

Our ref: L.A11938.002.00_FA_Report.docx

17 February 2023

Michael Wood and Associates Pty Ltd
30 Second Avenue
East Lismore
NSW 2480

Attention: Michael Wood

Dear Michael

RE: River Street Community Precinct Maclean - Flood Assessment

BMT has completed the flood assessment for the proposed redevelopment of the River Street Community Precinct at Lot 1 DP 667217, Lot 8 DP 758631 and Lot 9 DP 758631. This letter contains a summary of the work undertaken to ensure the proposed use of the facility is compatible with flood risk.

Yours Sincerely,

BMT

A handwritten signature in black ink, appearing to read "Mel Blum".

Melissa Blum
Senior Flood Engineer

1 Background

1.1 Site Description

The Site is located in Maclean, along the eastern bank of the Clarence River, as shown in Figure 1.1, and covers three lots; Lot 1 DP 667217, Lot 8 DP 758631 and Lot 9 DP 758631. The land is zoned B2 – Local Centre. Located on the Site is an existing community hall, office buildings, trees and vegetation.

1.2 Proposed Works

The proposed works include the demolition of the existing buildings on-site and the development of a 2 Phase community precinct. This report is focused on Phase 1, which includes the development of a 3-story building to contain:

- Basement level car parking (RL 7.35m).
- Ground floor including function room/foyer, box office, auditorium, stage, dressing room, workshop, meeting rooms, kitchen, bar and associated facilities (RL 11.00m).
- Second floor including the auditorium and AV room (RL 14.00m).

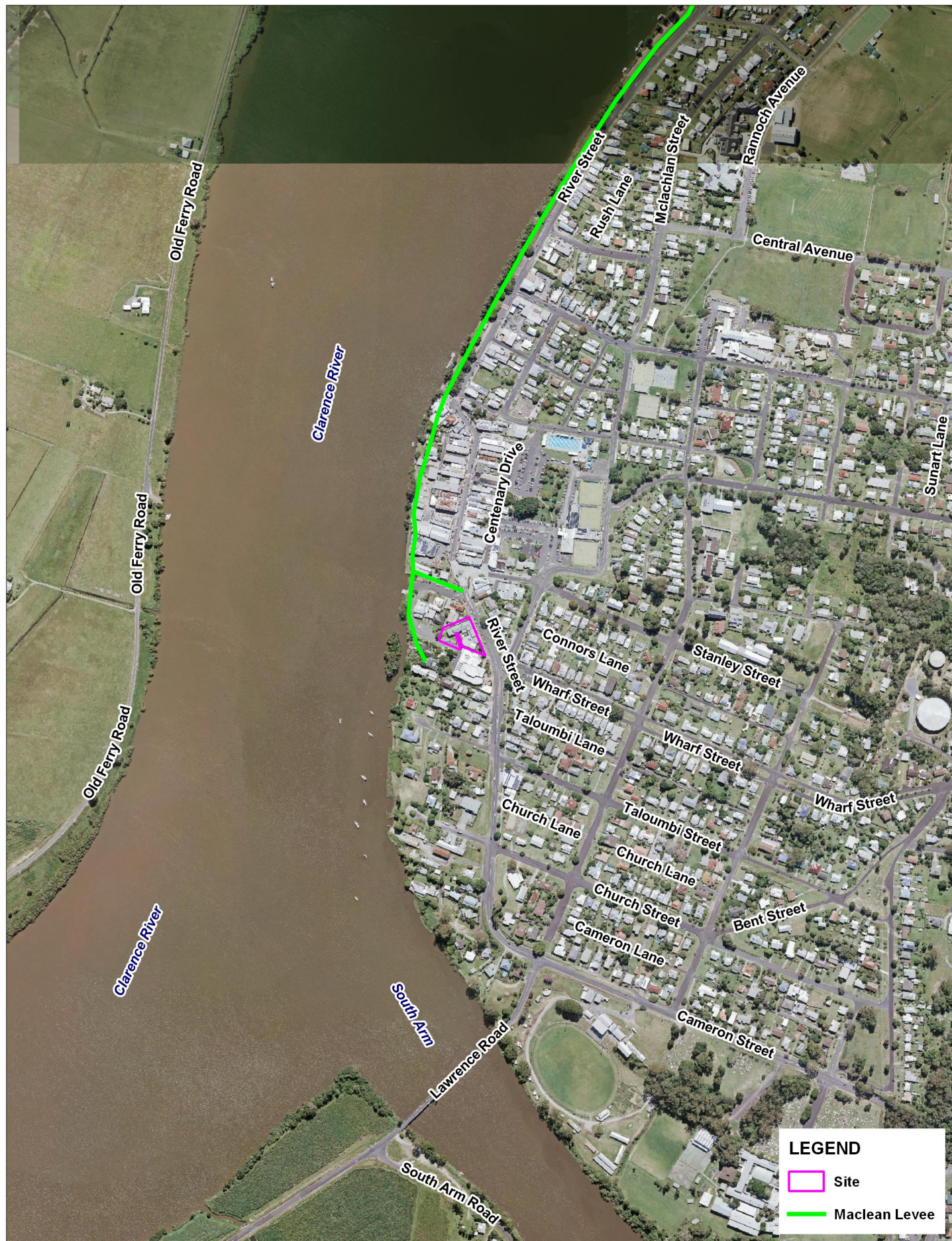
The auditorium will have 291 seats, including 6 accessible seats.

1.3 Scope of Investigation

The scope of this investigation is as follows:

- Review of documents to inform the flood assessment, including:
 - Clarence Valley Local Environmental Plan (LEP) 2011
 - Clarence Valley Development Control Plan (DCP) 2011
 - Clarence Valley Flood Study Update 2013
 - Clarence Valley Flood Risk Management Study and Plan 2007
 - Grafton and Maclean Flood Levee Overtopping Hydraulic Assessments 2010
 - Clarence Valley Local Flood Plan 2017
- Document the Flood Planning Levels relevant to the Site.
- Discuss the existing and post-development flood risk and flood impacts to the surrounding properties.
- Outline the relevant flood preparedness and evacuation requirements, including the triggers for enacting a Flood Action Plan.

It should be noted that no hydrologic or hydraulic modelling has been undertaken as part of this assessment.



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Site

Maclean Levee

Title:
Site Location

Figure:
1-1

Rev:
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2 Document Review

The following information was considered relevant from the document review. Further commentary on key aspects is presented in the sections below.

2.1 Clarence Valley LEP 2011

The Clarence Valley LEP outlines high level objectives in relation to flood planning, which are outlined below:

- To minimise the flood risk to life and property associated with the use of land.
- To allow development on land that is compatible with the flood function and behaviour on the land, taking into account projected changes as a result of climate change.
- To avoid adverse or cumulative impacts on flood behaviour and the environment.
- To enable the safe occupation and efficient evacuation of people in the event of a flood.

2.2 Clarence Valley DCP 2011

- The proposed development should not result in any increased risk to human life.
- The additional economic and social costs which may arise from damage to property from flooding should not be greater than that which can reasonably be managed by the property owner and general community.
- The proposal should only be permitted where effective warning time and reliable access is available for evacuation from an area potentially affected by floods to an area free of risk from flooding. Evacuation should be consistent with any relevant flood evacuation strategy.
- Development should not detrimentally increase the potential flood effects on other development or properties either individually or in combination with the cumulative impact of development that is likely to occur in the same floodplain.
- Motor vehicles are able to be relocated, undamaged, to an area with substantially less risk from flooding, within effective warning time.
- Procedures should be in place, if necessary, (such as warning systems, signage or evacuation drills) so that people are aware of the need to evacuate and relocate motor vehicles during a flood and are capable of identifying an appropriate evacuation route.
- The filling of flood liable land must not increase the flood risk on other land within the floodplain.
- The flood impact of the development to be considered to ensure that the development will not increase flood effects elsewhere, having regard to: (i) loss of flood storage; (ii) changes in flood levels and velocities caused by alterations to the flood conveyancing; and (iii) the cumulative impact of multiple potential developments in the floodplain.

2.3 Clarence Valley Local Flood Plan 2017

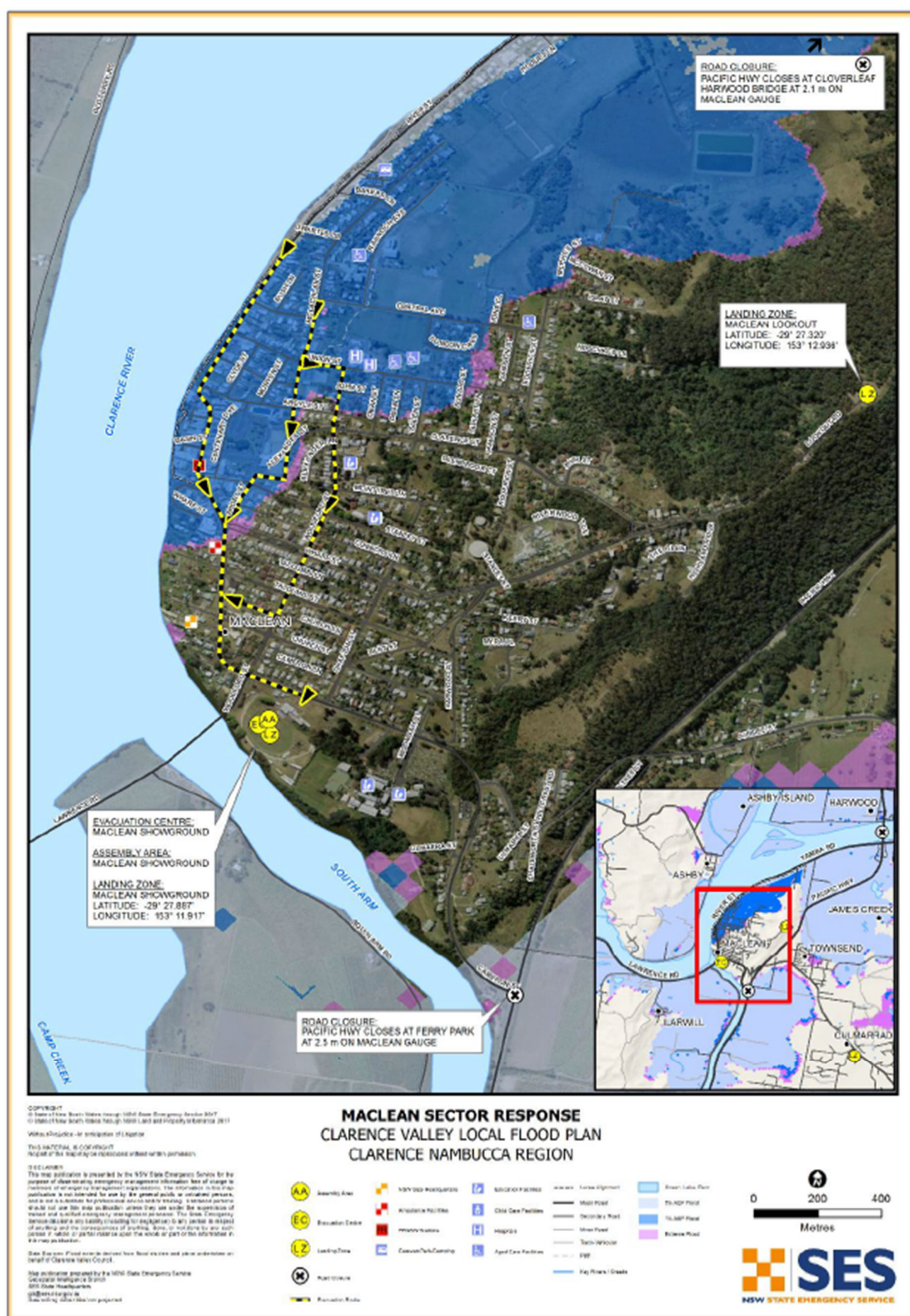
Note, this plan is scheduled for review.

- The key warning gauge for the area is the Maclean gauge (204410). The Bureau of Meteorology flood classification for this gauge indicates that:
 - A minor flood occurs when the gauge reaches 1.60m AHD.
 - A moderate flood occurs when the gauge reaches 2.20m AHD.
 - A major flood occurs when the gauge reaches 2.5m AHD.
- The first evacuation warnings issued in the Clarence Valley Council area can be expected under the following flood height prediction:
 - Predicted to exceed 5m at the Ulmarra gauge – properties in the Ulmarra area, lower lying areas outside the Grafton flood protection levee, lower areas in the Maclean area.
- Maclean has rising road access between 2.5 and 2.7m, thereafter becoming a high flood island with the levee overtopping heights at 3.3 - 3.4m. it can remain isolated for 2 - 4 days. Resupply is possible to the Maclean Base hospital, the Spa supermarket, the local bakery and fruit and vegetable store.
- Maclean has a levee which protects the CBD and residential area along the Clarence River on the town's western edge, but these areas (100 properties including nursing home and CBD) would be inundated if the levee were to fail or be overtopped (above 3.4m on the Maclean gauge).
- It is estimated to take 48 hours in a 1 in 50 AEP flood event (3.5m), 46.9 hours in a 1 in 100 AEP flood event (3.7m) and 30.4 hours in an extreme event (5.2m) for the levee to overtop.
- The known road closure locations for Maclean are as follows:
 - Pacific Highway at 'Cloverleaf' (southern approach to Harwood Bridge, 5km north of Maclean) when the Maclean gauge reaches 2.1m AHD.
 - Pacific Highway at Ferry Park when the Maclean gauge reaches 2.5m AHD.
 - Pacific Highway at Alipou Creek when the Prince St gauge reaches 5.4m AHD. Alternative route high level bypass Centenary Drive.
- The general strategy for the Maclean sector is:
 - Evacuation of at-risk population.
 - Self-evacuation of friends/family outside of the impact area.
 - Establishment of an Assembly Area at the Maclean Showground, Cameron Street, Maclean, where evacuees are able to gather while the flood situation is monitored.
- The key evacuation triggers are based on the Bureau of Meteorology flood height predictions at the Maclean Gauge:

1. **Prediction to reach and/or exceed 3.0m** – Evacuation Warning issued for Maclean residents living behind the levee system to prepare to relocate outside of the impact area.
 2. **Prediction to reach 3.3m** – at 3.3m the levee design height is thought to be exceeded and is likely that the low points in the levee will begin to be overtopped. Based on monitoring and assessment of levee condition, consideration of targeted Evacuation Order of numerous locations, including River Street.
 3. **Prediction to exceed 3.3m** – Evacuation Order issues for all impacted residences, including River Street.
- The evacuation routes and road closures are shown in Figure 2.1.

2.4 Grafton and Maclean flood levee overtopping: hydraulic assessments 2010

- During the 1 in 100 AEP flood event at 65 hours initial overtopping of the Maclean Levee occurs between Bakers and Hogues Lane. By 68 hours extensive overtopping of the levee occurs between Bakers Lane and Goddards Lane and the section between Munro Land and John Street is also overtopped. After the initial overtopping subsequent inundation of Maclean occurs relatively quickly (within 10 hours).
- The peak flood level for the 1 in 100 AEP flood event in the town of Maclean is uniform at 3.6m AHD, during which 89% of the Maclean Levee is overtopped.



3 Flood Assessment

3.1 Flood Planning Levels

Flood Planning Levels (FPL) are stipulated in the Development Control Plan 2011. The Site is in the B2 – Local Centre land use planning zone. The DCP stipulates that the *primary habitable floor level* is to be no lower than the 1 in 100 AEP flood level plus freeboard, where the freeboard equals an additional height of 500mm. Furthermore, all floor levels are to be no lower than the 1 in 5 AEP flood level plus freeboard, unless justified by the site-specific assessment.

Note, the DCP defines *habitable floor area* as:

- In an industrial or commercial situation: an area used for offices or to store valuable possessions susceptible to flood damage in the event of a flood.

According to Council's online mapping, the maximum 1 in 100 AEP flood level experienced on-site is between 3.65-3.75m AHD. Therefore, the FPL for habitable floor levels on Site is 4.25m AHD.

The proposed development has a ground floor level of 11m AHD. This is above the 1 in 100 AEP and Extreme design flood event levels for the Site.

3.2 Flood Risk

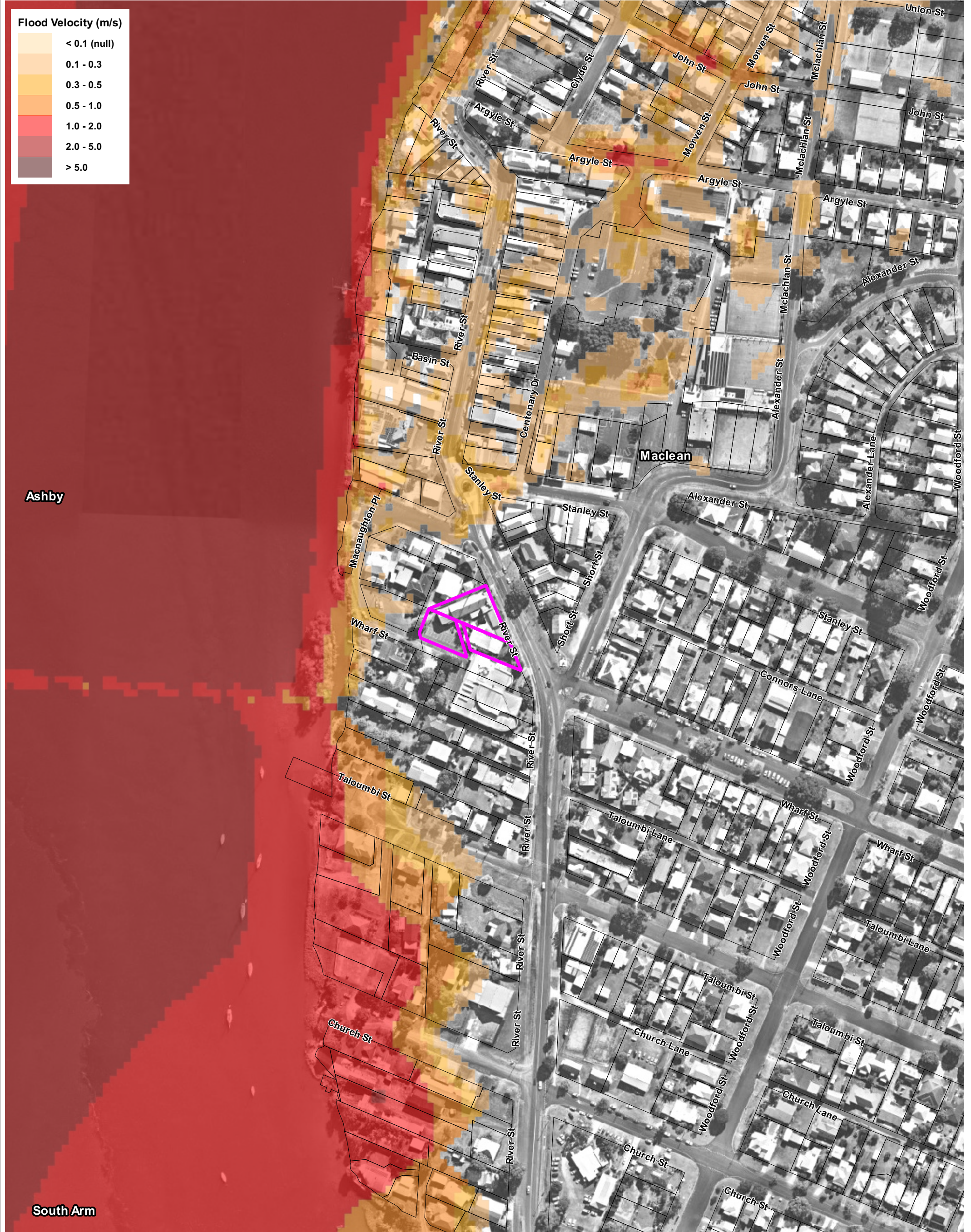
The Site is flood free until the 1 in 100 AEP design flood event. During the 1 in 100 AEP design flood event, Lot 1 DP 667217 begins to be impacted on the north-western boundary. The inundation experienced is minor, as shown in Figure 3.1, with peak flood levels between 3.65m AHD to 3.75m AHD. During the Extreme design flood event (refer Figure 3.2), the western portions of Lot 1 DP 667217 and Lot 8 DP 75631 are impacted, with flood levels of between 5.08m AHD to 5.2m AHD.

Figure 3.3 shows the flood velocity for the 1 in 100 AEP design flood event. Flood velocities impacting the Site and the surrounding area in the 1 in 100 AEP design flood event are low, with velocities around 0.008m/s. Figure 3.4 shows the flood velocity for the Extreme design flood event, with a peak flood velocity of 0.101m/s.


According to Council's hazard mapping, as shown in Figure 3.5, the Site does not have significant flood hazard.


3.3 Flood Impact

It is expected that the proposed development will have minimal flood impact to the surrounding area. This conclusion has been drawn based on the 1 in 100 AEP design event only encroaching slightly on the north eastern boundary of the Site and is outside of the proposed development extent.



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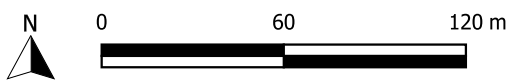
 Site

 Cadastral Boundaries

Title:

1 in 100 AEP Design Event Peak Flood Velocity

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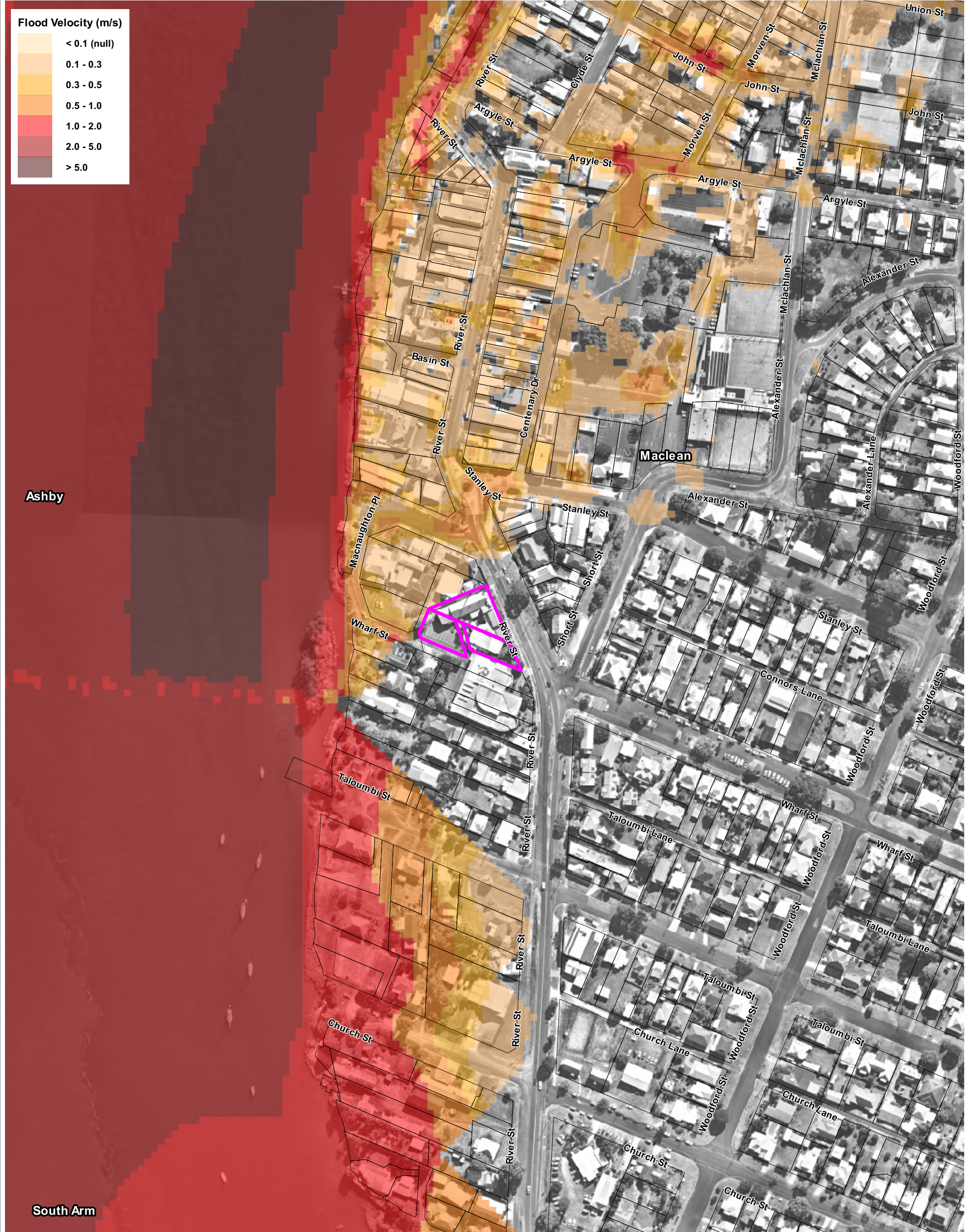
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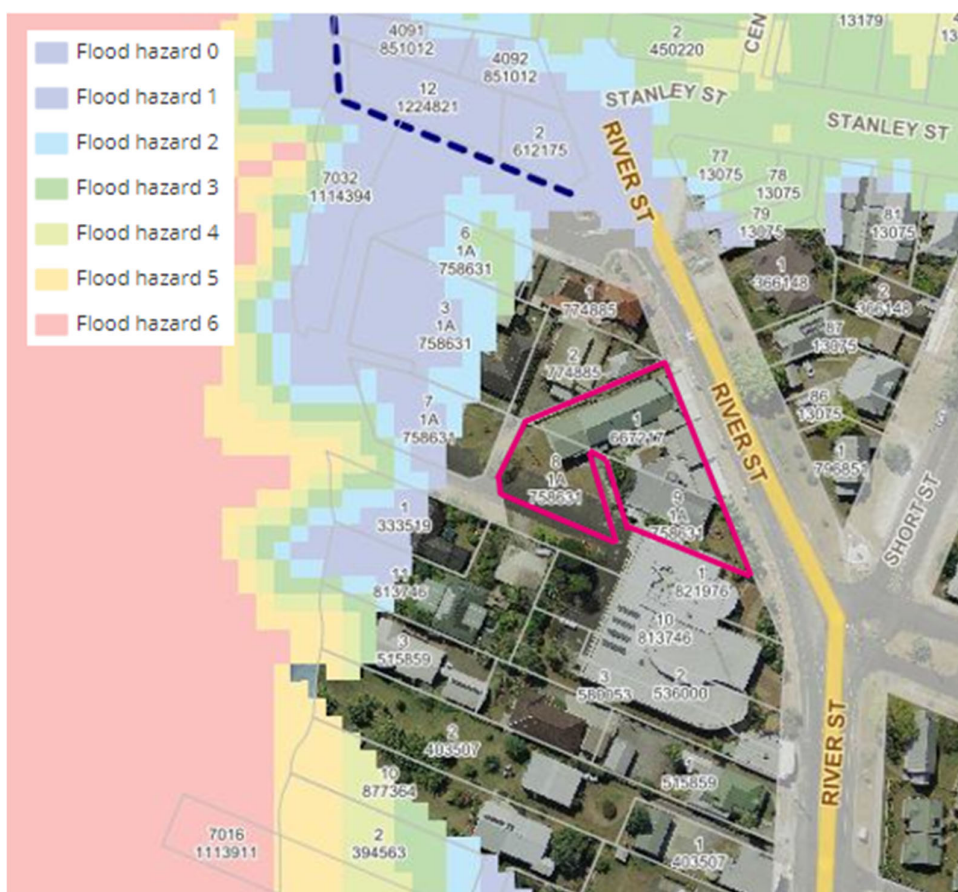


Figure 3.5 Flood Hazard (Source: Clarence Valley Council's Interactive Mapping)

4 Flood Preparedness Requirements

The Site is shown as mostly flood free in the Extreme flood event. Furthermore, the basement and ground floor levels are above the Extreme design flood level for the Site. Therefore there is a low risk to any patrons attending the Site of injury due to staying on-site during a flood event. In addition, there is a low risk of damage to the Site and/or equipment as a result of a flood event.

Therefore, due to the very low risk to the Site, it is not considered necessary to enact any flood preparedness requirements.

However, Maclean is a high flood island, with a risk of isolation extending to up to 4 days. A high flood island is where a location is surrounded by floodwater but does not get inundated by the largest design event. A visual representation of a high flood island is shown in Figure 4.1.

Furthermore, access to the basement carpark is off Wharf Street, which is flood prone. Therefore, it is recommended that during a flood event the patrons and staff are evacuated. The evacuation requirements are listed in Section 5 below.

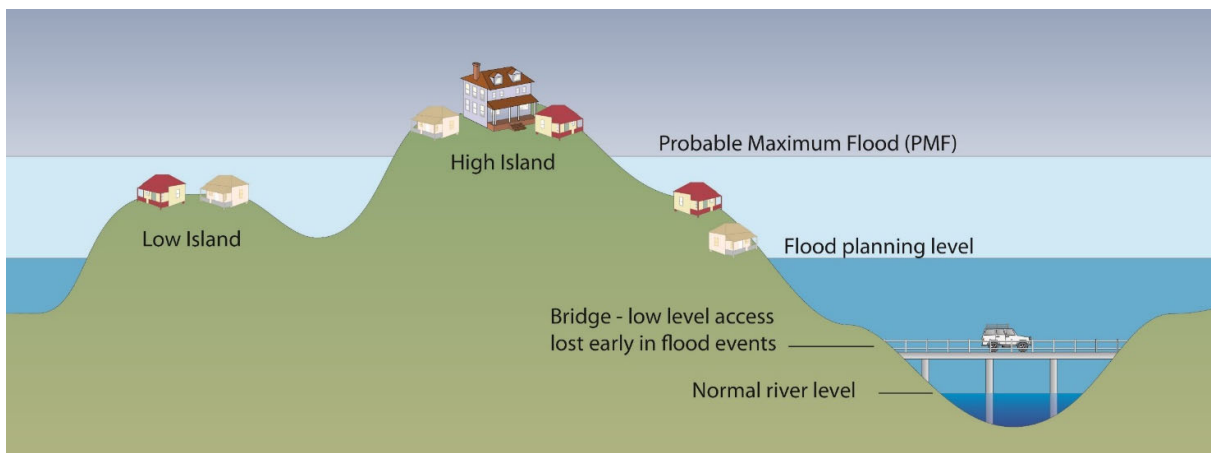


Figure 4.1 Example of high flood island

5 Evacuation Requirements

As outlined in Section 4, while the Site remains flood free, the vehicle access route is off Wharf Street, is flood prone. Therefore it is recommended to evacuate the Site, which should be in accordance with the NSW SES's requirements during an event

5.1 Site access

There is a basement carpark available at the Site. Access to the carpark is from Wharf Street, to the west of the Site. Wharf Street is flood prone from the 1 in 50 AEP design flood event.

The main pedestrian entry is also off Wharf Street. Pedestrian access to the building is also possible from River Street, through the outdoor piazza space. In an emergency, it may be possible for people to exit the building directly onto River Street through the Back of House entrance.

5.2 Evacuation route

The preferred SES evacuation route from the Site is shown in Figure 2.1. The cars leaving the Site would join the preferred evacuation route on River Street. They would then head south, following River Street until it changes to Cameron Street. The Maclean Show Grounds is used as both an Assembly Area and Evacuation Centre.

5.3 Evacuation triggers

It is recommended to follow the Clarence Valley Local Flood Plan evacuation triggers to trigger the evacuation of the Site. In addition to this, advice should be given around potential road closures out of Maclean, acknowledging that not all Patrons will be staying locally.

- **Maclean gauge predicted to reach and/or exceed 2.1m AHD** - advice should be given to Patrons and staff that there are rising river levels and that there is the risk of not being able to cross the river to the north of Maclean.
- **Maclean gauge predicted to reach and/or exceed 2.5m AHD** – advice should be given to Patrons and staff that there are rising river levels and that there is the risk of not being able to cross the river to the south of Maclean.
- **Maclean gauge predicted to reach and/or exceed 3.0m AHD** – staff should be monitoring the Maclean gauge flood levels and the SES website for the latest evacuation advice. Advice should be given to Patrons that an Evacuation Warning has been issued by the SES and that the situation will be monitored by staff in conjunction with the SES.
- **Maclean gauge predicted to exceed 3.3m AHD** – evacuation of the Site is recommended, in line with the SES Evacuation Order.

6 Conclusion

The proposed development of the River Street Community Precinct (Phase 1) is not expected to cause significant impact to flood behaviour in the surrounding areas.

The Site begins to be flood impacted during the 1 in 100 AEP design flood event, however the inundation extent is minor. The proposed development floor levels are above the Extreme event flood levels, therefore there is low flood risk to the Site. The vehicle access to the Site, including the basement car park off Wharf Street, which is flood prone from the 1 in 50 AEP design flood event. Evacuation of the Site should be in line with the Clarence Valley Local Flood Plan and SES guidance during the event. It is recommended that additional triggers around the potential closure of roads out of Maclean also be included, acknowledging that the Parton's of the Site may not be staying locally.