INFRASTRUCTURE COMMITTEE MEETING

AGENDA

18 SEPTEMBER 2018

Your attendance is required at a meeting of the Infrastructure Committee to be held in the Council Chambers, 232 Bolsover Street, Rockhampton on 18 September 2018 commencing at 12.30pm for transaction of the enclosed business.

ACTING CHIEF EXECUTIVE OFFICER
11 September 2018

Next Meeting Date: 16.10.18

Please note:

In accordance with the *Local Government Regulation 2012*, please be advised that all discussion held during the meeting is recorded for the purpose of verifying the minutes. This will include any discussion involving a Councillor, staff member or a member of the public.

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1 OPENING

2 PRESENT

Members Present:

The Mayor, Councillor M F Strelow
Councillor R A Swadling
Councillor N K Fisher
Councillor C E Smith
Councillor C R Rutherford
Councillor M D Wickerson

In Attendance:

Mr P Kofod – General Manager Regional Services (Executive Officer)
Mr E Pardon – Chief Executive Officer

3 APOLOGIES AND LEAVE OF ABSENCE

Leave of absence previously granted to Councillor Tony Williams from 17 to 21 September 2018 inclusive.

4 CONFIRMATION OF MINUTES

Minutes of the Infrastructure Committee held 21 August 2018

5 DECLARATIONS OF INTEREST IN MATTERS ON THE AGENDA

6 BUSINESS OUTSTANDING

6.1 BUSINESS OUTSTANDING TABLE FOR INFRASTRUCTURE COMMITTEE

File No:	**10097**
Attachments:	**1. Business Outstanding Table⇩**
Authorising Officer:	**Peter Kofod - General Manager Regional Services**
Author:	**Peter Kofod - General Manager Regional Services**

SUMMARY

The Business Outstanding table is used as a tool to monitor outstanding items resolved at previous Council or Committee Meetings. The current Business Outstanding table for the Infrastructure Committee is presented for Councillors' information.

OFFICER'S RECOMMENDATION

THAT the Business Outstanding Table for the Infrastructure Committee be received.

BUSINESS OUTSTANDING TABLE FOR INFRASTRUCTURE COMMITTEE

Business Outstanding Table

Meeting Date: 18 September 2018

Attachment No: 1

Date	Report Title	Resolution	Responsible Officer	Due Date	Notes
17/07/2018	Proposed Bus Shelter Program	THAT: 1. Council consider, as part of future budget discussions, the upgrade of the identified 10 bus stop locations to provide shelter structures at a cost of approximately $200,000; 2. A report be submitted on bus shelter design options and funding sources; and 3. Council look at the priorities around aged care facilities.	Stuart Harvey	31/07/2018	

7 PUBLIC FORUMS/DEPUTATIONS

Nil

8 OFFICERS' REPORTS

8.1 AGNES STREET TRAFFIC SAFETY CONCERNS

File No:	**7127**
Attachments:	1. **Agnes Street Site Investigation⇩**
Authorising Officer:	**Peter Kofod - General Manager Regional Services** **Martin Crow - Manager Infrastructure Planning** **Stuart Harvey - Coordinator Strategic Infrastructure**
Author:	**Stuart Singer - Technical Officer**

SUMMARY

Council received an informal petition along with several customer requests for the installation of a 40km/h speed zone and / or a pedestrian crossing in Agnes Street, between Penlington and Corberry Streets. This report details the traffic safety analysis performed for this area of Agnes Street.

OFFICER'S RECOMMENDATION

THAT Council install pedestrian awareness signage on Agnes Street and seek agreement from McAuley Place administration for the removal of on street car parking.

COMMENTARY

In April 2018, Council resurfaced Agnes Street between Penlington Street and Denham Street. Following this resurfacing, Council were presented with an informal petition from attendees to the church at McAuley Place, along with several other customer requests regarding concerns for pedestrian safety on this section of Agnes Street. Council has not received any requests outlining safety concerns by residents whose properties front this section of Agnes Street (between Penlington and Corberry Streets).

The petition and requests related to three main requests:

- lowering the default urban speed limit of 50km/h to 40km/h between Penlington and Corberry Streets
- installing a formal pedestrian crossing on Agnes Street near McAuley Place
- visibility constraints when entering Agnes Street from the private driveways at McAuley Place.

Due to the number of requests and the informal petition, Council officers have performed a site investigation for the residential section of Agnes Street (between Penlington and Corberry Streets) to address the concerns raised. The details of this investigation can be seen in Attachment 1. Considering the findings of the investigation, commentary on the issues raised is detailed below.

Install a formal pedestrian crossing

The Department of Transport and Main Roads, Transport and Road Use Manual has a crossing assessment tool to calculate whether a pedestrian crossing is warranted in a location. It considers several different factors that include but aren't limited to, pedestrian volumes, delay time for pedestrians, prevalence of defined crossing desire lines, traffic volumes, crossing sight distance and distance to existing crossing facilities. Due to the low volumes of traffic and the low volumes of pedestrians crossing the road, the warrants for a crossing facility on Agnes Street could not be met. It is Council's experience that installing crossing facilities where they are not fully warranted can increase the risk of crash for both pedestrians and vehicular traffic.

Considering the above, and the recommendation by the 3E's committee to not support a pedestrian crossing, this option is not recommended to be progressed. It is recommended

that pedestrians cross where they have adequate sight distance of oncoming vehicles and cross when it is safe to do so.

Implement a special '40' km/h zone

The Manual of Uniform Traffic Control Devices (MUTCD) – Speed Controls, states that except for school zones, a 40 km/h speed limit shall only be applied in:

- local streets that are designed to support a lower speed limit or where LATM devices have been installed or
- locations that are considered to be within High Active Transport User areas.

As Agnes Street does not have a significant active transport user volume, nor does it have a road environment that is designed to support a lower speed, it does not meet these criteria.

Analysis of the traffic volumes indicate that the volume of traffic on Agnes Street between Penlington and Corberry Streets is as expected for a Minor Urban Collector road. Speed analysis has indicated that there is general compliance with the speed limit and vehicles are not excessively speeding. The speed data profile is in the lower bound of what is typical for a '50' km/h street.

Visibility constraints from commercial driveways

An assessment was performed on the various driveways at the Range complex. Due to the vertical alignment of the road, there are some restrictions on sight distance at these driveway locations. One access driveway already has restricted parking on either side to improve sight distance. The access into McCauley Place has parking either side of the exit and this has an impact on sight distance when exiting the property.

The removal of on street car parking is a valid solution to increase sight distance however this would disadvantage residents and visitors who choose to park on street in front of McAuley Place. With the support of McAuley Place administration, Council would consider removing some on street car parking in front of McAuley Place access to improve sight distance.

Officers recommend that the speed limit remains at the urban default of 50km/h and that no dedicated crossing facility is constructed. However recognising that there is potentially an unexpected presence of pedestrians it is proposed to install pedestrian awareness signage in the vicinity of McCauley Place. Furthermore Council will seek agreement from McCauley Place regarding parking restrictions to improve driveway sight distance.

BUDGET IMPLICATIONS

The proposed works can be covered under Council's 2018/19 Traffic and Road Safety Minor Capital Works Program.

STAFFING IMPLICATIONS

Nil

RISK ASSESSMENT

There is always a risk of pedestrian / vehicle conflict in an urban environment, however, lack of or poor infrastructure would most likely not be considered a contributing factor in such an event. There is also a risk that pedestrian crossings increase vehicle rear end crashes, particularly at locations with infrequent pedestrian movements.

CORPORATE/OPERATIONAL PLAN

Consult on, advocate, plan, deliver and maintain a range of safe urban and rural public infrastructure appropriate to the Region's needs, both present and into the future.

CONCLUSION

In response to an informal petition, and several other customer requests from the community, a traffic and safety analysis was performed to respond to concerns raised at this

location. The analysis and recommendations are presented to Council for review and endorsement.

AGNES STREET TRAFFIC SAFETY CONCERNS

Agnes Street Site Investigation

Meeting Date: 18 September 2018

Attachment No: 1

Rockhampton Regional Council

Strategic Infrastructure Planning

Site Investigation Agnes Street:

At the request of the community, an investigation into Agnes Street (between Corberry Street and Penlington Street) was performed. Particular attention was placed on speed and pedestrian safety around the Range Complex property.

Issues Raised by community:

Several issues were raised by members of the community around the Range Complex and McCauley Place facilities on Agnes Street. Several customer requests and an informal petition were submitted to Council highlighting the following requests:

- lowering the default urban speed limit of 50km/h to 40km/h on Agnes Street between Penlington and Corberry Streets
- installing a formal pedestrian crossing on Agnes Street near McAuley Place / the Range complex.
- Improving visibility constraints when entering Agnes Street from the private driveways at McAuley Place / The Range complex.

Site Location:

Agnes Street is classified as a Minor Urban Collector road which is a traffic carrying road. The Capricorn Municipal Development Guidelines state that the main function of a Minor Urban Collector road is to collect and distribute traffic from local areas to the wider road network. The design speed for this classification is '50' km/h and the use of traffic control devices (LATM) should be avoided where possible to maintain traffic conveyance. A locality map of the area investigated is included below:

Traffic Count Data:

Traffic counting tubes were installed for two weeks from 1 June to 15 June on Agnes Street at McAuley Place to gain an appreciation of current vehicle volumes, classifications and speeds. This traffic data enabled officers to determine if Agnes Street is operating within its functional capacity, as determined in the Capricorn Municipal Development Guidelines (CMDG) and the Rockhampton Regional Planning Scheme (RRPS). Table 1 below shows the counted traffic volumes of Agnes Street does not exceed the functional capacity assigned to this street.

Table 1

Road	From	To	Road Hierarchy	Functional Capacity	ADT	%HV
Agnes St	Penlington St	Corberry St	Minor Urban Collector	3,000vpd	2531vpd	9.3%

Analysis of the speed data was also performed to understand the speed profile for vehicles in the study area. The speed data highlighted a general compliance with the posted speed limit of '50' km/h, with the 85th% speed (the speed at which 85% of recorded vehicles are travelling at or under) to be only marginally higher than the posted speed limit (refer Table 2). Further to this, the 15km/h pace (15km/h speed range that contains the largest number of vehicles) indicates 63% of vehicles travel between 38-53 km/h.

Table 2

Road	From	To	Location	Posted Speed Limit	85th% Speed (km/h)	Mean Speed (km/h)	15km Pace	% in 15km Pace
Agnes St	Penlington St	Corberry St	Opposite 238	50	54.2	45.1	38-53	63
MUTCD speed distribution ranges table C1				50 40		41-53 32-43	46-59 36-49	>60 >60

Speed Limit

The MUTCD Chapter 4 – Speed Controls, states that except for school zones, a 40 km/h speed limit shall only be applied on:

- local streets that are designed to support a lower speed limit or where LATM devices have been installed
- in locations that are considered to be within High Active Transport User areas.

A change to a 40km/hr speed zone in Agnes Street would require the implementation of an LATM scheme to support a '40' km/h speed environment. The MUTCD does not recommend LATM on roads other than residential streets, on roads that have high use of emergency vehicles or on bus routes. Agnes Street operates as a collector road, has a bus route and is used for access to the Base and Mater Hospitals.

Under Council's current Local Area Traffic Management Policy and Procedure, a community request is raised by residents, quantitative evidence is obtained and the issue is raised with the 3E committee before further action is taken. Upon review and recommendation from the 3E committee to proceed with LATM, consultation with the residents occurs before options are developed and brought to Council for budgetary approval.

Considering requests have not been raised by residents in Agnes Street, and recognizing the function of the road, speed data profile the implementation of LATM is not considered appropriate at this location. As a result of this, and considering the low pedestrian volumes observed it is not considered appropriate to reduce the speed limit to 40km/hr.

Crash history

Crash history in this area was obtained utilising Web crash. The usual analysis period for this assessment is 5 years however this period was extended to 18 years to gain a full appreciation of potential issues in the area. The crashes obtained for the period between 2000-2018 indicated that there has only been 2 reported crashes within this section of Agnes Street, the details of those crashes are shown in Table 3 below.

Table 3

Location	Crash Date	Crash Type	Crash Cause
Agnes St – (Sth of Herley St)	April 2003	601 – Hit Parked Car (travelling Sth)	Undue Care and Attention
Agnes St – (Sth of Herley St)	Aug 2007	401 – Vehicle Leaving Parking hit car (travelling Sth)	Failure to Give Way

These crash types are largely attributed to undue care and attention and are not as a result of the existing road infrastructure. Perhaps the 2007 crash could be attributed to the presence of parked vehicles along Agnes Street however none of the crash information specifically mentions speed or pedestrians as a contributing factor to the crashes.

Pedestrian Assessment:

As part of the investigation, a pedestrian assessment was performed to quantify the potential pedestrian issues in this location. Officers consulted with the community to gain an appreciation of the peak pedestrian period and performed site investigations on two separate days in the morning peak. With regards to the pedestrian movements in the vicinity of McAuley Place, no more than 4 pedestrian movements crossing Agnes Street within any 2 hour period were observed during the site visits conducted. While it is conceded that a pedestrian count was not performed on Sunday, the assumed largest gathering at the church, the recorded Sunday traffic volumes of 314 vehicles per hour on Agnes Street are lower than weekday volumes (up until 9:30am, weekend traffic volumes are half the weekday traffic volumes recorded).

A site assessment of potential pedestrian desire lines was undertaken however there did not appear to be a single location where all pedestrians would be likely to cross. This is due to the length of parallel parking spaces along Agnes Street and the several access driveways to properties in this section of road. The geometry of the road also restricts crossing sight distance which limits where a pedestrian facility could be located. Due to the lack of continuous pedestrian traffic in Agnes Street, and the low vehicle numbers, a dedicated crossing facility could not be substantiated.

There is always a risk of pedestrian / vehicle conflict in an urban environment, however, lack of or poor infrastructure would most likely not be considered a contributing factor in such an event. There is also a risk that pedestrian crossings increase vehicle rear end crashes, particularly at locations with infrequent pedestrian movements. Pedestrians are encouraged to cross where they have adequate sight distance of oncoming traffic.

Sight Distance Issues from Driveway Accesses:

There was a concern raised from the requests and petition about the restricted sight distance when exiting the Range Complex onto Agnes Street. An assessment was performed on the various driveways at this facility onto Agnes Street. Due to the vertical alignment of the road there are some restrictions on sight distance at these driveway locations. One access driveway already has a 16m yellow line to the right of the driveway and a bus stop to the left which has improved sight distance. The access into McCauley Place has parking either side of the exit and this has an impact on sight distance when exiting the property. The removal of on street car parking is a valid solution to increase sight distance for motorists entering the roadway. This would disadvantage residents and visitors who choose to park on street in front of McAuley Place. However with the support of McAuley Place administration, Council would consider removing some on street car parking in front of McAuley Place access.

3E committee Recommendations:

The issues raised by the requestors were presented to the 3E committee (including Queensland Police Service and the Department of Transport and Main Roads road safety representatives) on Wednesday 13th June 2018. Upon review of the road classification, current speed data profile, accident history and current pedestrian activity, the committee recommended to not support the requests for a 40km/h speed zone or formal pedestrian crossing at this location.

8.2 PROGRESSION OF THE PORT ALMA BOAT RAMP PLAN

File No:	**8026**
Attachments:	**1. Letter from Minister for Transport and Main Roads⇩** **2. Map of Proposed Casuarina and Inkerman Creek boat launching sites⇩**
Authorising Officer:	**Chris Ireland - Manager Regional Development and Promotions** **Tony Cullen - General Manager Advance Rockhampton** **Martin Crow - Manager Infrastructure Planning**
Author:	**Wade Clark - Regional Business Development Officer**

SUMMARY

The Minister for Transport and Main Roads has indicated support for Council's preferred solution for two boat ramps in the Port Alma area at Casuarina Creek and Inkerman Creek and is seeking Council's in principle agreement to proceed with the project.

OFFICER'S RECOMMENDATION

THAT:

1. Council agrees in principle to the Department of Transport and Main Roads (DTMR) proposal to progress the development of the Casuarina and Inkerman Creek boat ramps;
2. Council agrees to investigate appropriate land tenure through the Department of Natural Resources and Mines (DNRM) for the Casuarina and Inkerman Creek boat ramp car parks;
3. Council continues to negotiate a funding model with the Gladstone Ports Corporation (GPC) to fund the construction and maintenance costs for the Casuarina and Inkerman Creek car parks based on detailed designs being completed by GPC; and
4. A further report to Council be presented on future budgetary impacts when detailed designs and costs for the Casuarina and Inkerman Creek car parks are completed.

COMMENTARY

Building a modern boat launching facility in the Port Alma area has been identified as a priority action by the Rockhampton Recreational Fishing Development Strategy and on 24 October 2017, the Council endorsed the proposed locations of Casuarina Creek and Inkerman Creek for a two boat ramp solution.

On 10 July 2018, the Hon Mark Bailey (Minister for Transport and Main Roads) provided official correspondence to the Council (See Attachment 1) on the matter. This correspondence outlined that:

1. The Minister supported the boat ramp proposal solution from Council.
2. The Minister directed staff of DTMR to allocate sufficient funding for preliminary planning (design and approvals) for the in-water works at both sites (Casuarina Creek and Inkerman Creek).
3. GPC has agreed to partially fund the project and has offered to assist with the land-side development design.
4. DTMR can incorporate measures such as acceleration and deceleration lanes to facilitate safer access to both boat ramps.
5. Both new boat launching facilities should be commissioned prior to any closure of the current Port Alma facility.

6. The Minister is seeking an agreement from Council for in principle support to proceed the project based on these terms and provided that Council can agree to:
    a. Arrange suitable land tenure in its favour for the proposed boat ramp car parks.
    b. Accepting appointment under the Transport Infrastructure (Public Marine Facilities) Regulation 2011. Note that this was previously endorsed by Council on 24 October 2017.
    c. Consulting directly with GPC regarding the land side work (i.e. car-trailer parking, drainage, lighting etc.) and come to an agreement to fund and construct the standard requirements for each of the two lane boat ramps which equates to 45 car and trailer parks per boat ramp.

It is recommended that Council provide in principle support to the Minister for Transport and Main Roads, agree to investigate appropriate land tenure through DNRM and further negotiate a potential funding model with GPC based on detailed designs with a report to be brought back for Council's consideration.

Undertaking the development of the Casuarina and Inkerman Creek boat ramps will:

- Support the implementation of the Rockhampton Recreational Fishing Development Strategy, where better boat ramp facilities in the Port Alma area were identified as a priority action.
- Provide boat launching facilities that are well outside of the Port Alma Shipping Terminal and the Class 1 explosives overpressure area.
- Support local jobs through construction and operation phases.
- Support Rockhampton region's branding as the Home of the Barramundi.
- Support recreational fishing tourism in the region.
- Support the Region's growing recreational fishing industry including fishing charters.
- Support Council's mandate to attract new residents to the region as boat ramps enable lifestyle pursuits.
- Leverage economic and social benefits from one of the region's most significant natural assets – the 70,000 hectares that makes up the Fitzroy Delta.

It is recommended that Council pursue an agreement with GPC whereby the construction and ongoing maintenance costs are calculated into the overall cost of the project.

PREVIOUS DECISIONS

13 SEPTEMBER 2016 COUNCIL RESOLUTION

THAT Council adopts the Rockhampton Recreational Fishing Development Strategy.

24 OCTOBER 2017 COUNCIL RESOLUTION

THAT Council's agreement to the following is subject to the existing facility at Port Alma being retained and in practical use until such time as both new facilities are operational:

1. Council endorses the locations of Casuarina Creek and Inkerman Creek (as specified in this report) for two modern boat launching facilities requesting Department of Transport and Main Roads undertake planning;
2. Council agrees to be appointed facility manager under the Transport Infrastructure Act (1994) in the event of new boat launching facilities in Casuarina Creek and Inkerman Creek proceeding;
3. Council develops with Department of Transport and Main Roads and Gladstone Ports Corporation a Deed of Agreement to direct capital, resourcing and staging for the proposed boat launching facilities;

4. Council takes a cost neutral approach for the potential development of the boat launching facilities including ongoing maintenance through grant funding and cost sharing; and
5. Council endorses Option 1 in the report as a funding model.

BUDGET IMPLICATIONS

At this stage there are no direct budget implications for Council.

STAFFING IMPLICATIONS

The Manager for Infrastructure Planning with support from the A/Senior Executive, Economic and Business Development will action discussions with DNRM (land tenure) and GPC (design and proposed funding model).

CORPORATE/OPERATIONAL PLAN

Social – Community Expectation – Regional Infrastructure and Facilities

Safe, accessible, reliable and sustainable infrastructure and facilities

Regional public places that meet our community's needs

Economic – Community Expectation – Regional Profile and Services

A destination sought for lifestyle, community events and tourism

Service Excellence – Community Expectation – Regional Planning and Development

Plan for future population and economic growth giving consideration to a diverse range of industries and services

CONCLUSION

With the completion of the North Rockhampton boat ramp, the next major marine infrastructure development that has support from the Minister responsible for Transport and Main Roads are boat launching facilities into Casuarina Creek and Inkerman Creek. Further negotiations with GPC and investigation into land tenure will proceed subject to Council's approval.

PROGRESSION OF THE PORT ALMA BOAT RAMP PLAN

Letter from Minister for Transport and Main Roads

Meeting Date: 18 September 2018

Attachment No: 1

9337860 - 16/07/2018

Queensland Government

Minister for Transport and Main Roads

Our ref: MC101501

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10 JUL 2018

Councillor Margaret Strelow
Mayor
Rockhampton Regional Council
PO Box 1860
ROCKHAMPTON QLD 4700

Dear Councillor Strelow

Thank you for your letters of 18 April 2018 about progressing Casuarina and Inkerman Creek boat ramps.

I have discussed your proposal to relocate the current Port Alma boat ramp into two new smaller two-lane boat ramps at Casuarina Creek and Inkerman Creek, with officers from the Department of Transport and Main Roads (TMR).

I am pleased to advise that I am supportive of the proposed relocation and have requested that TMR allocate funding sufficient to proceed with preliminary planning (design and approvals) for the in-water works at both sites. Future allocation of funding for capital works (boat ramps and floating walkways) is subject to receiving certain assurances from you, and competing priorities for available funding.

TMR has liaised with Gladstone Ports Corporation Limited (GPC). GPC has agreed to partially fund the project and has offered to assist with the land-side development design. I request that you consult directly with GPC, come to an agreement, and advise me if Rockhampton Regional Council (RRC) will, with GPC contribution, commit to funding the required land-side works such as car-trailer parking, drainage, lighting, and so on. The required standard for car-trailer parking bay numbers is 45 for each of the two-lane ramps.

I am advised that TMR is upgrading the port access road from Bajool to Port Alma and can incorporate measures, such as acceleration and deceleration lanes, to facilitate safer access from the road to the proposed car-trailer parks at each of the two boat ramp sites. Confirmation is required if RRC is prepared to arrange suitable land tenure in its favour for the proposed car-trailer parks, and accept appointment under the Transport Infrastructure (Public Marine Facilities) Regulation 2011, as facility manager for management and control of the two boat launching facilities. This matter requires early attention, as TMR is not able to progress in-water construction approvals without suitable adjoining land tenure acceptable to the Department of Natural Resources, Mines and Energy as owner of the creek seabeds.

9337860 - 16/07/2018

From TMR's viewpoint, and noting the destinations likely to be accessed by boaties, both new boat launching facilities should be commissioned into use prior to any closure of the current Port Alma facility. It has been previously agreed by respective officers from TMR that the Casuarina Creek boat ramp site will be commissioned into use ahead of the Inkerman Creek site.

To aid in the planning and preparation of estimates, TMR's in-water works will include a transition slab (or manoeuvring area) at the top of each boat ramp to join the ramp-top to your car-trailer park works.

Subject to agreement in principle, TMR will prepare a suitable deed of agreement for joint execution.

I trust this information is of assistance and look forward to receiving your response.

Yours sincerely

MARK BAILEY MP
Minister for Transport and Main Roads

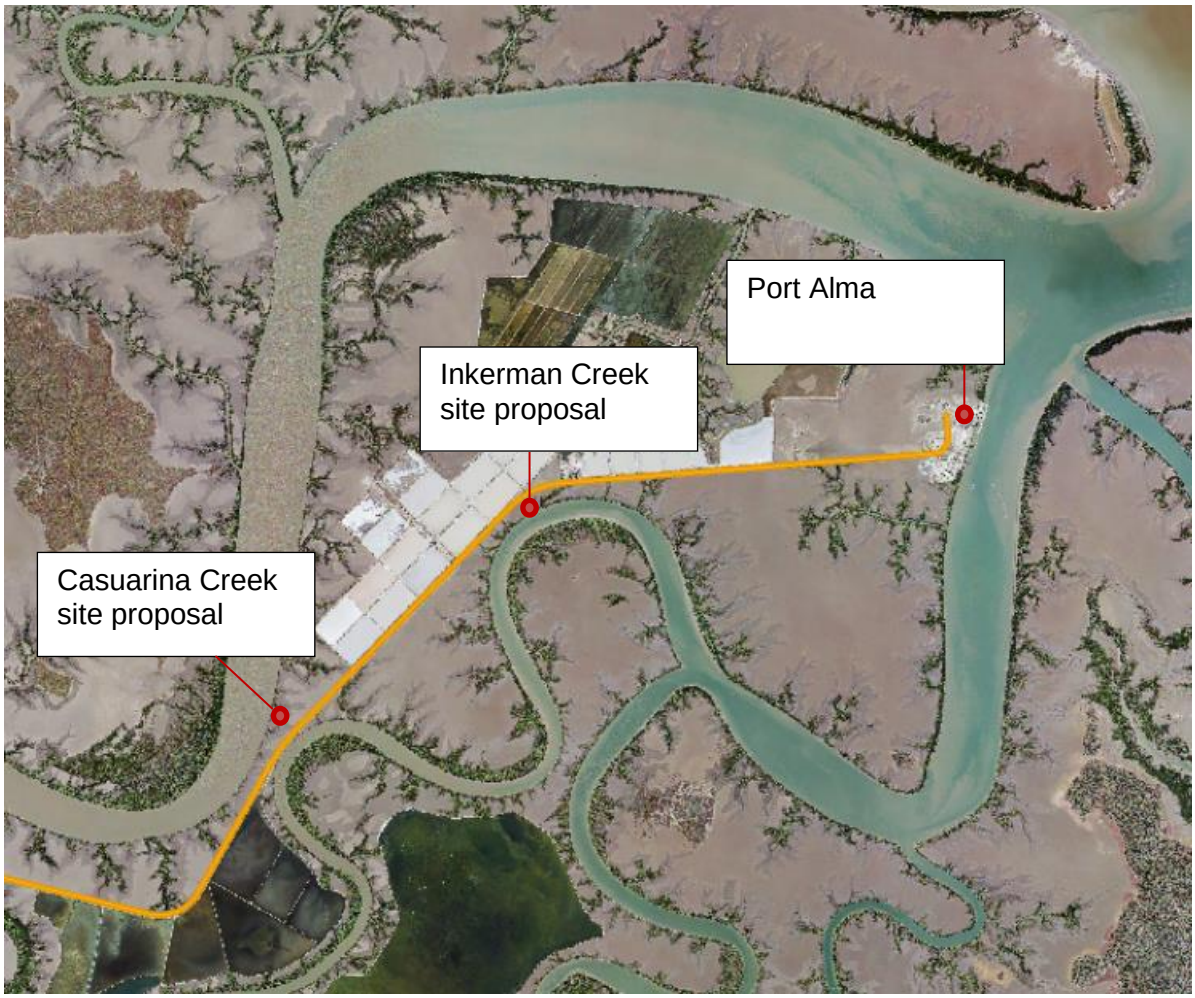
PROGRESSION OF THE PORT ALMA BOAT RAMP PLAN

Map of Proposed Casuarina and Inkerman Creek boat launching sites

Meeting Date: 18 September 2018

Attachment No: 2

Attachment 2 – Map of Proposed Casuarina and Inkerman Creek boat launching sites



8.3 RIPARIAN CORRIDOR MANAGEMENT STUDY: FRENCHMANS AND THOZETS CREEKS

File No: 1743

Attachments: 1. Riparian Corridor Management Study Summary⇩

Authorising Officer: Martin Crow - Manager Infrastructure Planning
Peter Kofod - General Manager Regional Services

Author: Monishaa Prasad - Senior Infrastructure Planning Engineer - Floodplain Management

SUMMARY

A Riparian Corridor Management study has been completed for Frenchmans and Thozets Creeks. The study assessed the current state of the catchment and developed a holistic waterway restoration strategy. The restoration strategy includes a program of works to better manage the riparian zone across the catchment.

OFFICER'S RECOMMENDATION

THAT Council endorse the Frenchmans and Thozets Creek Riparian Corridor Management Study.

COMMENTARY

A Riparian Corridor Management study has recently been completed for Frenchmans and Thozets Creeks. The study, which was undertaken by Alluvium Consulting, assessed the geomorphology, aquatic ecology and terrestrial vegetation across the Frenchmans Creek and Thozets Creek study reaches to gather a 'full systems' understanding of the catchments. Following this assessment, a restoration strategy for the Frenchmans Creek and Thozets Creek study reaches was developed and presented in the '*Riparian Corridor Management Study*: *Frenchmans and Thozets Creeks'* report. The summary of the report is included as Attachment 1 The full version has been sent to Council via a dropbox link.

The study report outlines the riparian management objectives and guidelines for both creek systems, and provides detailed reach-scale summaries which cover aquatic ecology, geomorphic condition, and environmental assessment as well as opportunities, and threats. A restoration strategy comprising of revegetation, structural works, and stormwater management measures to restore the creeks has also been developed, and is put forward as part of a program of works to address concerns at the individual reach-scale level and deliver the holistic outcomes sought.

It is anticipated that the study recommendations will assist Council with developing and implementing successful waterway restoration actions which seek to seamlessly integrate drainage, waterway stability, waterway health, and the natural environment to re-establish the natural creek regimes, restore creek functionality, and reconnect the community with the Riparian corridors in the Frenchmans and Thozets Creek catchments. In doing so, the Creek systems will once again become a highly valued community asset for not only residents, but also the wider Rockhampton Region

BACKGROUND

The Frenchmans and Thozets Creek catchment areas have long been subject to periods of rapid growth and urbanisation (particularly over the past 25 years), with detrimental activities such as modification of the creek corridors, historical land clearance, residential encroachment of creek bank areas, and construction of road and drainage infrastructure routinely being permitted. As a result, the ecological and hydrological characteristics of the creeks have been substantially altered, which has led to poor water quality, loss of aquatic and riparian habitat, and stream bank instability issues.

Observation of the presence of alluvial soils and compromised stream bank issues suggest that the creek banks are susceptible to serious erosion as a result of these hydrologic changes.

As urbanisation is expected to continue within these catchments, urgent strategic planning preparation is required to identify opportunities to mitigate against further adverse impacts to the creek corridors, and restore waterway health and bank stability of the creeks. Council is in the process of preparing a series of actions to better manage urbanised catchments in the region. A key step forward is developing an understanding of the fluvial and geomorphic elements of the creek systems (and their role within the floodplain) in order to develop a long-term management strategy for prioritizing and implementing waterway restoration actions for areas of high instability. The Riparian management measures outlined within the Frenchmans and Thozets Creek Riparian Corridor study report provide an important response for addressing the current and future concerns in these catchment areas, and will help to support a sustainable vision for the creek catchments.

PREVIOUS STUDIES

A similar study in the form of the Frenchmans Creek Master Plan study was undertaken in 2007 to assist with creek corridor management in the context of recreation and community use. That study focussed on habitat restoration and monitoring activities (including voluntary schemes), and worked with other agencies and organizations to develop integrated projects with the goal of restoring multiple riparian functions, including habitat, floodplain function, and improved groundwater recharge. Using these previous efforts as a guide, the Frenchmans and Thozets Creeks Riparian Corridor Management study builds a successful template for ecosystem-based creek catchment restoration efforts which includes the continued encouragement and implementation of voluntary restoration and monitoring activities

BUDGET IMPLICATIONS

There are no immediate budget implications at this stage, however as Council progresses with developing it's Floodplain Management planning for Frenchmans and Thozets Creeks, it is expected that proposed waterway restoration works will be classified and prioritized for implementation and funded as per the budgetary allowances.

RISK ASSESSMENT

The report supports Council's strategic vision for managing catchments, and seeks to balance flooding, social, ecological and cultural interests, to permit the sustainable and valuable use of its floodplains.

CORPORATE/OPERATIONAL PLAN

This study achieves the following objectives of the Corporate Plan and the 2018/2019 Operational Plan:

- 3.1 Contribute to healthy natural ecosystems (Corporate Plan)
- 3.1.1 Ensure effective management, protection and future sustainability of the Region's wider landscapes, river network, ecosystems, ecological processes, fauna and flora (Operational Plan 2018/2019)

The study also addresses the 'Local Creek Studies' component of the Rockhampton Regional Council (2014) Flood Management Strategy.

CONCLUSION

The Riparian Corridor Management study for Frenchmans and Thozets Creeks provides a 'full systems' understanding of the Frenchmans Creek and Thozets Creek fluvial areas to inform a restoration strategy to address areas of instability in these creek systems. It is expected that the recommendations from the study will allow Council to appropriately plan and prioritise holistic catchment management measures to inform Council's floodplain management planning.

RIPARIAN CORRIDOR MANAGEMENT STUDY: FRENCHMANS AND THOZETS CREEKS

Riparian Corridor Management Study Summary

Meeting Date: 18 September 2018

Attachment No: 1

alluvium

FINAL DRAFT REPORT:

Riparian Corridor Management Study: Frenchmans and Thozets Creeks

July 2018

Rockhampton Regional Council

Summary

Alluvium Consulting Australia (Alluvium) has been commissioned by Rockhampton Regional Council (RRC) to develop a wholistic restoration plan for Frenchmans Creek and Thozets Creek (referred to herein as the study reaches). The plan aims to enhance riparian communities, instream health and channel and floodplain stability. Specifically, the objectives of this study include:

- Determine existing instream and riparian values within the study area
- Establish the level of channel and floodplain stability within the study area
- Identify major threats to instream and riparian ecology and channel and floodplain stability
- Develop options for management which improve the ecological value and stability of the study reaches within the constraints of their urban landscape
- Provide a set of principles and guidelines to assist in the future management of the study reaches floodplain and riparian zone.

Frenchmans Creek and Thozets Creek drain the western slopes of the Berserker Ranges. The Berserker Range forms the eastern and north-eastern boundary of the city of Rockhampton. The highest peak in the ranges is Mount Archer which is the 608 m above sea level and is located in the headwaters of the Frenchman Creek catchment. The creeks exit the ranges and flow through an urban environment consisting of a mix of residential and light industrial zones as well as recreational parklands before entering the Fitzroy River, downstream from the Fitzroy River Barrage.

In order to develop a wholistic restoration plan, the study assessed the geomorphology, aquatic ecology and terrestrial vegetation across the study reaches. A combination of desktop assessments and field investigations were used to inform the study and develop a series of management options.

The morphology of an alluvial stream is primarily defined by its flow regime, sediment supply and riparian vegetation condition. Often when these factors remain unchanged a relatively stable stream exists, where there is limited adjustment in morphology. Across the Frenchmans Creek and Thozets Creek catchments there have been major changes to the primary inputs that can impact on channel morphology. The clearing of catchment vegetation and urbanisation have increased runoff. The increased run off has led to increased flows within the channel and increased incidences of water overtopping the banks. Channelisation and removal of vegetation has increased stream power and decreased the strength of waterway boundary. These changes have resulted in significant lateral adjustment of the waterway as excess flow energy is used to rework the coarse sediments, which comprises the channel boundary. The most notable example of this is a reach of Frenchmans Creek in Ollie Smith Park, where the left bank retreated as much as 18 m between 2016 and 2017.

A restoration strategy for the study reaches was developed. The first step involved defining clear management objectives that are achievable, within the constraints and capabilities of the stream and its riparian area. Based on discussions with Rockhampton Regional Council (RRC) a range of management objectives were developed to protect certain values within the study reaches and the broader region. These objectives have been developed based on the understanding that the study reaches are high energy systems that transport and store high volumes of coarse sediments. They are susceptible to frequent flash flood events and it is unrealistic to hope or plan for a stable stream that does not encroach on private and public interests.

Based on our assessments and the agreed management objectives a recommended program of works for the study reaches was developed. These recommended works fall into the following categories:

Revegetation
To achieve the management objectives in each reach relating to connectivity, water quality and channel stability remnant standard riparian vegetation needs to be established. In an urban setting this will not always be possible due to surrounding land use and planning constraints. A five-tier restoration effort was developed based on the existing condition of the reach and surrounding land use, for example channel proximity to

residential property boundaries. The restoration efforts range from landholder engagement and support for riparian planting to major revegetation and weed maintenance and monitoring.

Structural works

Riparian vegetation is the most effective long-term solution to limiting stream bank erosion. However, the erosion potential is so great in some zones that waiting for vegetation to reach a level of maturity required to protect stream banks from erosion may not be acceptable. Structural works have been recommended in a number of locations across the study reaches to limit further bank retreat and provide the necessary time for vegetation to reach maturity. Structural works have also been recommended in certain locations for the immediate protection of public and private assets. While a detailed civil and hydraulic design will be required for these sites, several conceptual proposals have been outlined including bank reprofiling, rock revetment, log toe protection and a grade control structure.

Stormwater treatment

Several stormwater treatment options have been proposed within the study area. These options aim to provide treatment to stormwater before entering the study reaches, ultimately improving water quality and reducing sediment and nutrient loads exported to the Great Barrier Reef. Improved off channel storage may also result in reduced inflows into the study reaches during rain events. The proposed treatment options considered available space, land use, existing topography and position within the catchment. Options include landscape wetlands, constructed wetlands and vegetated treatment zones.

Along with the recommended program of works a set of waterway management guidelines were developed. The guidelines outline the general principles for riparian and integrated floodplain management. The intended purpose of the guidelines is to provide guidance to RCC to aid future decision making surrounding catchment and riparian planning.

8.4 FRENCHMANS AND THOZETS CREEK FLOOD STUDY

File No:	**1743**
Attachments:	**1. Flood Study Executive Summary⇩**
Authorising Officer:	**Martin Crow - Manager Infrastructure Planning** **Peter Kofod - General Manager Regional Services**
Author:	**Stuart Harvey - Coordinator Strategic Infrastructure**

SUMMARY

The Frenchmans and Thozets Creeks Flood Study (2017) has reviewed and updated the original study undertaken in 2014. This report seeks Council's endorsement of this flood study.

OFFICER'S RECOMMENDATION

THAT Council endorses the 2017 Frenchmans and Thozets Creek Flood Study.

COMMENTARY

Council, as part of its on-going commitment to the Rockhampton Regional Council Flood Management Strategy, has completed a flood study to improve upon its current flood information and risk profiling of the Rockhampton region, and prepare a series of land use planning actions to better manage urbanized catchments. A key component of this work has involved updating the Frenchmans Creek and Thozets Creek flood studies, and incorporating both catchments into a new, combined flood study.

A copy of the executive summary of the Flood Study has been attached to this report (Attachment 1) and, due to its size, the full report and appendices have been sent to Councillors via a dropbox link.

The revised flood study incorporates new modelling methodology, updated national best practice guidance from Australian Rainfall and Runoff, and updated creek catchment information, including new terrain data, stormwater network, and floor level survey data. The flood modelling has also been calibrated to the February 2015 (TC Marcia) local flood event, and validated to the 2013 (Ex TC Oswald), and 2017 (Ex-TC Debbie) flood events.

The new flood study provides improved flood risk management information:

- Updated Hazard identification
- Indicative flood damages (Annual Average Damages) for residential and commercial buildings
- Identification of buildings subject to Over-floor flooding
- Major overland flowpath areas
- Hazard profile across the catchment
- Vulnerable areas and critical asset locations
- Time of inundation and Duration of inundation information
- Areas of potential isolation
- Indicative Evacuation routes
- Climate Change scenario mapping

The study outcomes provide Council with a better understanding of local catchment flood behaviour, flood risk, and vulnerability, to assist with the development of flood mitigation options and inform future natural hazard overlays for associated development controls. The flood study outcomes also provide information which assists Council in its emergency management planning, preparedness and response.

BACKGROUND

In 2014, Council undertook local catchment flood studies for the Frenchmans Creek and Thozets Creek Catchments to better understand local flood impacts and gauge local flood risk for communities located within these creek floodplain areas to inform flood mitigation and management measures. These flood studies were endorsed by Council for land use planning and policy administration purposes, and the flood mapping produced was adopted and incorporated as part of the Flood Management Overlay flood mapping in Council's current planning scheme (Rock e Plan 2015).

Recent local and riverine flood events have highlighted the need to improve the long-term flood resilience of the region. Council seeks to take this opportunity by identifying and improving the current available information, and enhancing the risk profiling of the Rockhampton region. Improved awareness of the flood risk, along with updated flood mapping will contribute to better decision making about future development in Rockhampton, as well as decisions about rebuilding following flood events.

PREVIOUS DECISIONS

Council resolved on the 10th of July 2018 that Flood Hazard Catchment Overlay Map OM-8C and associated provisions be endorsed as part of the Rockhampton Regional Council Planning Scheme major amendment. These Flood Hazard Maps were derived from this Flood Study

LEGISLATIVE CONTEXT

Completing an updated flood study is also consistent with the findings of the Final Report of the Queensland Floods Commission of Inquiry (2012) which recommended all Councils to provide up to date flood information and warnings to residents. Improved awareness of the flood risk, along with updated flood mapping contributes to better decision making about future development in Rockhampton, as well as decisions about rebuilding following flood events.

RISK ASSESSMENT

The updated flood study has determined the flood depths and velocities within the Frenchmans and Thozets Creek catchments. This information has increased the understanding of flood risk within the catchment and will be used to guide and manage future development and flood mitigation projects.

CORPORATE/OPERATIONAL PLAN

This study achieves the following outcomes in the Corporate Plan:

1.1 Safe, accessible, reliable and sustainable infrastructure and facilities

CONCLUSION

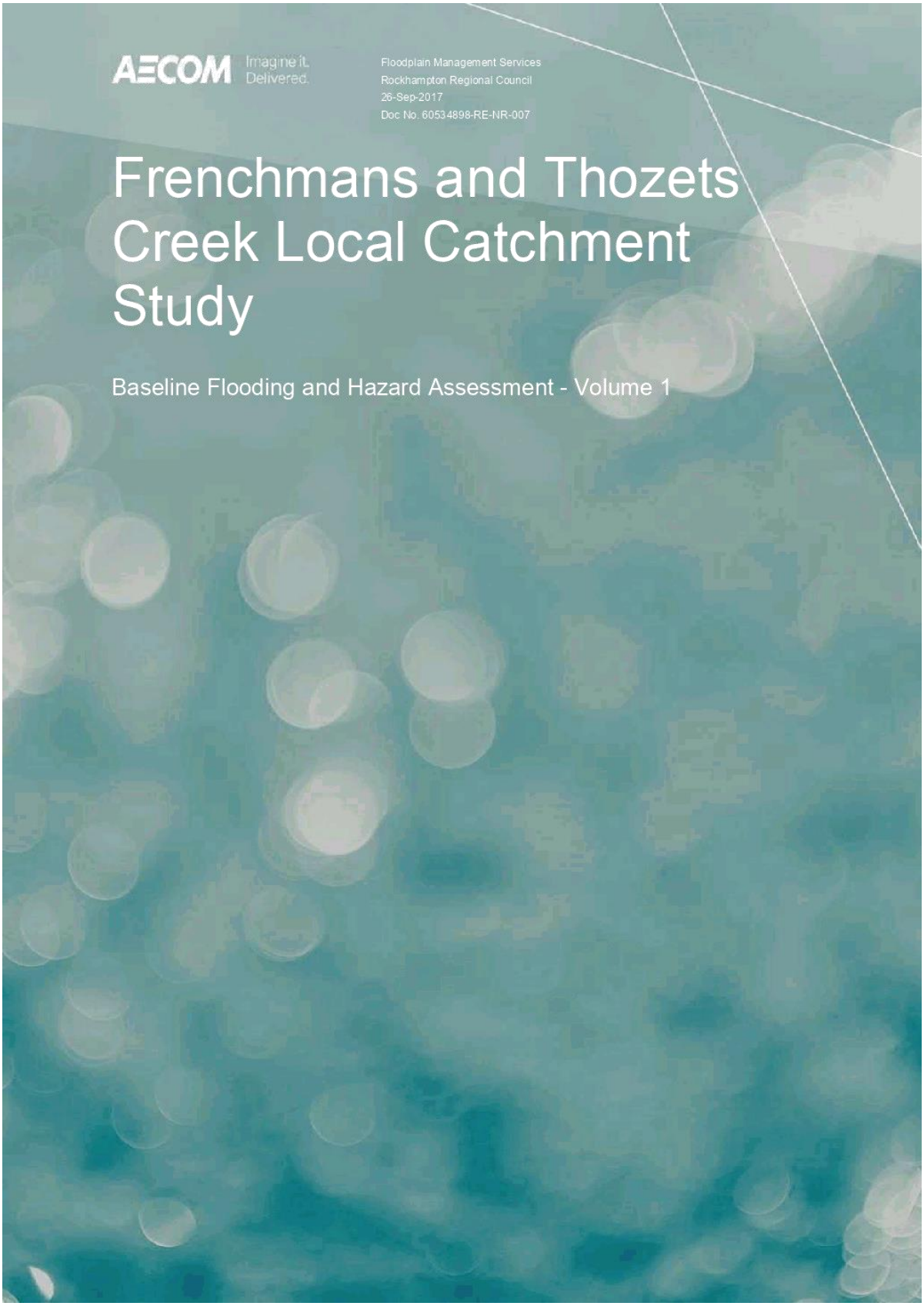
The flood study for Frenchmans and Thozets Creek in Rockhampton provides an understanding of the flood behaviour in thee catchments and will assist in future planning and flood mitigation. This report is presented to Council for endorsement.

FRENCHMANS AND THOZETS CREEK FLOOD STUDY

Flood Study Executive Summary

Meeting Date: 18 September 2018

Attachment No: 1


AECOM
Imagine it. Delivered.
Floodplain Management Services
Rockhampton Regional Council
26-Sep-2017
Doc No. 60534898-RE-NR-007
Frenchmans and Thozets Creek Local Catchment Study
Baseline Flooding and Hazard Assessment - Volume 1

Executive Summary

Background

In December 2016, Rockhampton Regional Council (RRC) engaged AECOM Australia Pty Ltd (AECOM) to undertake the Floodplain Management Services (FMS) program for the 2017 calendar year. The FMS program entails the completion of a number of individual floodplain management projects including the Frenchmans and Thozets Creek Catchment Study, which is the subject of this report.

Flooding in North Rockhampton can occur as a result of three different flood mechanisms:

- Riverine flooding due to rainfall over the Fitzroy River catchment.
- Overland flooding due to rainfall over the local urban catchment.
- Creek flooding due to rainfall over the local creek catchment.

This study focuses on overland and creek flooding due to rainfall over the local catchment.

The key objectives of this study are:

- The development of a detailed hydraulic model based on current best practice procedures, capable of adequately simulating the flood characteristics and behaviour of the local catchment using the latest available data.
- The assessment of existing flood risk within the study area. It is expected that these results will be used to inform long term infrastructure planning, future emergency planning and floodplain management.
- The development of clear and easy to understand flood mapping products for use in future community education and awareness campaigns.
- Determination of key hydraulic controls within the study area which will later be used to inform mitigation options analysis.

Catchment Characteristics

The Frenchmans and Thozets Creek catchments cover a combined area of approximately 18.5 km^2 starting within the reaches of Mount Archer National Park. Frenchmans Creek is an ephemeral meandering system consisting of low flow paths and riffle pools within the mid and lower portions of the catchment. The natural creek bed material varies from exposed medium-sized cobbles / rocks to silty / sandy soils. Riparian vegetation along the creek varies from very dense grasses, shrubs and trees – to very limited vegetation in higher velocity sections of the reach.

Thozets Creek is also an ephemeral meandering system with low flow paths within the lower portions of the catchment. Two thirds of the reach length is contained within dense bushland, therefore the channel and overbanks are populated by trees and shrubs. Some areas of exposed medium sized rock occur in the lower reaches, along with some sections of very dense channel vegetation.

Urbanisation has increased the proportion of impervious areas such as roads, concrete and building structures. Urban overland flow paths within the Frenchmans and Thozets Creek catchment generally follow defined natural or constructed channels and road corridors.

Hydrologic / Hydraulic Analysis

The Frenchmans and Thozets Creek Phase 1 Baseline Flood Study included the development of a TUFLOW model for the urbanised portions of the Frenchmans and Thozets Creek local catchments. This model utilises a combination of runoff-routing and direct rainfall approaches in order to determine the overland flow paths and establish baseline flood extents and depths within the study area.

Anecdotal and recorded data was obtained and used to calibrate the model to a local flood event caused by TC Marcia in February 2015. Further model validations were undertaken for two other local flood events, namely Ex-TC Debbie in March 2017 and Ex-TC Oswald in January 2013.

Revision C – 26-Sep-2017
Prepared for – Rockhampton Regional Council – ABN: 59 923 523 766

The model calibrated very well to the 2015 event. The validation to the 2017 event resulted in a reasonable comparison between modelled and recorded levels, with most points above tolerance. Discrepancies identified between the modelled and recorded levels are largely due to the vegetation density at the time of the flood event and variation in the spatial distribution of rainfall across the rural and urban components of the catchment.

The validation to the 2013 event revealed the majority of anecdotal records matched simulated levels within tolerance. Locations at which discrepancies exceeded allowable tolerances were expected to be a result of changes to the channel geometry due to ongoing geomorphological processes.

Ongoing changes to channel geometry results in additional uncertainty when validating the model to historic events using the latest 2016 terrain data. Despite this, the model calibrates and validates well with modelled behaviours anticipated to appropriately predict flood patterns at the time of this study.

On completion of the calibration / validation process, various design flood events and durations were simulated and results extracted. The critical duration for the catchment was determined to be the 90 minute event.

The modelling has confirmed that there are a number of key hydraulic controls within the catchment – particularly the various culverts / bridges which cross Frenchmans and Thozets Creek. Sensitivity analyses have been undertaken to highlight the uncertainties in the model results and support the selection and application of an appropriate freeboard provision when using the model outputs for planning purposes.

Baseline Flood Hazard and Vulnerability Assessment

Following completion of baseline model development, design event modelling and sensitivity analyses; a flood hazard and vulnerability assessment was completed for the Frenchmans and Thozets Creek catchments. This included:

- Flood hazard analysis.
- Vulnerability assessment of key infrastructure.
- Evacuation route analysis.
- Building inundation and impact assessment.
- Flood Damages Assessment (FDA).

Each of these aspects has been discussed in further detail below.

Flood Hazard

Flood hazard categorisation provides a better understanding of the variation of flood behaviour and hazard across the floodplain and between different events. The degree of hazard varies across a floodplain in response to the following factors:

- Flow depth.
- Flow velocity.
- Rate of flood level rise (including warning times).
- Duration of inundation.

Identifying hazards associated with flood water depth and velocity help focus management efforts on minimizing the risk to life and property. As such, a series of Flood Hazard Zones have been developed according to ARR 2016, in alignment with recommendations made in the ARR, Data Management and Policy Review (AECOM, 2017).

Figure E1 shows the adopted hazard categories along with a general description of the risk associated with each category.

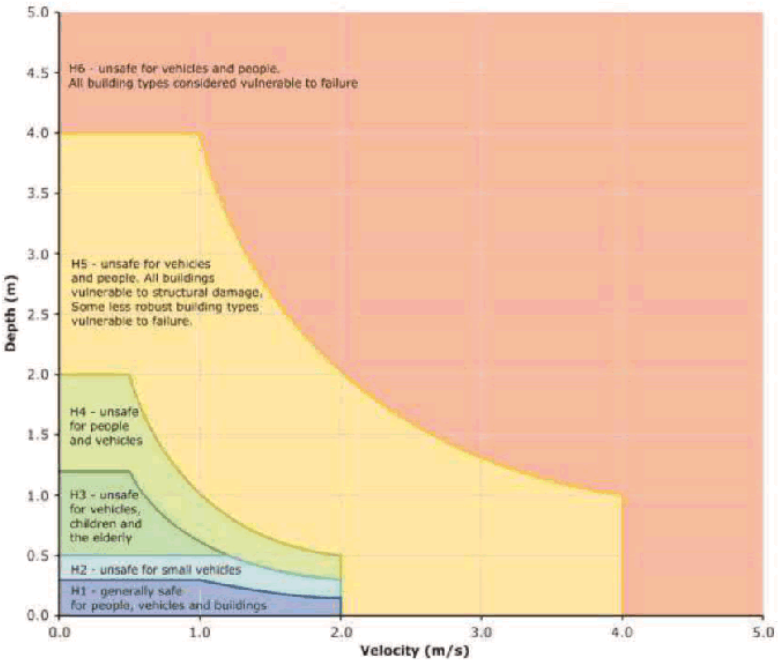


Figure E1 Hazard Vulnerability Classifications (Graphical)

Analysis of the 1% AEP baseline flood hazard within the Frenchmans and Thozets Creek catchments generally shows:

- Low to medium hazard (H1 and H2) across the majority of urbanised areas within the catchment.
- High hazard (H3 and H4) within a majority of natural and man-made channels, as well as open areas such as local parks.
- High to extreme hazard (H4 and H5) within some natural and man-made open channels, aswell as some open areas such as Alan Bray Park, Bill Crane Park, Rigarlsford Park, Ollie Smith Park and Duthie Park.
- High to extreme hazard (H4 and H5) in the vicinity of:
  - the Frenchville State School on Frenchville Road,
  - across the Kerrigan Street crossing of Frenchmans Creek,
  - across Elphinstone Street at Rigarlsford Park,
  - in Honour Street near the Mt Archer Scout Hall.
- Extreme hazard (H5 or H6) within the Frenchmans and Thozets Creek channel and adjacent overbank areas.

Vulnerability Assessment

A baseline vulnerability assessment has been undertaken to identify critical infrastructure and community assets which are at risk of flooding. The following categories have been included in this assessment:

- Water and sewerage infrastructure.
- Emergency services facilities including ambulance, police, fire and hospitals.

- Community infrastructure including schools, day-care centres, nursing homes, retirement villages and community facilities.
- Key road and rail assets.

The following provides a summary of key findings of the vulnerability assessment:

- The Blue Gum Terrace SPS (Ref: 463743), Water Street SPS (Ref: 463740), Frenchville Road SPS (Ref: 463736), Kerrigan Street SPS (Ref: 463748), Wehmeier Street WPS (Ref: 463723) and Pilbeam Drive 1 WPS (Ref: 463707) are predicted to have less than 0.2% AEP flood immunity. It is recommended this information be passed onto FRW as the asset owner.
- Low depth flooding is predicted at Frenchville State School, Mountain View Village, Elfin House Childcare and Skippy's Early Learning Centre in the 0.2% AEP, however the depth and velocity of flooding results in a low risk.
- The Yeppoon Branch Rail Line is predicted to have high level flood immunity to Top of Ballast, with inundation only predicted during the PMF event.
- A number of road segments are predicted to experience inundation in the 1EY event and larger. Approximate TOS values ranges from 1.0 hour to approximately 4 hours.

Evacuation Routes

Generally local catchment flooding within the Frenchmans and Thozets Creek catchment is due to short duration, high intensity rainfall events. The relatively steep upper catchment and urbanisation throughout much of the middle and lower catchment can result in inundation of residential and commercial buildings. In addition, inadequate stormwater infrastructure in some locations results in nuisance flooding within the urbanised catchment due to overland runoff.

Due to the short critical duration of the Frenchmans and Thozets Creek catchment, the warning time between the commencement of the rain event and subsequent flood inundation can be short. This limits the opportunity for evacuation, and generally the action taken by the community is to '*shelter in place*' until the flooding has passed.

An assessment of evacuation routes has therefore focussed on areas that become isolated during flooding, as well as high hazard areas that may require flood free evacuation access.

The following areas have been assessed as being isolated and/or lack adequate evacuation routes during the PMF event:

- Subdivisions off Frenchville Road → loses evacuation via Frenchville Road (includes Cascade Close, Rainbow Court, Lange Street, Frenchmans Lane, Beaumont Drive, Candlebark Court, Rogar Avenue, Seifert Drive, Jard Street, Davey Avenue and side streets).
- Ironbark Terrace, Archerview Terrace, Blue Gum Terrace, Jordan Close → loses evacuation via Ironbark Terrace to Frenchville Road.
- Boyd Street, Moyle Street, Murphy Street → loses evacuation via Beasley Street to Frenchville Road and/or via Murphy Street to Thozet Road.
- Limpus Street, Vallis Street, Coome Street → loses evacuation via Dean Street to Vallis Street.
- Water Street, Bremner Street, Mason Street → loses evacuation via Mason Street to Dean Street and/or via Water Street to Elphinstone Street.

Building Impact Assessment

Council provided a building database containing ~28,000 digitised buildings focussed on Creek flooding extents in North Rockhampton and Fitzroy River flood extents in South Rockhampton. Of these, ~5,900 buildings contained surveyed data.

In order to complete a Building Impact Assessment and FDA, a complete building database with floor levels, classifications and ground levels is needed within the modelled area. To achieve this, the following tasks were completed:

- Review of the digitised buildings, to remove erroneous data such as *footpaths*, *building demolished*, *no building* etc.
- Estimation of ~6,600 floor levels and ground levels within the Frenchmans and Thozets Creek modelled area, for buildings outside Council's surveyed database.
- Classification of ~8,740 buildings within the Frenchmans and Thozets Creek modelled area, in accordance with ANUFLOOD requirements.

The ground level at each building was estimated from aerial survey (LiDAR) provided for the project. Ground levels were assigned to the building footprints based on the average LiDAR elevation within the building extents.

Buildings lacking data regarding number of storeys were assumed to be one storey. Buildings on slabs were assumed to have a minimum habitable floor level of 100mm above ground level. Low set buildings were assumed to have a minimum habitable floor level of 600mm above ground level and high set buildings were assumed to have a minimum habitable floor level of 1,800mm above ground level. Buildings lacking data regarding what type of floor they have were assumed to be on slabs.

Table E2 provides a summary of the number of residential and commercial buildings anticipated to be inundated for various flood events within the Frenchmans and Thozets Creek catchment. These results are also shown graphically in Figure E2. Existing buildings which experience flood levels above ground level are noted and buildings inundated above floor level are shown in brackets beside.

Note that the indicated number of buildings is for entire buildings. Residential multi-unit buildings may contain multiple dwellings per building. Also, large commercial/industrial buildings may include multiple businesses.

Table E2 № of Buildings Impacted

AEP (%)	№ Residential Buildings	№ Commercial Buildings
	Flood level above property ground level (building inundated above floor level)	Flood level above property ground level (building inundated above floor level)
1EY	34 (9)	6 (4)
39	76 (14)	17 (10)
18	169 (52)	30 (19)
10	248 (77)	46 (34)
5	373 (142)	60 (45)
2	482 (198)	72 (53)
1	710 (315)	89 (68)
0.2	974 (435)	123 (102)
0.05	1319 (626)	152 (126)
PMF	2605 (1559)	233 (213)

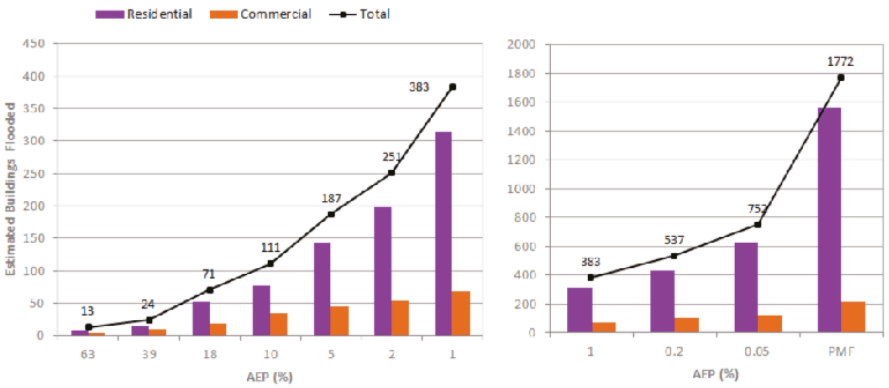


Figure E2 Estimated Buildings with Above Floor Flooding (Number of Buildings)

Figure E3 provides a breakdown of the number of buildings inundated in 'creek' and 'overland flow' areas. The graph confirms that the majority of buildings within the catchment (68%) are not inundated up to and including the PMF event. Of the 32% of buildings predicted to experience inundation, approximately 40% are impacted by overland flow and the other 60% are impacted by creek inundation.

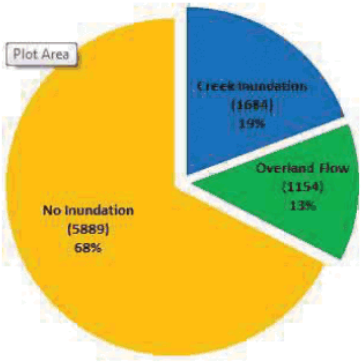


Figure E3 Inundation within Creek and Overland Flow Areas (Number of Buildings)

As shown in Figure E4 (below), median flood depths are generally less than 0.2 metre for each flood event. This indicates that reductions in flood depths of 0.2 metre could significantly reduce overall damage. The figure also shows that a significant number of buildings experience flood depths of 0.2 metre or less during frequent events such as the 1EY flood event, generally corresponding to higher flood damages.

It is noted that where surveyed floor levels were not available, slab on ground buildings were assumed to have a floor level 0.1m above the existing ground level. This is consistent with other studies undertaken in the Rockhampton area, however may result in a higher estimate of inundated buildings and consequential flood damages due to the increased incidence of above floor flooding.

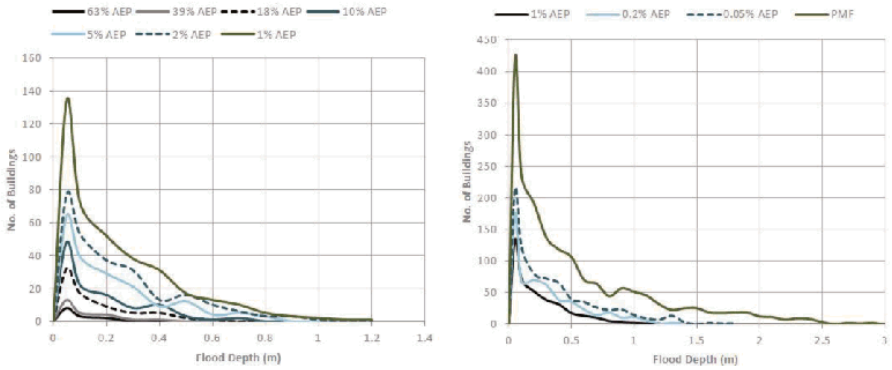


Figure E4 Estimated Flood Depths Above Floor Level by % AEP (Number of Buildings)

Flood Damages Assessment

Flood damages, or the anticipated cost to residents, businesses and infrastructure due to flooding, have been estimated using a standardised approach adopted throughout Australia. The approach estimates the tangible impacts flooding has on people, property, and infrastructure, such as flooding of a building and/or contents, the lost opportunity value associated with wages and revenue and flooding of transport and utility networks. These tangible impacts are estimated based on the depth, likelihood of flooding and type of building. Intangible impacts, such as emotional stress and inconvenience, were not quantified due to their non-tangible nature.

Figure E5 summarises the estimated total flood damages for various flood events according to their AEP. As shown, total damages range from $509,000 (1EY flood event) to $242M (PMF flood event). Figure E2 shows that 13 buildings are expected to be inundated above floor in the 1EY event, whilst 1,772 buildings are anticipated to be inundated above floor in the PMF event

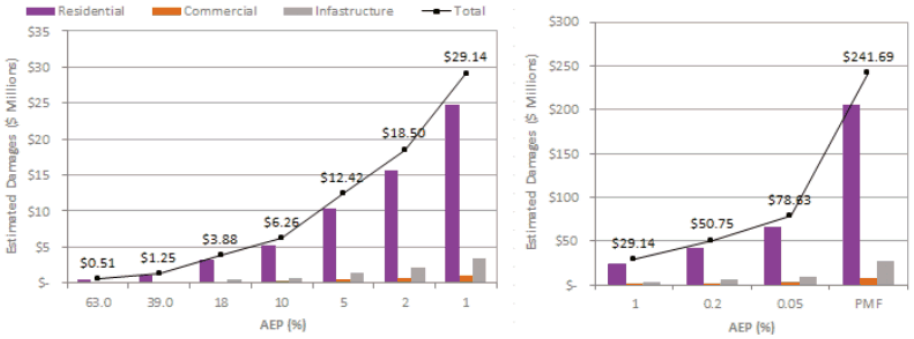


Figure E5 Estimated Flood Damages – O2 Environmental Damage Curves ($ Million)

These figures also demonstrate that Residential buildings make up the large majority of impacted buildings, and consequently estimated flood damages, within the Frenchmans and Thozets Creek catchment across the full range of design events assessed.

While the above provides an estimate of potential damages during specific flood events, understanding what damages may be expected on an annual basis is often an easier way to relate risk to residents and businesses. As such, the above damages were converted to Average Annual Damages (AAD) based on the likelihood of the flood event and the total estimated damage during that event.

The calculated AAD for the Frenchmans and Thozets Creek catchment *is estimated to range from approximately $2,428,000 to $2,832,000 per annum.*

Figure E6 provides a breakdown of the AAD and building impact assessment. The area in blue corresponds to individual building AAD (residential and non-residential combined) in brackets of $100 per annum. The orange line corresponds to the cumulative AAD for residential and non-residential buildings combined. Note that this does not include infrastructure damages.

As shown, 75% of all buildings exhibit less than $500 damage per annum, excluding infrastructure damage.

65% of damages are associated with less than 5% of all buildings. Again, this demonstrates that a minority of buildings produce the majority of damages.

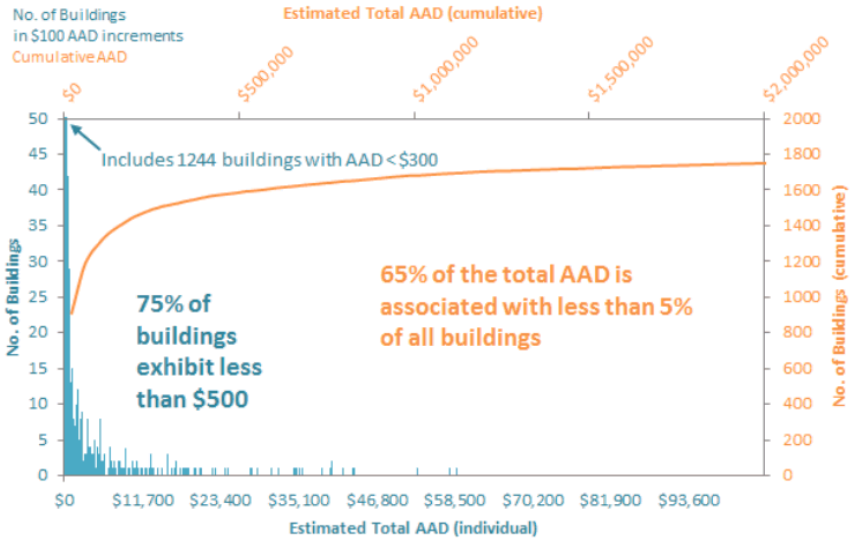


Figure E6 Individual Building vs. Cumulative Total Average Annual Damages

Rainfall Gauge, Maximum Flood Height Gauge and Flood Warning Network

A desktop review of the existing rainfall gauge, maximum flood height gauge and flood warning network yielded the following recommendations/findings for the Frenchmans and Thozets Creek catchment:

- Additional Council rain gauges could be installed at North Rockhampton Sewerage Treatment Plant (NRSTP) and South Rockhampton Sewerage Treatment Plant (SRSTP). These locations are ideal as they are already administered by Council (through Fitzroy River Water) and have access to telemetry.
- In addition to the seven existing maximum flood height gauges within the Frenchmans and Thozets Creek catchment, it is recommended that gauges be install in the following locations:
  - Along Frenchville Road, opposite the Rogar Avenue intersection area.
  - Along Frenchville Road, opposite the Lange Street intersection area.
- There is no current flood warning system within the Frenchmans and Thozets Creek catchment.

Recommendations

A number of recommendations have been made in relation to this study:

- Baseline flood mapping (i.e. peak depths, velocities and water surface elevations) provided in this study should be used to update Council's current Planning Scheme layers, at the next available opportunity.
  - Final post-processing of the GIS flood layers is recommended in accordance with the procedures outlined in the ARR, Data Management and Policy Review (AECOM, 2017).
  - Appropriate freeboard provisions should be included, based on the findings of the sensitivity analyses outlined in this study.
- This report and associated outputs should be communicated to the community and relevant stakeholders when appropriate.
- Hydrologic and hydraulic modelling undertaken for this study has been based on methods and data outlined in Australian Rainfall and Runoff 1987. The 1987 revision has been adopted as per Council's request. It is recommended that future updates to this study incorporate the new 2016 updates.
- It is recommended that Council continue to undertake building floor level survey within the Frenchmans / Thozets Creek catchment to supplement the existing building database. An updated FDA should be undertaken when additional building survey data has been obtained.
- It is recommended that Council continue to record rainfall and flood heights associated with future Frenchmans / Thozets Creek catchment flood events. This data will support ongoing model calibration / validation works that should be undertaken in future updates to this study. The implementation of additional gauges identified in this study is also recommended.
- Updated creek cross sectional survey should be undertaken after major flood events, and prior to undertaking future updates to this study. It is recommended that cross sections be surveyed at the same locations undertaken in this study to assess longer term geomorphic changes, and potential implications to flood behaviour.
- The baseline vulnerability and flood hazard assessment outputs from this report should be used to support Phase 3 of the Study (Flood Mitigation Options Development and Assessment). Potential mitigation options should be focussed on both creek and overland flooding.

8.5 INFRASTRUCTURE PLANNING MONTHLY OPERATIONS REPORT AUGUST 2018

File No:	**7028**
Attachments:	**1. Infrastructure Planning Monthly Operations Report August 2018⇩**
Authorising Officer:	**Peter Kofod - General Manager Regional Services**
Author:	**Martin Crow - Manager Infrastructure Planning**

SUMMARY

This report outlines Infrastructure Planning Monthly Operations Report for the period to the end of August 2018.

OFFICER'S RECOMMENDATION

THAT the Infrastructure Planning Monthly Operations Report for August 2018 report be received.

COMMENTARY

The Infrastructure Planning Section submits a monthly operations report outlining issues faced by the section and performance against nominated service level criteria.

Due to the reporting timeframes and agenda requirements of the Infrastructure Committee, the statistics utilised in the reports will lag the committee meeting dates by approximately 1 month.

INFRASTRUCTURE PLANNING MONTHLY OPERATIONS REPORT AUGUST 2018

Infrastructure Planning Monthly Operations Report August 2018

Meeting Date: 18 September 2018

Attachment No: 1

MONTHLY OPERATIONS REPORT

Infrastructure Planning

PERIOD ENDED August 2018

1. Highlights

Civil Design

Major design projects completed in August include:

Macquarie Street Reconstruction (Stages 2 & 3)
Hindley Street Reconstruction
Park Street Drainage (Stage 5)
North Street Bicycle Path
Central Street Water Main Replacement
Wood Street / Quay Street Intersection Stormwater Upgrade
Ridgelands Road Transfer Station

Major projects that have made significant progress this month include the Water Street Reconstruction (to allow installation of the temporary flood levee at this location), the Calmorin Road Bridge Upgrade, the Gracemere CBD Footpath Upgrade, and the Alexandra Street Reconstruction.

Strategic Infrastructure

Work continues on the Inner Rockhampton Mesoscopic Model to update and calibrate the model. A working group with DTMR has been created to ensure the model achieves shared outcomes for both organisations. This project is tracking well despite some initial delays due to network issues identified in the model.

Strategic Infrastructure has completed an investigation into the Infrastructure Implications of the Airport Master Plan. This has highlighted some opportunities and limitations for the development of the airport and airport businesses precinct. The review has highlighted that the airport is required to perform some further planning work to understand and mitigate the infrastructure limitations identified.

Officers have completed the Riparian Management Study for Frenchmans and Thozets creek, identifying remedial works required to enhance and improve the riparian quality within these creeks. A workshop has been held with Council, highlighting the findings and the report will be brought to infrastructure committee for endorsement. The outcomes of the report will be incorporated into a wider floodplain management plan for Frenchmans and Thozets creeks.

Strategic Infrastructure were also notified that their application for funding under the Heavy Vehicle Safety and Productivity Program was successful and have received $1,156,000 towards a total project sum of $2,312,000 for the widening and strengthening of Macquarie Street between Foster Street and Douglas Street in Gracemere, including the Macquarie and Douglas Streets intersection. This will increase access for road trains and other heavy vehicles, and improve safety.

Assets and GIS

Bridge Condition Assessments
The Australian Road Research Board (ARRB) is currently completing level 2 bridge inspections on 15 structures. Level 3 bridge condition assessments are also required on the following structures:

- High Street Bridge - Moores Creek

- Kerrigan Street Bridget - Moores Creek
- Kerrigan Street Major Culvert – Frenchmans Creek

The scope of work for the level 3 assessments has been determined and discussed onsite with ARRB. ARRB will now submit contract variations for Council to review.

Routine condition assessments and ongoing defect monitoring activities continue to be performed as planned.

Road Condition Assessments
Pavement Management Services (PMS) is currently processing the data collected during the road condition survey that was completed in July 2018. Council expects to receive the report from PMS this month.

Asset Data Reviews
Work continues on the review of Council's asset data in both GIS and Conquest. The GIS review of all sewer/effluent assets has now been completed for Mount Morgan, Gracemere and South Rockhampton. The Conquest review of all water assets is continuing. Officers are working towards the finalisation of the water and sewer asset registers in readiness for the 2018/19 asset revaluations.

A new transport schema has been developed and is currently under review. A new parks schema is currently being developed.

Footpath Inspections
Approximately 89kms of Council's footpath network has been inspected in 2018. The scheduled inspections are now 76% complete.

Stormwater Investigations
Stormwater investigations are continuing at the Rockhampton Airport.

2. Innovations, Improvements and Variations

Civil Design Unit

Civil Design Unit has been improving the Permanent Survey Marks in the Rockhampton Region to achieve a uniformly spaced network of high accuracy. The improvements have been included in the survey of capital projects to allow economical delivery of the upgrades, which include installing new marks or the upgrade of existing marks. In 2020, Queensland will be adopting a new dynamic survey datum (GDA 2020). The upgrades RRC are implementing will ensure our region is a front runner in compliance with the new datum. The main purpose of GDA2020 is to improve the worldwide accuracy of GPS locations with the ever increasing reliance on mobile phones and other smart devices requiring positional accuracy (such as driverless cars etc.).

Assets and GIS

Council officers have explored the available technologies for non-destructive and destructive testing of bridge structures, and ARRB's resources for bridge condition assessments.

A drone will be used by ARRB for some of the level 2 bridge inspections being conducted this month. This will improve safety and accessibility to some of different components.

FRW's plan register is now complete. Plans for all active assets (i.e. pump stations and treatment plants) are now accessible via GeoCortex.

3. Customer Service Requests

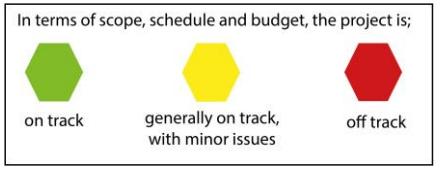
Response times for completing customer requests in this reporting period for August 2018 are within the set timeframes.

All Monthly Requests (Priority 3)
Engineering 'Traffic Light' report
August 2018

	Balance B/F	Completed in Current Mth	Current Month NEW Requests		TOTAL INCOMPLETE REQUESTS BALANCE	Work Orders Issued	On Hold	Avg W/O Issue Time (days) 12 months	Completion Standard (days)	Avg Completion Time (days) Current Mth	Avg Completion Time (days) 6 Months	Avg Completion Time (days) 12 Months	Avg Duration (days) 12 Months (complete and incomplete)
			Received	Completed									
Disaster Management / SES	0	0	0	0	0	0	0	0.00	14	0.00	0.00	43.75	0.00
Flood Management Creeks/Rivers	0	0	5	5	0	0	0	3.14	14	1.60	9.42	19.46	4.83
Heavy Vehicles (Not related to MTCE)	0	0	0	0	0	0	0	0.00	28	0.00	4.50	4.50	4.50
Petition (Infra Use Only)	0	0	0	0	0	0	0	0.00	90	0.00	0.00	0.00	0.00
Roundabout/Medians (Not related to MTCE)	1	1	0	0	0	0	0	0.13	28	0.00	9.00	8.00	8.00
Speed Limits/Traffic Volumes (Not related to MTCE)	0	0	6	5	1	0	0	2.82	28	3.60	7.00	10.79	8.83
Signs & Lines (New Request - not already existing)	2	2	16	6	9	0	0	123.85	28	7.33	6.44	9.45	7.37
Traffic Signals (Stop Light) (Not related to MTCE)	1	1	0	0	0	0	0	-0.45	28	0.00	23.75	25.80	21.67
Traffic Counts	0	0	0	0	0	0	0	-0.61	28	0.00	1.00	4.50	4.50

4. Capital Projects

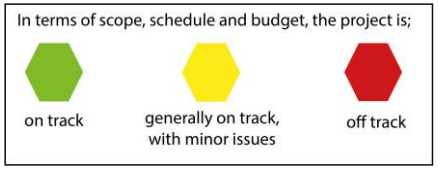
Details of capital projects not reported regularly to Council or a particular Committee in other project specific report updates as at period ended August 2018 – 16.7 % of year elapsed



Project	Planned Start Date	Planned End Date	On Track	Budget Estimate	YTD actual (incl committals)
Land Acquisitions and Resumptions	01/07/2018	30/06/2019		$375,000	0
LDCC Equipment Upgrade	01/07/2018	30/06/2019		$100,000	$58,962
Preliminary design and conceptual layouts	01/07/2018	30/06/2019		$197,000	0
New Design Office Survey Equipment	01/07/2018	30/06/2019		$60,000	0
Webber Park Drainage Scheme Stage 1	01/07/2018	30/06/2019		$5,000	$2,149
Purchase of Charles Street Residence (SES)	01/07/2018	30/06/2019		$6,500	$848

5. Operational Projects

As at period ended August 2018 – 16.7% of year elapsed



Project	Planned Start Date	Planned End Date	On Track	Comment	Budget Estimate	YTD actual (incl committals)
Traffic/Transport Planning Consultancy Budget	01/07/2018	30/06/2019		Traffic models for Rockhampton and Gracemere and secondment for transport planning.	$100,000	$98,401
Stormwater Drainage Planning Consultancy Budget	01/07/2018	30/06/2019		Continuation of stormwater and flood mitigation investigations.	$300,000	$45,455
Road Safety Consultancy Budget	01/07/2018	30/06/2019		Road Safety Audits	$25,000	0
Roads Alliance Consultancy Budget	01/07/2018	30/06/2019		Technical Coordinator support to the Regional Roads and Transport Group	$55,000	$50,000
Water and Sewerage Planning Consultancy Budget	01/07/2018	30/06/2019		Water Loss and Sewer Infiltration Investigations	$15,000	0

Project	Planned Start Date	Planned End Date	On Track	Comment	Budget Estimate	YTD actual (incl committals)
Design Services Consultancy Budget	01/07/2018	30/06/2019		Technical Support for the Design Services section when required.	$15,000	$13,636
Disaster Management Consultancy Budget	01/07/2018	30/06/2019		Master Planning SES Facilities Flood Gauge Investigations	$50,000	0
Road Management and Risk Assessment Consultancy Budget	01/07/2018	30/06/2019		Road management services and risk assessment of heritage bridges	$45,000	$35,000
Asset & GIS Operational Consultancy Budget	01/07/2018	30/06/2019		Asset and GIS operational projects	$50,000	$22,708
Stormwater Network Consultancy Budget	01/07/2018	30/06/2019		Stormwater network	$20,000	$35,449
Bridge Management System Consultancy Budget	01/07/2018	30/06/2019		Bridge management system	$30,000	$17,700

6. Budget

End of Month General Ledger - (Inc Operating & Capital) - INFRASTRUCTURE PLANNING

As At End Of August

Report Run: 05-Sep-2018 09:19:11 Excludes Nat Accs: 2802,2914,2917,2924

	Adopted Budget	Revised Budget	Adopted Budget (Pro Rata YTD)	YTD Actual	YTD Commit + Actual	Variance	On target
	$		$	$	$	%	16.7% of Year Gone
OPERATIONS							Revised Budget Comparison
INFRASTRUCTURE PLANNING							
Strategic Infrastructure							
1 - Revenues	(38,310)	0	(6,385)	0	0	0%	✗
2 - Expenses	1,924,403	0	320,734	173,657	351,023	18%	✗
3 - Transfer / Overhead Alloc	(312,420)	0	(52,070)	(15,481)	(15,481)	5%	✗
Total Unit: Strategic Infras	***1,573,673***	***0***	***262,279***	***158,176***	***335,541***	**21%**	✗
2 - Expenses	295,298	0	49,216	46,010	50,555	17%	✗
Total Unit: Infrastructure I	***295,298***	***0***	***49,216***	***46,010***	***50,555***	**17%**	✗
Civil Design							
2 - Expenses	732,742	0	122,124	72,297	99,358	14%	✓
3 - Transfer / Overhead Alloc	17,000	0	2,833	213	213	1%	✓
Total Unit: Civil Design	***749,742***	***0***	***124,957***	***72,510***	***99,571***	**13%**	✓
Assets & GIS							
1 - Revenues	(1,300)	0	(217)	(186)	(186)	14%	✗
2 - Expenses	1,660,459	0	276,743	240,483	346,770	21%	✗
3 - Transfer / Overhead Alloc	37,959	0	6,326	3,390	3,390	9%	✓
Total Unit: Assets & GIS	***1,697,118***	***0***	***282,853***	***243,687***	***349,973***	**21%**	✗
Disaster Coordination							
1 - Revenues	(38,570)	0	(6,428)	(431)	(431)	1%	✗
2 - Expenses	303,196	0	50,533	32,702	39,309	13%	✓
3 - Transfer / Overhead Alloc	251,000	0	41,833	30,590	30,590	12%	✓
Total Unit: Disaster Coord	***515,626***	***0***	***85,938***	***62,861***	***69,468***	**13%**	✓
Total Operations:	**4,831,457**	**0**	**805,243**	**583,244**	**905,109**	**19%**	✗
CAPITAL							Revised Budget Comparison
INFRASTRUCTURE PLANNING							
CP430 - CAPITAL CONTROL INFRASTRUCTURE PLANNING							
2 - Expenses	157,000	743,500	123,917	2,997	61,959	8%	✓
Total Unit: Disaster Coord	***157,000***	***743,500***	***123,917***	***2,997***	***61,959***	**8%**	✓
CP431 - CAPITAL CONTROL INFRASTRUCTURE PLANNING							
1 - Revenues	(500,000)	0	0	0	0	0%	✓
Total Unit: Disaster Coord	***(500,000)***	***0***	***0***	***0***	***0***	**0%**	✓
Total Capital:	**(343,000)**	**743,500**	**123,917**	**2,997**	**61,959**	**8%**	✓
Grand Total:	**4,488,457**	**743,500**	**929,159**	**586,241**	**967,069**	**130%**	✗

9 NOTICES OF MOTION

Nil

10 URGENT BUSINESS/QUESTIONS

Urgent Business is a provision in the Agenda for members to raise questions or matters of a genuinely urgent or emergent nature, that are not a change to Council Policy and can not be delayed until the next scheduled Council or Committee Meeting.

11 CLOSURE OF MEETING