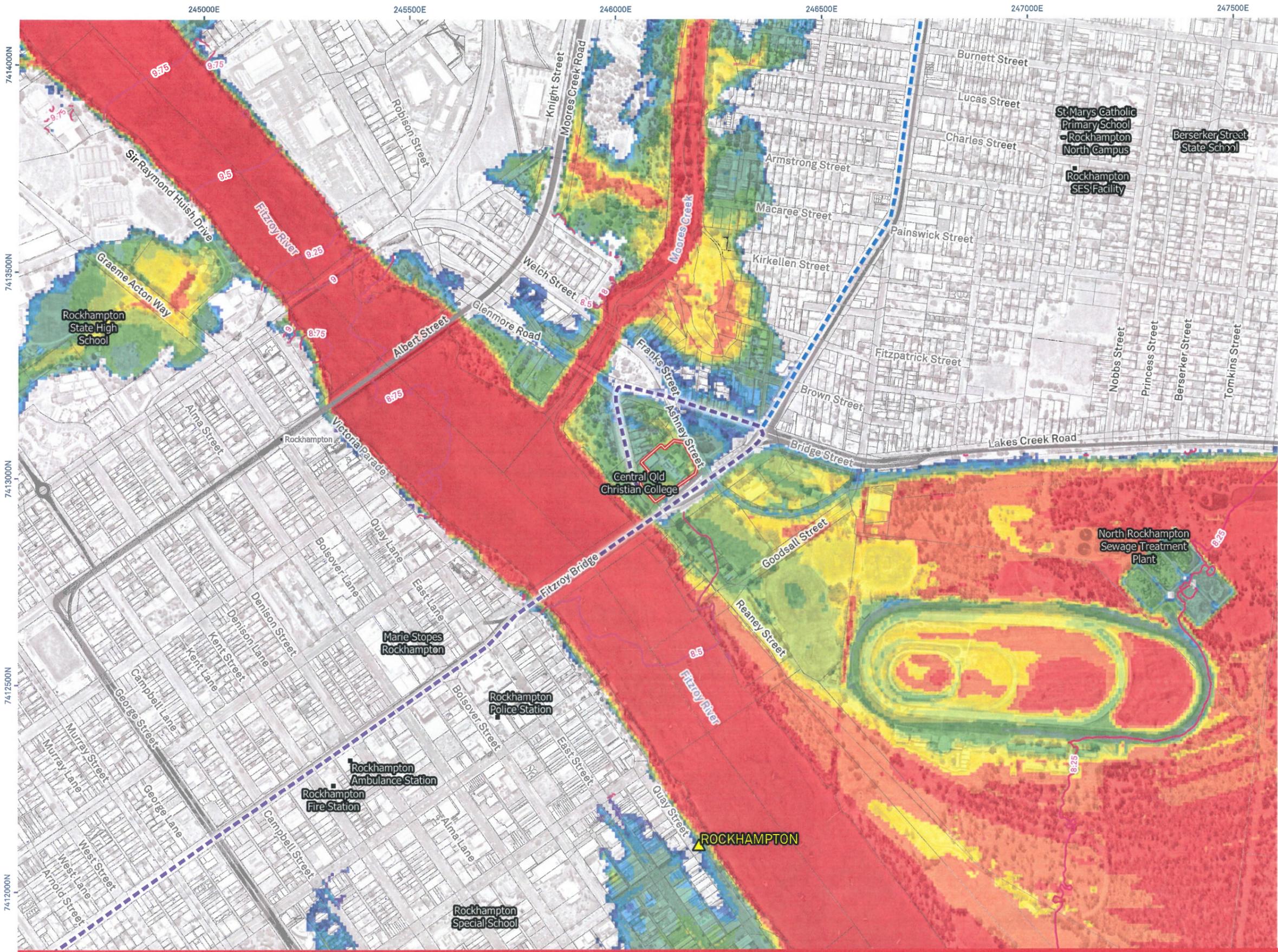
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- LEGEND**
- Site Boundary
  - Cadastre
  - ▲ River Gauge
  - Access**
  - North
  - South
  - Flood Depth (m)**
  - 0.00 - 0.10
  - 0.10 - 0.25
  - 0.25 - 0.50
  - 0.50 - 1.00
  - 1.00 - 1.50
  - 1.50 - 2.00
  - 2.00 - 2.50
  - 2.50 - 3.00
  - 3.00 - 4.00
  - Above 4.00
  - Water Level Contour (mAHD)

**FIGURE 6**

**FITZROY RIVER FLOOD MAP - 1% AEP (RRC)**

19 Reaney Street, Berserker  
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 Central Queensland Christian College Ltd t/a Kingsley College

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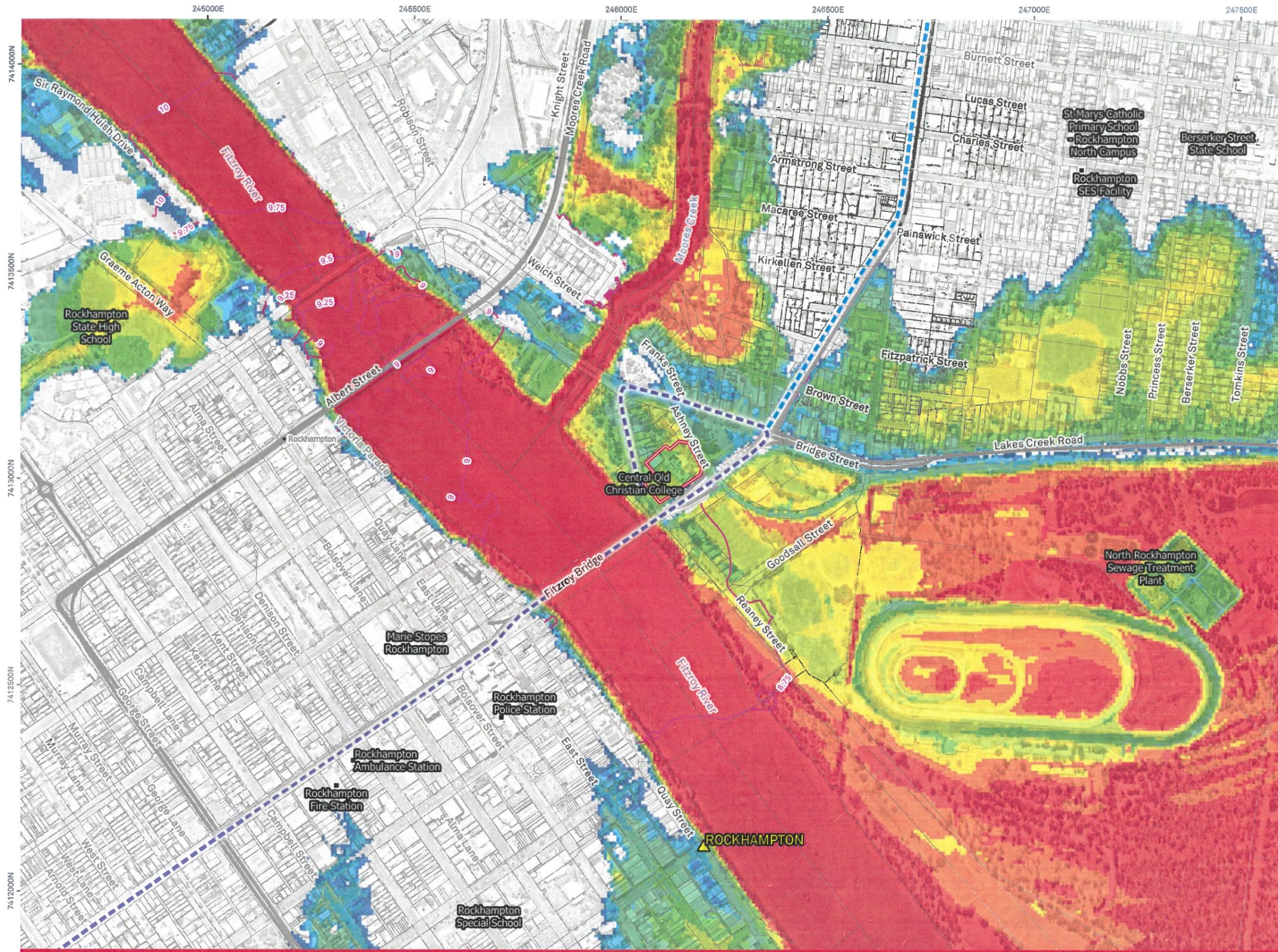
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**LEGEND**

- Site Boundary
- Cadastre
- ▲ River Gauge
- Access**
- North
- South
- Flood Depth (m)**
- 0.00 - 0.10
- 0.10 - 0.25
- 0.25 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 4.00
- Above 4.00
- Water Level Contour (mAHD)

**DATE**  
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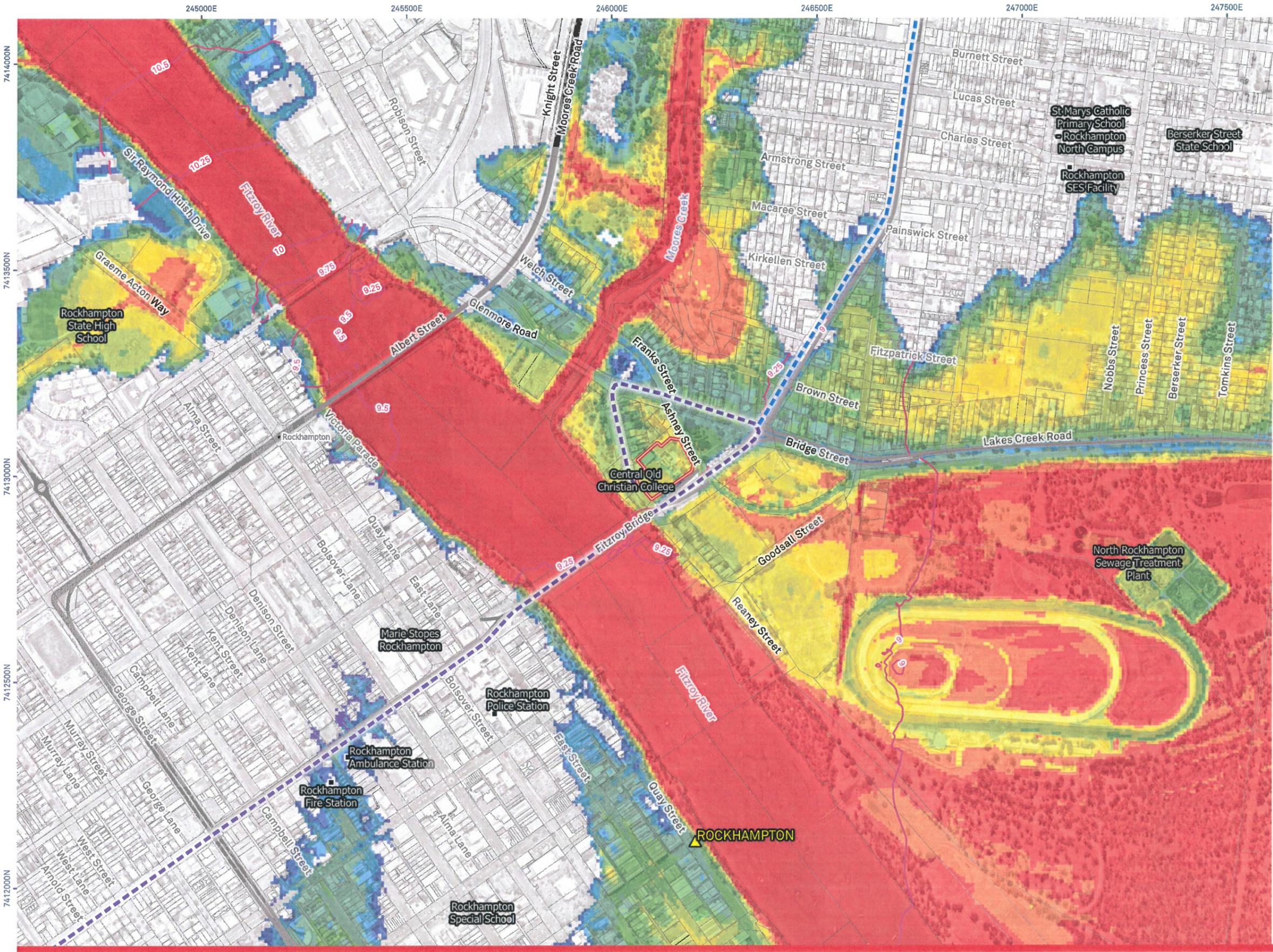
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**FIGURE 7**  
**FITZROY RIVER FLOOD MAP - 0.5% AEP (RRC)**  
19 Reaney Street, Berserker  
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- LEGEND**
- Site Boundary
  - Cadastre
  - ▲ River Gauge
  - Access**
  - North
  - South
  - Flood Depth (m)**
  - 0.00 - 0.10
  - 0.10 - 0.25
  - 0.25 - 0.50
  - 0.50 - 1.00
  - 1.00 - 1.50
  - 1.50 - 2.00
  - 2.00 - 2.50
  - 2.50 - 3.00
  - 3.00 - 4.00
  - Above 4.00
  - Water Level Contour (mAHD)

**FIGURE 8**

**FITZROY RIVER FLOOD MAP - 0.2% AEP (RRC)**  
 19 Reaney Street, Berserker  
 Flood Emergency Management Assessment  
 Central Queensland Christian College Ltd t/a Kingsley College

**DATE**  
07 October 2021

**REFERENCE**  
J21081

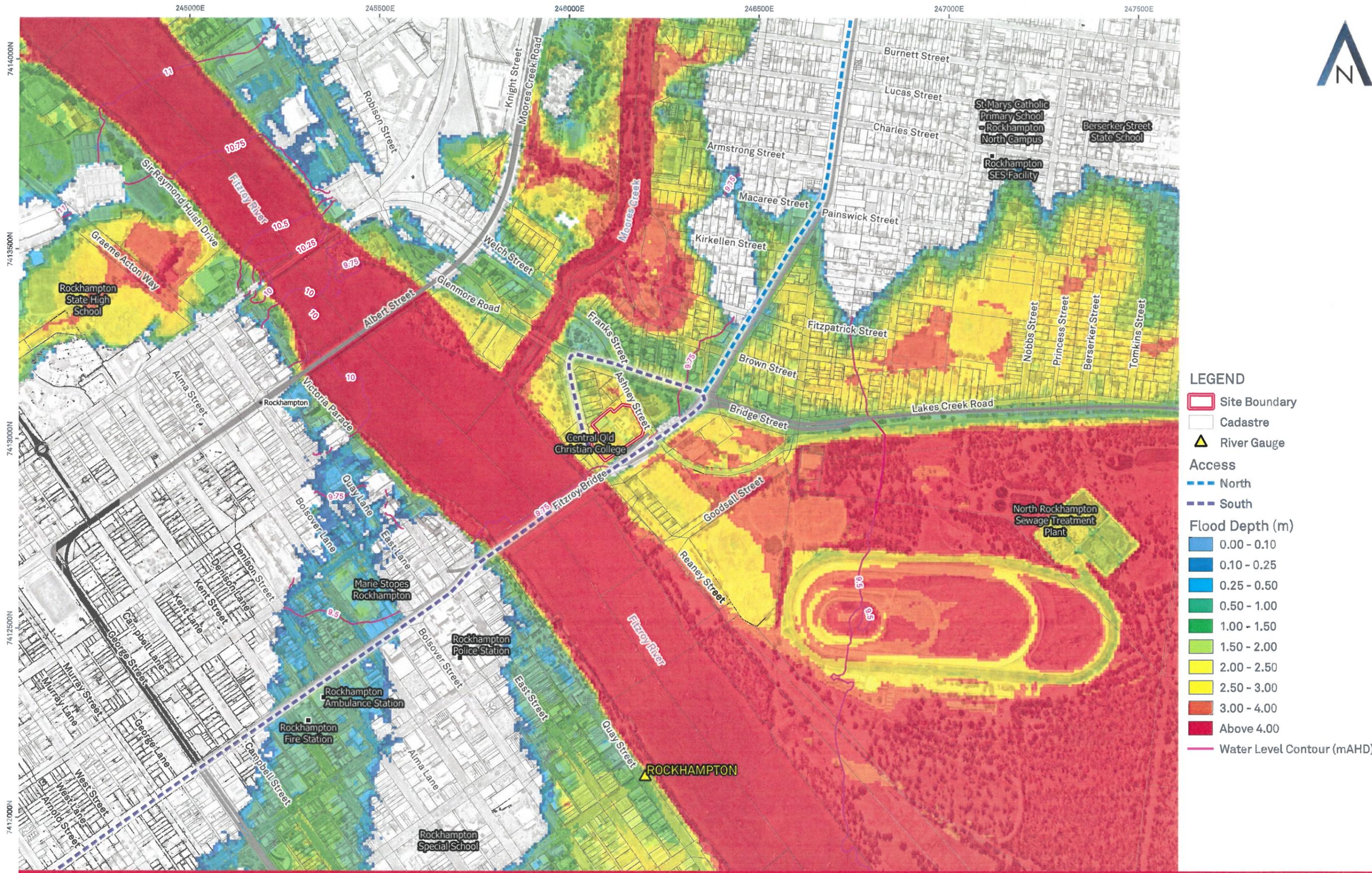
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- LEGEND**
- Site Boundary
  - Cadastre
  - ▲ River Gauge
  - Access**
  - North
  - South
  - Flood Depth (m)**
  - 0.00 - 0.10
  - 0.10 - 0.25
  - 0.25 - 0.50
  - 0.50 - 1.00
  - 1.00 - 1.50
  - 1.50 - 2.00
  - 2.00 - 2.50
  - 2.50 - 3.00
  - 3.00 - 4.00
  - Above 4.00
  - Water Level Contour (mAHD)

**FIGURE 9**

**FITZROY RIVER FLOOD MAP - 0.05% AEP (RRC)**

19 Reaney Street, Berserker  
 Flood Emergency Management Assessment  
 Central Queensland Christian College Ltd t/a Kingsley College

**DATE**  
07 October 2021

**REFERENCE**  
J21081

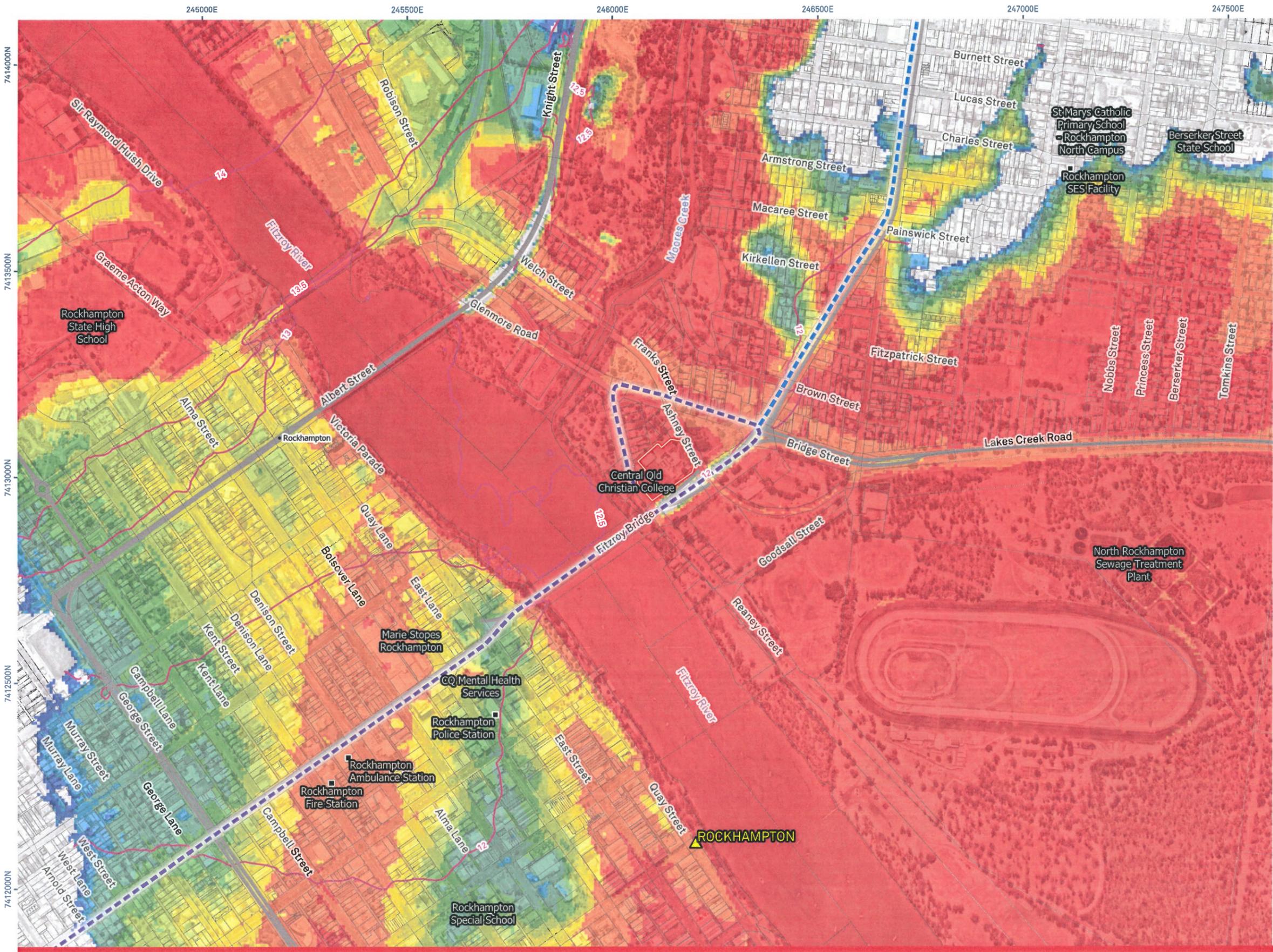
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- LEGEND**
- Site Boundary
  - Cadastre
  - ▲ River Gauge
  - Access**
  - North
  - South
  - Flood Depth (m)**
  - 0.00 - 0.10
  - 0.10 - 0.25
  - 0.25 - 0.50
  - 0.50 - 1.00
  - 1.00 - 1.50
  - 1.50 - 2.00
  - 2.00 - 2.50
  - 2.50 - 3.00
  - 3.00 - 4.00
  - Above 4.00
  - Water Level Contour (mAHD)

**FIGURE 10**

**FITZROY RIVER FLOOD MAP - PMF (RRC)**  
 19 Reaney Street, Berserker  
 Flood Emergency Management Assessment  
 Central Queensland Christian College Ltd t/a Kingsley College

**DATE**  
07 October 2021

**REFERENCE**  
J21081

**SIZE**  
A3

**SCALE**  
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## REFERENCE DRAWINGS

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<span style="display:inline-block; width:15px; height:15px; background-color:yellow;"></span>	EXISTING DECK
<span style="display:inline-block; width:15px; height:15px; background-color:grey;"></span>	EXISTING OFFICE

PROPOSED SITE  
LOT 179  
CP890747

CONCEPT ONLY

**EXISTING PLAN @1:500**

drawing title:  
**EXISTING PLAN**

drawing no: **MAST-E** project no: **KI-003**



project: **A3 DRAWING** NOTED SCALES RELATE TO A3 DRAWINGS  
**2021 MASTERPLANNING**

location:  
19 REARNEY STREET,  
BERSERKER, ROCKHAMPTON

client:  
KINGSLEY CHRISTIAN  
COLLEGE

REV	DESCRIPTION	DATE
1	PRELIMINARY	30/11/2020

**REVISIONS**

PRELIMINARY SKETCH PLANS  
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<b>PRELIMINARY</b>	
scale As indicated	rev
date NOV 20	<b>1</b>
drawn Author	



PROPOSED LEGEND	
	ADMIN
	LIBRARY
	SCIENCE+FLA
	YR 9 - YR 12
	YR 1- YR 8
	PREP+ KINDERGARTEN
	MUSIC+STORE
	ATELIER (INDOOR)
	ATELIER (OUTDOOR)
	??
	NEW DECK
	EXISTING DECK
	SMALL OVAL
	CARPARK

**CONCEPT ONLY**

**PROPOSED MASTERPLAN @1:500**

drawing title:  
**PROPOSED MASTERPLAN**

drawing no: **MAST-P** project no: **KI-003**



project: <b>2021 MASTERPLANNING</b>	<b>A3 DRAWING</b> NOTED SCALES RELATE TO A3 DRAWINGS
location: 19 REARNEY STREET, BERSERKER, ROCKHAMPTON	client: KINGSLEY CHRISTIAN COLLEGE

REV	DESCRIPTION	DATE
1	PRELIMINARY	30/11/2020

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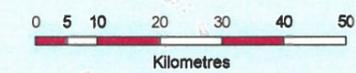
ISSUED FOR <b>PRELIMINARY</b>	
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date NOV 20	drawn Author

# Coastal Rivers - South

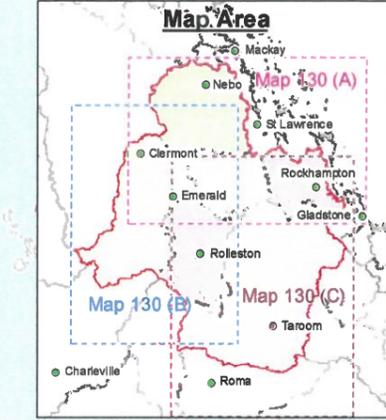
## FITZROY BASIN (ISAAC, MACKENZIE, FITZROY CATCHMENTS)

Flood Warning Network, as at 30/10/2020

Map produced by Flood Forecasting and Warning Services, Bureau of Meteorology, Brisbane



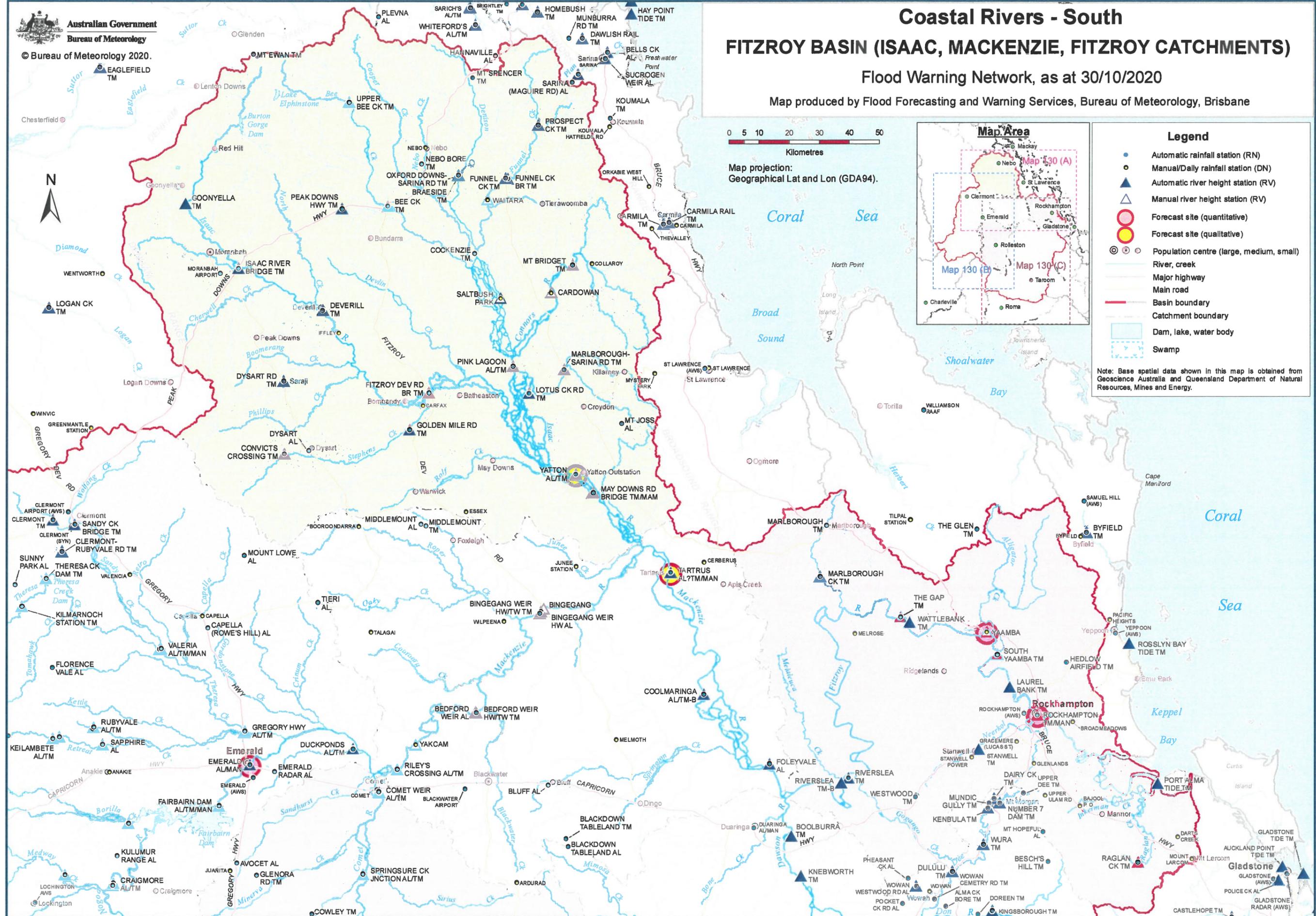
Map projection:  
Geographical Lat and Lon (GDA94).



### Legend

- Automatic rainfall station (RN)
- Manual/Daily rainfall station (DN)
- ▲ Automatic river height station (RV)
- △ Manual river height station (RV)
- Forecast site (quantitative)
- Forecast site (qualitative)
- ⊙ Population centre (large, medium, small)
- River, creek
- Major highway
- Main road
- Basin boundary
- Catchment boundary
- Dam, lake, water body
- Swamp

Note: Base spatial data shown in this map is obtained from Geoscience Australia and Queensland Department of Natural Resources, Mines and Energy.



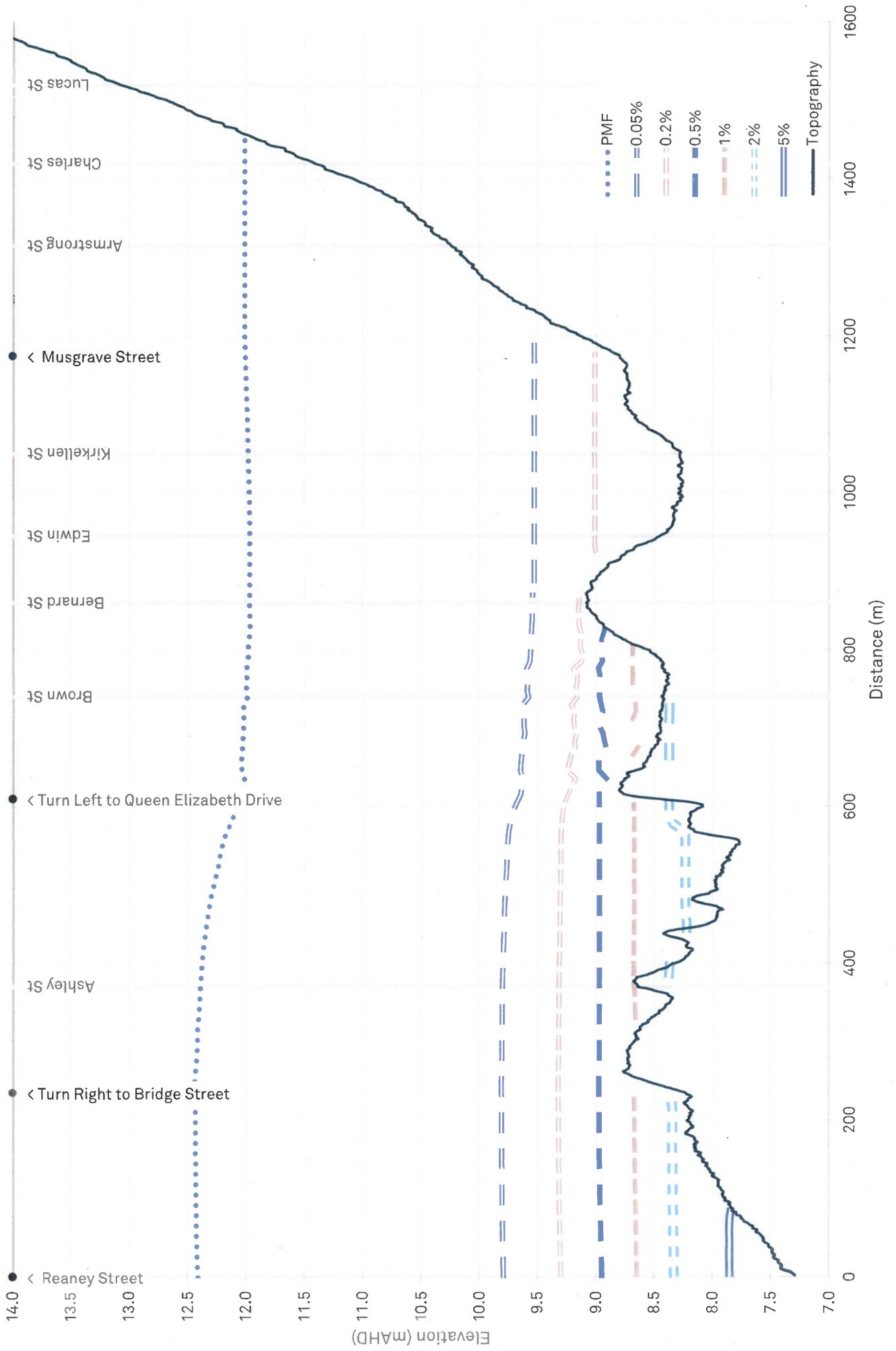


# **APPENDIX A**

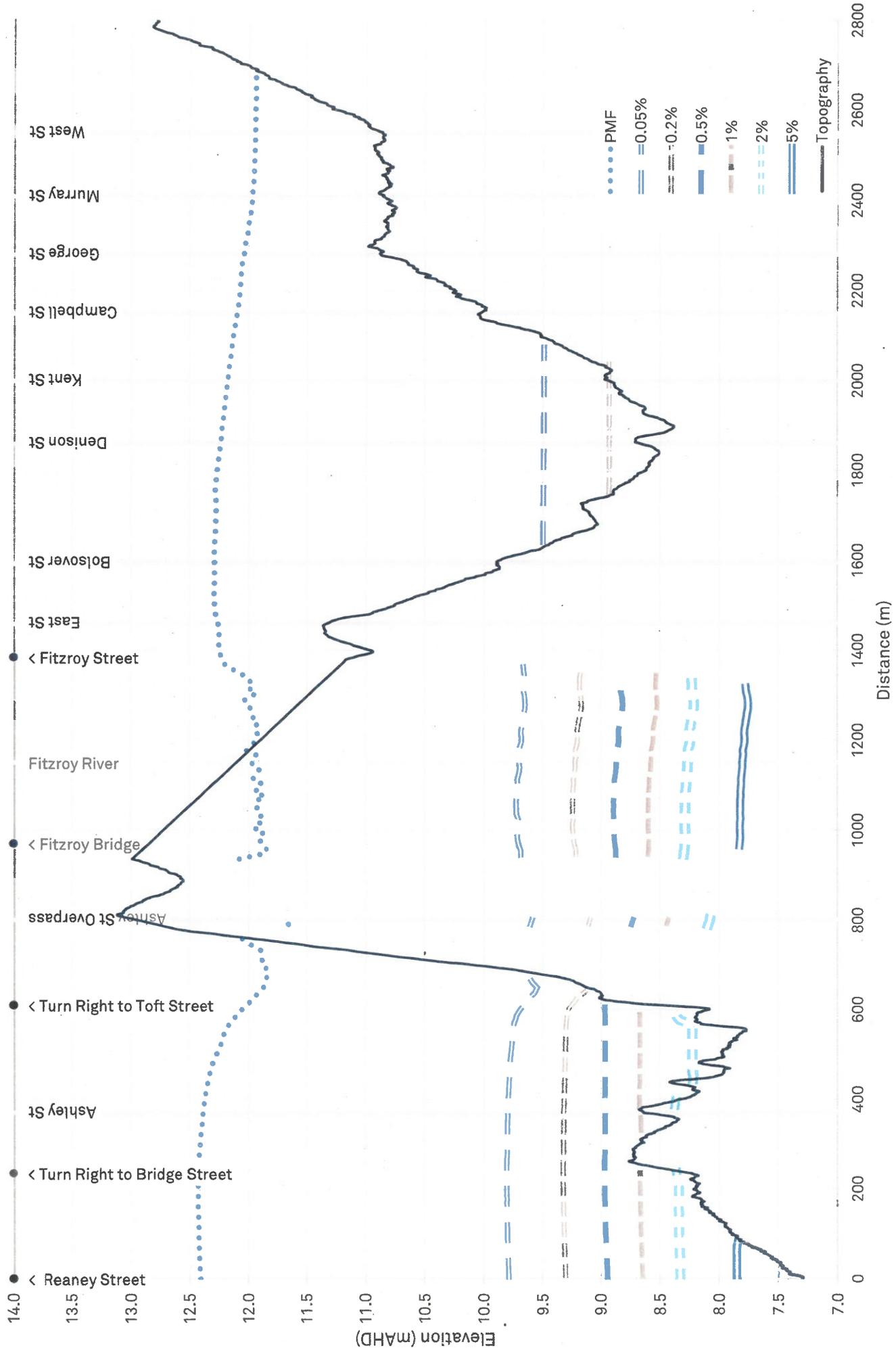
## **ACCESS ROUTE LONG SECTIONS**

---

# Access Route Long Section - North



# Access Route Long Section - South



## APPENDIX B

### SITE INUNDATION PREPARATION

---

## SITE PREPARATION

---

### 1.1 SITE PREPARATION

Conduct site preparation only if inundation is observed / predicted and if safe to do so. Avoid contact with flood water as it may be contaminated or subject to currents and other hazards.

### 1.2 UTILITIES

#### 1.2.1 Electricity

If flooding is imminent, switch each circuit breaker to the OFF position. This will minimise the danger of short circuits when the power authority returns service to the facility after the flood.

#### 1.2.2 Gas

Close main gas valve. Gas cylinders/bottles should be tied down.

#### 1.2.3 Water

If possible, close off all main water valves and place sandbags within toilet bowls to limit potential of raw sewage surcharge.

### 1.3 HOUSEHOLD GOODS AND OTHER STORAGE ITEMS

If accessible, consider the use of sandbags to minimise flood inundation of lower building areas.

Relocate vulnerable or high value items from ground floor storage areas to upper levels.

Secure all items that may move or float due to flood inundation, such as outdoor furniture, timber, drums and other loose, buoyant items, sports equipment. Tie and anchor outdoor garbage bins.

Relocate chemicals and other toxic substances stored on ground level to upper levels. Include cardboard boxes and newspapers as they may disintegrate and clog drains.





**mcmurtrie**  
CONSULTING ENGINEERS

# TRAFFIC IMPACT ASSESSMENT

*PROPOSED SCHOOL MASTER PLAN*

*Kingsley College*

*2 Schoolhouse St, Berserker*

*Lot 179 on CP890747*

***Prepared For: Kingsley College***

Job No. 0562021

October 2021

Revision A

**ROCKHAMPTON REGIONAL COUNCIL**

**APPROVED PLANS**

These plans are approved subject to the current conditions of approval associated with

**Development Permit No.: D/144-2021**

**Dated: 5 July 2022**

ABN 69 958 286 371

P (07) 4921 1780

F (07) 4921 1790

E mail@mcmengineers.com

PO Box 2149

Wandal Q 4700

63 Charles Street

North Rockhampton Q 4701

# TRAFFIC IMPACT ASSESSMENT

Rev.	Description	Signature	Date
A	DA Issue	 RPEQ 5141	14-10-21

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**CONTENTS**

**INTRODUCTION** ..... 1

    1.1. BACKGROUND..... 1

    1.2. REFERENCES..... 1

**SITE ENVIRONS** ..... 2

    2.1. SUBJECT SITE..... 2

    2.2. ADJACENT LAND USE / APPROVALS ..... 3

    2.3. ROAD NETWORK..... 3

        Schoolhouse Street ..... 3

        Reaney Street ..... 3

        Surveyed Traffic Volumes ..... 5

    2.4. INTEGRATED TRANSPORT INFRASTRUCTURE..... 6

        Public Transport ..... 6

        Pedestrian Infrastructure ..... 7

        Cyclist Infrastructure..... 7

**DEVELOPMENT PROPOSAL**..... 7

    3.1. LAND USES ..... 7

    3.2. VEHICLE ACCESS ..... 7

    3.3. CAR PARKING..... 7

    3.4. PEDESTRIAN AND CYCLIST FACILITIES..... 8

**CAR PARKING** ..... 10

    4.1. STATUTORY REQUIREMENT..... 10

    4.2. ADEQUACY OF PROPOSED PARKING SUPPLY ..... 10

    4.3. CAR PARKING LAYOUT AND DESIGN ..... 11

        Car Parking ..... 11

        Provision for queuing ..... 13

    4.4. SUITABILITY OF PROPOSED ACCESS ..... 13

**ACCESS AND MOBILITY MANAGEMENT** ..... 15

    5.1. PROVISIONS FOR PEDESTRIANS..... 15

    5.2. PROVISION FOR BICYCLES AND END OF TRIP FACILITIES..... 15

**TRAFFIC IMPACT**..... 16

    6.1. TRAFFIC GENERATION..... 16

    6.2. TURN WARRANTS ASSESSMENT..... 17

**CONCLUSIONS AND RECOMMENDATIONS** ..... 18

**APPENDICES** ..... A

## INTRODUCTION

---

### 1.1. BACKGROUND

McMurtrie Engineers has been engaged by Kingsley College to prepare a Traffic Impact Assessment for the proposed School Masterplan expansion located at 2 Schoolhouse St, Berserker, Lot 179 on CP890747.

This report forms part of a Development Application to be lodged with the Rockhampton Regional Council (RRC).

The following issues have been addressed as part of the study:

- Adequacy of the proposed car parking supply;
- The proposed car parking layout and design;
- Site access arrangements;
- Provision for service vehicle access;
- Provision for safe access by cyclists and pedestrians;
- Potential impact upon the local road network.

The site accesses from Reaney Street which is a Council controlled road – no State Controlled Roads are expected to be impacted.

### 1.2. REFERENCES

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

- Rockhampton Region Planning Scheme;
- Australian / New Zealand Standard, Parking Facilities, Part 1: Off-Street Car parking AS/ NZS 2890.1:2004;
- Australian / New Zealand Standard, Parking Facilities, Part 2: Off-Street Commercial Vehicle Facilities AS/ NZS 2890.2:2018;
- Australian / New Zealand Standard, Parking Facilities, Part 6: Off-Street Parking for People with a Disability AS/ NZS 2890.6:2009;
- Background traffic AADT received from Transport and Main Roads
- Other documents and data as referenced in the report.





**Figure 2.2 - Location of Subject Site**  
[Source: Rockhampton Region Planning Scheme]

## 2.2. ADJACENT LAND USE / APPROVALS

The subject site is located within a community facilities zone, with a low density residential zone just to the north of the site and open space to the east and west.

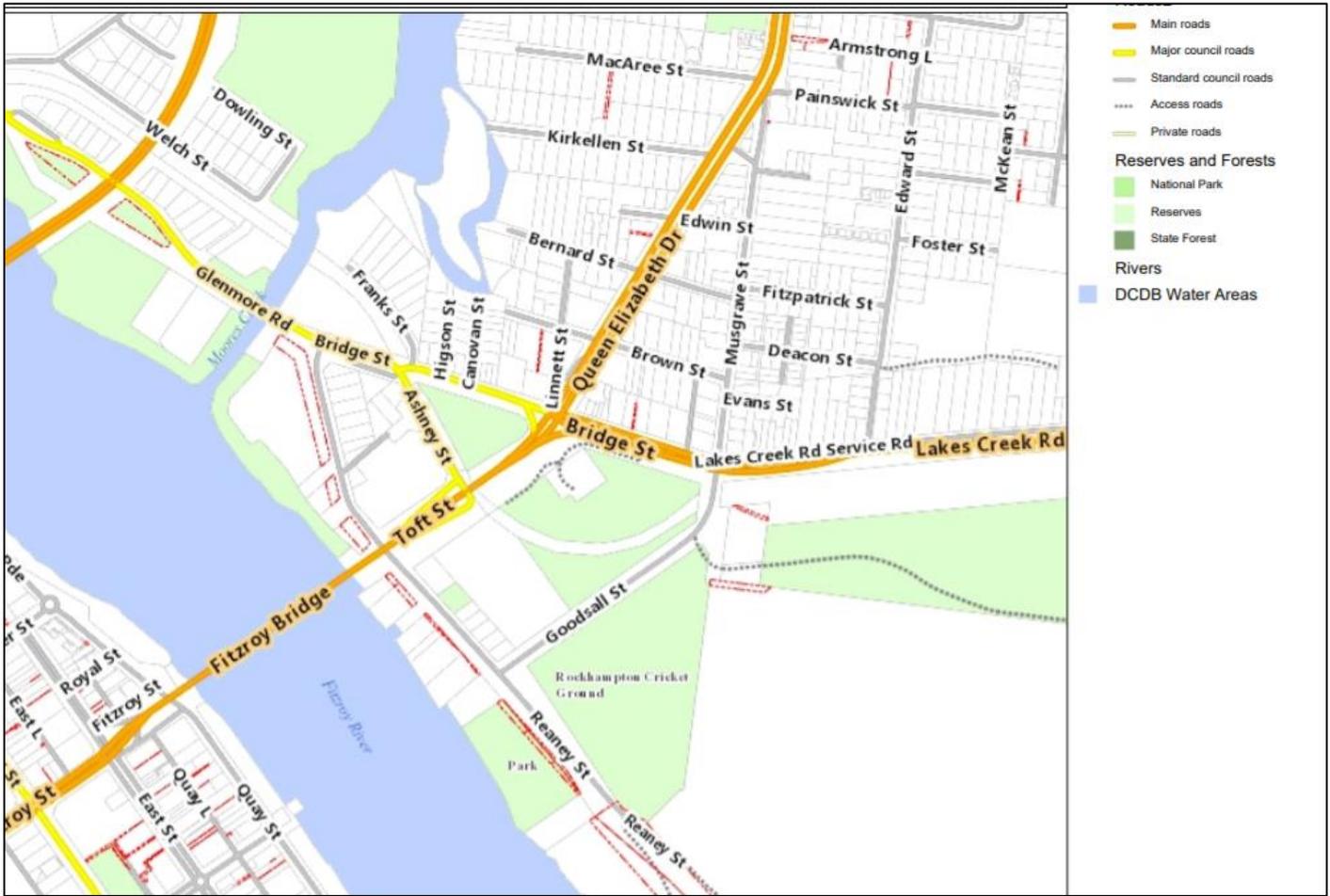
## 2.3. ROAD NETWORK

### Schoolhouse Street

Access to the site is gained directly from Schoolhouse Street. As shown in Figure 2.3, Schoolhouse Street is a narrow access street under the control of RRC. Images of the local road access frontages are shown in Figures 2.4 and 2.5.

### Reaney Street

Access will also be gained directly from Reaney Street. As shown in Figure 2.3, Reaney Street is a collector street also under the control of RRC and images of the local road access frontages are shown in Figures 2.4 and 2.5.



**Figure 2.3 – Local Road Network**  
[Source: Rockhampton Region Planning Scheme & Google Maps]



**Figure 2.4 – Reaney Street along the frontage of the site, facing north with Schoolhouse Road on the RHS**



**Figure 2.5 – Reaney Street along the frontage of the site, facing south**

### Surveyed Traffic Volumes

No traffic count data was available but it is estimated that Reaney Street would not carry more than 2,000 vpd at a peak of 200 vph.

## 2.4. INTEGRATED TRANSPORT INFRASTRUCTURE

### Public Transport

A review of public transport available in the vicinity of the site is summarised in Figure 2.6.

It is noted that a bus stop for Kingsley College owned buses is located on Reaney Street adjacent the southern corner of the site.



Figure 2.6 – Bus stops in the vicinity of the site [Google Maps / Source]

### Pedestrian Infrastructure

The site does not provide pedestrian connectivity along the entire frontage, however a footpath is provided on the Ashney Street site frontage.



**Figure 2.7 – Pedestrian Infrastructure on Ashney Street**

### Cyclist Infrastructure

Bicycle lanes are not currently provided along the frontage of the site.

## DEVELOPMENT PROPOSAL

---

### 3.1. LAND USES

The proposed plan of development is for the addition of school facilities to the existing site.

Access to the site is proposed from Reaney Street directly and Schoolhouse Street via Reaney Street.

A plan of the proposed development is shown in Figure 3.1.

### 3.2. VEHICLE ACCESS

The proposal provides an all movement access arrangement with separate entry and exit crossovers off Reaney Street and the existing all movement access from School house Street via Reaney Street.

### 3.3. CAR PARKING

The proposed development will provide a total of 31 car parking spaces, as follows:

General parking – existing from Schoolhouse Street:	13 spaces
General Parking from Reaney Street:	18 spaces

Additionally, there is provision of a drop off area on school grounds via Reaney Street

### 3.4. PEDESTRIAN AND CYCLIST FACILITIES

Given the use of the proposed development, students and staff generally arrive to the site via private vehicle.



## CAR PARKING

### 4.1. STATUTORY REQUIREMENT

The car parking requirement for different development types are set out in the Rockhampton Regional Council Access, Parking and Transport Code. A review of the car parking rates and the use of the proposed development result in the below parking requirement:

Educational Establishment	1 space per full-time employee	<ul style="list-style-type: none"> <li>• 1 space per 10 students of driving age, plus</li> <li>• Provision for set down areas for the loading and unloading of passengers as determined by Council</li> </ul>
---------------------------	--------------------------------	---

Based on the above parking rates, the Acceptable Outcome for car parking of the proposed development is as follows:

**Table 4.1: Acceptable Outcome for Car Parking (Rockhampton Regional Council)**

Description	Use / scale	Statutory Parking Rate	Acceptable Outcome for Car Parking
Primary School	32 FT staff	1 spaces / FT staff	32 spaces
	12 student vehicles	1 space / 10 student vehicles	1 spaces
	Set down area		Set down area provided
<b>TOTAL</b>			<b>33 spaces</b>

### 4.2. ADEQUACY OF PROPOSED PARKING SUPPLY

The proposal provides a total of 31 car parking spaces

Based on the above it is requested that Council consider that the proposed parking supply is satisfactory and will meet the parking demand generated by the proposed uses as the shortfall is only minor.

### 4.3. CAR PARKING LAYOUT AND DESIGN

#### Car Parking

The geometric layout of the proposed car parking has been designed to comply with *AS2890.1:2004*, in respect to parking bay dimensions and aisle widths. The proposed car parking provides the following dimensions and characteristics:

**Table 4.2: Parking Layout and Geometry**

Design Element	Required	Supplied	Compliance
General parking (User Class 2)	2.5m wide x 5.4m long	2.6m wide x 5.4m long	Compliant
Disabled Parking	2.4m wide x 5.4m long, plus shared zone	2.5m wide x 5.4m long	Compliant
Clearance adjacent to vertical obstructions	0.3m (i.e. walls, fences, etc)	Minimum 0.3 metres	Compliant
Aisle Width	5.8 metres	> 5.8 metres	Compliant
Circulation width	5.5 metres	> 5.5 metres	Compliant
Aisle extension	1 metre beyond last parking / 8 metre aisle	N/A	N/A
Grades (driveway)	1:20 maximum for the first 6 metres into the site	1:20 for the first 6 metres	Compliant
Grades (car parking module)	1:20 measured parallel to the angle of the parking space or 1:16 in all other directions	1:20 measured parallel to the angle of the parking space or 1:16 in all other directions	Compliant
Grade (transitions)	Max 1:8 (summit) and 1:6.7 (sag) at 2 metres	N/A	N/A
Height Clearance	Minimum 2.2m clearance to overhead structures and services	N/A	N/A

As demonstrated in Table 4.2, the internal geometric layout should be compliant with the requirements of the Australian Standards publication *AS2890.1:2004*. A dimensioned layout of the proposed car parking arrangements will be provided as part of Operational Works submission. Wheel stops can be provided at the end of parking spaces fronting a footpath for pedestrian protection.

A swept path analysis has been prepared for the proposed parking arrangements. As shown in Figures 4.1, the proposed parking arrangements allow satisfactory manoeuvring for the design vehicle (85<sup>th</sup> percentile vehicle) to negotiate the proposed car parking and exit the site in a forward gear.

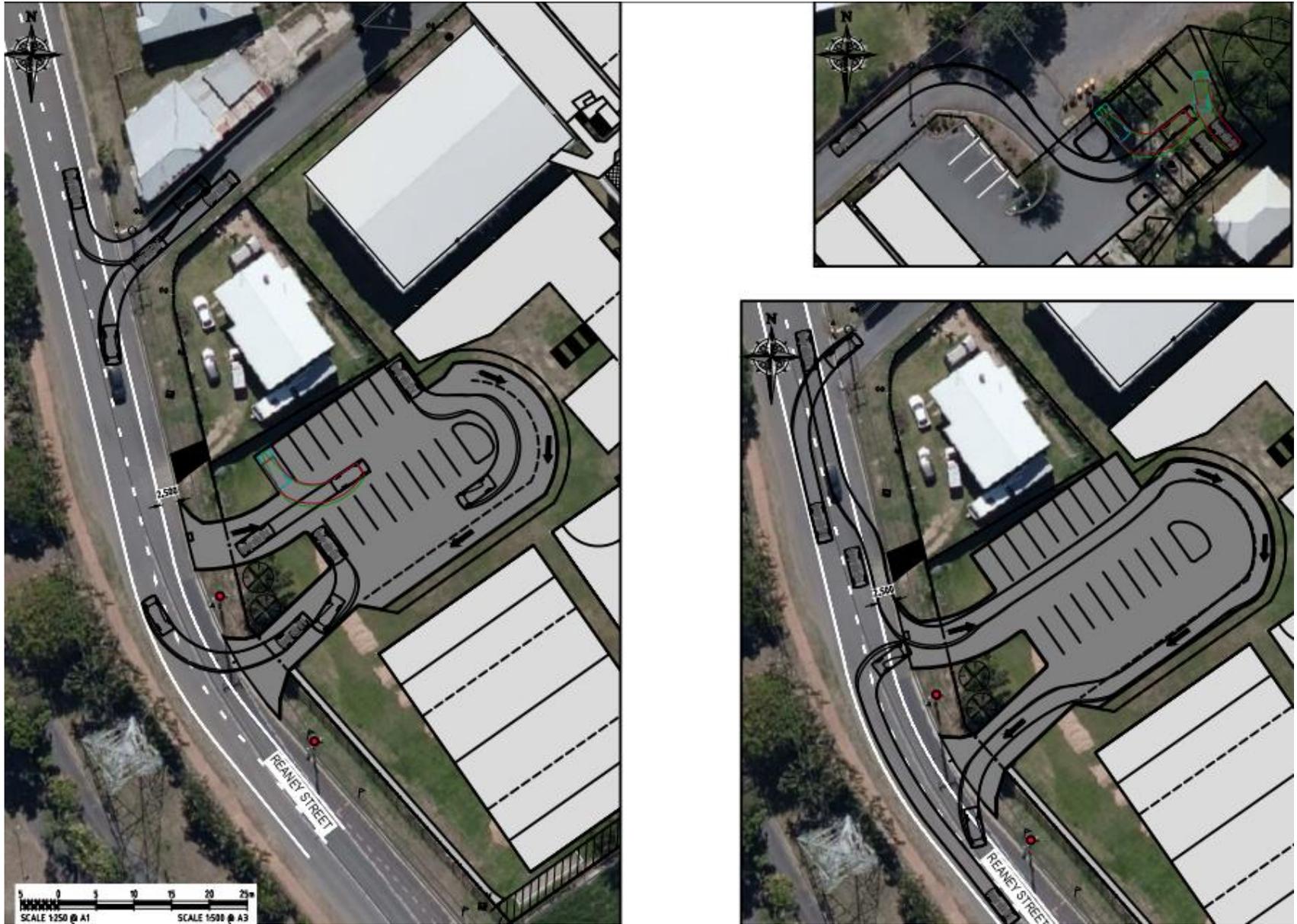


Figure 4.1 – Swept Path of 85<sup>th</sup> Percentile Vehicles

### Provision for queuing

A setdown area will be provided to maximise the number of vehicles queued onsite and still allowing vehicles to pass within the Reaney Street carpark.

## 4.4. SUITABILITY OF PROPOSED ACCESS

As mentioned previously access to the site is proposed to be gained via the existing arrangement at Schoolhouse Street and via a new carpark access directly onto Reaney Street as shown in Figure 4.4.

The existing access via Schoolhouse Road has been previously assessed and accepted as a satisfactory site access for the current use however swept path analysis per Figure 4.1 suggests there is a width deficiency at the throat of the intersection and it would seem appropriate to widen this intersection crossover area to ensure 2 vehicles could safely traverse the intersection concurrently and not result in undue queueing on either leg.

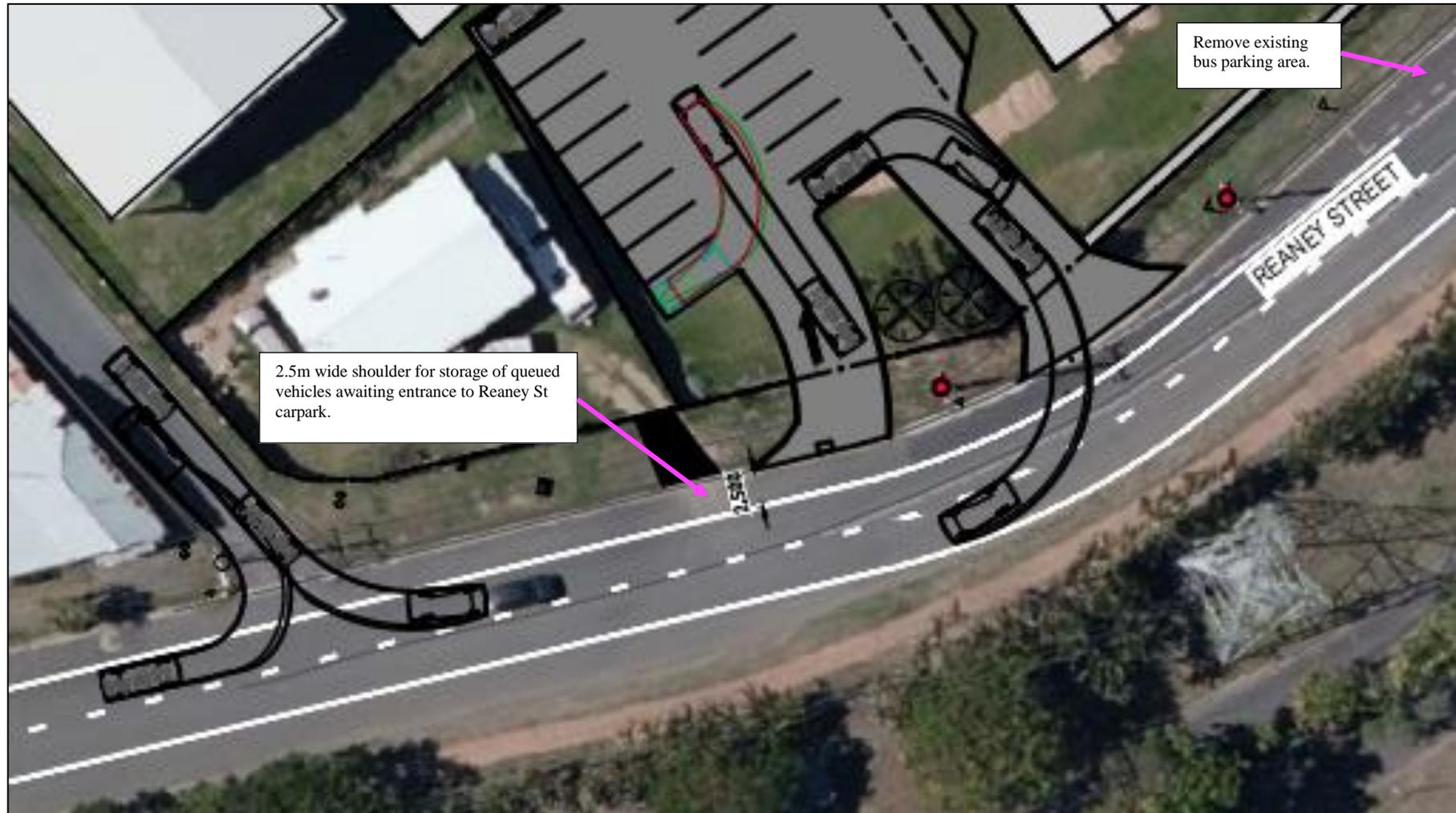
The proposed access to the new carpark from Reaney Street was previously raised with Council in writing (Appended to this report) for suitability and Council's comments are summarised as follows:

- Address bus parking area (note this area is for the school's buses) to the south of the access (see Figure 4.2) and possible impact of access visibility;
- Realignment of road centre line and addition of edge lane lines to allow for vehicles to queue on road shoulder downstream of carpark entrance.



**Figure 4.2 – Existing Bus Parking area**

Both of these issues raised have been addressed as per Figure 4.3.



**Figure 4.3 – Proposed Access Arrangements**

## ACCESS AND MOBILITY MANAGEMENT

---

### 5.1. PROVISIONS FOR PEDESTRIANS

The majority of students and staff arrive onsite by private vehicle or bus. Therefore, a dedicated pedestrian path linking to the wider pedestrian network is not considered to be required.

### 5.2. PROVISION FOR BICYCLES AND END OF TRIP FACILITIES

In accordance with Council's parking and access code, the following bicycle parking rates are applicable to the proposed use and will be provided.

Educational Establishment

(a) for a primary school 1 space per 4 students in year 4 or higher.

## TRAFFIC IMPACT

### 6.1. TRAFFIC GENERATION

Vehicle trip generation rates for Primary Schools have been examined in the RMS document - Roads and Maritime Services, Trip Generation Surveys Schools Analysis Report by GTA Consulting.

For Primary Schools in regional areas peak hour vehicle generation rates per student are up to a maximum of 1.23 trips/student which is considered extremely conservative.

Application of the above rates for a total of 323 students results in the following estimates for the proposal.

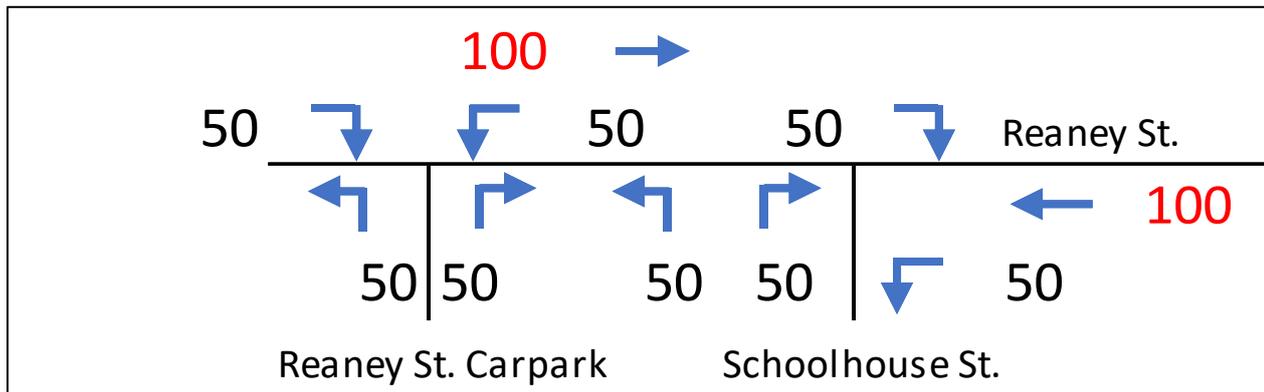
**Table 6.1 - Estimated Development Traffic Generation**

Component	Morning Peak Hour			Afternoon Peak Hour		
	In	Out	Total	In	Out	Total
Primary School	200	200	400	200	200	400

Peak hour distribution- AM: 50/50, PM: 50/50

As mentioned previously no traffic data is available for Reaney Street but a conservative assumption of 2,000 vpd or 200 vph has been adopted.

Access directional splits have been assumed as an equal split on all access movements.

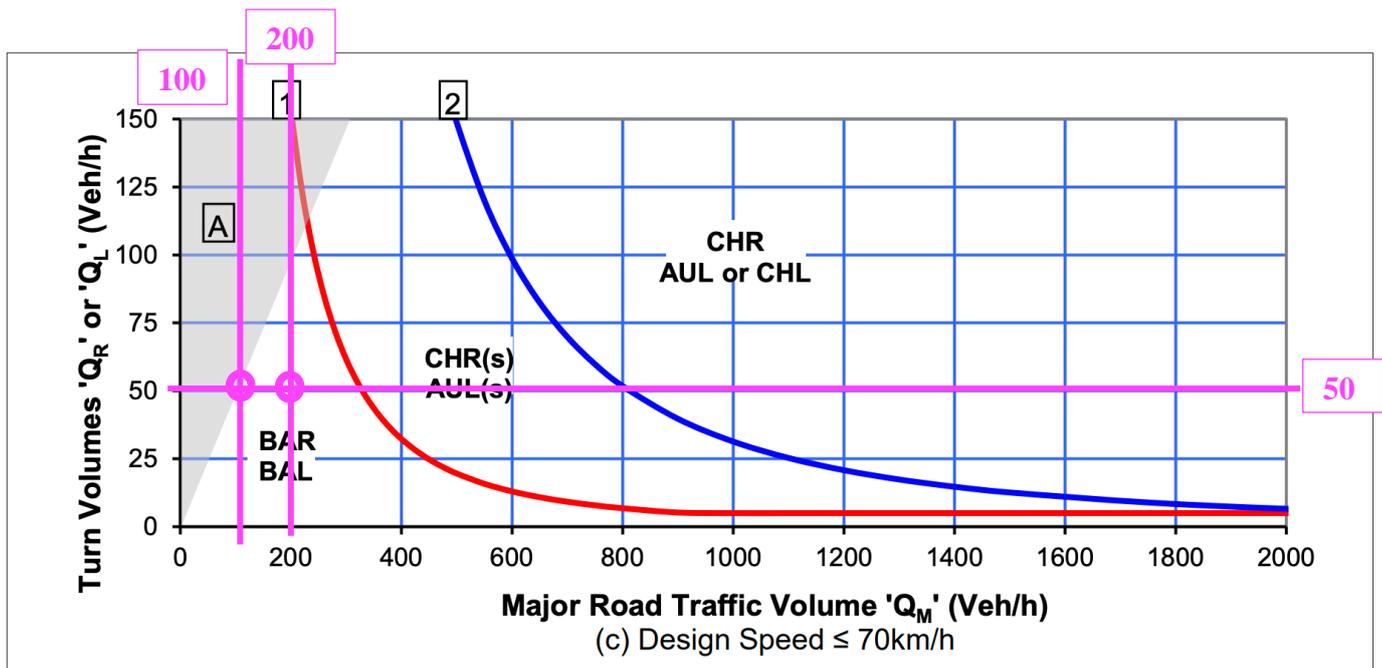


**Figure 6.1 – Access Directional Splits Assignment**

## 6.2. TURN WARRANTS ASSESSMENT

A turn warrants analysis has been carried out at the entry crossovers for left and right turns based on Figure 6.1.

As shown in Figure 6.2, in accordance with Austroads part 6, BAR/BAL treatments are warranted. The existing geometry of Reaney Street provides a wide shoulder which can facilitate traffic decelerating clear of the through lane before turning into the site. It is therefore considered that no further works be required to facilitate ingress movements to the site other than the provision of a standard crossover for site ingresses/egresses in accordance with standard drawing CMDG-R-042.



Note: the minimum right-turn treatment for multilane roads is a CHR(s).

Source: TMR (2016a).

**Figure 6.2 – Turn Warrants Diagram (<70km/hr)  
at Proposed Entries**

## CONCLUSIONS AND RECOMMENDATIONS

---

The subject site is the existing Kingsley College School which is located to the south eastern corner of the Reaney Street/Schoolhouse Street intersection and provides for an expansion of the existing site facilities. The site is identified as 2 Schoolhouse St, Berserker, Lot 179 on CP890747. As shown as Figure 2.2 the site is located within a Community Facility Zone.

In terms of site access a turn warrants analysis of the proposed entries indicates that a BAR/BAL is warranted at both access points to Reaney Street. Left turn storage can be facilitated in the shoulder of the existing road with some modification to the through lane alignments, therefore no additional works are considered to be required to facilitate entry movement to the site.

It is recommended that the throat of the existing Reaney Street/Schoolhouse Street intersection be widened to enable safe and clear traversing of vehicles performing concurrent inbound and outbound manoeuvres and that new carpark accessing directly from Reaney Street be constructed in accordance with standard drawing CMDG-R-042 subject to detailed design as part of Operational Works.

## APPENDICES

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## TECHNICAL MEMORANDUM

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To: Colin Strydom – Design and Architecture  
From: Chris Hewitt  
McMurtrie Consulting Engineers  
Date: 28/01/2021  
Project No: 0562021  
Re: Access Location Assessment for Kingsley College – Reaney Street, North Rockhampton

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### Introduction

McMurtrie Consulting Engineers (MCE) have been engaged by Kingsley College to provide advice in relation to the proposed location of a carpark access from Lot 179CP890747 directly onto Reaney Street.

### Background

The Kingsley College school oval is directly adjacent to Reaney Street and the future proposal (as part of the School's proposed Masterplan) is to construct a carpark area within the area of the school oval including direct access to Reaney Street to reduce the use of Schoolhouse Road which is narrow and has residential uses directly abutting the road reserve.

**Figure 1** below shows the location of the Kingsley College Oval and **Figure 2** shows the proposed carpark access location as part of the future Masterplan for the School.

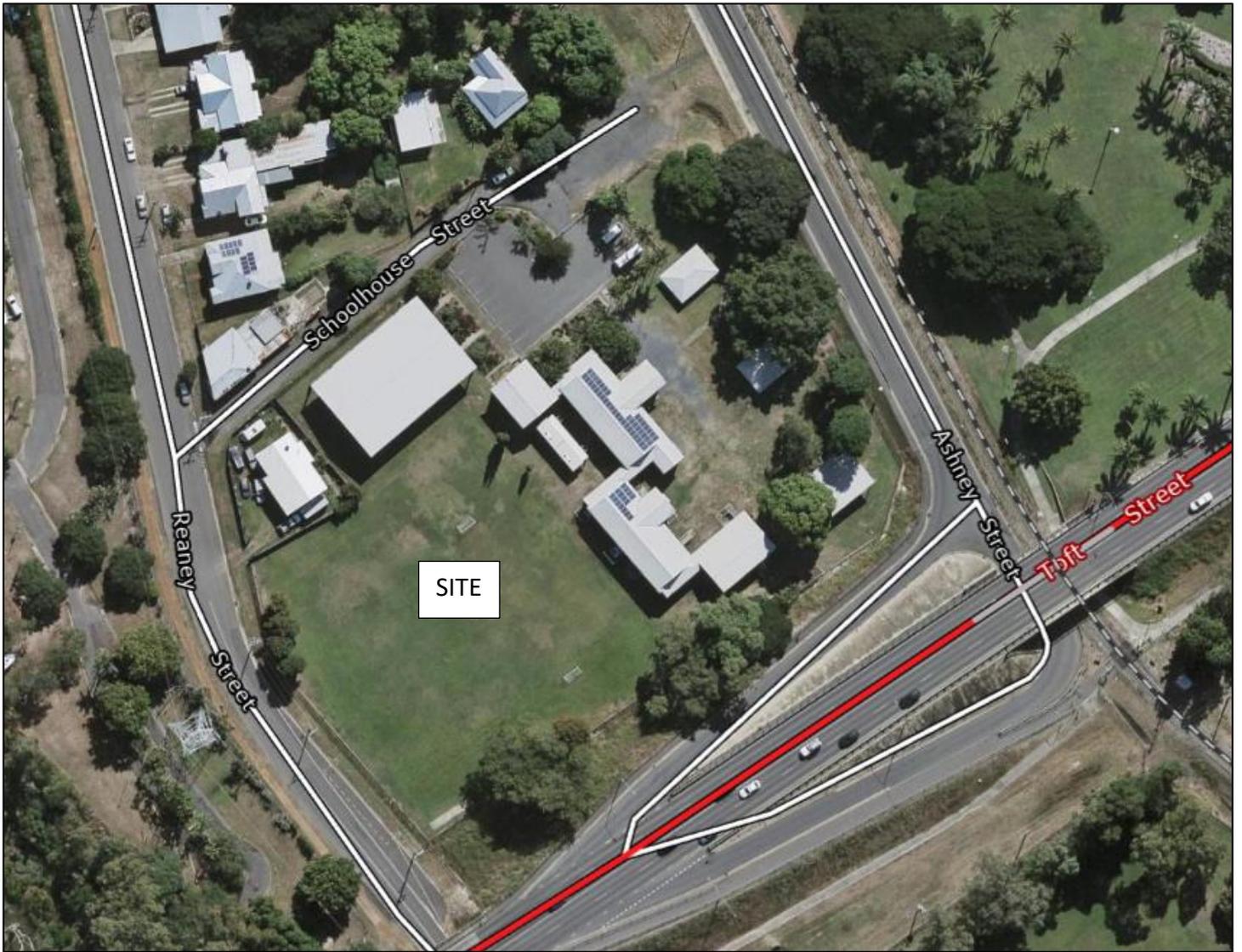


Figure 1 – Site Location

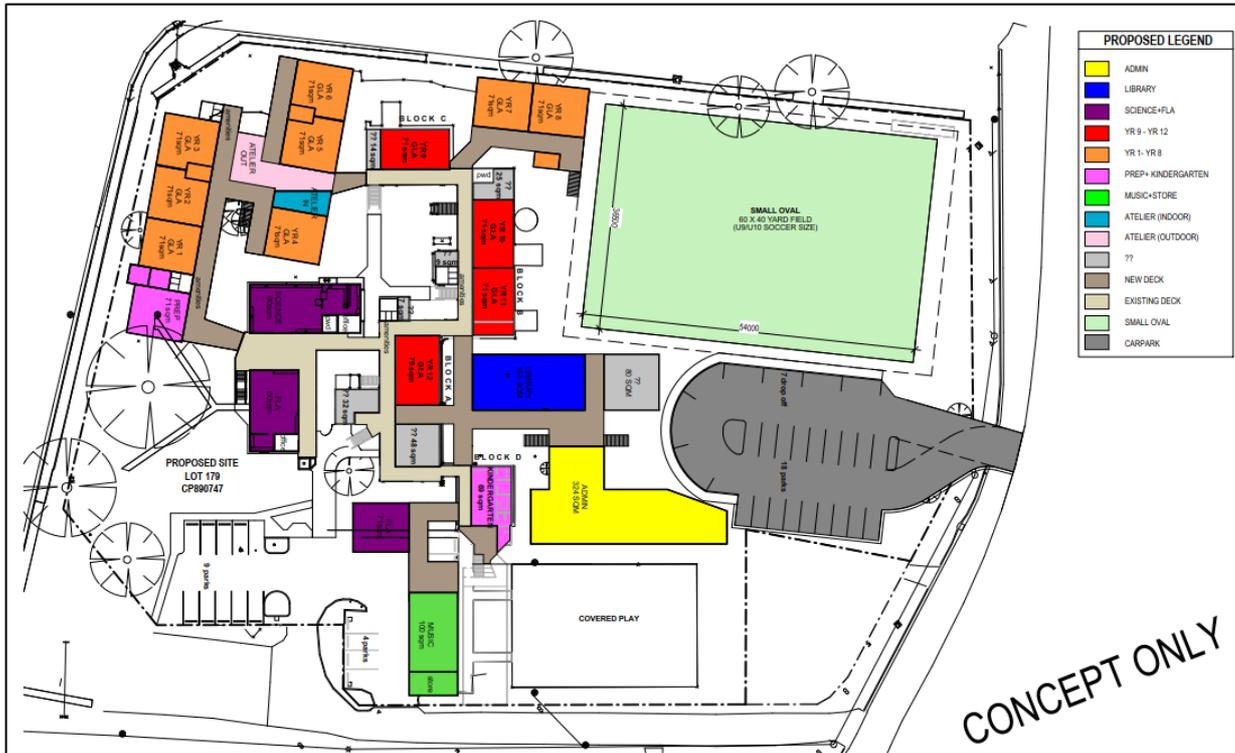


Figure 2 – Proposed Site Layout

### Site Inspection

A site inspection was carried out in January 2021 and the following photographs recorded.



Figure 3 – From proposed access point looking to the south



Figure 4 – From proposed access point looking to the north



Figure 5 – From the northern approach towards the proposed access

### Proposed Site Access

The new proposed site access arrangement seeks to rationalise and control site access to a specified location and will generally be most heavily used during school drop off and pick up times when the mandated speed limit on Reaney Street is 40kph.

Notwithstanding the 40kph School Zone speed limit from the above photographs and **Figure 6** below it is evident that the access visibility is satisfactory and well in excess of the required minimum of 83m in both directions, in accordance with Figure 3.2 of AS/NZS 2890.1:2004 – Parking Facilities Part 1: Offstreet car parking for a 60kph speed zone.

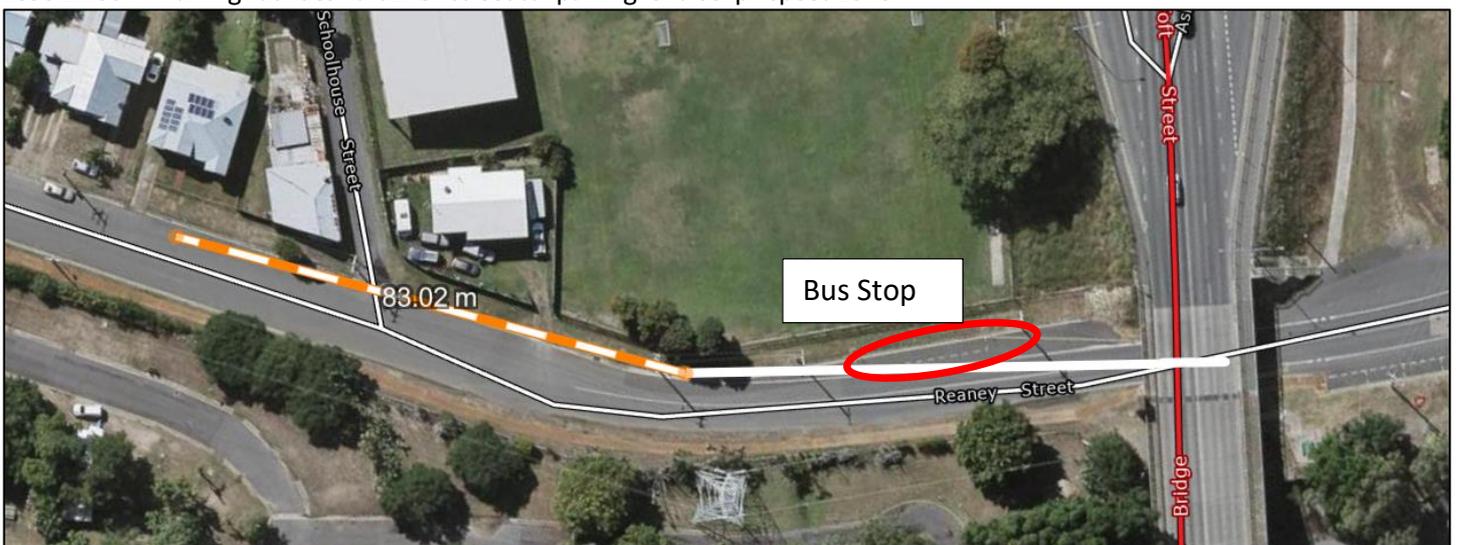


Figure 6 – Minimum required Sight Distance from access location

Additionally, there is a bus stop located as indicated in **Figure 6** above that will require relocation as it impacts visibility from the proposed site access to the south.

Given the satisfactory access visibility it is presumed that there would be no impediment to Council approving access to Reaney Street as shown and subject to detailed engineering design including a standard crossover for site ingress/egresses in accordance with standard drawing CMDG-R-042 (excerpt below) designed to accommodate 2 way traffic and the largest vehicle swept paths and necessary clearances (minimum 1m) from the adjacent Ergon pole.

Should the proposal for the access proceed it would be necessary to carry out further assessment of traffic and stormwater impacts however this would be expected to be relatively straight forward.

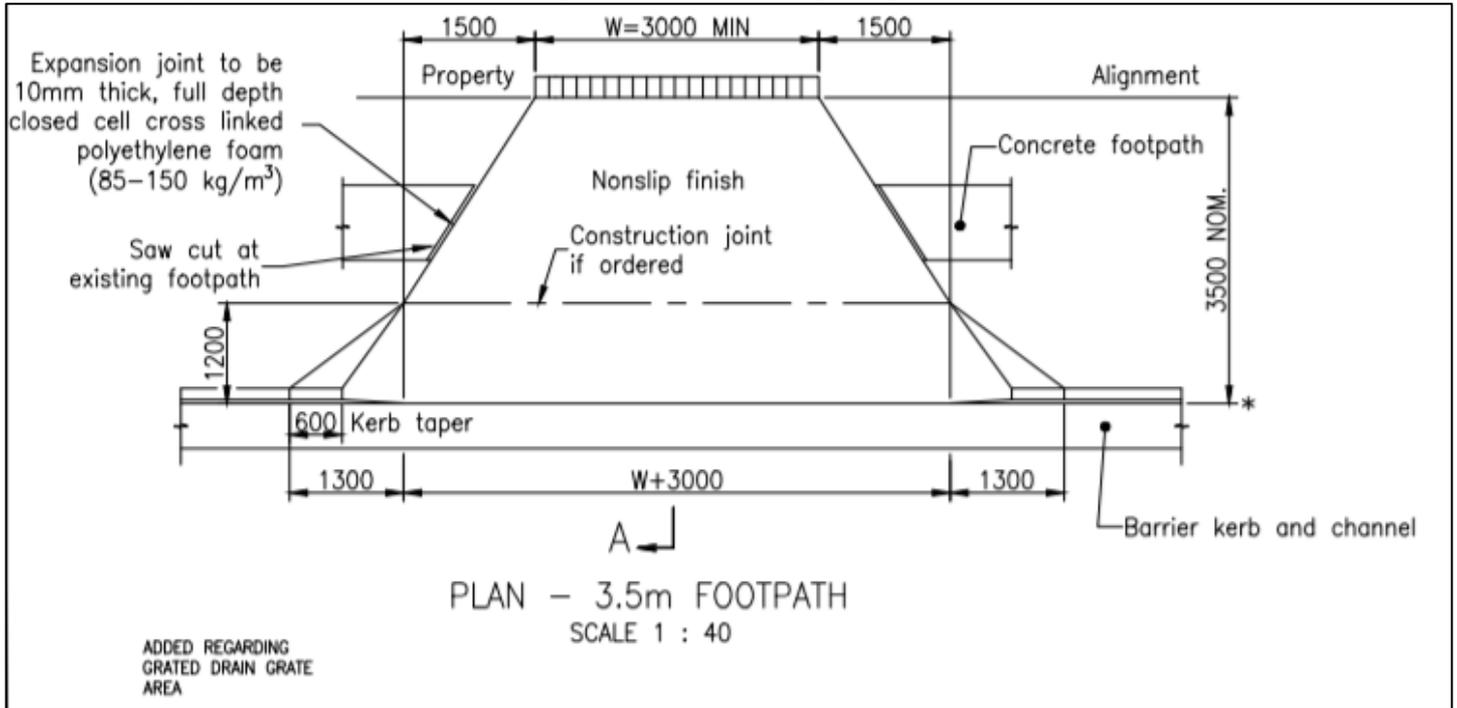


Figure 7 – Excerpt from CMDG-R-042

Yours sincerely

**Chris Hewitt**  
Principal Civil Engineer  
RPEQ NO. 5141

OUR AFFILIATIONS

