# Hazard Evaluation Report

## Flood

**December 2021**

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# Hazard Evaluation Report – Flood

## Introduction

This flood evaluation report has been prepared to form part of Council's requirement to satisfy the State Planning Policy as it relates to flood hazard.

Following the major flood events of 2010/11 and 2013 Council has been actively responding to the flood hazard throughout the region to which the planning scheme will play an important role. The planning scheme and accompanying resolution made under section 8 of the *Building Regulation 2021* (previously section 13 of the Building Regulation 2006) seeks to:-

- ensure new critical community infrastructure is suitably immune from flood;
- identify areas of inundation during nominated flood events (e.g. the Burnett River 2013 flood event) and where records of significant historical events do not exist or insufficient data is available to model such events Council will adopt a 1% AEP flood event;
- adopt, where no or limited flood records exist and no flood modelling has been undertaken, the State Planning Policy Level 1 – Queensland Floodplain Assessment Overlay Mapping;
- identify land uses that can and cannot establish within the flood hazard area;
- provide guidance on how identified land uses that are tolerable to flood can establish within the flood hazard area.

As new flood data is made available via ongoing flood modelling throughout the region, amendments will be made to the planning scheme and or resolution to reflect the most recent and up-to-date information.

The State Planning Policy state interest for natural hazards, risk and resilience identifies four (4) policy elements for all natural hazards, including flood. The *State Planning Policy: State interest guideline – natural hazards, risks and resilience* provides further guidance on achieving the state interest. A response to each policy element is provided below, structured based on the *Technical Manual: evaluation report: flood* (version as at August 2014).

## Outcome sought 1

### *Identify natural hazard areas*

#### 1. Confirm the flooding extent: Identify across the whole local government area the areas that may flood

Flood Hazard Area Maps (see schedule 1) identify the Flood Hazard Areas across the entire local government area. Table 1 below identifies the flood studies and adopted flood events that have informed the flood hazard area mapping included in the proposed Council resolution. Where detailed information in the form of a modelled 1% AEP or similar or larger historical event is not available, Council has used the SPP Level 1 mapping. It is noted that the extent which the SPP Level 1 mapping has been used is limited to land upstream of the Paradise Dam wall.

The Flood Hazard Area Maps will be adopted by Council by resolution under section 8 of the Building Regulation 2021 at the same time the planning scheme is adopted. The planning scheme, specifically parts 3 and 5, uses the adopted mapping as a trigger for assessment against the relevant planning scheme provisions.

**Table 1 - Flood Studies**

| Column 1<br>Catchment | Column 2<br>Author / date | Column 3<br>Adopted defined flood event detail |
|---|---|---|
| **Riverine DFE** | | |
| Burnett River (lower) | Flood extent<br>Queensland Government<br>As amended by Council (see appendix 1 for detail)<br><br>Flood velocity & height<br>GHD / 2013<br>As amended by GHD Feb 2015 | Flood extent extracted from aerial photography of the 2013 Burnett River flood event<br><br>Flood velocities and heights from the modelled January 2013 flood event[#] |
| Burnett River (upper) | GHD / 2013 | Modelled January 2013 flood event |
| Kolan River and Gin Gin Creek | GHD / 2014 | 1% AEP with climate change |
| Baffle Creek | Engeny / 2018 | 1% AEP with climate change |
| Burrum, Cherwell, Isis, Gregory River | GHD 2015 | 1% AEP with climate change |
| **Local DFE** | | |
| Saltwater Creek | Cardno / 2010<br>As amended by BRC / 2013 | 1% AEP with climate change |
| Bundaberg Creek | Cardno / 2013<br>As amended by Council (see appendix 1 for detail) | 1% AEP with climate change |
| McCoy Creek | GHD / 2013 | 1% AEP with climate change |
| Bundaberg Coastal Small Streams | BMT WBM / 2014 (including updated northern area) | 1% AEP with climate change |
| Apple Tree Creek | Cardno / 2004 | 1% AEP |
| Palmer and O'Connell Creeks | GHD / 1997 | 1% AEP |
| **Other** | | |
| Non-urban creeks and Overland Flow Path | BMT WBM / 2014 | 100 year ARI including climate change<br>Clipped to SPP extent only and not used in urban areas |
| State Planning Policy Level 1 – Queensland Floodplain Assessment Overlay Mapping<br>In catchments where Council has no historic or modelled flood data | Queensland Government | Nil |
| Storm Tide | BMT WBM / 2013 | 1% AEP with climate change |

[#] The modelled January 2013 flood event is similar in magnitude to a 1% AEP flood event. In Bundaberg, the difference between the modelled 2013 event and a modelled 1% AEP event is mostly +/- 0.02m with a maximum difference being +0.06m.

## 2. Identify flood investigation areas: Identify those flood prone areas that overlap with areas of existing development or proposed development

Council has identified existing urban areas that are prone to flooding within the flood hazard areas. Schedule 2–Flood Hazard Assessment Report Locality Maps, overlay the flood hazard area over existing urban areas and growth areas identified in the planning scheme, identifying flood prone areas of existing development and proposed development areas.

Table 2 identifies the urban localities that are impacted by each flood extent within the Flood Hazard Overlay Maps contained within the planning scheme. In the case of the Bundaberg City area, suburbs that are impacted by individual flood extents are also identified.

Table 2 - Urban / Growth Areas Impacted by the Flood Hazard Area

| Flood Study | Urban / Growth Areas Impacted |
|---|---|
| Burnett River Flood Study | Bundaberg City (Ashfield, Avoca, Branyan, Bundaberg North, Bundaberg South, Bundaberg East, Bundaberg, Central, Gooburrum, and Kalkie), Burnett Heads, Moore Park Beach, and Wallaville |
| Kolan River and Gin Gin Creek Flood Study | Gin Gin, Bucca, Avondale and Miara |
| Baffle Creek Flood Study | Winfield |
| Burrum, Cherwell, Isis, Gregory River Flood Study | Buxton, Walkers Point |
| Saltwater Creek Flood Study (as amended 2014) | Bundaberg City (Bundaberg Central, Bundaberg South, Bundaberg West, Kensington, Svensson Heights) |
| Bundaberg Creek Flood Study | Bundaberg City (Ashfield, Avenell Heights, Bundaberg East, Bundaberg South, Kalkie, Kepnock, Norville, Walkervale) |
| McCoys Creek Flood Study | Bundaberg City (Avoca, Branyan, Kensington) |
| Bundaberg Coastal Small Streams Flood Study | Bargara, Burnett Heads, Coral Cove, Innes Park, Elliott Heads, and Riverview |
| Apple Tree Creek Flood Study | Apple Tree Creek |
| Bundaberg City Drainage Study (Palmer Creek and O'Connell Creek catchments only) | Avoca, Bundaberg West, and Millbank |
| Storm Tide | Bargara, Burnett Heads, Buxton, Coral Cove, Elliott Heads, Innes Park, Moore Park Beach, Riverview, Winfield, and Woodgate Beach |

## Outcomes sought 2

***Include provisions that seek to achieve an acceptable or tolerable level of risk, based on a fit for purpose natural hazards study and risk***

### 3. Undertake a suitable 'fit for purpose' flood investigation: For each investigation area, choose a level of investigation that will provide the level of detail required to make evidence based planning decisions

With the information available and knowledge of the impacts floods have on the Bundaberg region, Council has identified five broad categories of planning outcomes that have been applied to the planning scheme. The five categories consist of:-

**Category 1 –** Areas identified within the SPP Level 1 mapping

**Category 2 –** Areas identified within a modelled area (including SPP Level 2) and not in a high hazard area

**Category 3 –** Areas identified within a modelled area and in a high hazard area, but have a resilient community

**Category 4 –** Areas identified within a modelled area and in a high hazard area and the hazard is too extreme for the community

**Category 5 –** Areas identified within a flood hazard area and within a growth area of the planning scheme

These categories determine which fit for purpose elements of the planning scheme apply to each area.

**Category 1**

One relatively small area of the Bundaberg Region is within a Category 1 area, refer to map 7 of the attached Flood Hazard Maps located within schedule 1 of this report. The land identified is restricted to land upstream of the Paradise Dam wall. Urban development, other than for infrastructure associated with the dam, is not expected within this area.

**Category 2**
Within a category 2 area, detailed modelling has been undertaken. This modelling has identified areas that are susceptible/liable to flooding in a defined flood event, but are not 'high hazard area' (refer Category 3 below). Urban development is supported subject to compliance with provisions of the Flood hazard code, Utilities code, and Community activities code (where applicable).

**Category 3**
Within a category 3 area, detailed modelling has identified the area to be in a high hazard area, but have a local community that is resilient to the impacts of flooding.

A high hazard area is considered an area that is subject to flood water velocities greater than 1.5m/sec and/or subject to inundation depth greater than 2.4m when inundated by a flood event up to the adopted event, or a property or community that is isolated by high hazard areas during a flood event up to the adopted flood and in the event of a larger flood has a greater level of vulnerability due to its isolation.

The water velocity and depth indicators used to identify a high hazard area were determined as they best represented hazard to the built environment, specifically as it relates to a dwelling, i.e. –

a) 1.5m/sec aligns with the QDC Part 3.5 and the Standard for Construction of Buildings in Flood Hazard Areas (Version 2012.2). Where an area is subject to flood water with velocities greater than 1.5m/sec a full engineering analysis is required to satisfy P1 of QDC Part 3.5 as the provisions nominated in the Standard for Construction of Buildings in Flood Hazard Areas no longer apply.
b) 2.4m depth is the maximum height Council considers reasonable for an under storey non-habitable area for a dwelling constructed with a suspended floor.

Rezoning or 'back zoning' of residential areas is appropriate within these localities. However, zoning will allow a dwelling to be located on each lot due to the resilience of the local community. In these instances lots have been included in the Limited development zone with a precinct that allows the establishment of a dwelling house subject to satisfying self assessable criteria.

Establishment or intensification of other residential uses, especially medium and high density uses, is inappropriate within these areas.

Expansion of non-residential uses (specifically commercial and industrial) in some locations within these areas is appropriate to provide opportunities for economic stimulus. Non-residential uses can proceed subject to compliance with provisions of the Flood hazard code and Utilities code (where applicable).

Other non-residential uses, unless established to service the immediate population, are generally inappropriate within these areas.

**Category 4**

Within a category 4 area, detailed modelling has identified the area to be in a high hazard area. These areas include –

a) areas that experienced some of the highest depth and velocity of flood waters in the Burnett River January 2013 flood, causing significant damage to property, with some houses and structures being completely removed from their site from the force of the flood waters;
b) properties that have historically been known to be impacted by the effects of flooding and have been previously included in a non-urban zoning (despite their urban setting).

In these areas the hazard is considered too extreme to allow urban development to be intensified or recommenced if discontinued. Back zoning is appropriate within these areas. Lots located within this area have been included within the Limited development zone.

**Category 5**

Category 5 areas are identified growth areas around Bundaberg City and along the central coast (between the Burnett and Elliott Rivers). These areas include land within the Emerging community zone or are medium to large parcels of undeveloped Low density residential land. Any proposed urban development within these areas will be required be free from flood inundation as per the requirements of the Flood hazard overlay code.

In terms of localised flooding within category 5 areas, it is likely that the extent of areas affected by flooding will change. These changes will be the result of drainage/stormwater management associated with new urban development.

## 4. The risk assessment and subsequent planning provisions are developed in a manner consistent with the Risk Management process outlined in AS/NZS ISO 31000:2009

The planning scheme and the flood resilient measures it implements forms part of Council's broader response to the Natural Hazard Risk Assessment Report (as it relates to flood). A copy of Council's Natural Hazard Risk Assessment prepared by GHD is in schedule 3.

In defining the flood area categories identified in Section 2.1 above, consideration has been given to AS/NZS ISO 3100:2009, the *National Emergency Risk Assessment Guidelines* (NERAG) and *Planning for stronger, more resilient floodplains: Part 2 – Measures to support floodplain management in future planning schemes* (QRA, 2012). The defined flood events adopted by Council (typically the 1% AEP or similar or larger actual events) form the basis for land use planning, notwithstanding that planning for a higher event and greater level of flood immunity may be appropriate for particular uses such as community infrastructure and emergency services, as discussed at Section 4.1 below. Equally, there are other land uses and activities, such as agriculture and parkland, where the consequences of flooding are not as severe, and a lower level of flood immunity may be acceptable for such uses.

Given that the Flood Hazard Area and the defined flood event form the basis for land use planning, a risk assessment that considers a wide range of different likelihood levels has not been utilised in

identifying the levels of risk. A simplified risk and tolerability assessment, tailored to identify risks associated with existing and proposed land uses, is included in Table 3 at Section 6 below.

## 5. Identify risks to existing and proposed land uses

A risk and tolerability assessment for existing and proposed land uses is included in Table 3 at Section 2.4 below. While not ascribed any specific weighting, key criteria that was used to determine risk and tolerability included:-

Exposure

- Hazard severity. Elements of hazard are identified within each modelled flood study Council has undertaken. Each model identifies flood water velocity, flood water depth, and flood hazard (velocity x depth). High hazard areas have been identified where the depth and/or velocity of flood waters in the DFE exceed the identified thresholds (i.e. velocities greater than 1.5m/sec and/or areas subject to inundation depth greater than 2.4m).
- Land use. Different levels of risk and tolerability have been applied to different land uses.

Vulnerability

- High hazard areas have been considered to have higher levels of vulnerability, given the higher potential risk to property, and in consideration of the life of the built environment and infrastructure.

Tolerability

- The tolerability of each land use is determined by comparing the level of hazard, the community's resilience, and the planning expectations. Exposure and vulnerability of particular land uses has been balanced against community awareness, attitude, experience and acceptance, and disaster/ emergency management planning. These factors have resulted in different levels of tolerability for existing urban areas versus new development areas.

The Flood Hazard Assessment Report Locality Maps in schedule 2 display the Flood Hazard areas from each of the flood studies used to produce the overall flood hazard area and the localities each of these individual hazard areas impact.

## 6. Determine the acceptable, tolerable and intolerable levels of risk for each land use type located in the local government area

The acceptable, tolerable and intolerable levels of risk for each land use type have been assessed, and are included at Table 3 below.

**Table 3 – Flood Risk Tolerability Matrix**

| Likelihood | Consequence | Other Non-Residential Uses (e.g. Rural uses, Parks and Open Space) | Dwelling House in an Established Urban Area | Commercial or Industrial Uses in an Established Urban Area | Other Residential Uses in an Established Urban Areas | Residential, Commercial or Industrial Uses in New Urban Areas | Community Infrastructure |
|---|---|---|---|---|---|---|---|
| Inundated by a flood event up to and including the Defined Flood Event (1% AEP, or similar or larger actual event) | Extreme Risk (High Hazard Area) | Acceptable | Intolerable | Intolerable | Intolerable | Intolerable | Intolerable |
| | High Risk (High Hazard Area) | Acceptable | Tolerable | Tolerable | Intolerable | Intolerable | Intolerable |

| Likelihood | Consequence | Other Non-Residential Uses (e.g. Rural uses, Parks and Open Space) | Dwelling House in an Established Urban Area | Commercial or Industrial Uses in an Established Urban Area | Other Residential Uses in an Established Urban Areas | Residential, Commercial or Industrial Uses in New Urban Areas | Community Infrastructure |
|---|---|---|---|---|---|---|---|
| including SPP Level 2 mapping | Medium Risk | Acceptable | Tolerable | Tolerable | Tolerable | Intolerable | Intolerable |
| Included in SPP Level 1 Mapping | Medium Risk | Acceptable | Tolerable | Tolerable | Tolerable | Tolerable | Tolerable |
| Not subject to flooding in the 1% AEP, but potentially inundated by a larger flood event | Low Risk | Acceptable | Acceptable | Acceptable | Acceptable | Acceptable | Tolerable |

## Outcome sought 3

***Include provisions that require development to:***

***(a) avoid natural hazard areas or mitigate the risks of the natural hazard, and***

***(b) support, and not unduly burden, disaster management response or recovery capacity and capabilities, and***

***(c) directly, indirectly and cumulatively avoid an increase in the severity of the natural hazard and the potential for damage on the site or to other properties, and***

***(d) maintain or enhance natural processes and the protective function of landforms and vegetation that can mitigate the risks associated with the natural hazard***

## 7. Confirm the planning scheme provisions that achieve acceptable and/or tolerable levels of risk through the local government area

Table 4 identifies acceptable, tolerable and intolerable levels of risk for each land use type within the Flood Hazard Area identified in the planning scheme. The fit for purpose categories identified in section 3 have been used to identify levels of risk for particular land uses within each flood hazard category. Table 4 also identifies the planning scheme provisions that achieve the desired planning outcomes. Precinct

**Table 4 - Land Use Tolerability and Planning Scheme Provisions**

| Land use | Determined Flood Risk and Planning Scheme Provisions | Tolerable / Intolerable Level of Risk |
|---|---|---|
| **Category 1** | | |
| Dwelling House | Due to the flood characteristics being unknown self assessable provisions relating to the siting of a dwelling are appropriate. These provisions are located within the Flood hazard overlay code. | Tolerable |
| Other residential land uses | Limited opportunities for these types of development exist within category 1 areas due to the desired standards of service. The zonings reflect this expectation. | |
| Commercial land uses | Non-residential land uses are subject to assessment against the Flood hazard overlay code. Provisions to protect flood waters | |

| Land use | Determined Flood Risk and Planning Scheme Provisions | Tolerable / Intolerable Level of Risk |
|---|---|---|
| Industrial land uses | from hazardous materials and improving the flood immunity of each use will apply. Flood immunity provisions will apply to Community infrastructure via the Utilities and Community activities codes. | |
| Community infrastructure | | |
| Other non-residential land uses | Rural land uses and other uses such as open space and outdoor sporting facilities are compatible uses that can establish in these areas. | Acceptable |
| **Category 2** | | |
| Dwelling House | Residential uses will be subject to self assessable provisions contained within the Flood hazard overlay code, including minimum habitable floor heights. | Tolerable |
| Other residential land uses | | |
| Commercial land uses | Non-residential land uses are subject to assessment against the Flood hazard overlay code. Provisions to protect flood waters from hazardous materials and improving the flood immunity of each use will apply. Flood immunity provisions will apply to Community infrastructure via the Utilities and Community activities codes. | |
| Industrial land uses | | |
| Community infrastructure | | |
| Other non-residential land uses | New rural uses are not expected to be established within category 2 areas. Other uses such as open space and outdoor sporting facilities are compatible uses that can establish in these areas. | Acceptable |
| **Category 3** | | |
| Dwelling House | Due to the community's resilience to flood impacts dwelling houses can establish within category 3 areas subject to compliance with self assessable provisions contained within the Flood hazard overlay code, including minimum habitable floor heights.<br><br>Included in the Flood hazard code is an alternative QDC provision which allows for dwelling houses established within the flood hazard area to have an overall height of 9.5m, rather than the standard QDC provision that states a maximum overall height of 8.5m. This alternative provision is designed to enable residents impacted by the flood hazard to improve their flood immunity without having to go through an additional application process.<br><br>In addition to minimum floor heights for habitable floor levels dwelling houses will be required to comply with the building provisions that relate to construction within areas subject to high velocity flood water contained within the Building Act. | Tolerable |
| Other residential land uses | Establishment or intensification of other residential land uses, especially medium and high density uses, is inappropriate within these areas. The assessment table makes such uses impact assessable. The Flood hazard overlay code, the Limited development zone code, and the strategic framework where it relates to protection from natural hazards apply to these types of developments. | Intolerable |
| Commercial land uses | Commercial and industrial land uses, where zoned appropriately, can be established or intensified to provide economic stimulus to the locality. Assessment against the Flood hazard overlay code will be required to ensure floodwaters are protected from hazardous materials and to improve the flood immunity of each development. | Tolerable |
| Industrial land uses | | |
| Community infrastructure | Major community infrastructure is not desirable in category 3 areas. Minor infrastructure may be required to service the local population. Such development will be subject compliance to | Intolerable |

| Land use | Determined Flood Risk and Planning Scheme Provisions | Tolerable / Intolerable Level of Risk |
|---|---|---|
| | flood immunity provisions that apply to community infrastructure within the Utilities and Community activity codes. | |
| Other non-residential land uses | Rural uses are not expected to be established within category 3 areas. Other uses such as open space and outdoor sporting facilities are compatible uses that can establish in these areas. | Acceptable |
| **Category 4** | | |
| Dwelling House | Establishment or intensification of urban development is inappropriate within these areas.<br><br>The provisions of the Flood hazard overlay code, Limited development zone code, and strategic framework of the scheme will need to be satisfied prior to these uses being established within a category 4 area. | Intolerable |
| Other residential land uses | | |
| Commercial land uses | | |
| Industrial land uses | | |
| Community infrastructure | | |
| Other non-residential land uses | Rural uses are not expected to be established within category 4 areas. Although not likely other community uses such as open space and outdoor sporting facilities are compatible uses that can establish in these areas. | Tolerable |
| **Category 5** | | |
| Dwelling House | The planning scheme through the Flood hazard overlay code, local plans, and strategic framework require all new urban development within the identified growth areas to be free from adopted flood events. | Intolerable |
| Other residential land uses | | |
| Commercial land uses | | |
| Industrial land uses | | |
| Community infrastructure | | |
| Other non-residential land uses | Prior to development for urban purposes low impact rural land uses are allowable within the flood hazard areas. Intensive rural activities are subject to assessment against the Flood hazard overlay code, particularly provisions relating to storage of hazardous materials.<br><br>Other non-residential land uses such as open space and outdoor sport facilities are compatible uses that can establish in these areas. | Acceptable |

## 8. Confirm that the land use planning provisions have been developed within a broader risk management framework

Risk management measures including building controls, flood mitigation measures, community awareness, early warning systems and other disaster management measures have been considered in identifying the levels of risk and tolerability levels identified in Sections 6 and 7 above. The local disaster management group has been involved in the risk management planning process. Where further flood management options are pursued and flood risk for particular locations or land uses is reduced, it would be appropriate for Council to consider amendments to its planning scheme.

## 9. The strategic framework will set the vision and land use direction for the planning scheme and forms the basis for ensuring that only appropriate development occurs in flood hazard areas

The natural hazard theme (section 3.10) of the Strategic Framework identifies flood hazard areas that may be impacted within the local government area during adopted flood events. Section 3.10.4 (Relevant strategic framework maps) directs the reader of the planning scheme to the overlay maps and hazard mapping adopted by Council as required.

Section 3.10 (Natural hazard theme) provides guidance for development within flood hazard areas. Primarily the specific outcomes nominated within the Natural hazards theme that are specific to flood require new development to:-

a) minimise risk to people and property;
b) avoid areas subject to flooding in the DFE, as far as practicable;
c) not to intensify residential development within the high hazard areas;
d) be located, designed and constructed to be resilient to the adverse impacts of flooding;
e) construct habitable rooms above the DFE;
f) establish safe evacuation routes;
g) maintain or enhance the flood storage and conveyance of flood plains and watercourses;
h) ensure there is a non-worsening of existing flood conditions;
i) ensure no areas of community isolation are created;
j) design essential community services and community infrastructure to be useable during and after a DFE; and
k) take into account the predicted adverse impacts of climate change are taken into account.

## 10. A local planning instrument should map or identify natural hazard areas

Natural hazard mapping relating to flooding will be adopted in accordance with section 8 of the *Building Regulation 2021* at the same time as the Planning Scheme. The planning scheme references mapping adopted by Council to trigger assessment against the Flood hazard overlay code. The Flood hazard maps identify different flood types modelled within the local government area and where no detailed flood data/mapping is available Council has utilised the SPP Level 1 – Queensland Floodplain Assessment Overlay Mapping. Development is controlled through the use of the flood hazard mapping, Limited development zone, varying levels of assessment, and controls specified within use codes and the Flood hazard overlay code.

## 11. A local planning instrument should clearly articulate how it addresses flood hazards through the zoning

The planning scheme utilises a combination of the Limited development zone and the Flood hazard overlay to trigger development assessment against appropriate assessment criteria. In areas where the flood hazard has been identified, dependant on the use proposed, the development assessment tables identify the appropriate assessment criteria and level of assessment.

The Limited development zone has been used in areas where high flood hazard has been identified.

## 12. If a local planning instrument includes an overlay code it should address natural hazards and associated risks to people, property, economic activity, social wellbeing and the environment

The Flood hazard overlay code addresses concerns relating to:-

- risks to people and property;
- safety and wellbeing;
- the natural environment; and
- economic activity.

These themes are reflected in the assessment criteria, the purpose, and overall outcomes of the code.

### 13. If a planning scheme policy is included in a planning scheme to address flooding it should articulate how it addresses flood hazards

Council's *Planning Scheme policy for information Council may request, and preparing well made applications and technical reports* provides applicants with guidance about information that may be required to support a development application which is subject to the Flood hazard overlay code. Schedule 4 contains the extracted section of the policy that relates to flood.

## Outcome sought 4

***Facilitating the location and design of community infrastructure to maintain the required level of functionality during and immediately after a natural hazard event***

### 14. Siting of the infrastructure is compatible with the level of hazard, see table 1: flood immunity levels for community infrastructure

The Utilities code and Community activities code, which essential community service infrastructure and Community activities are assessed against nominate the levels of flood immunity for particular infrastructure. Table 5 and Table 6 below details the flood immunities nominated within each of the codes.

**Table 5 - Essential community service infrastructure flood immunity**

| Type of utility | Recommended flood level |
|---|---|
| Major switch yards and substations (refer to note) | 0.5% AEP |
| Power stations | 0.2% AEP |
| Sewage treatment plants (refer to note) | 1% AEP |
| Water treatment plants (refer to note) | 0.5% AEP |
| o Works of an electricity entity not otherwise listed in this table<br>o Communication network facilities | No specific recommended flood level but development proponents should ensure that the infrastructure is optimally located and designed to achieve suitable levels of service, having regard to the processes and policies of the administering government agency. |

Note—the recommended flood level applies only to electrical and other equipment that, if damaged by floodwater or debris, would prevent the infrastructure from functioning. This equipment should either be protected from damage or designed to withstand inundation.

**Table 6 - Community activity flood immunity**

| Type of community activity | Recommended flood level |
|---|---|
| Emergency service facilities (refer to note) | 0.2% annual exceedance probability (AEP) |
| Emergency shelters | In accordance with the *Design guidelines for Queensland public cyclone shelters* (available at www.hpw.qld.gov.au) |
| Hospitals and associated facilities | 0.2% AEP |
| Police facilities (refer to note) | 0.5% AEP |
| School facilities | 0.5% AEP |
| Stores of valuable records or items of historic or cultural significance | 0.5% AEP |

Note—some police and emergency services facilities (e.g. water police and search and rescue operations) are dependent on direct water access. The recommended flood levels do not apply to these aspects but other operational areas should be located above the recommended flood level to the greatest extent feasible.

### 15. Where flood areas can not be avoided, the risks associated with flooding must be mitigated to acceptable or tolerable levels

PO7 of the Utilities code, which essential community infrastructure is assessed against requires 'The functioning of a utility that is essential community infrastructure is maintained during and immediately after flood and storm tide inundation events'. This performance criteria is supported by item (2)(e) of the purpose and overall outcomes of the code which states 'essential community infrastructure, major utilities infrastructure and facilities are designed to function during and immediately after flood events'.

The Community activities code has similar outcomes as the Utilities code nominated above.

### 16. A business continuity plan includes the level of immunity achieved by siting and design and how the required level of service will be achieved during and immediately after a more severe flood event

A business continuity plan has not been prepared. The levels of flood immunity nominated within the planning scheme (other than for major switch yard and emergency shelters) are as nominated in the draft Model Flood Hazard Overlay Code.

If considered necessary by the State, Council would accept a condition requiring the flood immunity for a major switch yard and/or emergency shelters to be altered to be consistent with the model code.

# Schedule 1 – Flood Hazard Area Maps

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Gladstone
Regional
Council

North Burnett
Regional
Council

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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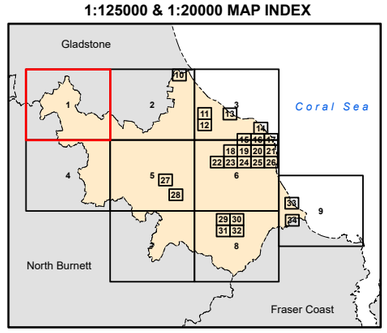
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-1**

Saved: Objective (A6383940)

BRC Drawing No. 147339

Gladstone
Regional
Council

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
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Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

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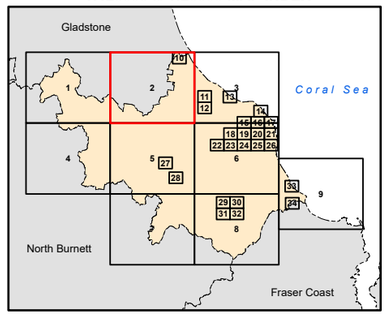


**Map Number: FHA-2**

Saved: Objective (A6383940)

BRC Drawing No. 147339

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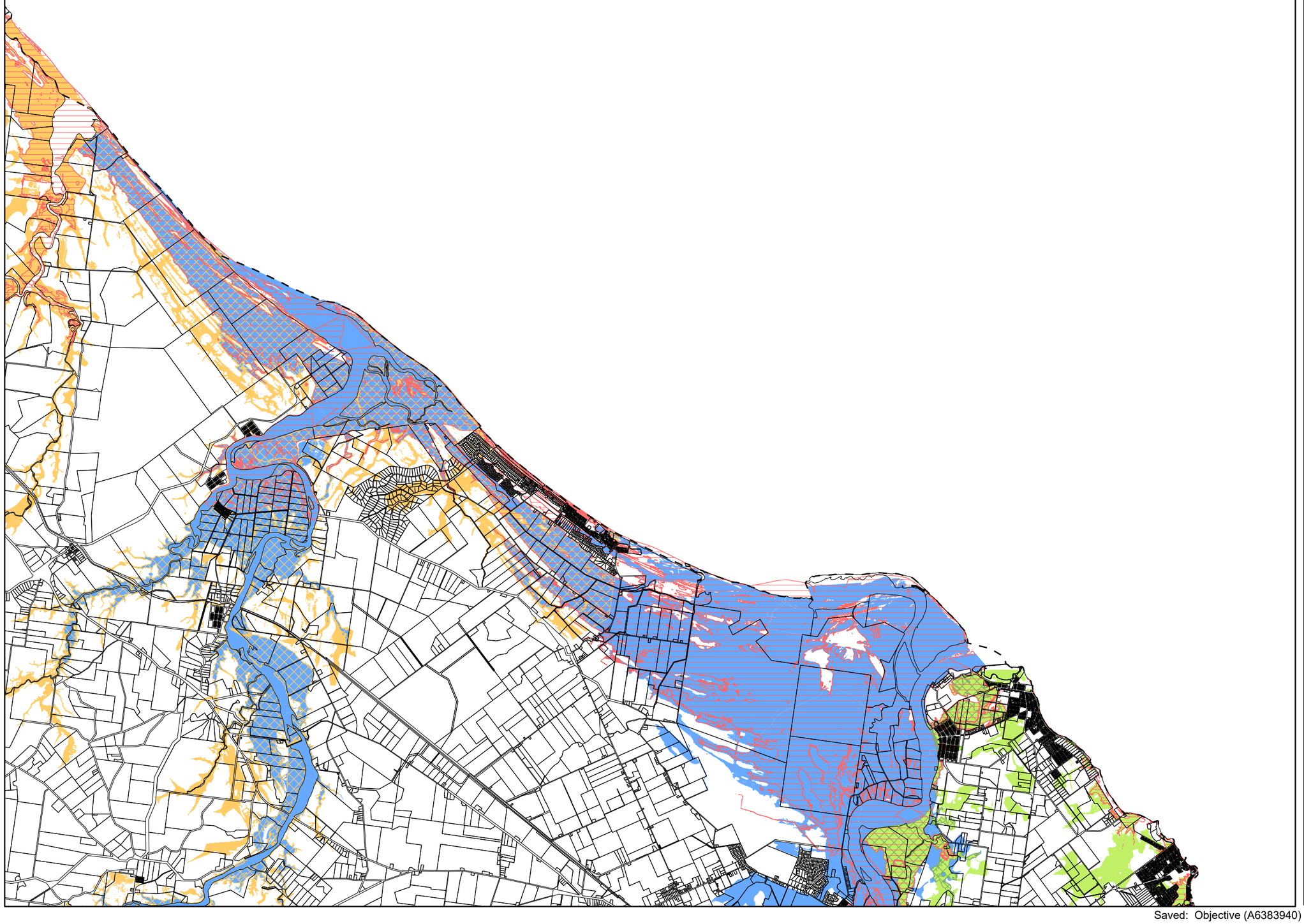

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
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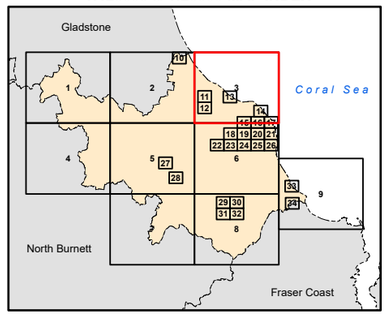
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-3**

Saved: Objective (A6383940)

BRC Drawing No. 147339

North Burnett
Regional
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REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
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Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

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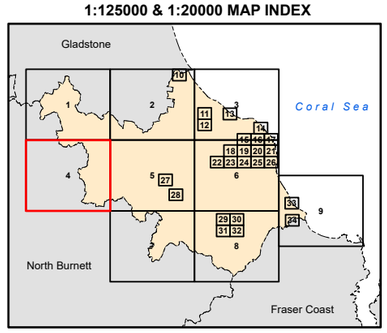


**Map Number: FHA-4**

Saved: Objective (A6383940)

BRC Drawing No. 147339

North Burnett Regional Council

BUNDABERG REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
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Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

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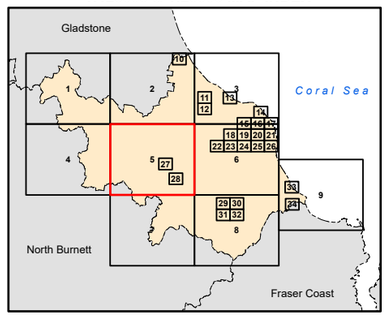


**Map Number: FHA-5**

Saved: Objective (A6383940)

BRC Drawing No. 147339

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

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Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

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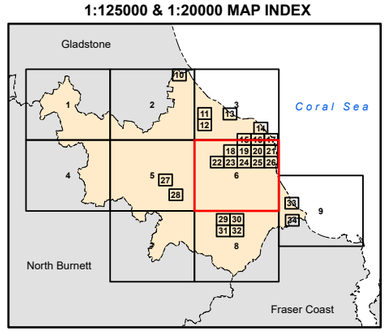


**Map Number: FHA-6**

Saved: Objective (A6383940)

BRC Drawing No. 147339

North Burnett
Regional
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REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

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Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

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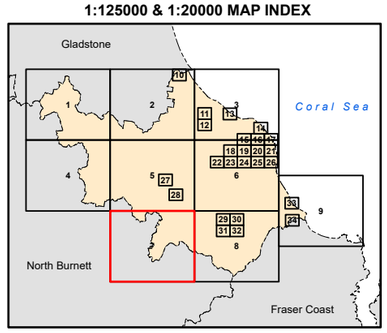


**Map Number: FHA-7**

Saved: Objective (A6383940)

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North Burnett
Regional
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Fraser Coast
Regional
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REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

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Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

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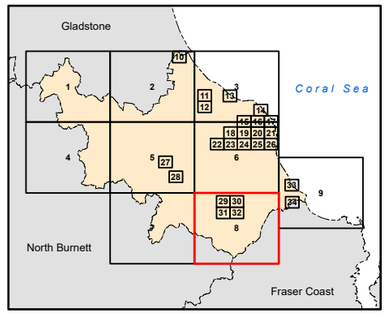


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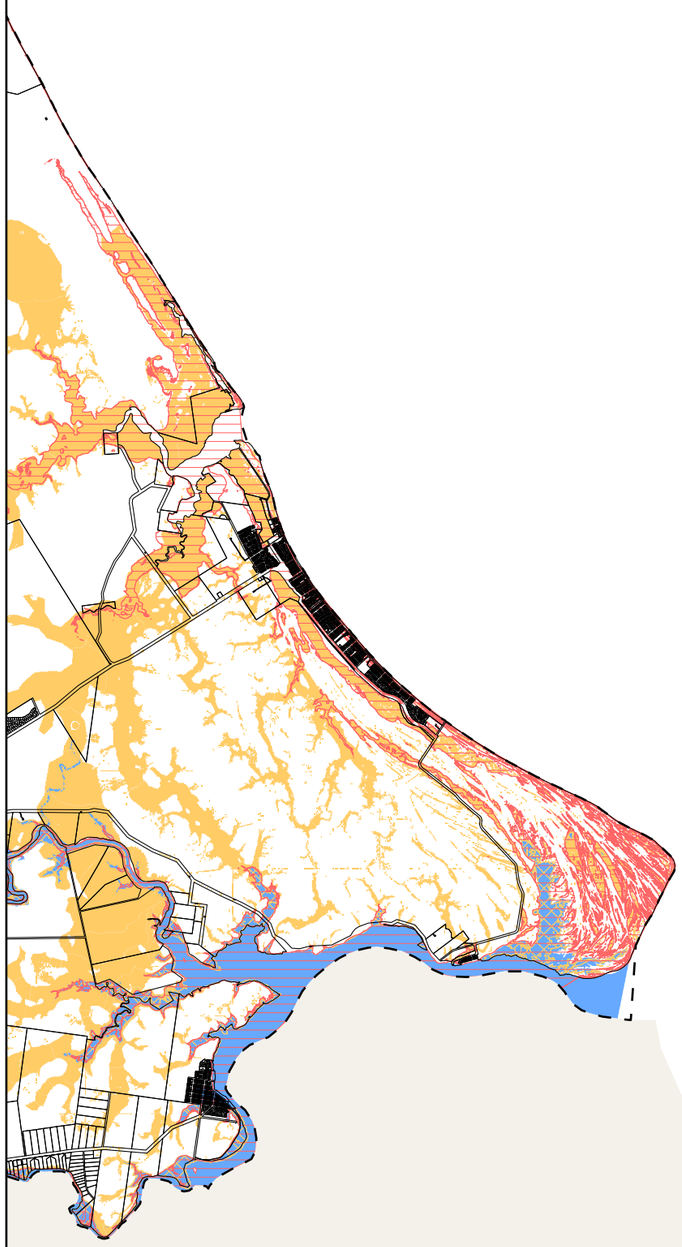
BRC Drawing No. 147339



Fraser Coast
Regional
Council

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

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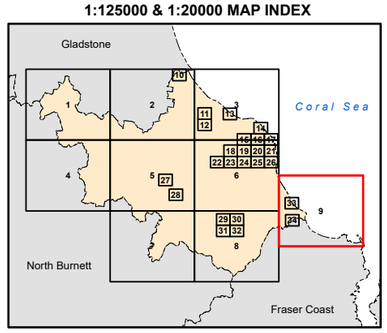
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-9**

Saved: Objective (A6383940)

BRC Drawing No. 147339

Gladstone
Regional
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REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

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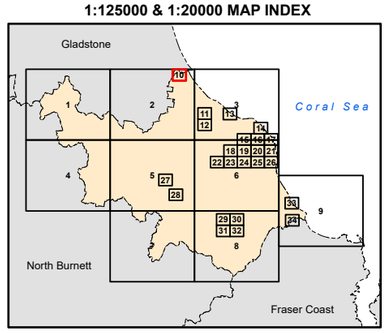
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-10**

Saved: Objective (A6383940)

BRC Drawing No. 147339

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REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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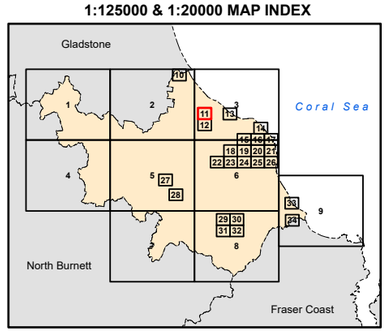


**Map Number: FHA-11**

Saved: Objective (A6383940)

BRC Drawing No. 147339

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REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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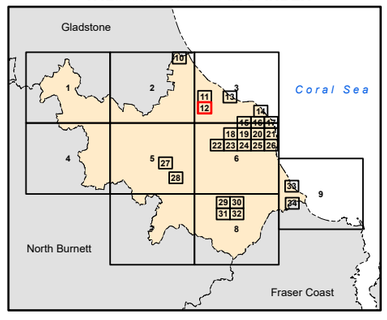


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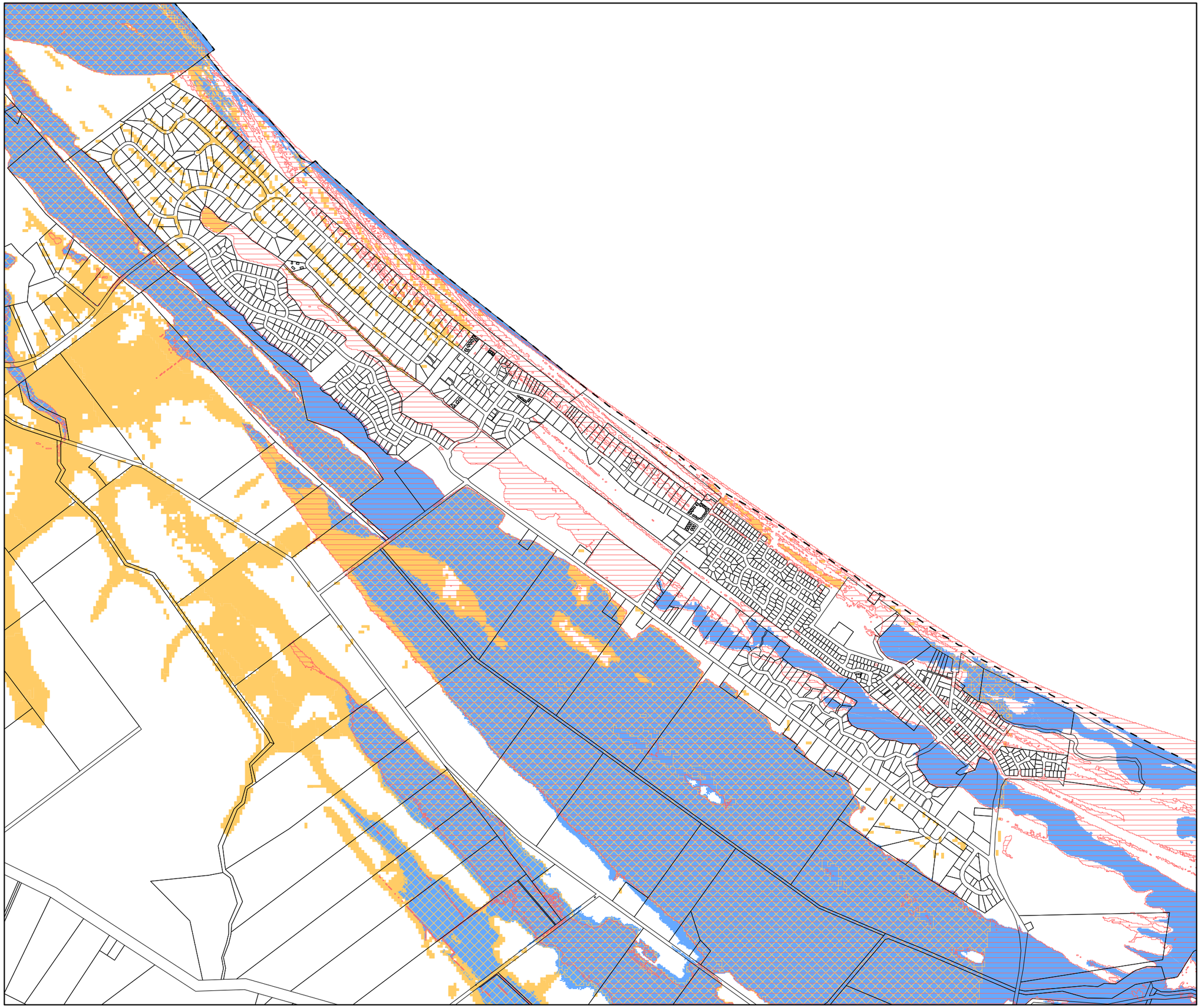
BRC Drawing No. 147339



BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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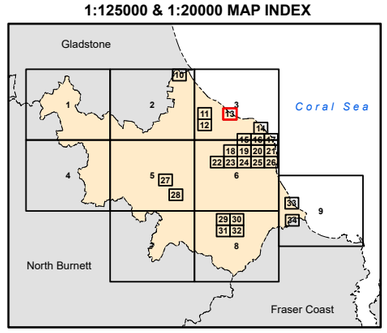


**Map Number: FHA-13**

Saved: Objective (A6383940)

BRC Drawing No. 147339

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REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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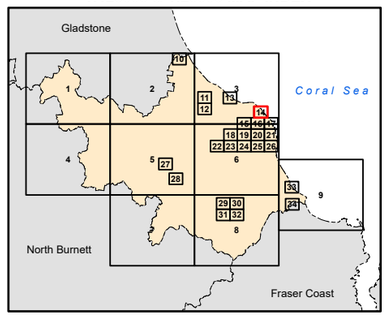


**Map Number: FHA-14**

Saved: Objective (A6383940)

BRC Drawing No. 147339

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REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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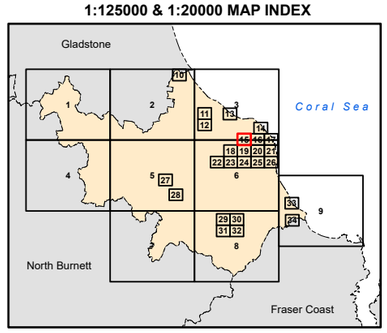
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-15**

Saved: Objective (A6383940)

BRC Drawing No. 147339

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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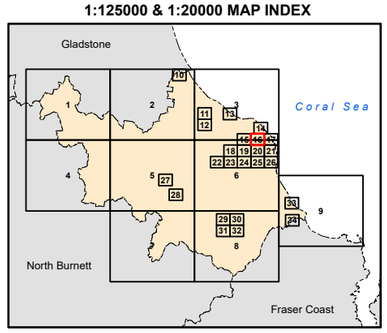


**Map Number: FHA-16**

Saved: Objective (A6383940)

BRC Drawing No. 147339

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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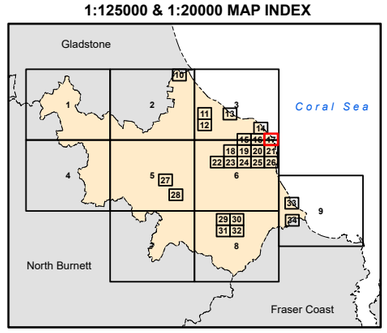


**Map Number: FHA-17**

Saved: Objective (A6383940)

BRC Drawing No. 147339

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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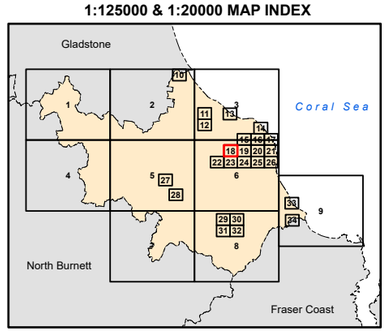
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-18**

Saved: Objective (A6383940)

BRC Drawing No. 147339

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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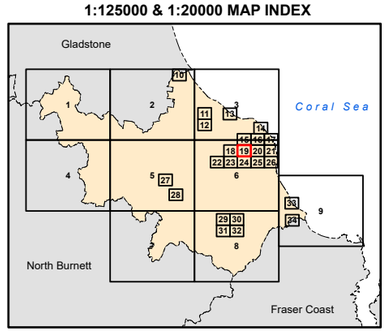


**Map Number: FHA-19**

Saved: Objective (A6383940)

BRC Drawing No. 147339

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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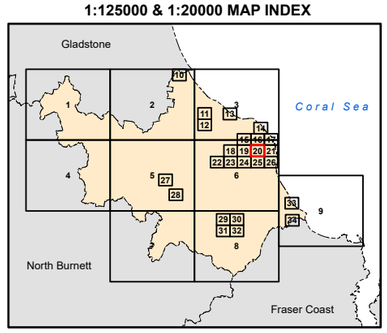


**Map Number: FHA-20**

Saved: Objective (A6383940)

BRC Drawing No. 147339

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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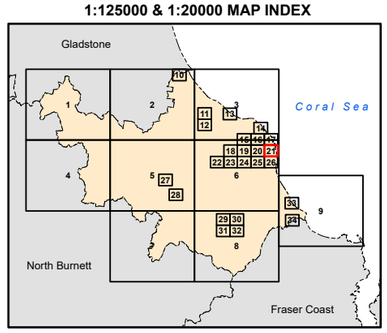


**Map Number: FHA-21**

Saved: Objective (A6383940)

BRC Drawing No. 147339

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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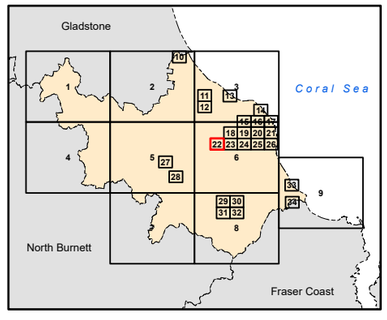


**Map Number: FHA-22**

Saved: Objective (A6383940)

BRC Drawing No. 147339

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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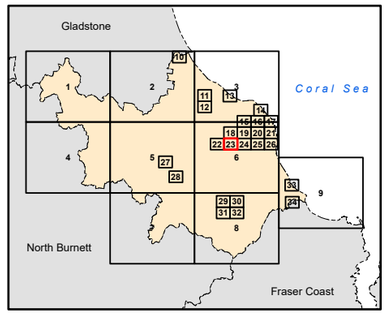


**Map Number: FHA-23**

Saved: Objective (A6383940)

BRC Drawing No. 147339

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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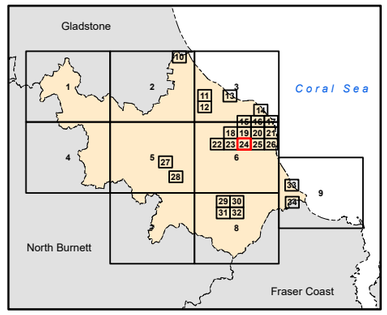


**Map Number: FHA-24**

Saved: Objective (A6383940)

BRC Drawing No. 147339

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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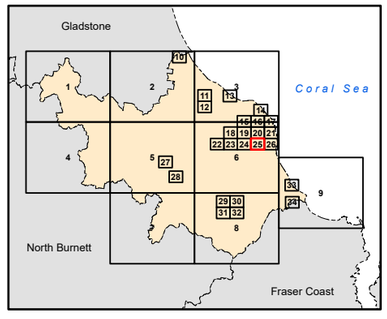


**Map Number: FHA-25**

Saved: Objective (A6383940)

BRC Drawing No. 147339

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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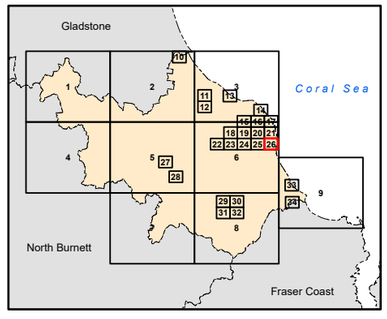


**Map Number: FHA-26**

Saved: Objective (A6383940)

BRC Drawing No. 147339

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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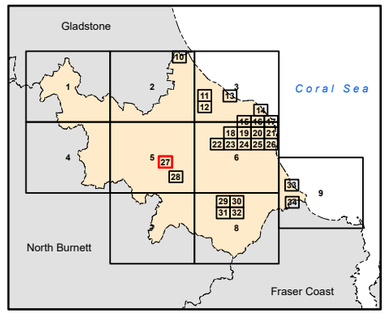
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-27**

Saved: Objective (A6383940)

BRC Drawing No. 147339

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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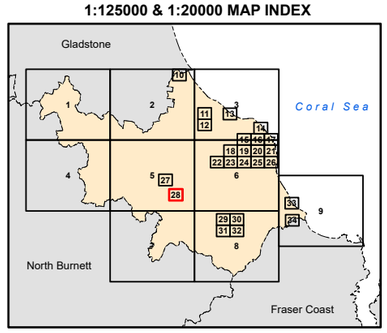


**Map Number: FHA-28**

Saved: Objective (A6383940)

BRC Drawing No. 147339

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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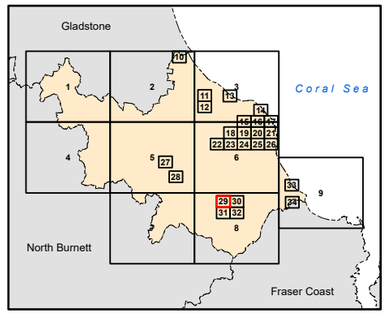
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-29**

Saved: Objective (A6383940)

BRC Drawing No. 147339

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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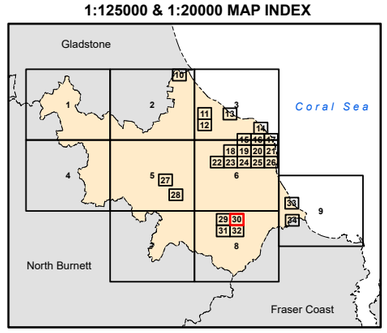
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-30**

Saved: Objective (A6383940)

BRC Drawing No. 147339

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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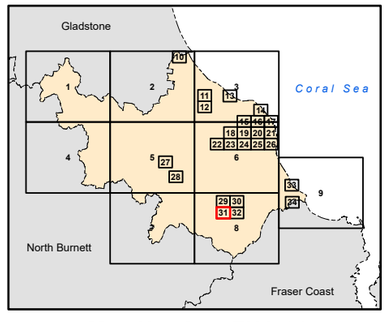
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-31**

Saved: Objective (A6383940)

BRC Drawing No. 147339

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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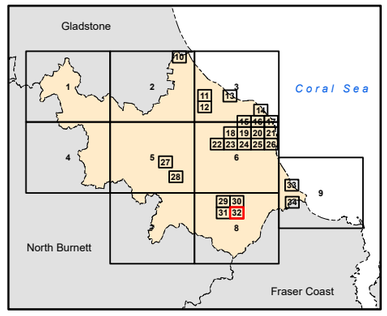
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-32**

Saved: Objective (A6383940)

BRC Drawing No. 147339

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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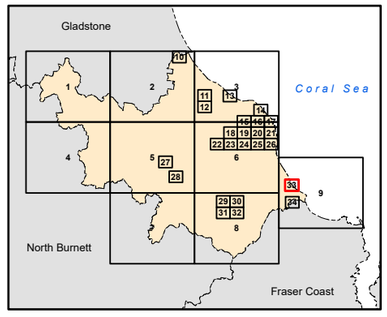
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-33**

Saved: Objective (A6383940)

BRC Drawing No. 147339

Fraser Coast
Regional
Council

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Area

## Flood Hazard Area Resolution (No. 1) 2021

### Legend

- Riverine DFE
- Local DFE
- Non-urban Creeks/Overland Flow
- State Planning Policy Flood Hazard Area
- Subject to both riverine DFE and Non Urban Creeks
- Subject to both riverine DFE and local DFE
- Storm Tide Area

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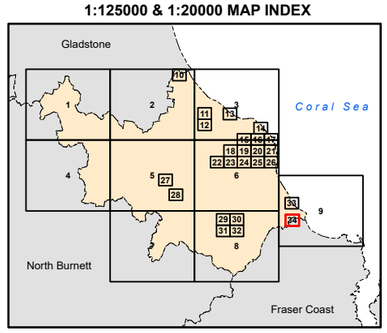
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-34**

Saved: Objective (A6383940)

BRC Drawing No. 147339

# Schedule 2 – Flood Hazard Assessment Report Locality Maps

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intentionally left blank

Gladstone Regional Council

Dalga

Kalpowar

North Burnett Regional Council

Molangul

Kolonga

Gaeta

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
- Riverine DFE - Burnett River 2013 Flood Event
- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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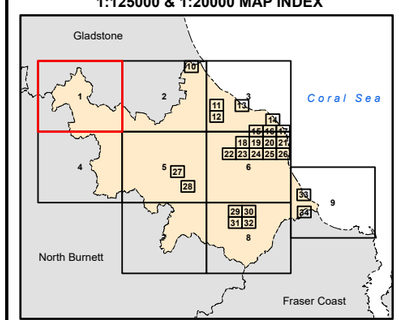
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-1**
**Revision 7.0**

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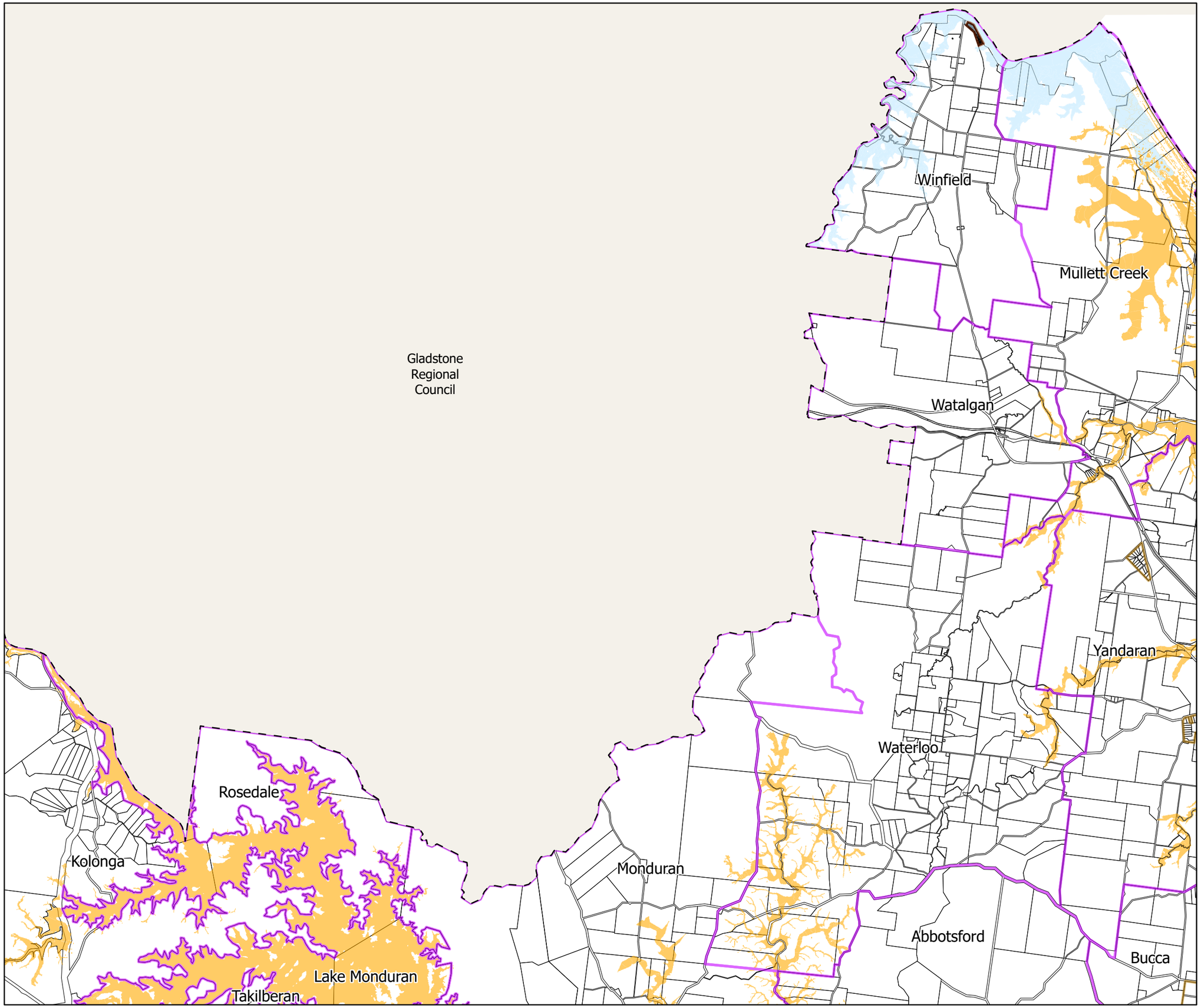
BRC Drawing No. 147340




BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
- Riverine DFE - Burnett River 2013 Flood Event
- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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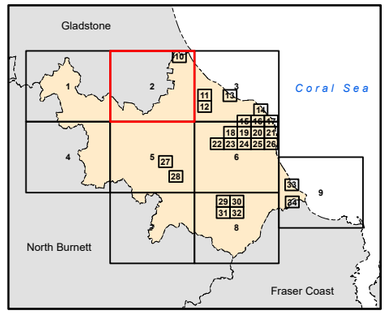
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-2**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

Gladstone Regional Council

Mullett Creek

Yandaran

Miara

Moore Park Beach

Moorland

Avondale

Welcome Creek

Fairymead

Burnett Heads

Bucca

Meadowvale

Gooburrum

Bundaberg North

Rubyanna

Mon Repos

Qunaba

Bargara

Saved: Objective (A6338792)

BUNDABERG REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
- Riverine DFE - Burnett River 2013 Flood Event
- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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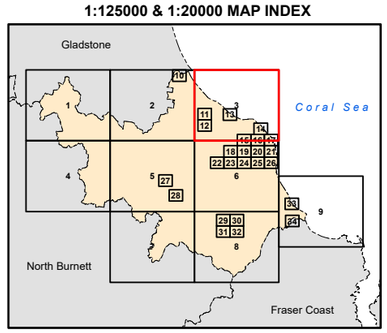
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-3**
**Revision 7.0**

BRC Drawing No. 147340

Molangul

Kolonga

Gaeta

Takilberan

North Burnett
Regional
Council

Wonbah Forest

New Moonta

Boolboonda

Wonbah

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
- Riverine DFE - Burnett River 2013 Flood Event
- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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Co-ordinate System:- GDA94 MGA Zone 56

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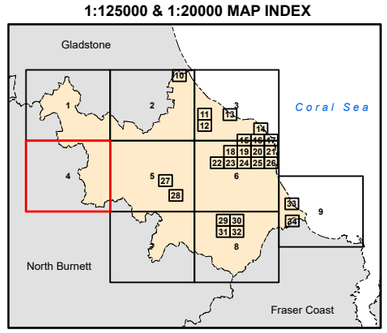


**Map Number: FHA-4**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

# Flood Hazard Assessment Report - Series 1 Locality Map

BUNDABERG REGIONAL COUNCIL

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
- Riverine DFE - Burnett River 2013 Flood Event
- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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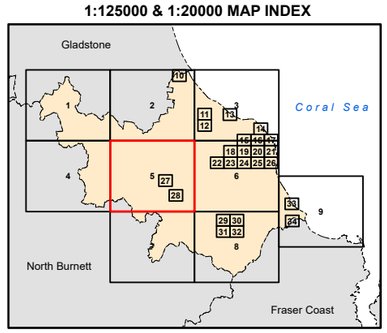
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**

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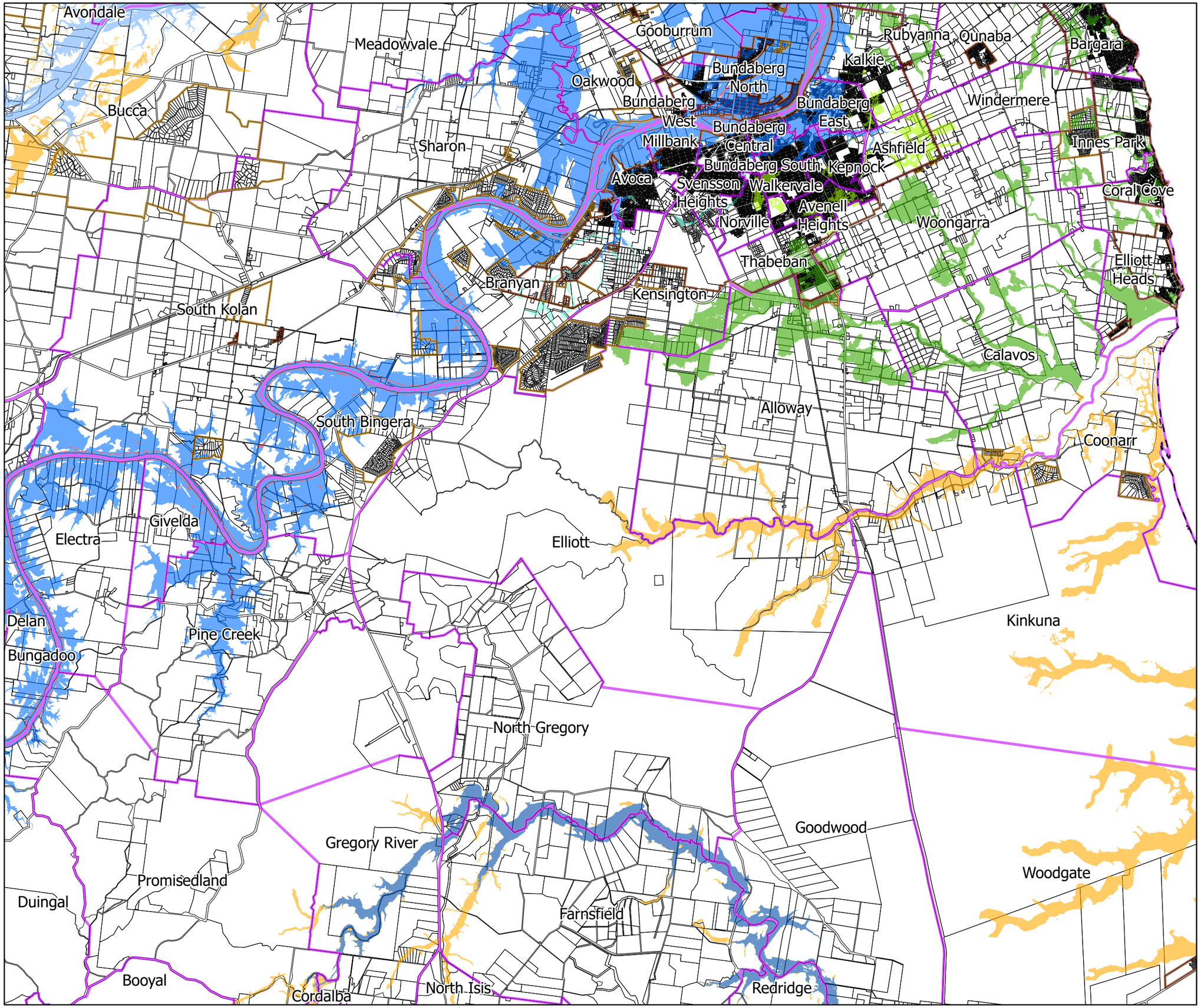


BUNDABERG REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
- Riverine DFE - Burnett River 2013 Flood Event
- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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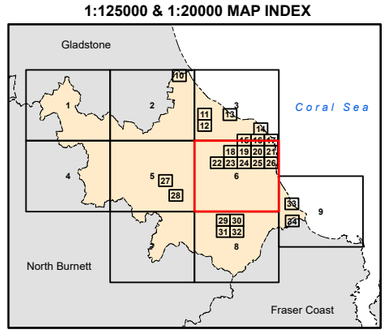
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**

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**Revision 7.0**

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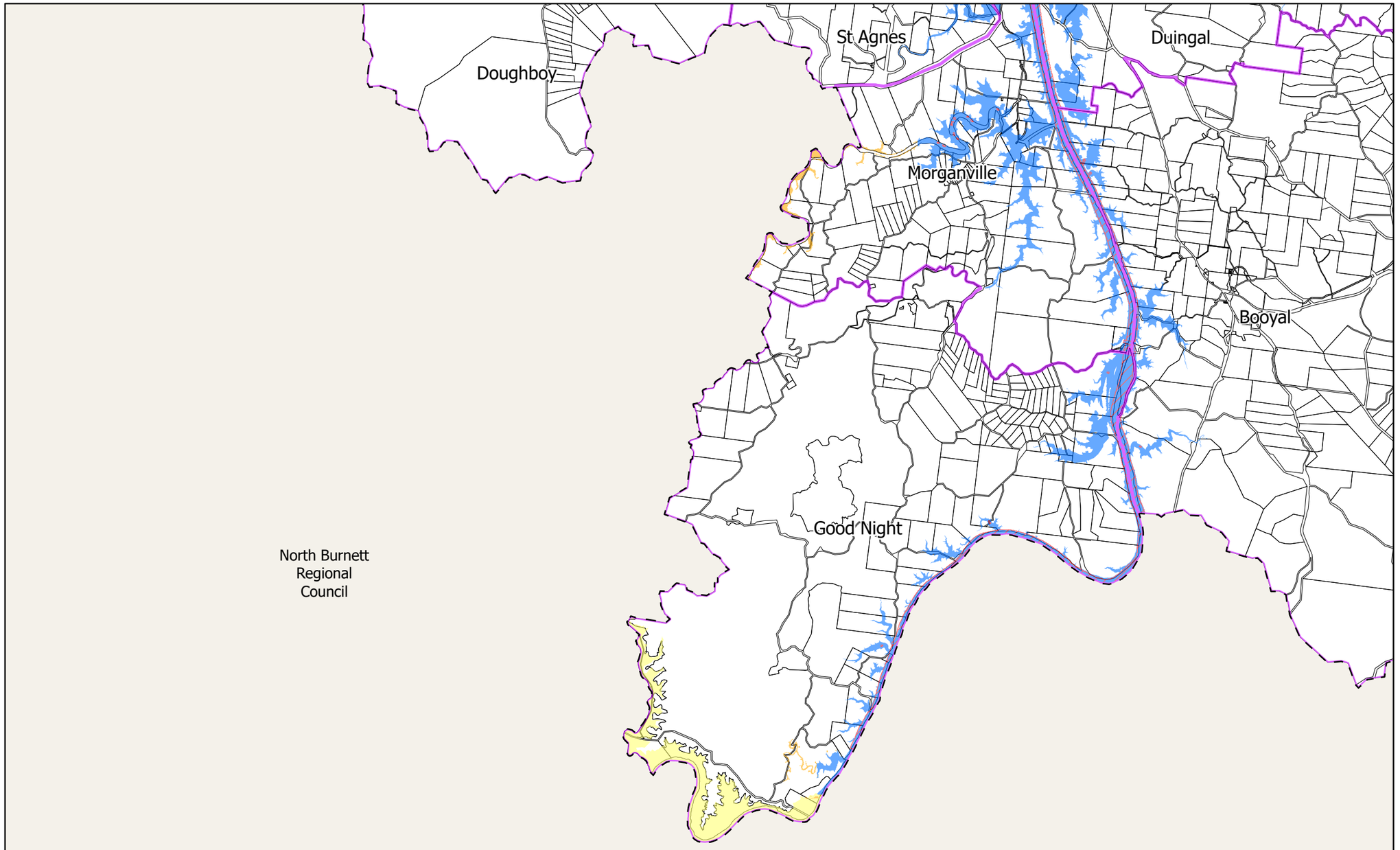


# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
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- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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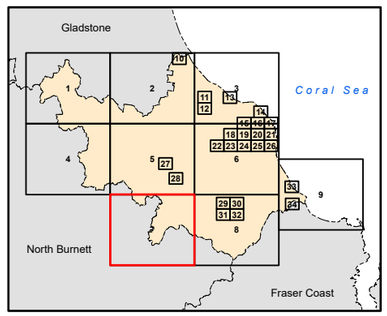
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**

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**Revision 7.0**

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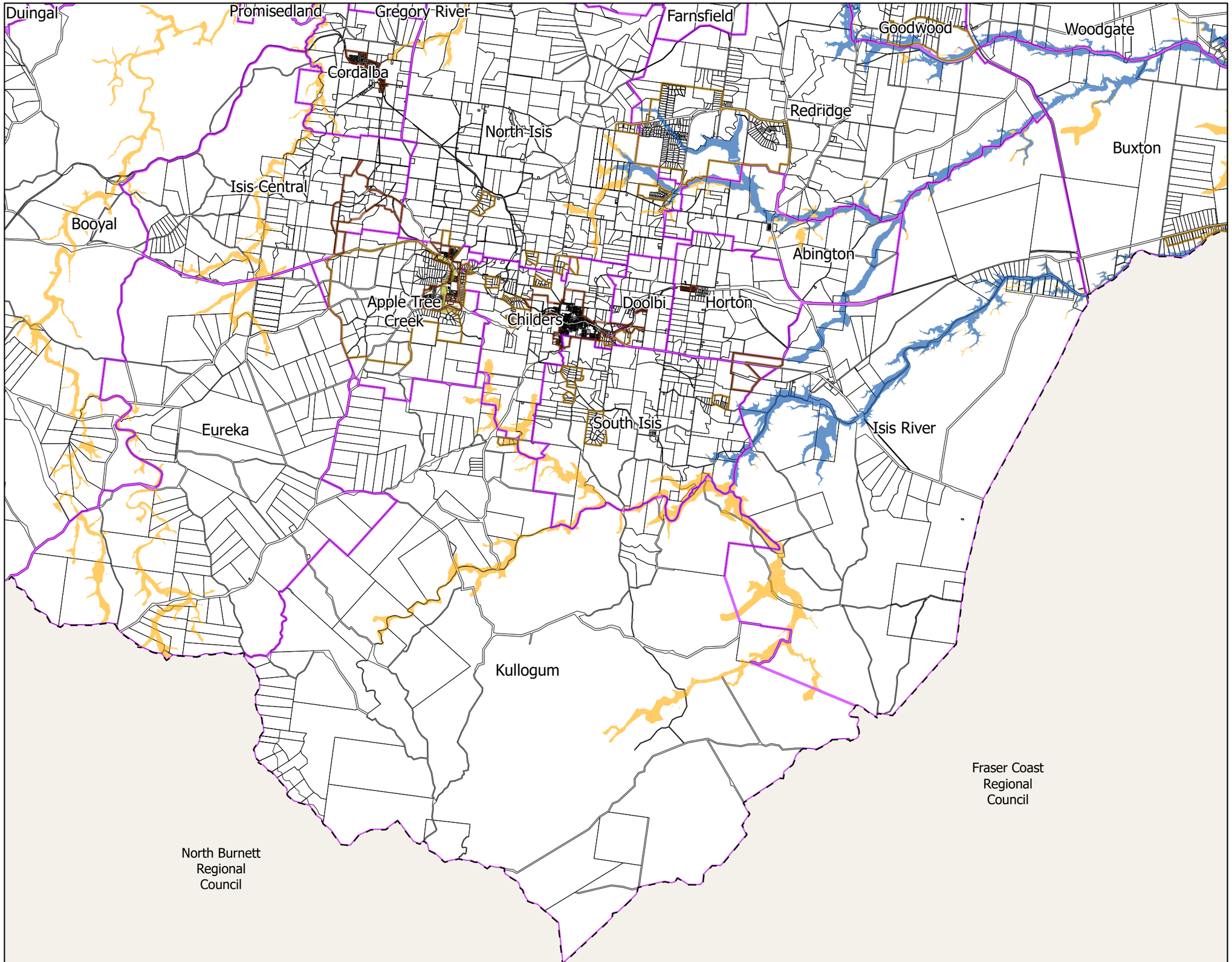
BRC Drawing No. 147340




BUNDABERG REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
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- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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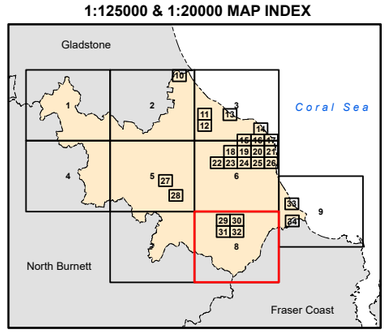
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

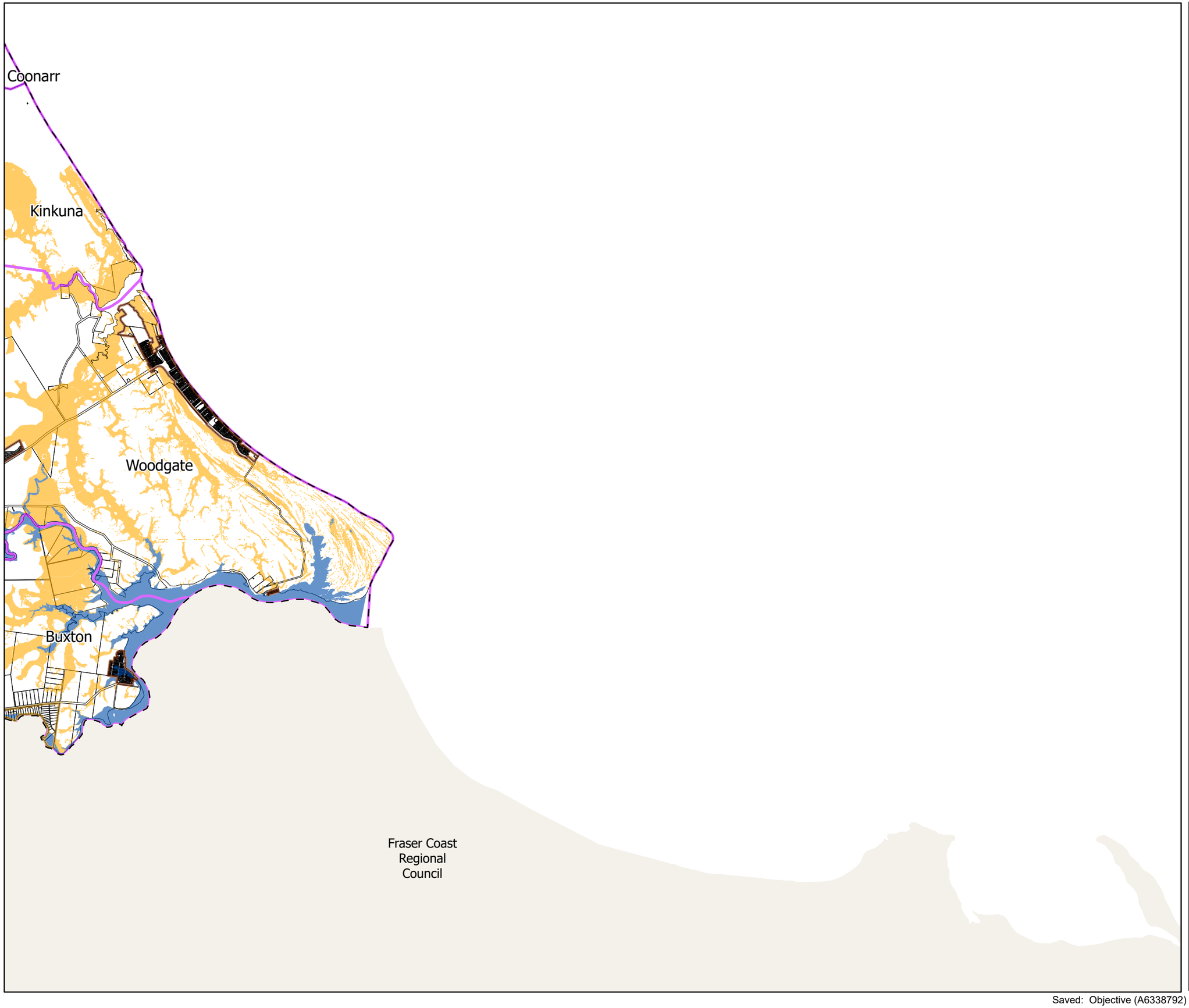
**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-8**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340




BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
- Riverine DFE - Burnett River 2013 Flood Event
- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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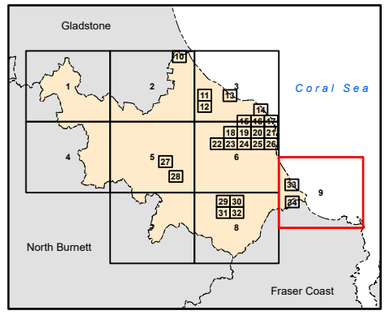
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-9**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

Gladstone Regional Council

Winfield

Mullett Creek

BUNDABERG REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
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- Local DFE - BuCC Drainage Study 1% AEP
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- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
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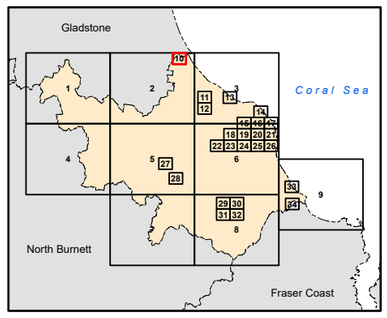
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-10**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

Miara

Moore Park Beach

Yandaran

Avondale

Moorland

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
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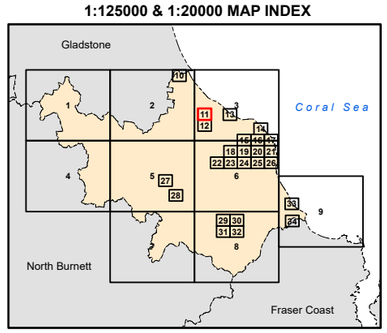
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

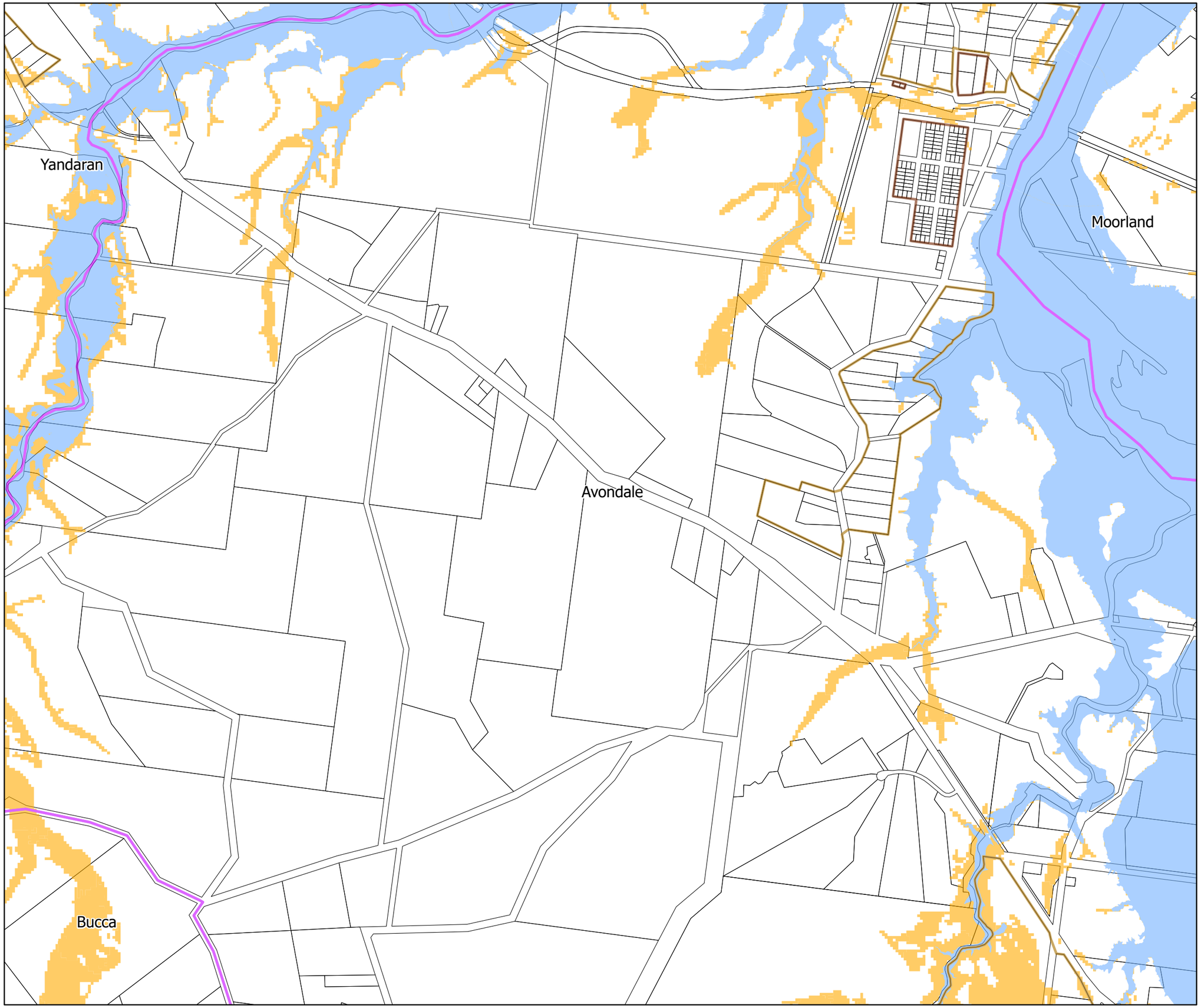
**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-11**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340




BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
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- Local DFE - BuCC Drainage Study 1% AEP
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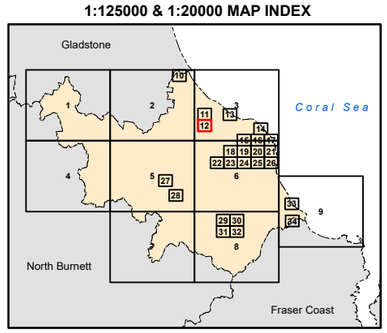
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

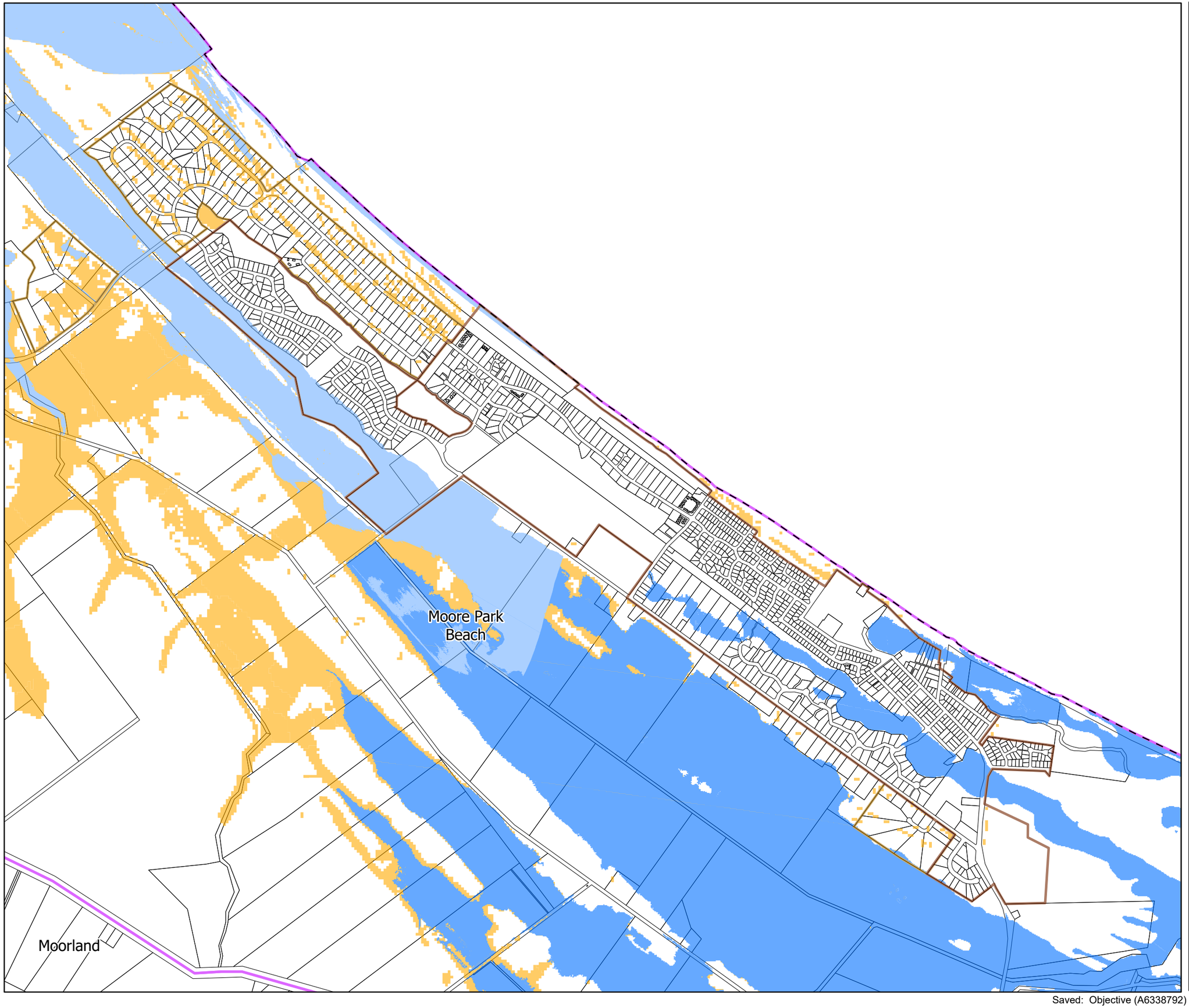
**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-12**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

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REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
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- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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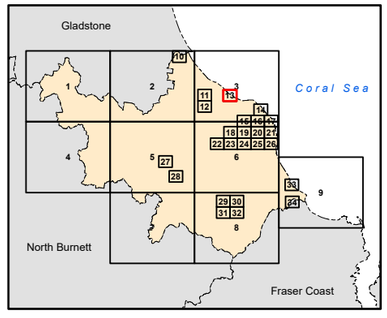
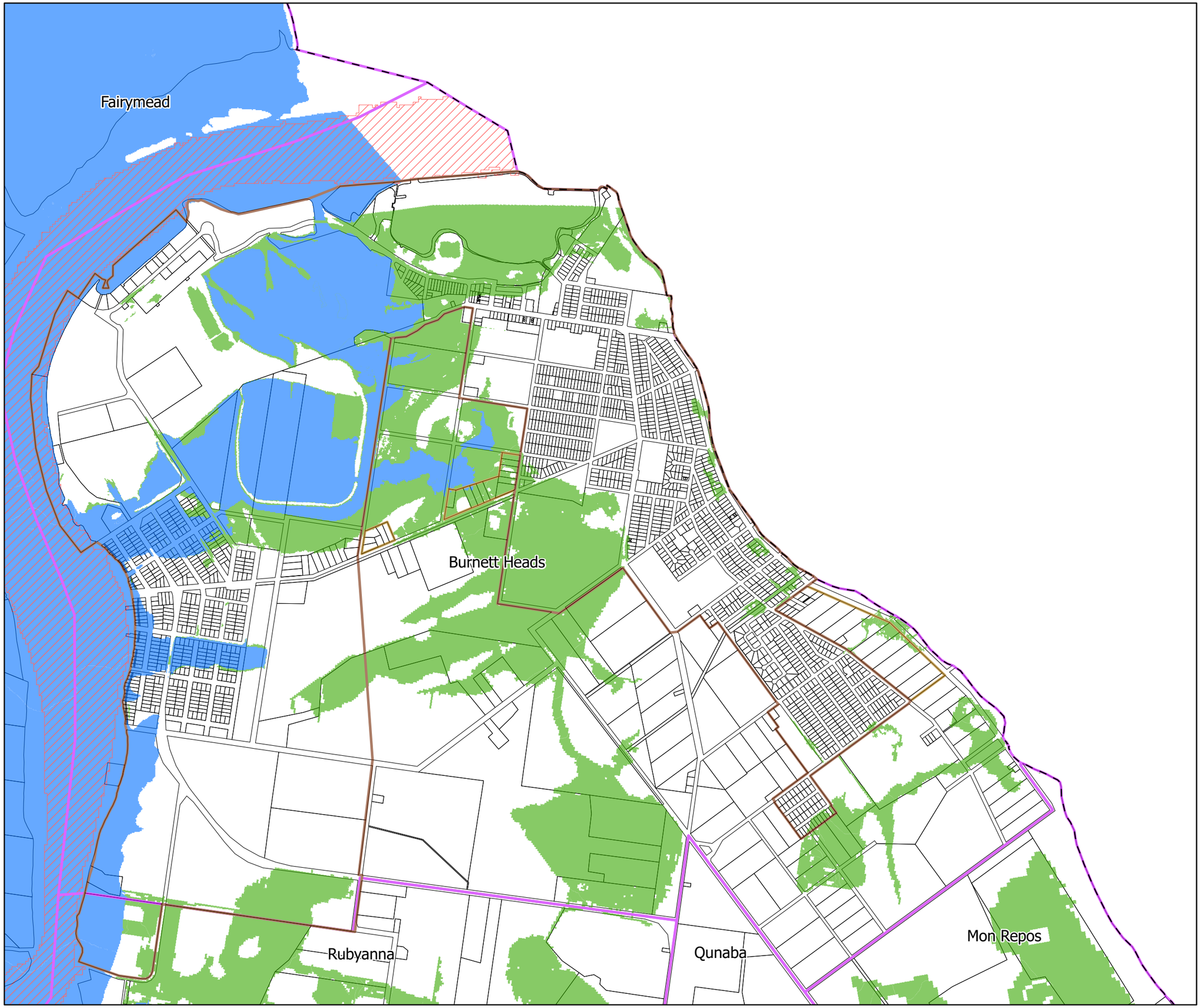



**Map Number: FHA-13**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

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REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
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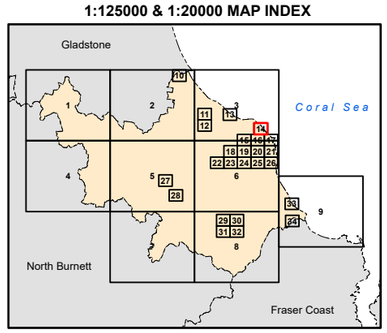
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-14**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

Welcome Creek

Fairymead

Rubyanna

Meadowvale

Gooburrum

Oakwood

Bundaberg North

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
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- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
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- Local DFE - Saltwater Creek 1% AEP CC
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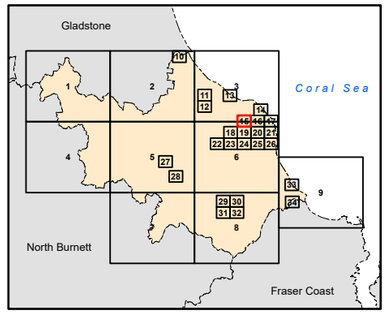
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-15**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

Fairymead

Mon Repos

Rubyanna

Qunaba

Gooburrum

Bundaberg North

Kalkie

Windermere

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
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- Burnett River Riverine High Hazard Area
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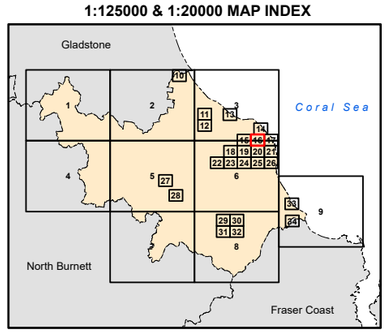
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

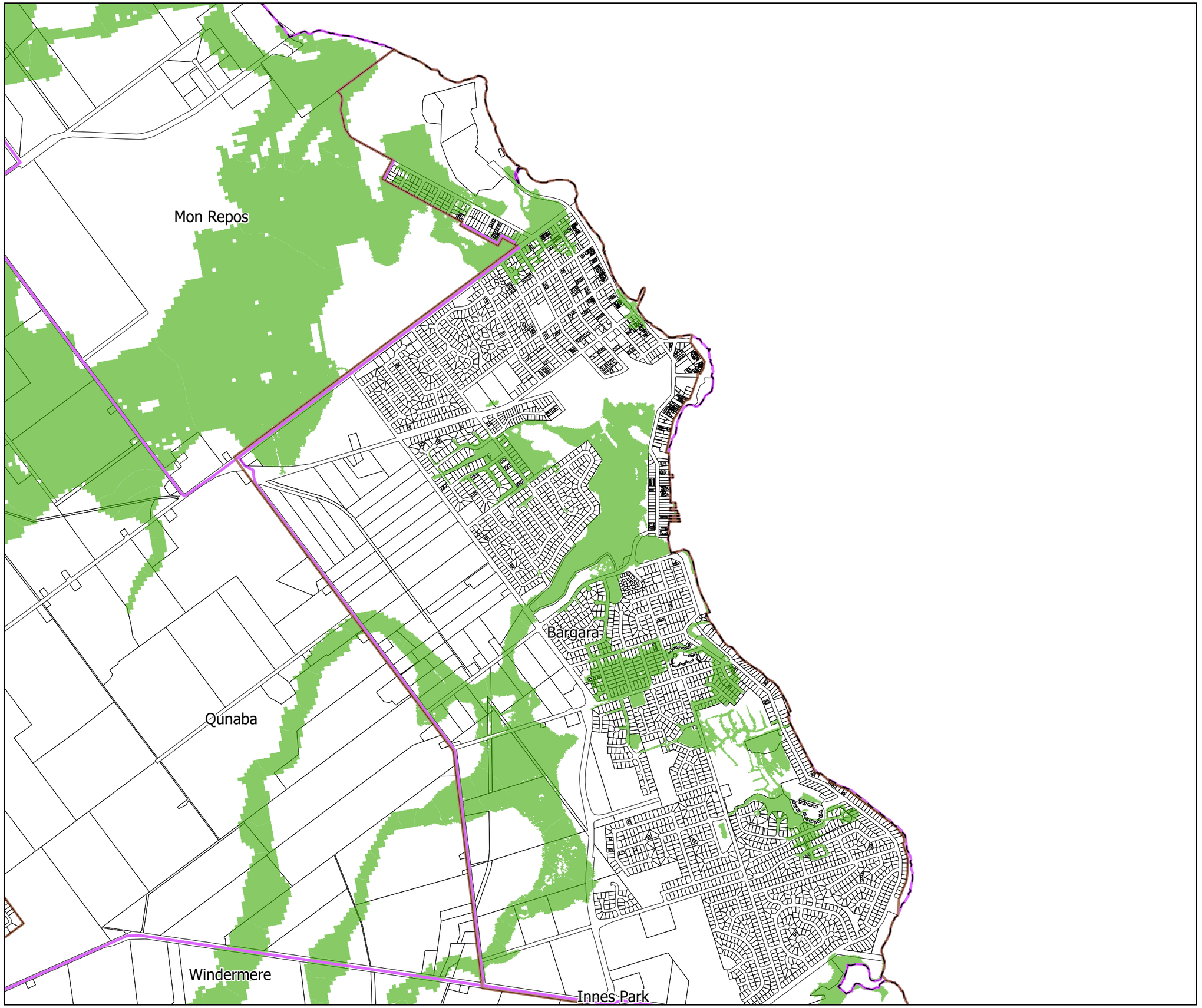
**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-16**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340




# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
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- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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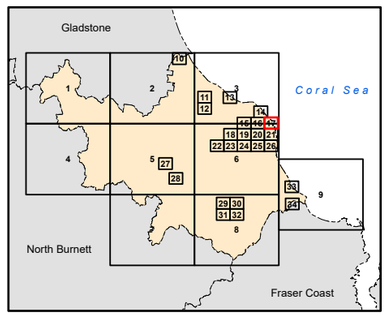


**Map Number: FHA-17**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

Meadowvale

Oakwood

Sharon

Avoca

Branyan

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
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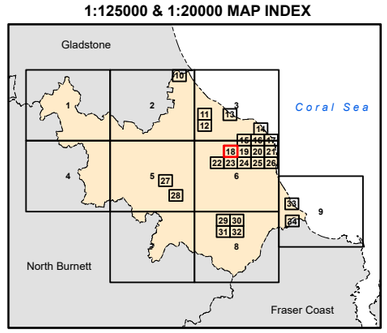
Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-18**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

Gooburrum
Oakwood
Bundaberg North
Bundaberg East
Bundaberg Central
Millbank
Bundaberg West
Bundaberg South
Kepnock
Avoca
Walkervale
Svensson Heights
Norville
Avenell Heights
Kensington
Branyan
Thabeban

# Flood Hazard Assessment Report - Series 1 Locality Map

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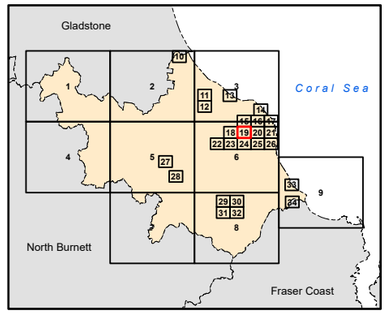
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

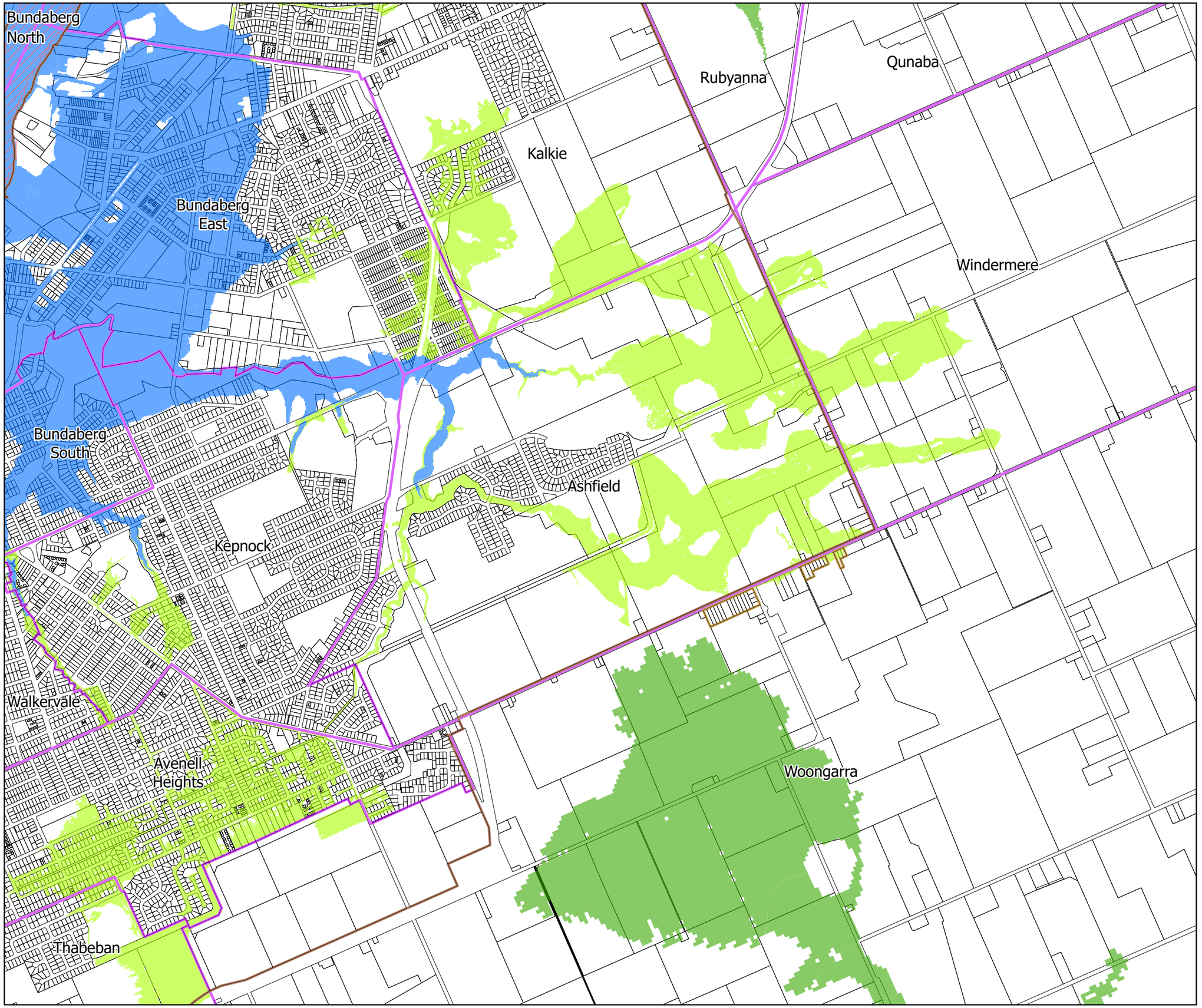
**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-19**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340




# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
- Riverine DFE - Burnett River 2013 Flood Event
- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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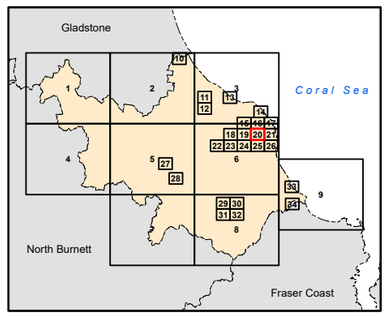
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-20**
**Revision 7.0**

Saved: Objective (A6338792)

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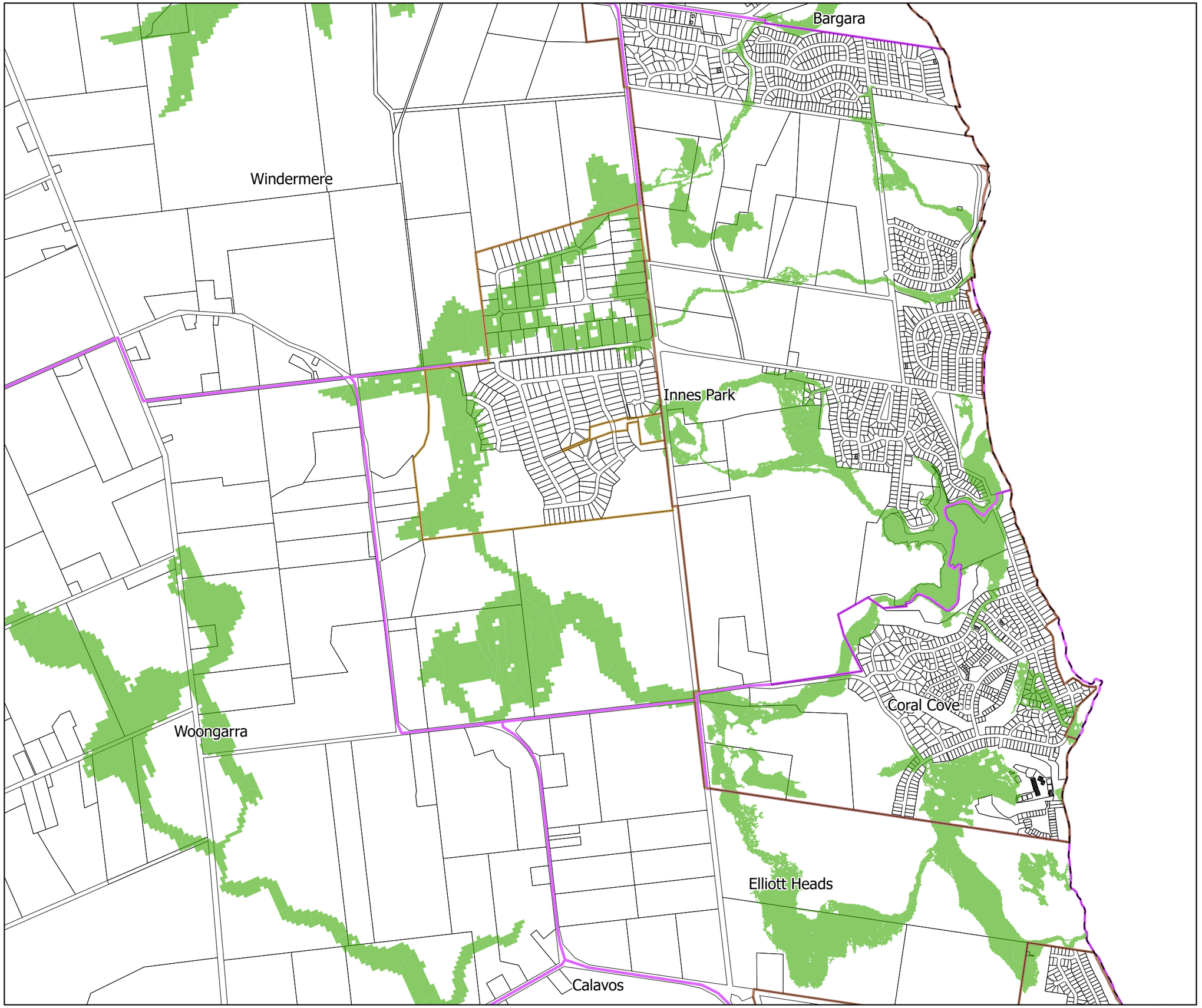


# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
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- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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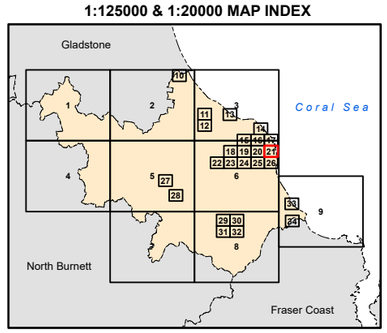
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-21**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

Sharon

South Kolan

South Bingera

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# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
- Riverine DFE - Burnett River 2013 Flood Event
- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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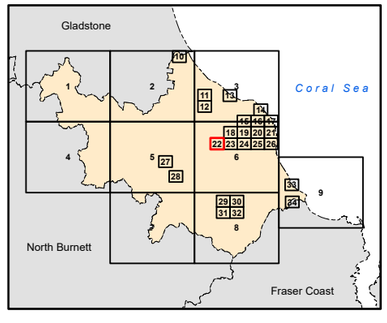
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-22**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

Sharon

Branyan

Kensington

South Kolan

South Bingera

Elliott

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
- Riverine DFE - Burnett River 2013 Flood Event
- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
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- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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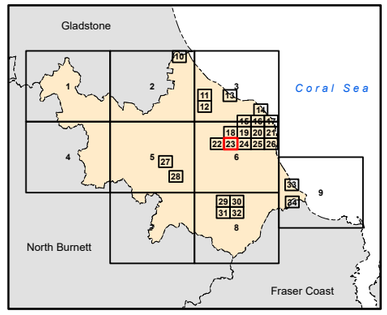


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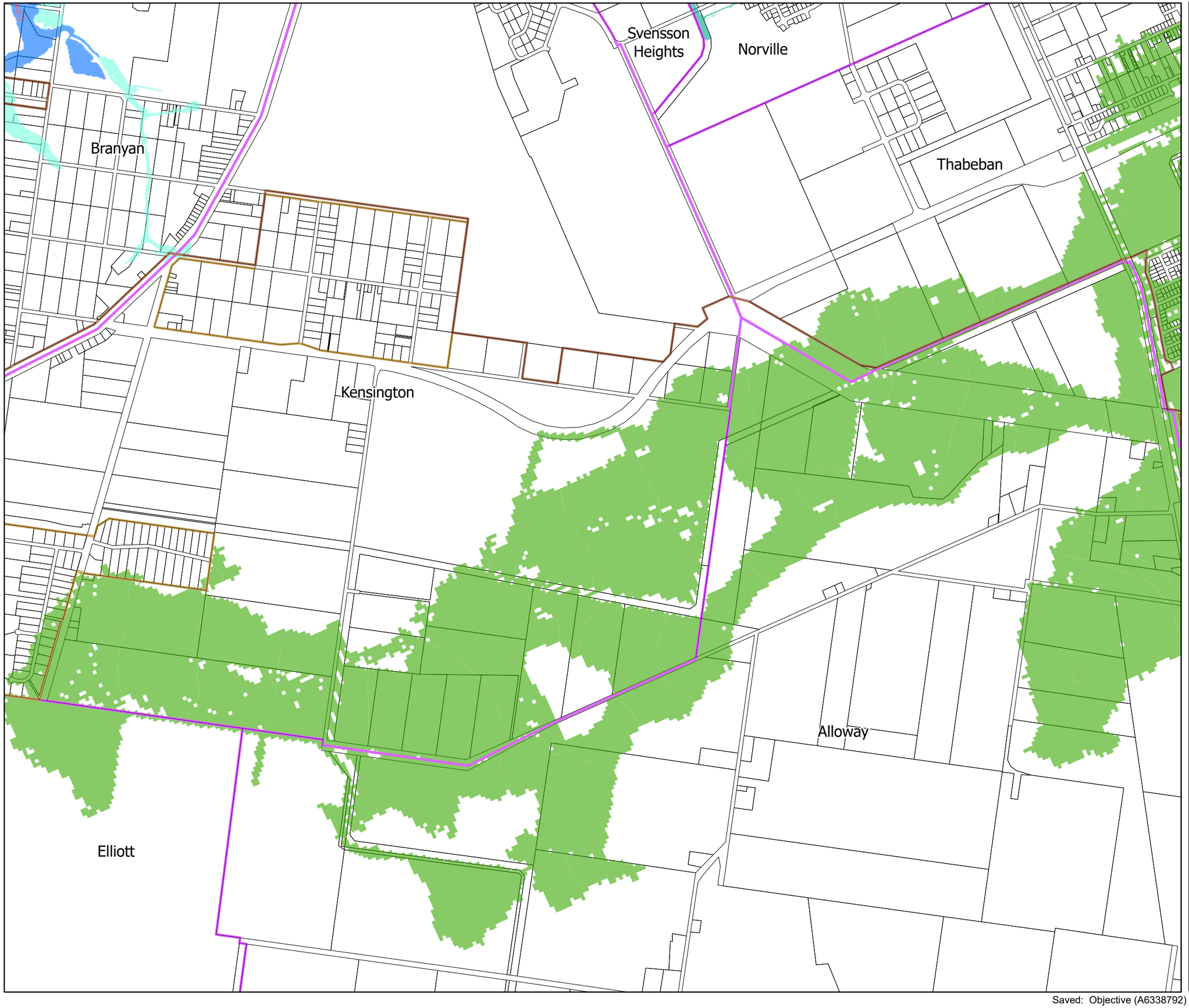
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

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# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
- Riverine DFE - Burnett River 2013 Flood Event
- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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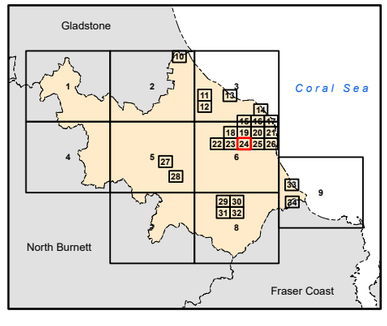
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

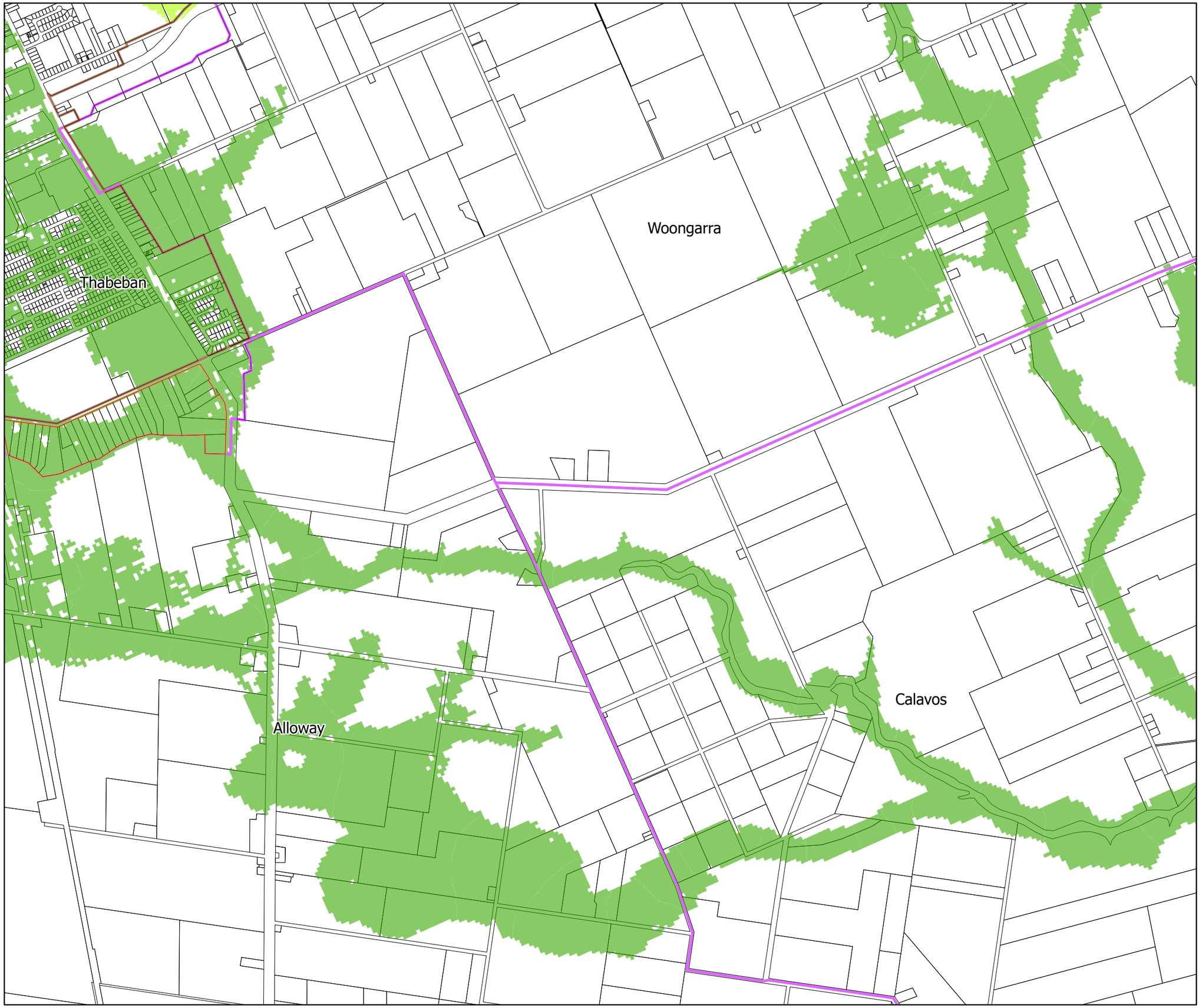
**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-24**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

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# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
- Riverine DFE - Burnett River 2013 Flood Event
- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
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- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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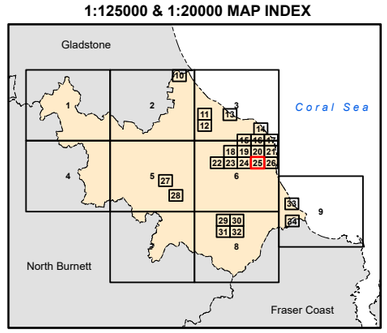
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**

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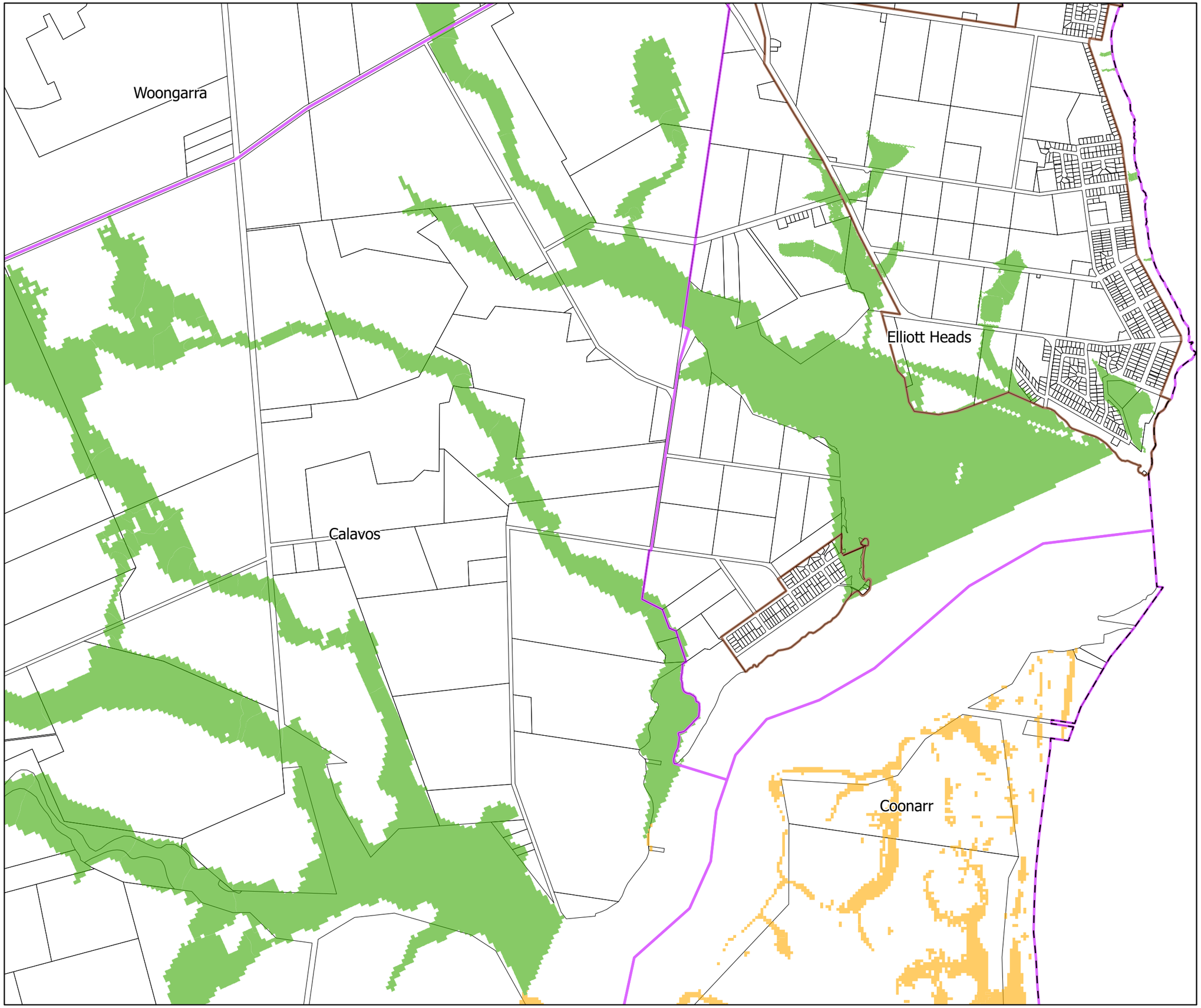
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

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# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
- Riverine DFE - Burnett River 2013 Flood Event
- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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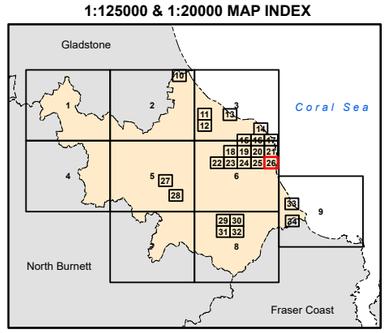


**Map Number: FHA-26**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
- Riverine DFE - Burnett River 2013 Flood Event
- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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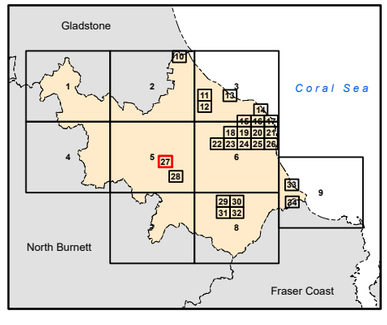
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

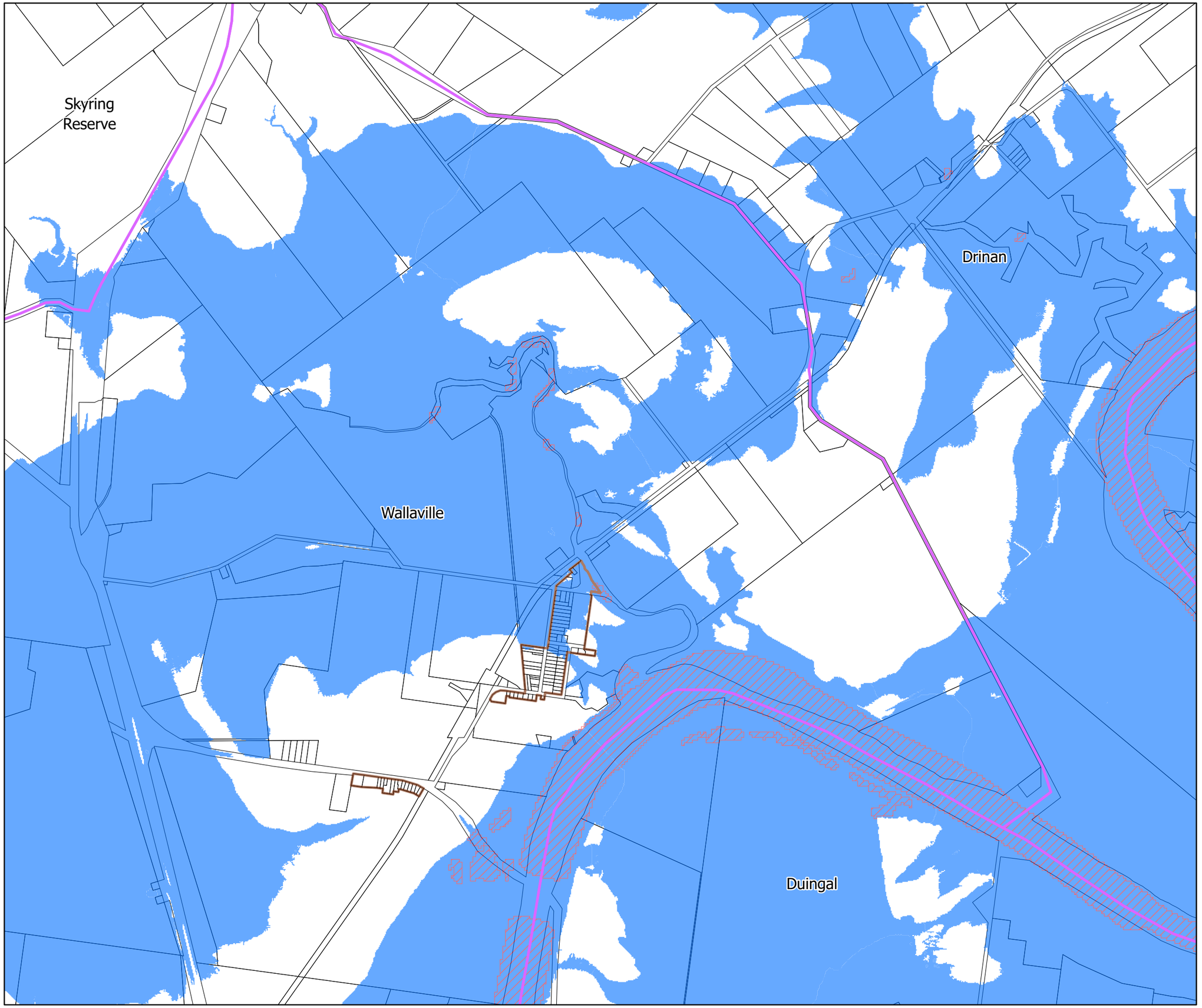
**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-27**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

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# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
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- Riverine DFE - Burnett River 2013 Flood Event
- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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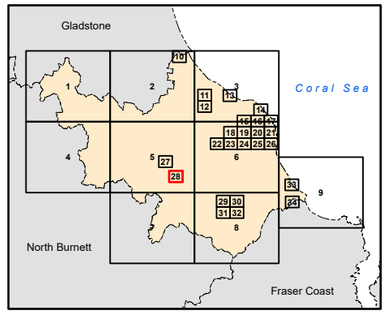
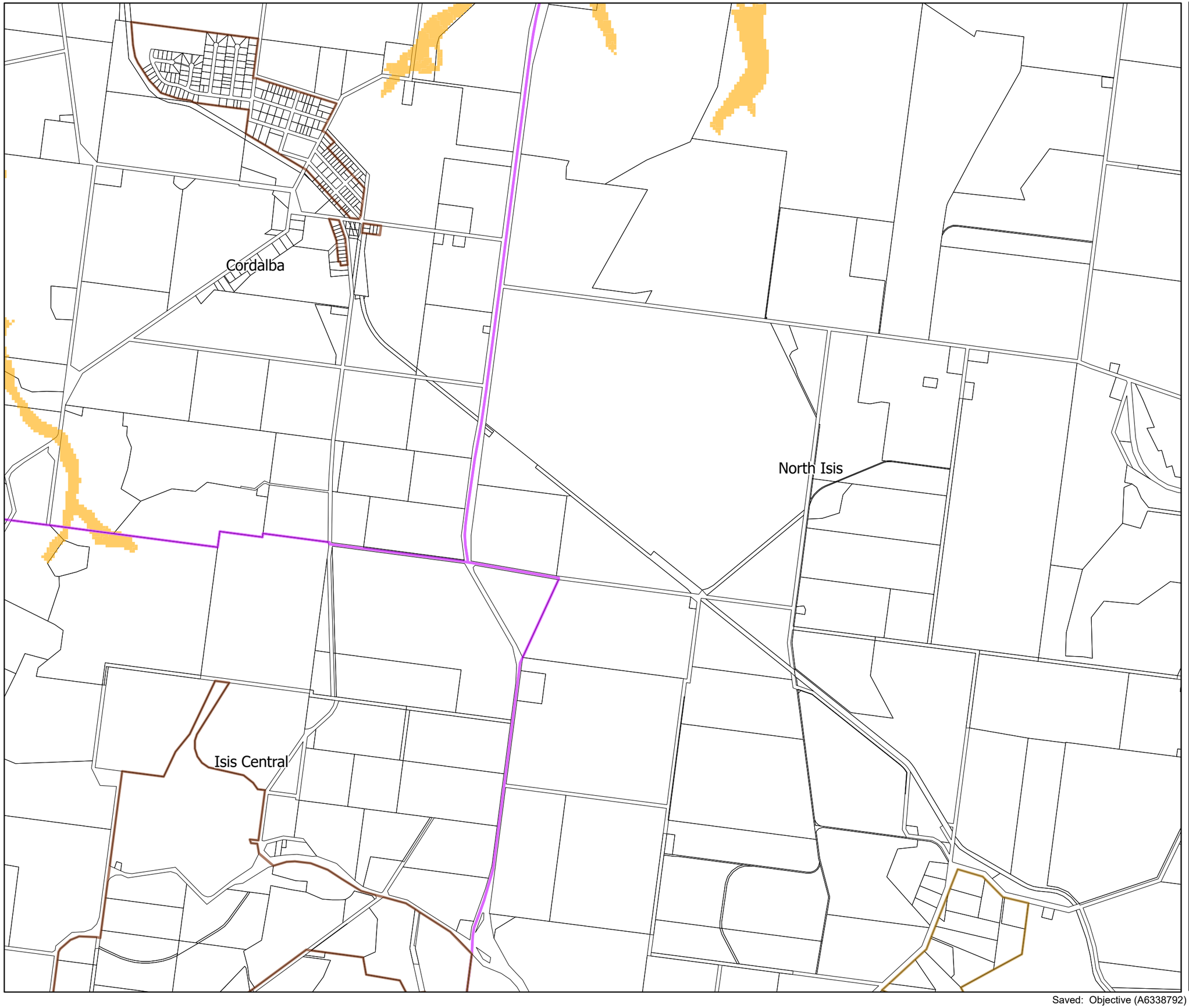



**Map Number: FHA-28**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

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# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
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- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
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- Non-urban Creeks/Overland Flow

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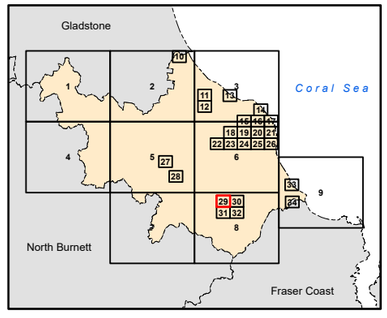
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-29**
**Revision 7.0**

Saved: Objective (A6338792)

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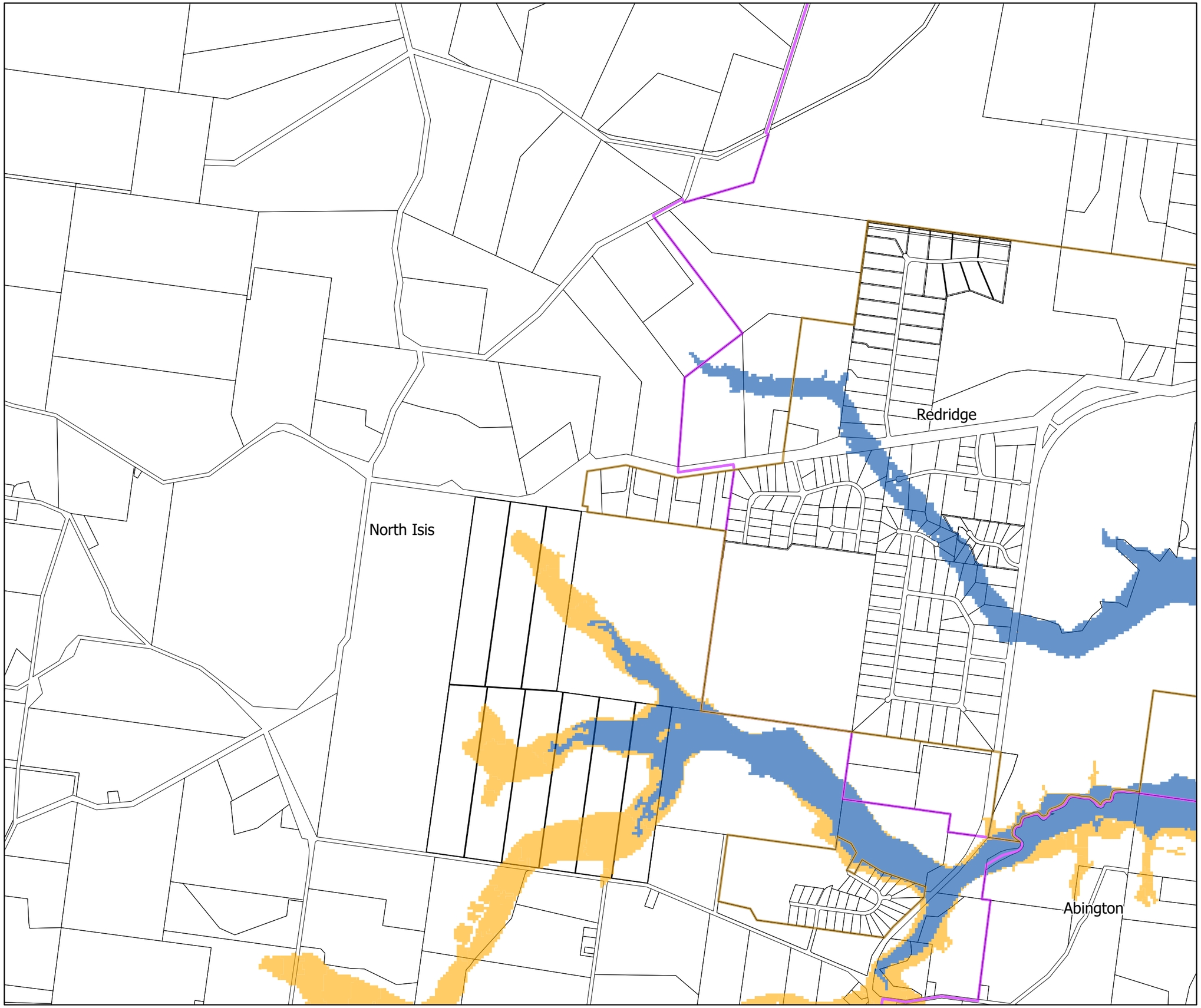


# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
- Riverine DFE - Burnett River 2013 Flood Event
- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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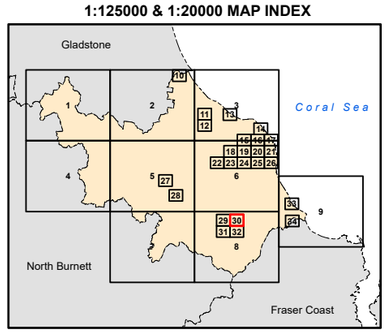
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-30**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

Isis Central

North Isis

Apple Tree Creek

Childers

Eureka

Kullogum

BUNDABERG REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
- Riverine DFE - Burnett River 2013 Flood Event
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- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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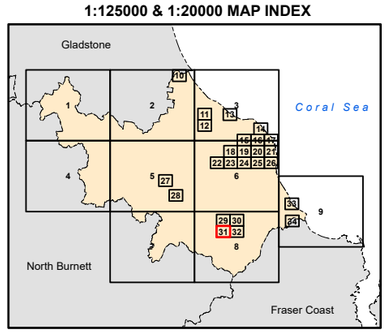


**Map Number: FHA-31**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340

North Isis

Abington

Horton

Doolbi

Childers

South Isis

# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
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- Riverine DFE - Burnett River 2013 Flood Event
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- Local DFE - Apple Tree Creek 1% AEP
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- Local DFE - McCoy Creek 1% AEP CC
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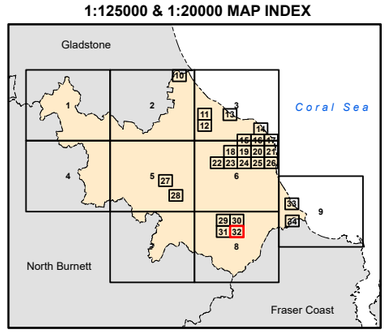
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

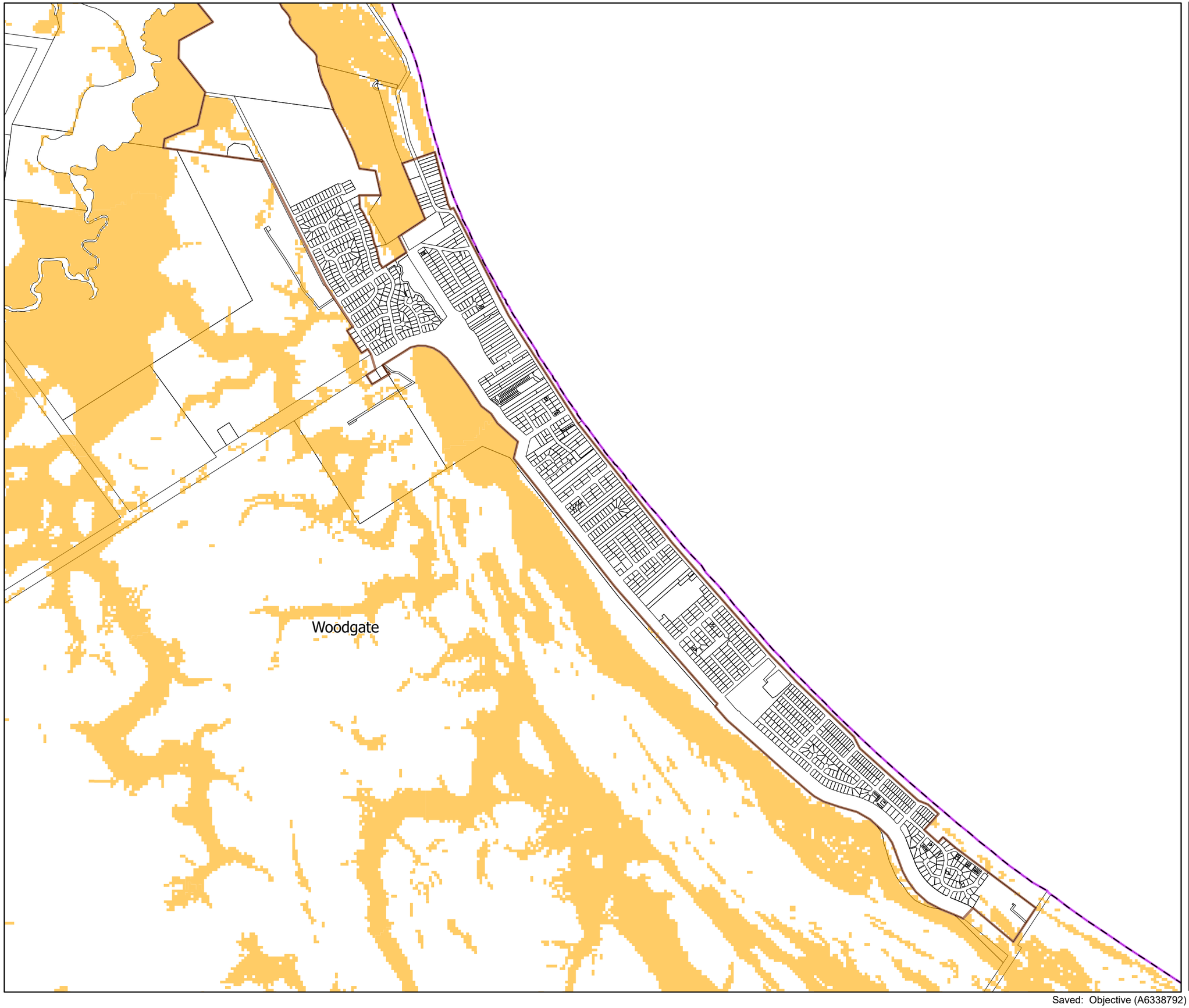
**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-32**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340




# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
- Riverine DFE - Kolan/Gin Gin Creek 1% AEP CC
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- Riverine DFE - Burrum River 1% AEP CC
- Local DFE - Apple Tree Creek 1% AEP
- Local DFE - Bundaberg Creek 1% AEP CC
- Local DFE - BuCC Drainage Study 1% AEP
- Local DFE - Coastal Small Streams 1% AEP CC
- Local DFE - McCoy Creek 1% AEP CC
- Local DFE - Saltwater Creek 1% AEP CC
- State Planning Policy Flood Hazard Area
- Non-urban Creeks/Overland Flow

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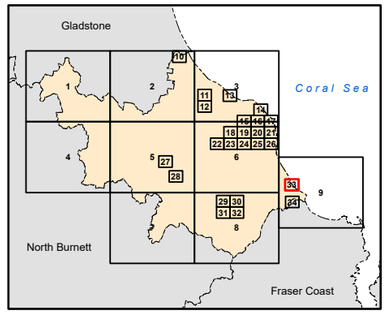
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

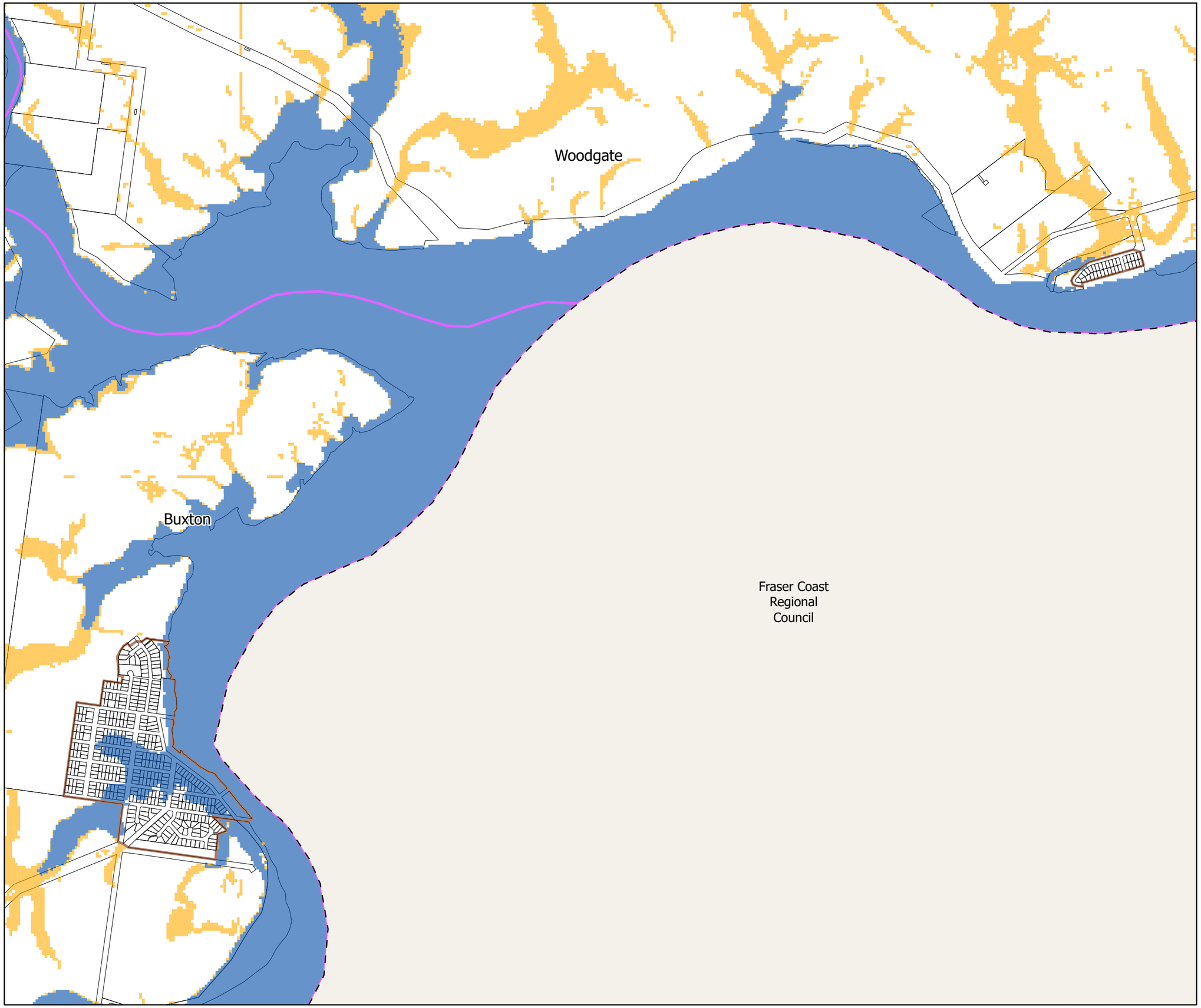
**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-33**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340




# Flood Hazard Assessment Report - Series 1 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Burnett River Riverine High Hazard Area
- Riverine DFE - Baffle Creek 1% AEP CC
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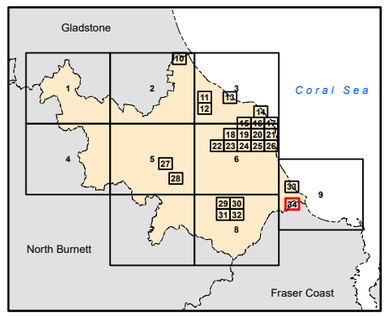
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

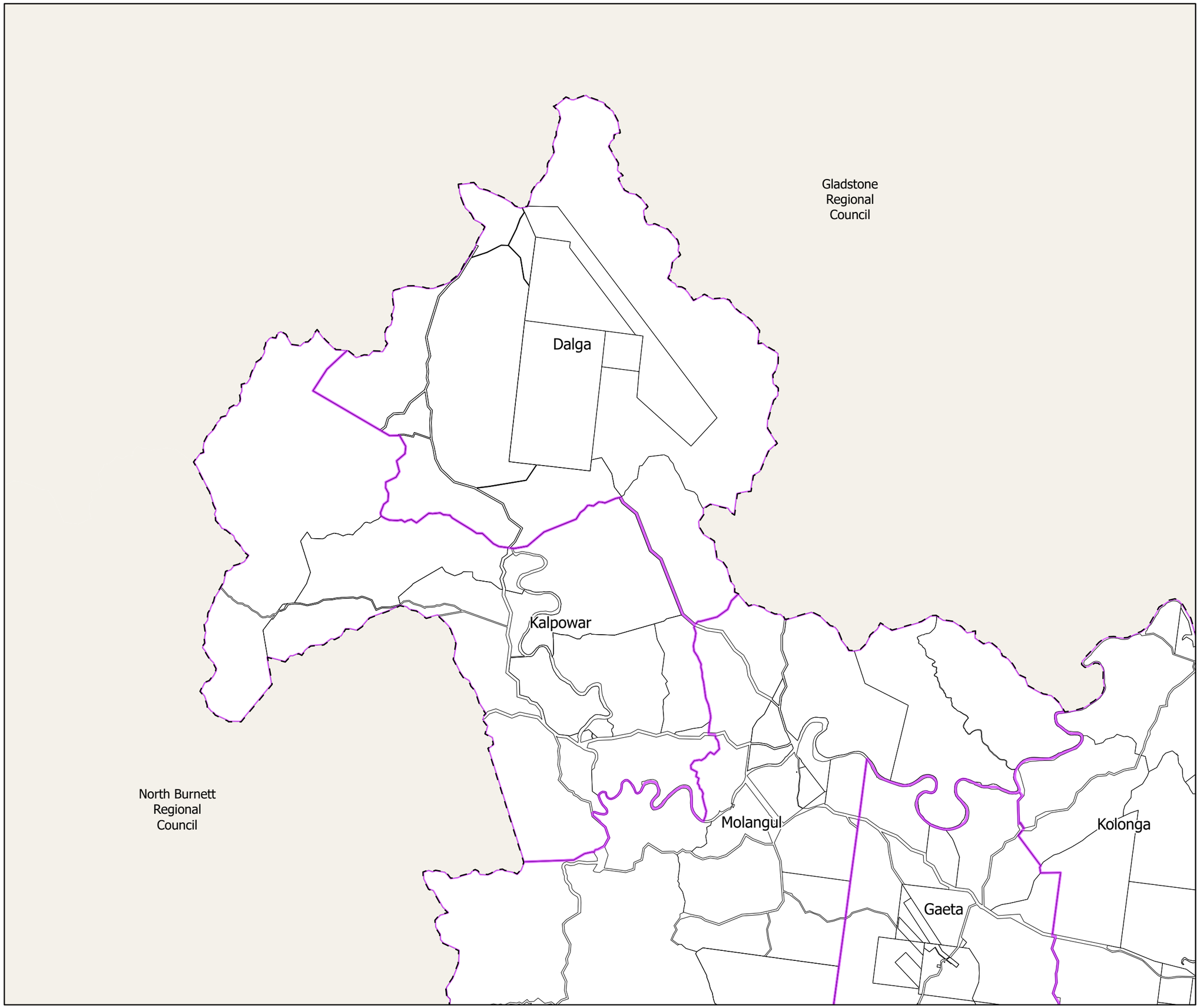
**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-34**
**Revision 7.0**

Saved: Objective (A6338792)

BRC Drawing No. 147340




BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 2 Locality Map

**Legend**

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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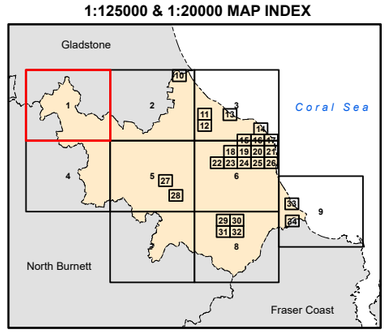
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-1**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341

Gladstone
Regional
Council

Winfield

Mullett Creek

Watalgan

Yandaran

Waterloo

Rosedale

Kolonga

Monduran

Lake Monduran

Takilberan

Abbotsford

Bucca

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 2 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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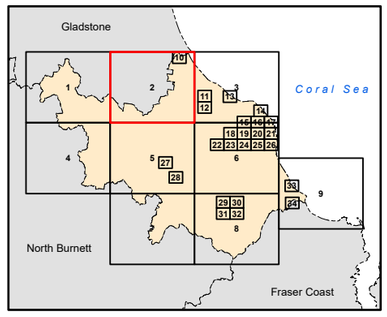
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-2**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341

Gladstone Regional Council

Mullett Creek

Miara

Yandaran

Moore Park Beach

Moorland

Avondale

Welcome Creek

Fairymead

Burnett Heads

Bucca

Meadowvale

Gooburrum

Bundaberg North

Rubyanna

Mon Repos

Qunaba

Bargara

Saved: Objective (A6338791)

BUNDABERG REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 2 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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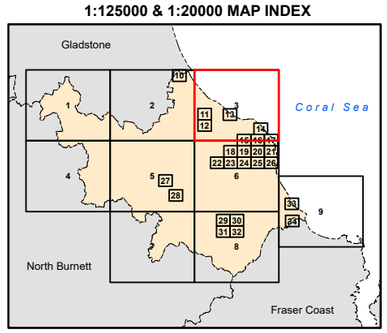
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-3**
**Revision 7.0**

BRC Drawing No. 147341

Molangul

Kolonga

Gaeta

Takilberan

North Burnett
Regional
Council

Wonbah Forest

New Moonta

Boolboonda

Wonbah

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 2 Locality Map

**Legend**

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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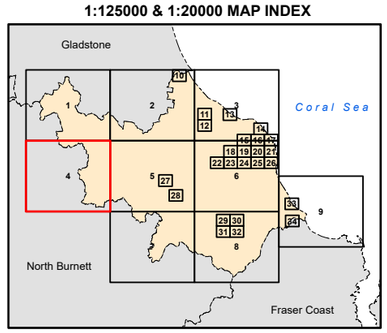
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-4**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341

Kolonga
Lake Monduran
Monduran
Abbotsford
Bucca
Takilberan
Damascus
Bullyard
Maroondan
Electra
Bungadoo
Wonbah Forest
Moolboolaman
Gin Gin
McIlwraith
Tirroan
Dalysford
Delan
New Moonta
Redhill Farms
Skyring Reserve
Drinan
St Kilda
Promisedland
Boolboonda
Nearum
Horse Camp
Wallaville
Duingal
North Burnett Regional Council
Doughboy
St Agnes
Morganville

Saved: Objective (A6338791)

BUNDABERG REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 2 Locality Map

**Legend**

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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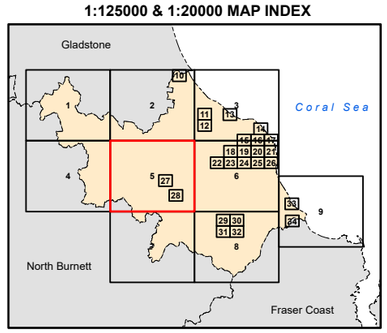
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-5**
**Revision 7.0**

BRC Drawing No. 147341

# Flood Hazard Assessment Report - Series 2 Locality Map

BUNDABERG REGIONAL COUNCIL

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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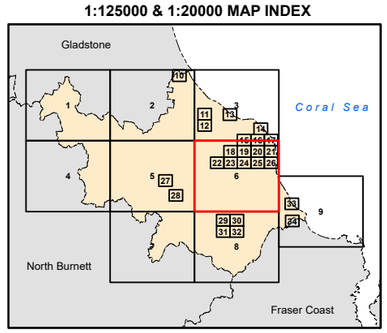
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

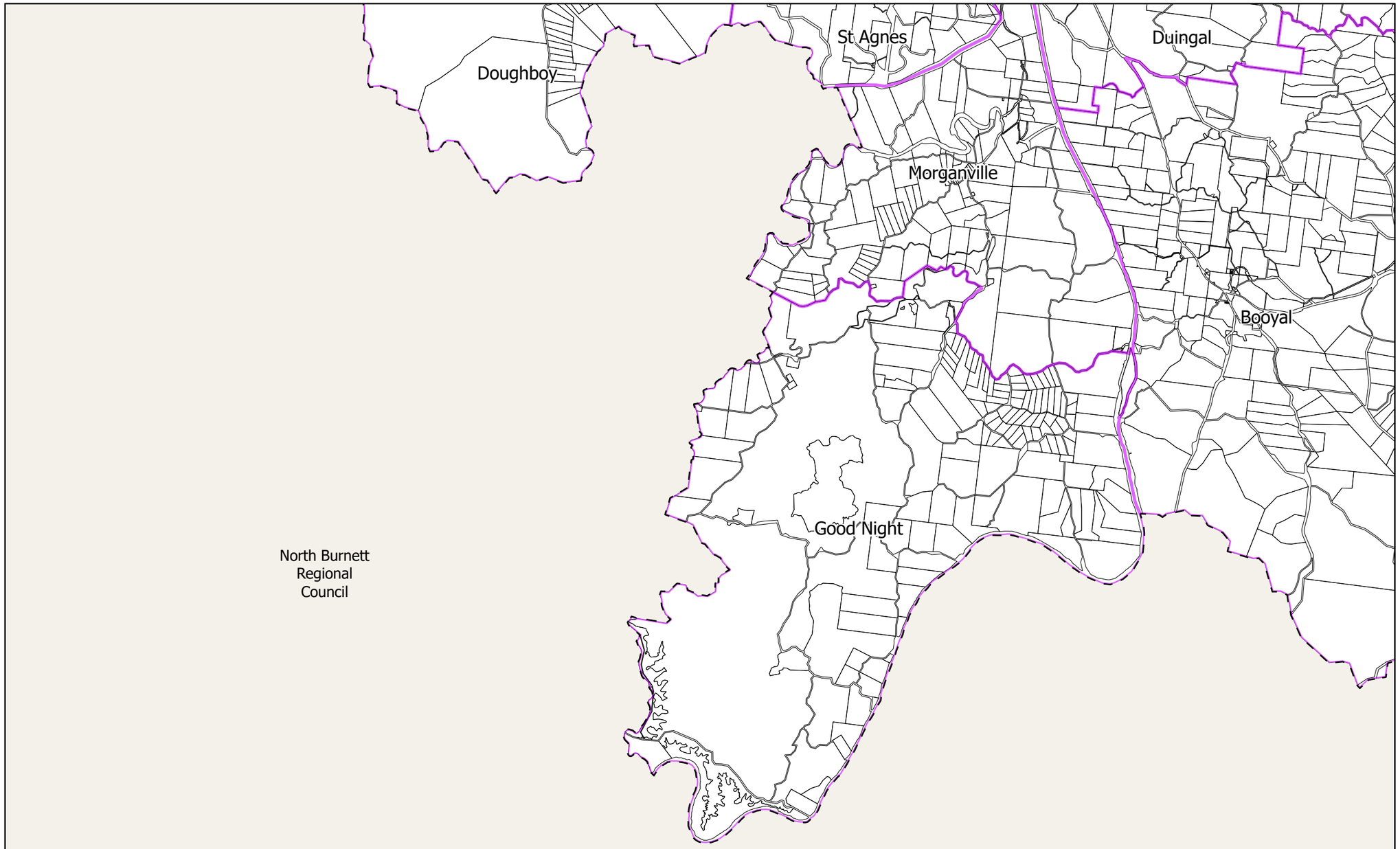
**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-6**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341

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REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 2 Locality Map

**Legend**

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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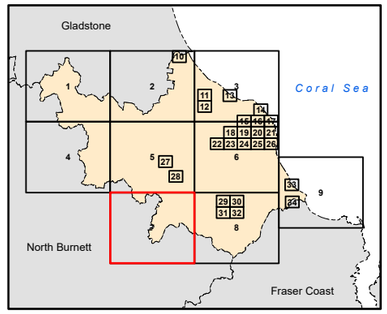
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

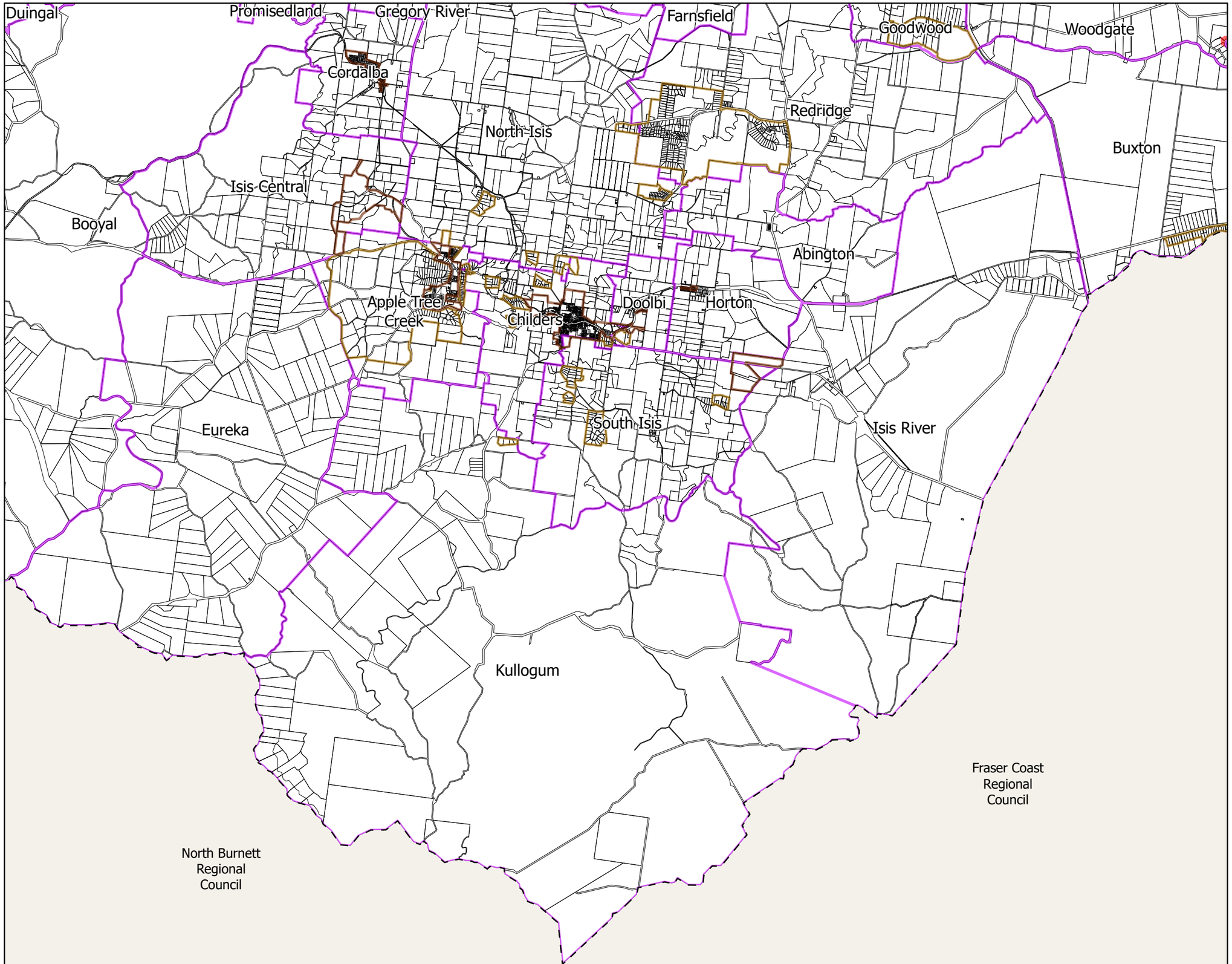
**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-7**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341




BUNDABERG REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 2 Locality Map

**Legend**

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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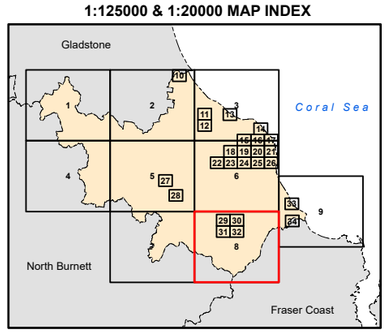
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

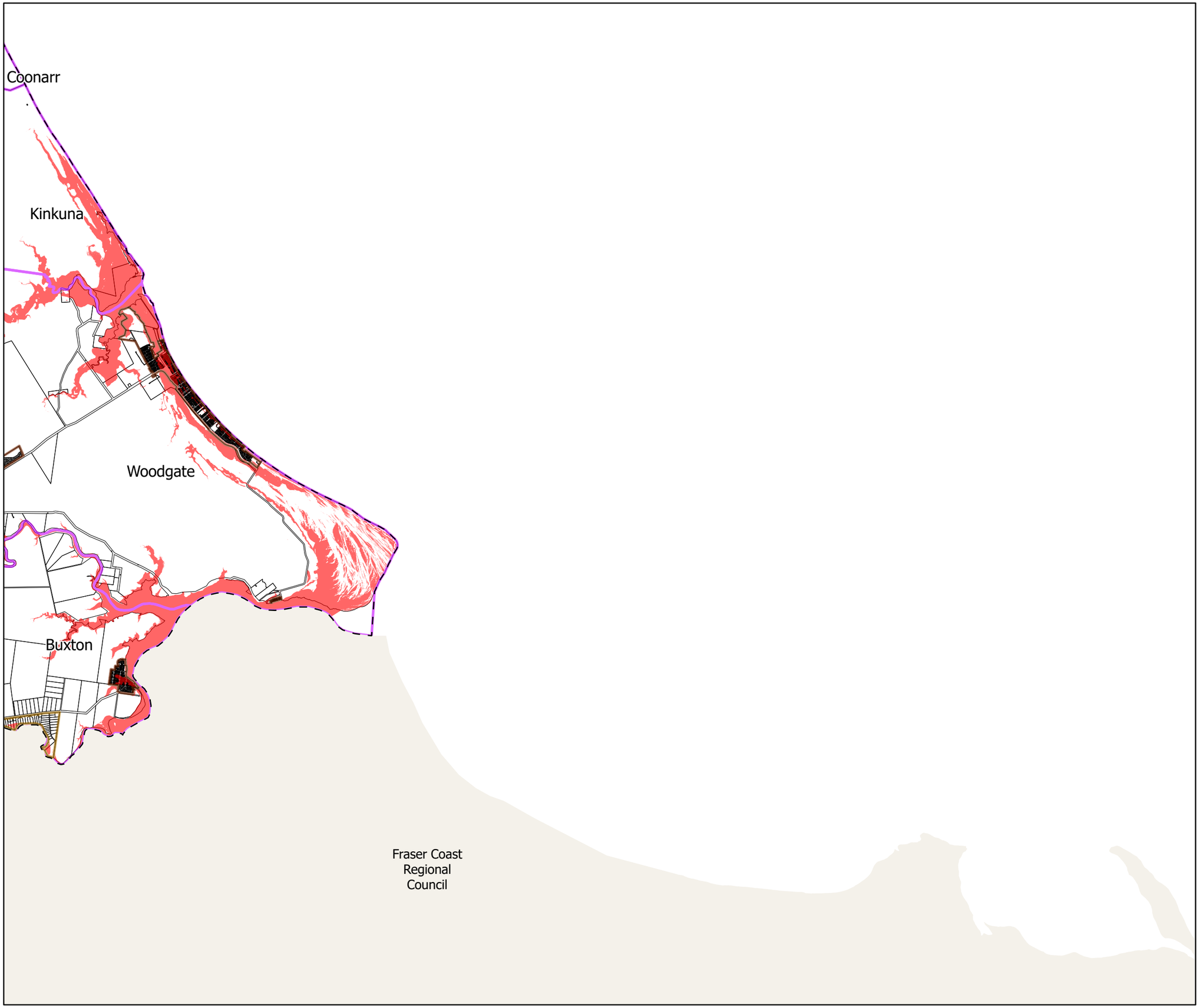
**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-8**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341




# Flood Hazard Assessment Report - Series 2 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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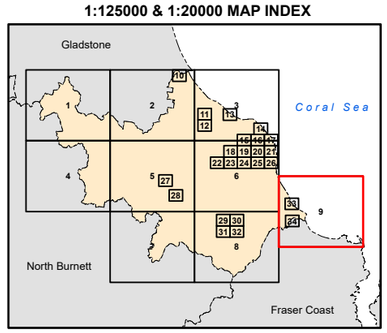
Scale at A3 - 125000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-9**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341

Gladstone Regional Council

Winfield

Mullett Creek

BUNDABERG REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 2 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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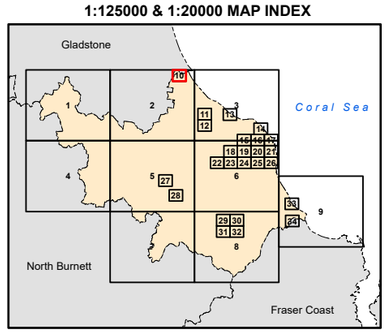
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-10**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341

Miara

Moore Park Beach

Yandaran

Avondale

Moorland

BUNDABERG REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 2 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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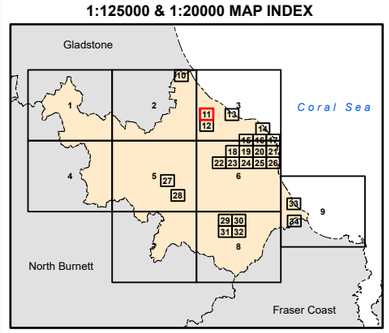
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-11**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341

Yandaran

Moorland

Avondale

Bucca

# Flood Hazard Assessment Report - Series 2 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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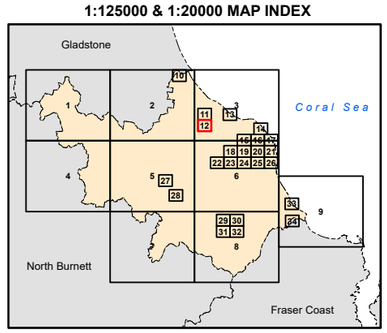
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

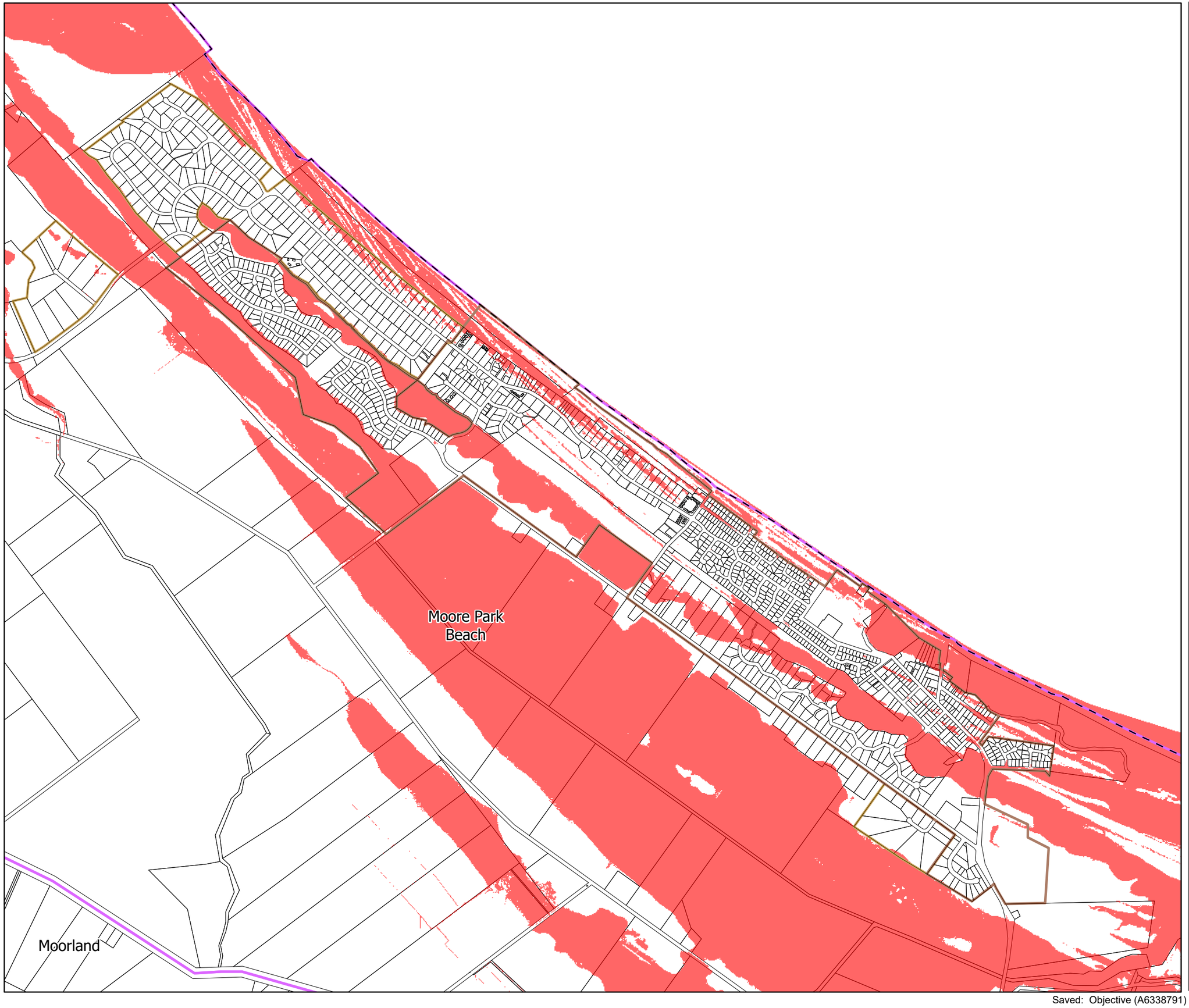
**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-12**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341




BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 2 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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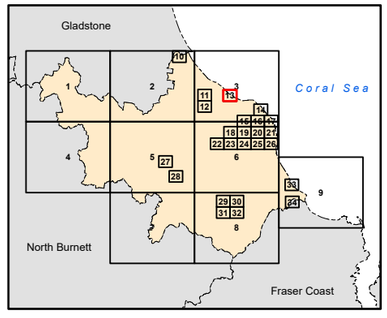
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

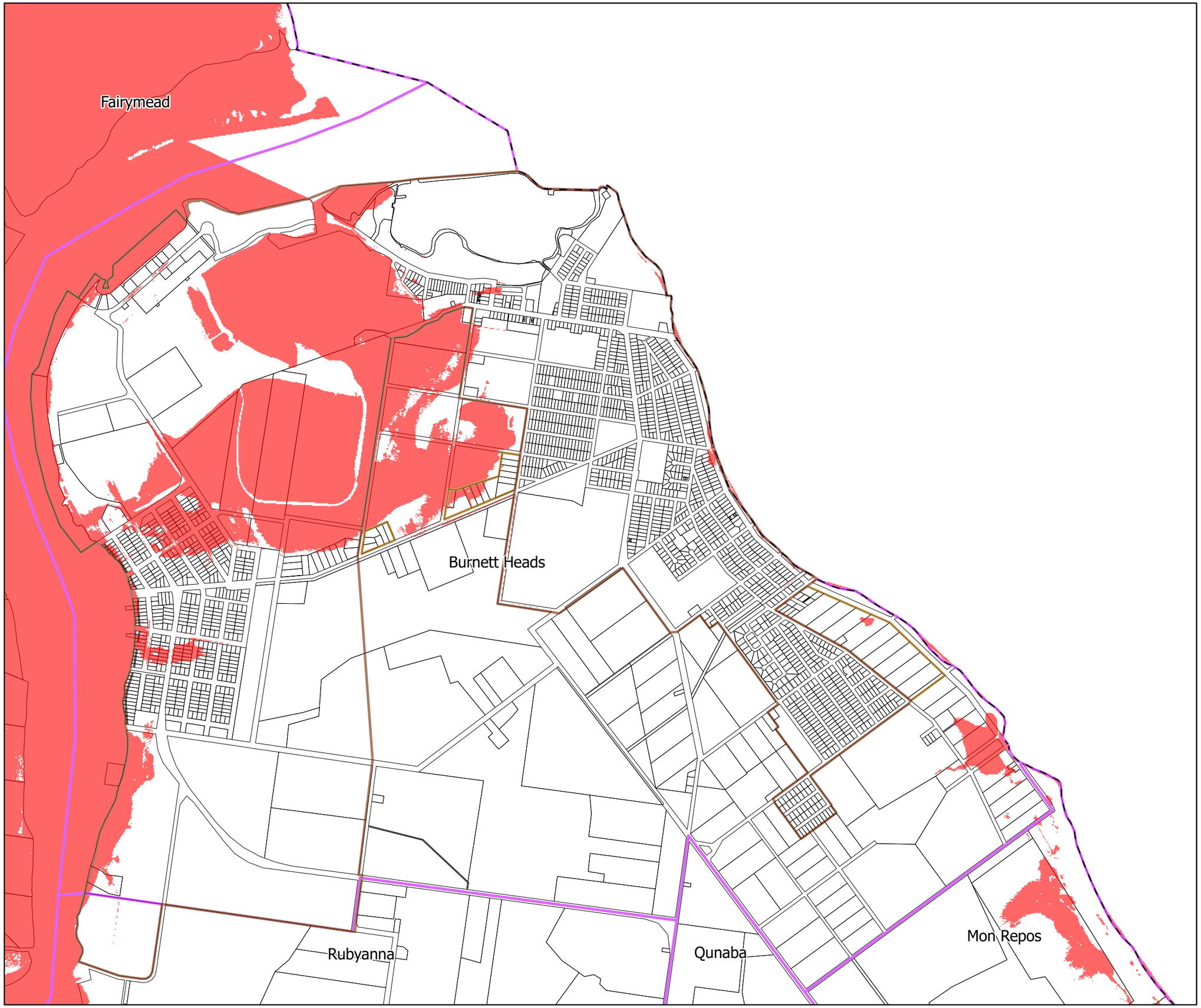
**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-13**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341




# Flood Hazard Assessment Report - Series 2 Locality Map

**Legend**

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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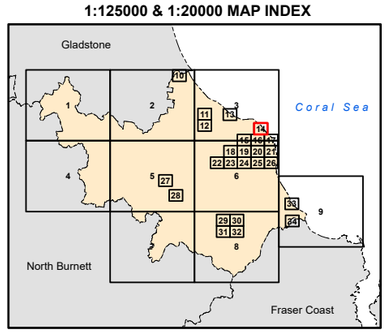
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-14**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341

Welcome Creek

Fairymead

Rubyanna

Meadowvale

Gooburrum

Bundaberg North

Oakwood

# Flood Hazard Assessment Report - Series 2 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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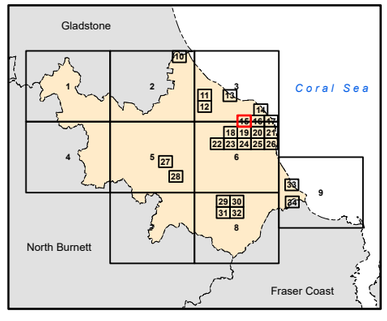
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-15**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341

Fairymead

Mon Repos

Rubyanna

Qunaba

Gooburrum

Bundaberg North

Kalkie

Windermere

# Flood Hazard Assessment Report - Series 2 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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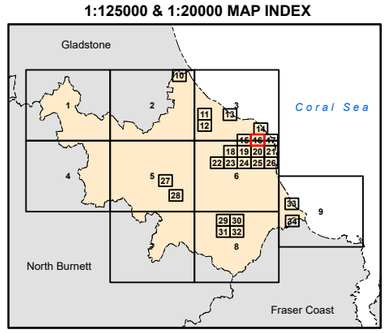
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

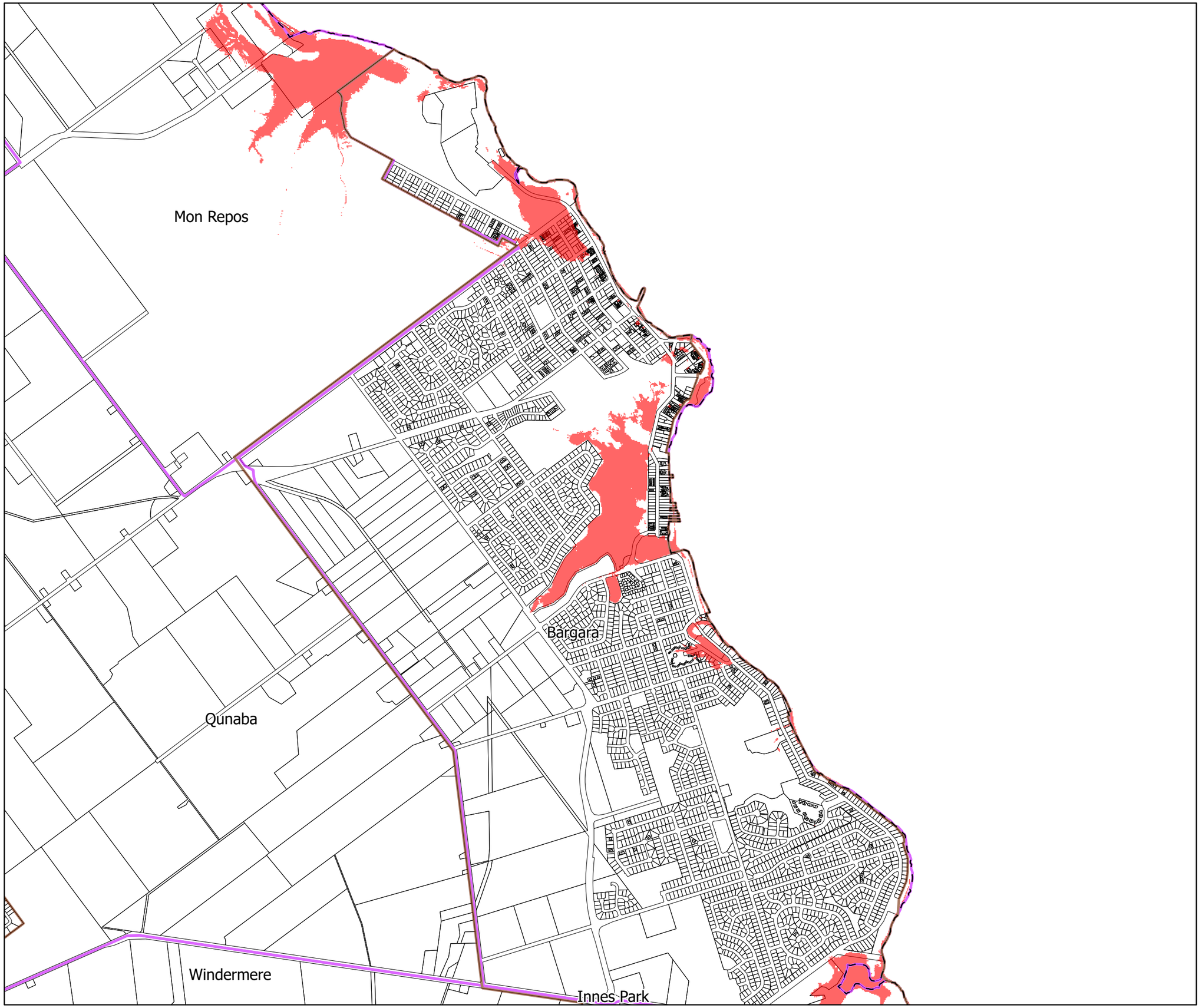
**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-16**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341




BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 2 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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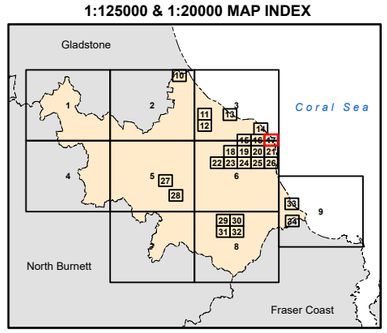
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-17**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341

Meadowvale

Oakwood

Sharon

Avoca

Branyan

# Flood Hazard Assessment Report - Series 2 Locality Map

**Legend**

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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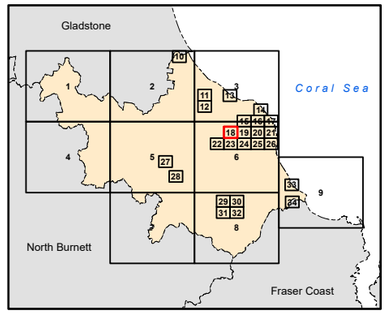
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-18**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341

Gooburrum
Oakwood
Bundaberg North
Bundaberg East
Bundaberg Central
Millbank
Bundaberg West
Bundaberg South
Kepnock
Avoca
Walkervale
Svensson Heights
Norville
Avenell Heights
Kensington
Branyan
Thabeban

# Flood Hazard Assessment Report - Series 2 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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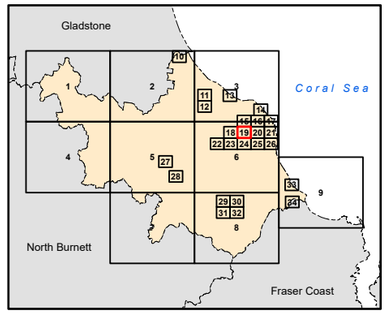
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-19**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341

Bundaberg North
Bundaberg East
Kalkie
Rubyanna
Qunaba
Windermere
Bundaberg South
Ashfield
Kepnock
Walkervale
Avenell Heights
Woongarra
Thabeban

BUNDABERG REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 2 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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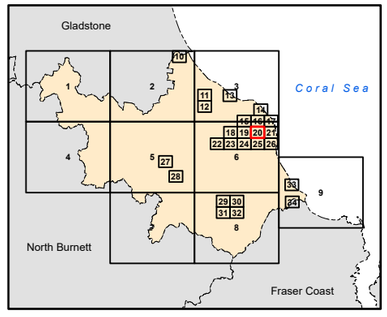
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-20**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341

Bargara

Windermere

Innes Park

Coral Cove

Woongarra

Elliott Heads

Calavos

# Flood Hazard Assessment Report - Series 2 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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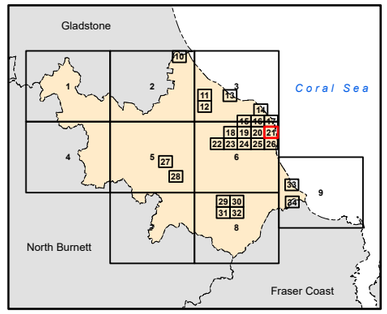
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-21**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341

Sharon

South Kolan

South Bingera

# Flood Hazard Assessment Report - Series 2 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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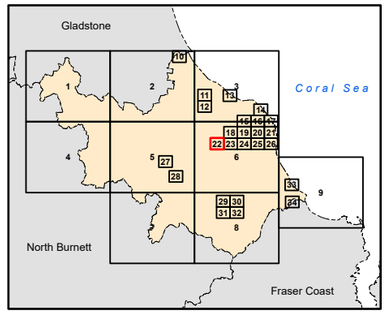
Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

**1:125000 & 1:20000 MAP INDEX**




**Map Number: FHA-22**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341

Sharon

Branyan

Kensington

South Kolan

South Bingera

Elliott

BUNDABERG
REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 2 Locality Map

## Legend

- Zoning Urban Area
- Zoning Rural Residential Area
- Locality Boundary
- Storm Tide Inundation Area

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Scale at A3 - 20000

Co-ordinate System:- GDA94 MGA Zone 56

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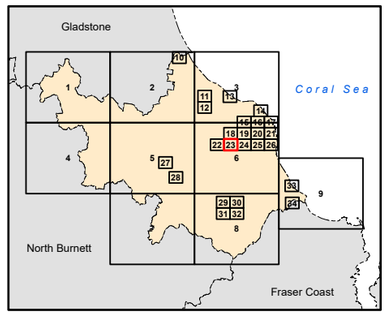
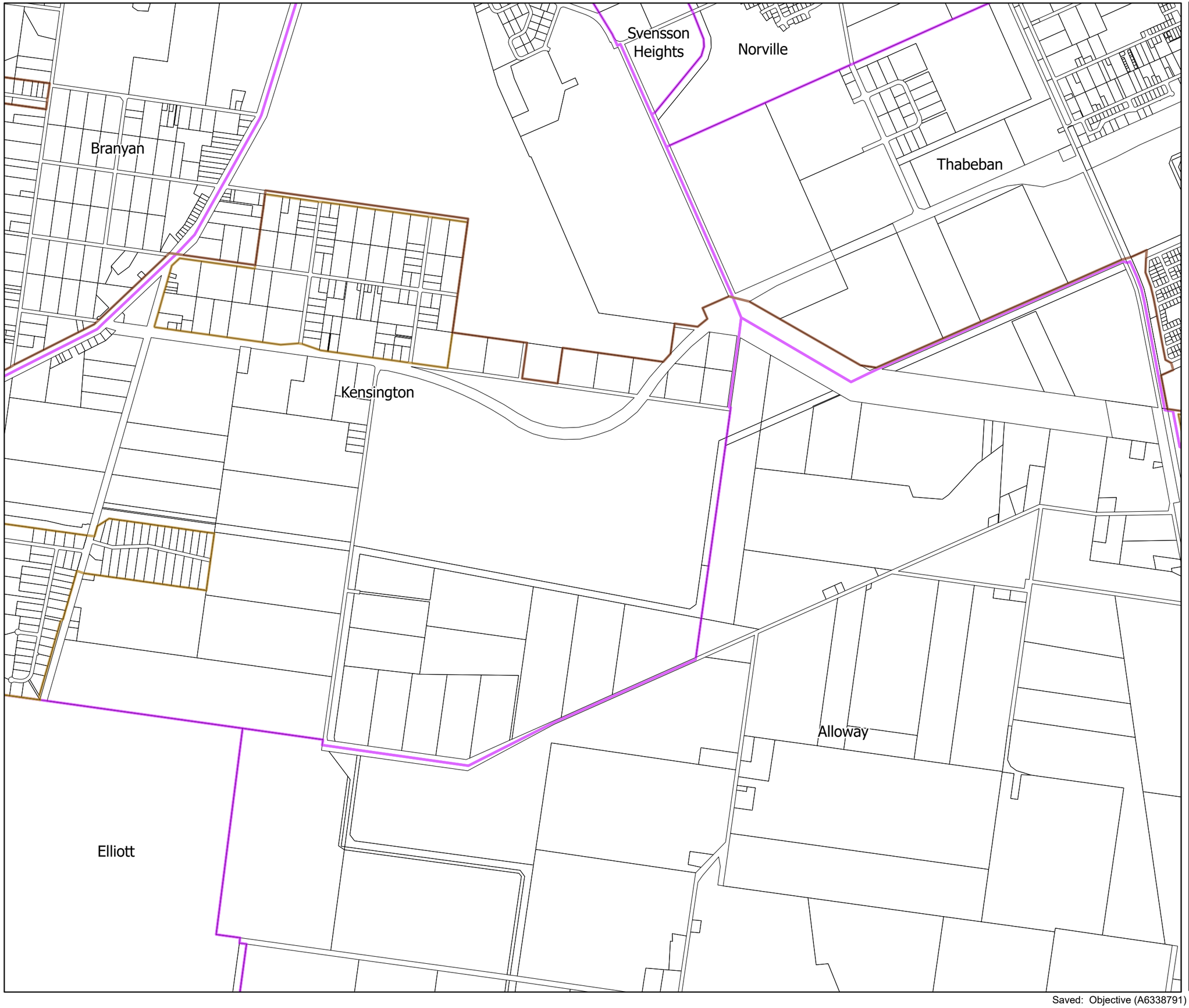



**Map Number: FHA-23**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341




BUNDABERG REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 2 Locality Map

**Legend**

- Zoning Urban Area
- Zoning Rural Residential Area
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Co-ordinate System:- GDA94 MGA Zone 56

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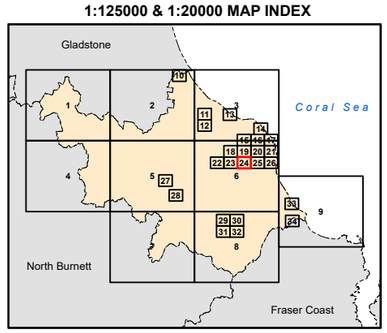


**Map Number: FHA-24**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341

Woongarra

Thabeban

Alloway

Calavos

# Flood Hazard Assessment Report - Series 2 Locality Map

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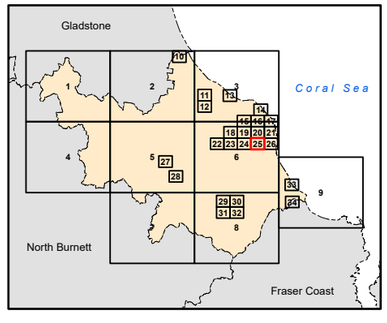


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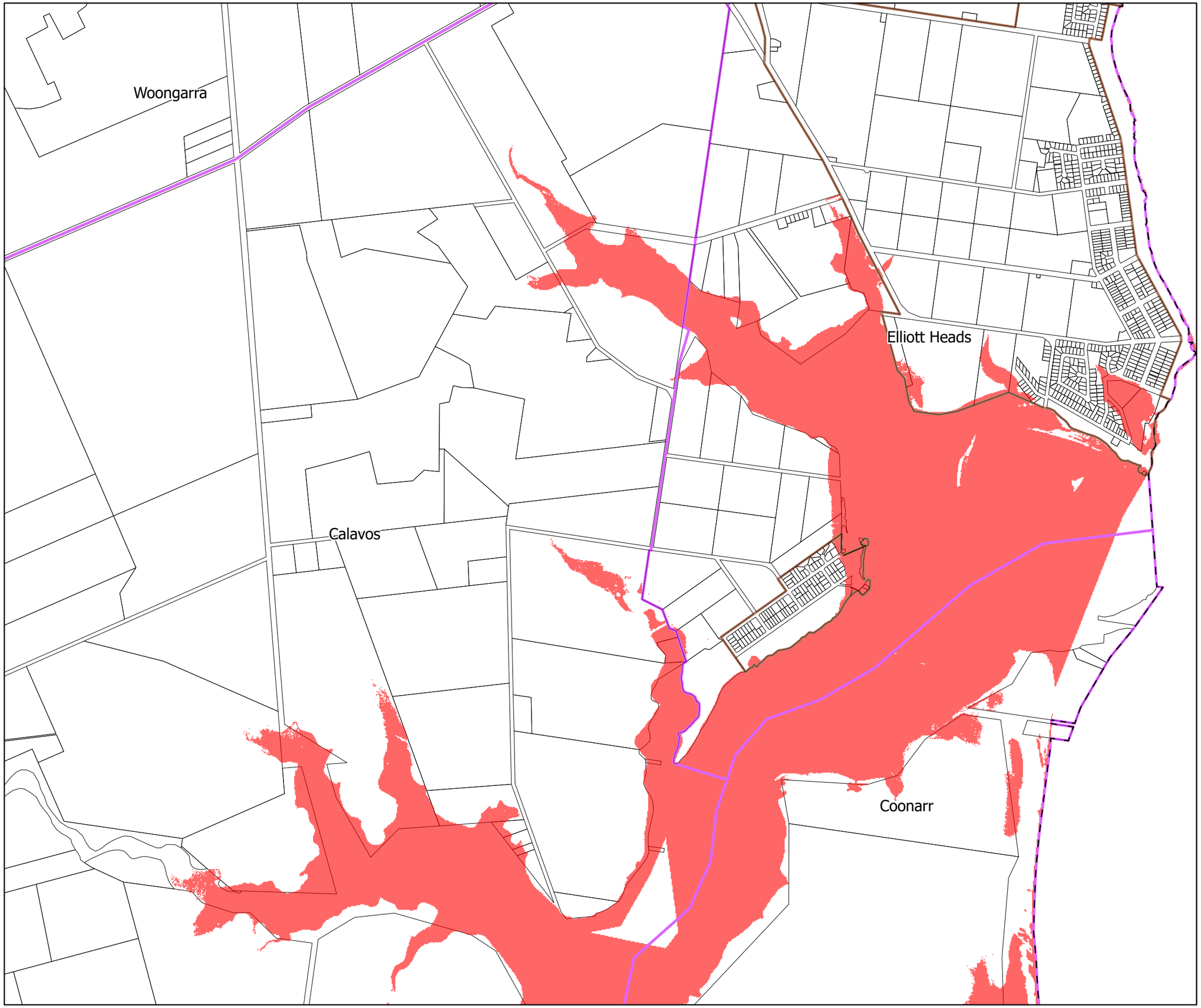


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# Flood Hazard Assessment Report - Series 2 Locality Map

**Legend**

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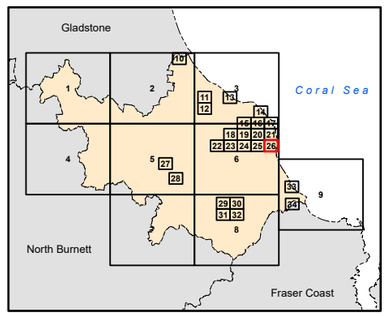


**Map Number: FHA-26**
**Revision 7.0**

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BRC Drawing No. 147341

Gin-Gin

Dalysford

Tirroan

Redhill Farms

McIlwraith

Drinan

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# Flood Hazard Assessment Report - Series 2 Locality Map

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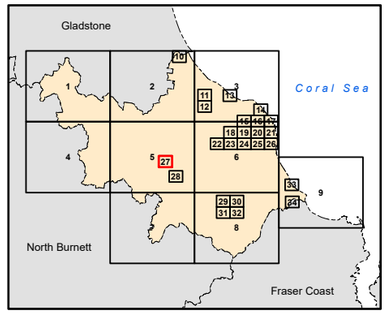


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**Revision 7.0**

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BRC Drawing No. 147341

Skyring Reserve

Drinan

Wallaville

Duingal

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# Flood Hazard Assessment Report - Series 2 Locality Map

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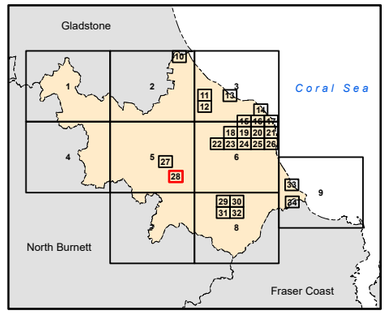


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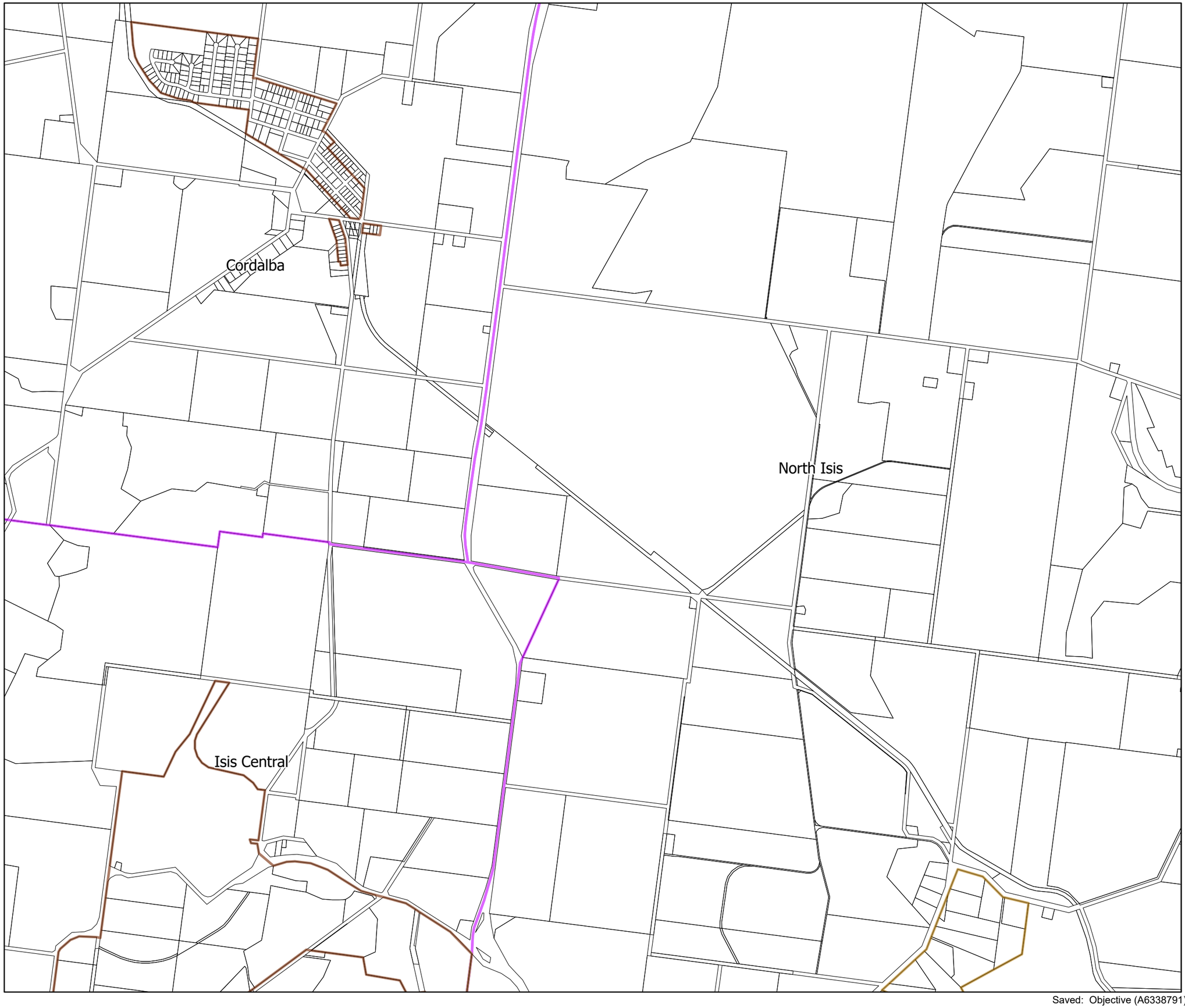


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# Flood Hazard Assessment Report - Series 2 Locality Map

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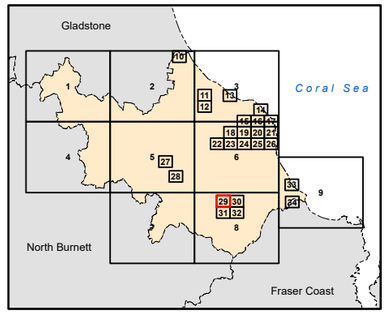


**Map Number: FHA-29**
**Revision 7.0**

Saved: Objective (A6338791)

BRC Drawing No. 147341

Redridge

North Isis

Abington

# Flood Hazard Assessment Report - Series 2 Locality Map

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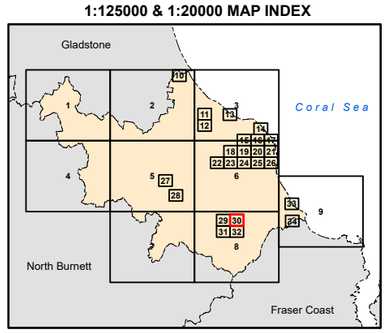


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**Revision 7.0**

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BRC Drawing No. 147341

Isis Central

North Isis

Apple Tree Creek

Childers

Eureka

Kullogum

BUNDABERG REGIONAL COUNCIL

# Flood Hazard Assessment Report - Series 2 Locality Map

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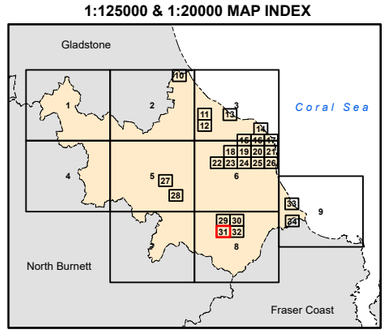


**Map Number: FHA-31**
**Revision 7.0**

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BRC Drawing No. 147341

North Isis

Abington

Childers

Doolbi

Horton

South Isis

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# Flood Hazard Assessment Report - Series 2 Locality Map

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Co-ordinate System:- GDA94 MGA Zone 56

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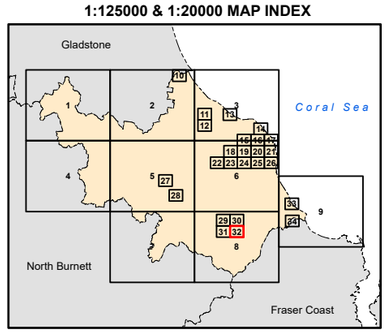


**Map Number: FHA-32**
**Revision 7.0**

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BRC Drawing No. 147341

Woodgate

# Flood Hazard Assessment Report - Series 2 Locality Map

## Legend

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Co-ordinate System:- GDA94 MGA Zone 56

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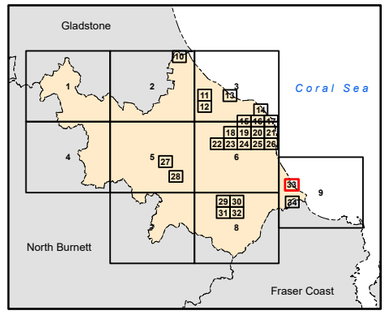


**Map Number: FHA-33**
**Revision 7.0**

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BRC Drawing No. 147341

Woodgate

Buxton

Fraser Coast
Regional
Council

# Flood Hazard Assessment Report - Series 2 Locality Map

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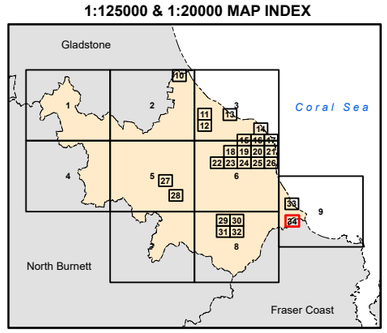


**Map Number: FHA-34**
**Revision 7.0**

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BRC Drawing No. 147341

# Schedule 3 – Natural Hazard Risk Assessment

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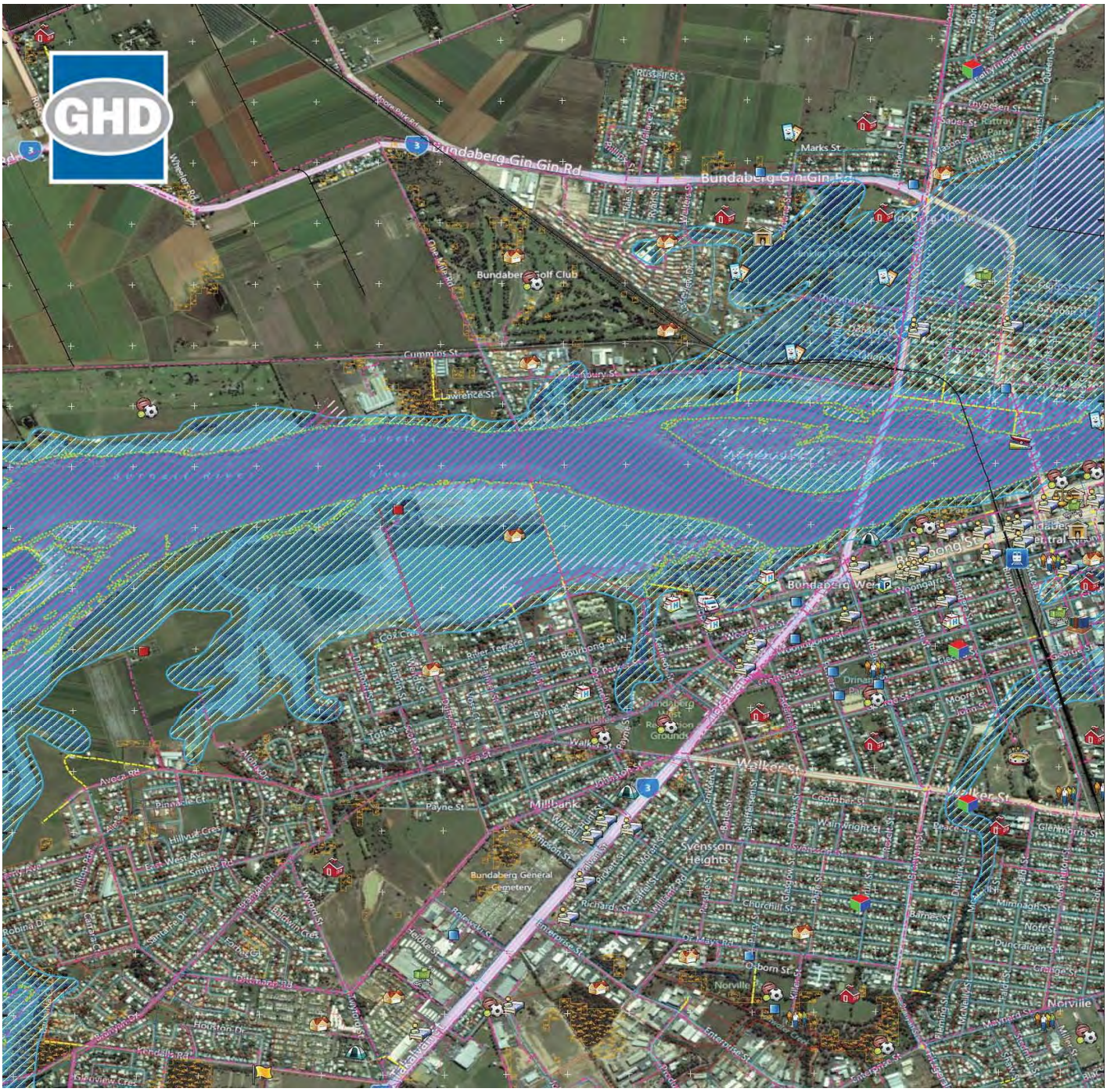


# Bundaberg Regional Council

## Local Disaster Management Plan

## Natural Hazard Risk Assessment Report

22 October 2012

## Disclaimer

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*GHD otherwise disclaims responsibility to any person other than Bundaberg Regional Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.*

*The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.*

*The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.*

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# Executive summary

This report has been compiled to provide an overview of the process, background reference material, preparation and results of the Natural Hazard Risk Assessment facilitated by GHD for Bundaberg Regional Council (BRC). The content of the report sections and appendices are summarised under each heading below.

## Section 1.0. Introduction

The introduction provides a brief background of the scope for the project and details the risks identified and considered by BRC.

## Section 2.0. Results

Provides a summary of results for each risk in terms of risk description, likelihood, consequence and overall residual risk rating, identified seasonally where time of year is a factor. This has been conducted using the AS/NZS/ISO 31000:2009 – Risk Management Standard and the Draft National Emergency Risk Assessment Guidelines (NERAG).

## Section 3.0 Key Issues

The assessment of all natural hazard risks has identified the main risks and priorities facing Council, especially where there are some courses of action required to further manage the highest scoring risks.

This section highlights the key issues and identifies the most applicable management options available for the highest risks, including sub plans to be developed for specific areas and communities.

## Appendix A – Hazard Risk Assessment

Results for each risk are presented in a 'reader-friendly' format for use by Council to communicate the results of the assessment. The pages present the identified hazards, consequence scores, likelihood scores, risk scoring matrices, and the results for each risk presented graphically for residual risk ratings throughout the year.

## Appendix B – Risk Register

The full risk register for each risk is included. These are the most detailed records of the assessment process. These were used as working documents for the process, including the assessment workshops. Contents of the registers include:

- Risk descriptor (summarised form the hazard definitions in Appendix C, immediate and strategic impacts on people, the environment, the economy, governance, social and community, and infrastructure. Any locations more susceptible to impact were also identified.
- Existing controls in place to both prevent and prepare for the impact, and respond and recover from an event. Comments are also supplied regarding the effectiveness of existing controls
- Current (residual) risk ratings in terms of consequence, likelihood and risk rating as per the risk scoring matrices in Appendix D. Seasonal variations affecting likelihood of an event are also noted.

- Possible risk reduction measures are listed. These are not confirmed action plans, but rather a brainstormed list of options, often derived from the identified gaps in the effectiveness of existing risk controls as well as fresh ideas for improvement.
- Any other comments that demonstrate to future reviewers what key scenarios and issues were in the forefront of the assessor's minds during the workshop.

## Appendix C – Hazard Definitions

The definitions for each identified hazard are listed as detailed and agreed prior to the assessment.

## Appendix D – Risk Scoring Matrices

As per the AS/NZS/ISO 31000 standard, the risk context was established and a set of likelihood, consequence and risk rating matrices were developed to establish a consistent basis for scoring the natural hazard risks.

## Appendix E – References and Resources

As part of the preparation for this assessment, international, national, state and council specific documents were identified and reviewed to see if these identified any of the following:

- Natural hazard risks
- Impacts of natural hazards
- Any data related to actual events, frequency, severity and any pertinent outcomes and resulting measures undertaken
- Legislation, guidelines and reports that affect the management of natural hazard risks
- Controls in place at national, state and regional level that would effectively assist to mitigate or even avoid the risk, and any assessment as to their effectiveness
- Any planning or strategies in place that will have an effect on the management of any future event

The references are listed and comments made as to the applicability of each document to this assessment.

## Appendix F – Program for Natural Hazard Risk Assessment Workshop

The program is a document provided in advance of the workshop detailing the project and workshop overview, attendees, syndicate groups where applicable, workshop agenda and location.

## Appendix G – Workshop Attendance Register

A copy of the attendance register is attached recording who attended the workshop, their names and roles.

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   2.1 Summary of Results ..... 2
3. Key Issues ..... 10
   3.1 Community Sub Plans ..... 10
   3.2 Other Recommendations ..... 13

# Appendices

Appendix A Hazard Risk Assessment

Appendix B Risk Register

Appendix C Hazard Definitions

Appendix D Risk Scoring Tables

Appendix E References & Resources

Appendix F Program for HRAW

Appendix G Attendance Sheet

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# 1. Introduction

GHD Pty Ltd (GHD) has been engaged by Bundaberg Regional Council (BRC) to prepare a Hazard Risk Assessment (HRA) in response to the amendments of the Disaster Management Act 2003 (the DMA) which forms the legislative bases for disaster management activities within all levels of Government in Queensland. The HRA has utilised the processes of both the ISO 31000:2009 – Risk Management and the Draft National Emergency Risk Assessment Guidelines (NERAG) to establish the context, identify the risks, analyse the risks and evaluate the risks for the following sixteen (16) hazards:

1. East Coast Low Pressure System;
2. Thunderstorm/ Electrical Storm;
3. Cyclone (Category 1, 2, 3);
4. Cyclone (Category 4 and 5);
5. Flood;
6. Tornado/ Dust Storm (winds exceeding 160 km/h);
7. Earthquake;
8. Landslide (including erosion);
9. Prolonged Drought;
10. Bushfire (Rural/ Urban/ Rural interface);
11. Pandemic and other contagious diseases (Human Diseases Outbreak);
12. Extreme High Temperature Event;
13. Insect or Exotic Plant/ Animal Disease;
14. Storm tide;
15. Tsunami; and
16. Algal Bloom.

# 2. Results

A Hazard Risk Assessment Workshop (HRAW) was undertaken on the 14 June 2012 between GHD, BRC and a range of principle stakeholders from the Local Disaster Management Group (LDMG) and supporting agencies. The purpose of the HRAW was to identify, analyse and evaluate the key risks identified by the NERAG process which feeds directly into the final Hazard Risk Assessment (HRA) including local knowledge and experience. A brief summary of the results and agreed definitions found in the risk workshop are listed below. The detailed results of the HRAW are provided in Appendix A.

## 2.1 Summary of Results

### 2.1.1 East Coast Low Pressure Systems

East Coast Lows (ECL) are intense low-pressure systems which occur on average several times each year (predominantly in Autumn and Winter) off the eastern coast of Australia, in particular southern Queensland, NSW and eastern Victoria. They can produce gale to storm-force winds, very heavy rainfall and in some cases coastal inundation. Maximum wind speeds recorded are lower than in severe tropical cyclones (Australian Bureau of Meteorology).

***Likelihood:***

**Likely:** January to June

**Possible:** July and August

**Unlikely:** September to December

***Consequence:***

**Moderate**

***Overall residual risk rating:***

**High (66):** From January to June

**Medium (54):** From July to August

**Medium (51):** September to December

### 2.1.2 Thunderstorm/Electrical Storm

A severe thunderstorm is defined as one which produces: hail with a diameter of 2 cm or more; or wind gusts of 90 km/h or greater; or flash floods; or tornadoes, or any combination of these. Most thunderstorms do not reach the level of intensity needed to produce these dangerous phenomena, but they all produce lightning which can cause death, injury and damage. (Australian Bureau of Meteorology).

***Likelihood:***

**Almost certain:** January to March

**Likely:** April, November and December

**Possible:** May and October

**Unlikely:** June to September

***Consequence:***

**Minor**

***Overall residual risk rating:***

**Medium (48):** January to March

**Medium (45):** April, November and December

**Low (27):** May and October

**Low (24):** June to September

### 2.1.3 Cyclone (1, 2 and 3)

Tropical Cyclones develop over very warm tropical waters where the sea surface temperature is greater than 26°C. They have relatively long life cycles, typically about a week. Category 1/2/3 cyclone will have wind speeds up to 224 km/hr. A tropical cyclone is a tropical depression of sufficient intensity to produce sustained gale force winds (at least 63 km/h). Severe tropical cyclones correspond to the hurricanes or typhoons of other parts of the world (Australian Bureau of Meteorology). The region covered by this risk extends from Capricornia Waters to Fraser Island Waters.

***Likelihood:***

**Likely:** January to March

**Possible:** April, November and December

**Unlikely:** May and October

**Improbable**: June to September

***Consequence:***

**Moderate**

***Overall residual risk rating:***

**High (66):** January to March

**Medium (54):** November, December and April

**Medium (51):** May and October

**Low (30):** June to September

### 2.1.4 Cyclone (4 & 5)

Category 4 and 5 severe tropical cyclones can produce significant property damage with wind speeds over 225km/hr near the centre, heavy rainfall and coastal inundation through storm surge. The region covered by this risk extends from Capricornia Waters to Fraser Island Waters.

***Likelihood:***

**Possible:** November to March

**Rare:** April

**Improbable:** June to September

***Consequence:***

**Major**

***Overall residual risk rating:***

**High (72):** November to March

**Medium (57):** April

**Low (36):** May to October

### 2.1.5 Flood

A flood is a general and temporary condition of partial or complete inundation of normally dry land areas from overflow of inland or tidal waters from the unusual and rapid accumulation or runoff of surface waters from any source (Geoscience Australia).

***Likelihood:***

**Possible**

***Consequence:***

**Major**

***Overall residual risk rating:***

**High (72)**

### 2.1.6 Tornado /Dust Storm

The rarest and most violent of severe thunderstorm phenomena are rapidly rotating columns of air that descend in the well-known funnel shape from the base of a storm cloud. A tornado vortex, which can range in width from a few metres to hundreds of metres, usually whirls clockwise (viewed from above) and contains very damaging winds that may reach more than 450 km/h. (Australian Bureau of Meteorology).Dust-storms are for the most part restricted to the drier inland areas of Australia, but occasionally, during widespread drought, they can affect coastal districts. (Bureau of Meteorology definition)

***Likelihood:***

**Possible:** September to January

**Unlikely:** February to May and August

**Rare**: June and July

***Consequence:***

**Major**

***Overall residual risk rating:***

**High (72):** September to January

**Medium (51):** February to May and August

**Low (33):** June and July

### 2.1.7 Earthquake

An earthquake is the shaking and vibration at the surface of the Earth caused by underground movement along a fault plane or by volcanic activity. Due to the nature of earthquakes, there is no 'season' for them to commonly occurring in. Therefore, it was found that the rating given to this hazard was the same throughout the year. The Likelihood rating given to a major earthquake was Rare. However, the consequence of a major earthquake is Catastrophic. This gave the overall risk rating of a major earthquake as Medium.

***Likelihood:***

**Unlikely**

***Consequence:***

**Catastrophic**

***Overall residual risk rating:***

**High (78)**

### 2.1.8 Landslide (including erosion)

A landslide is the movement of rock, debris or earth down a slope. Landslides can be triggered by natural causes or by human activity. They range from a single boulder in a rock fall or topple to tens of millions of cubic metres of material in a debris flow.

Landslides have factors that can affect their occurrence, however, like earthquakes; they do not have a common 'season' of occurrence.

***Likelihood:***

**Unlikely**

***Consequence:***

**Minor**

***Overall residual risk rating:***

**Low (24)**

### 2.1.9 Prolonged Drought

A prolonged drought in general is an acute water shortage. Defining the end of a period of rainfall deficiency is a difficult matter, and presents more problems than defining the start. In the content of this risk assessment, a drought is interpreted as a prolonged event that impacts directly on the Bundaberg Region, its water sources, the linked water grid and the natural environment.

***Likelihood:***

**Possible**

***Consequence:***

**Major**

***Overall residual risk rating:***

**High (72)**

### 2.1.10 Bushfire (Rural/ Urban/ Rural interface)

A general term used to describe a fire in vegetation in all vegetation types including grass fires. (Australian Fire and Emergency Services Authorities Council).

***Likelihood:***

**Likely:** November and January

**Possible:** September to October

**Unlikely:** February to August

***Consequence:***

**Moderate**

***Overall residual risk rating:***

**High (66):** November to January

**Medium (54):** September to October

**Medium (51):** February to August

### 2.1.11 Pandemic and other contagious diseases (Human Diseases Outbreak)

A pandemic is a global disease outbreak. An influenza pandemic occurs when a new influenza virus emerges and, because there is little or no immunity in the human population, it spreads rapidly from person-to-person over a wide geographical area causing serious illness in a significant proportion of those infected. This contrasts with seasonal influenza which, for most sufferers, is a self-limiting though unpleasant illness that does not endanger life (World Health Organisation). For the purposes of this risk assessment, Pandemic is taken to include all influenza and general disease outbreaks, not just the seasonal flu.

***Likelihood:***

**Possible**

***Consequence:***

**Major**

***Overall residual risk rating:***

**High (72)**

### 2.1.12 Extreme High Temperatures (> 36 degrees, > 2 days)

Extreme high temperatures are when there is a prolonged period of excessive heat. Queensland Health defines this as temperatures exceeding 36 degrees for a period exceeding 2 days. This unusual and uncomfortable hot weather can impact on human and animal health and cause disruption to community infrastructure such as power supply, public transport and services (Emergency Management Queensland).

***Likelihood:***

**Likely:** November to January

**Possible:** February to April and October

**Unlikely:** September

**Rare:** May to August

***Consequence:***

**Moderate**

***Overall residual risk rating:***

**High (66):** November to January

**Medium (54):** February to April and October

**Medium (51):** September

**Low (33):** May to August

### 2.1.13 Insect or exotic Plant/ Animal Disease

Exotic animal and/or plant disease is a transmissible disease or condition that degrades the health or productivity of a plant or animal.

***Likelihood:***

**Possible**

***Consequence:***

**Major**

***Overall residual risk rating:***

**High (72)**

### 2.1.14 Storm Tide

A storm tide occurs that breaches current natural and physical controls and directly impacts on coastal and riverine communities and infrastructure. 0.5m above the Highest Average Tide (HAT) level.

***Likelihood:***

**Possible:** January to December

***Consequence:***

**Major**

***Overall residual risk rating:***

**Medium (60):** January to March

**Medium (57):** April, November and December

**Low (36):** May to October

### 2.1.15 Tsunami

A series of large and fast travelling waves generated offshore impact on the region's coastline causing widespread casualties and damage.

***Likelihood:***

**Unlikely**

***Consequence:***

**Major**

***Overall residual risk rating:***

**Medium (60)**

### 2.1.16 Algal Bloom

An algal bloom is a rapid increase or accumulation in the population of algae in a freshwater or marine environment resulting in discolouration of the water e.g. from cyanobacteria. Of particular note are harmful algal blooms (HABs), which are algal bloom events involving toxic or otherwise harmful phytoplankton, such blooms often take on a red or brown hue and are known colloquially as red tides.

***Likelihood:***

**Rare**

***Consequence:***

**Moderate**

***Overall residual risk rating:***

**Low (30)**

# 3. Key Issues

As part of the HRAW, a number of key issues were identified. A detailed list of these relating to each individual hazard has been included within the HRR in ***Appendix A*** of this report. It is noted that these issues also include risk reduction methods which outline a range of mechanisms, tools and management options to reduce the impacts of the above hazards outlined in the introduction of this report. It is recommended that a review of each risk is conducted annually to

## 3.1 Community Sub Plans

During the HRAW it became apparent that some of the identified hazards may affect specific communities more than others and therefore required specific risk reduction methods which outline a range of mechanisms, tools and management options to reduce the impacts of the hazard on the community. The following communities were identified to suffer more severely from the specified threat due to their geographic location causing them to become isolated during an event. It is recommended that sub plans be prepared for these communities in order to lessen the effects of the hazard.

| Hazard | Specific Sub Plan Inclusions | General Sub Plan Inclusions |
|---|---|---|
| **DM Sub Plans recommended for selected communities such as Moore Park and Woodgate** | | |
| Flood | ◗ Flood studies and mapping- response mapping critical assets;<br>◗ Power/ communications providers keep systems well maintained and protected;<br>◗ Register of high risk people;<br>◗ Evacuation of flood prone communities (especially high risk patients);<br>◗ Usually have one to four days warning of an event, and need to keep monitoring and tracking intensity and direction;<br>◗ Some reliance on communications and ability to operate remotely;<br>◗ Dedicated evacuation centre, cyclone rated building;<br>◗ Generators for water supply and wastewater – both have telemetry;<br>◗ Updating website detailing information;<br>◗ DTMR website details road closures, ability for Council to update directly. Engineers make the calls regarding road closures;<br>◗ DTMR and councils currently working to coordinate and integrate road closures;<br>◗ Comprehensive and rehearsed Local Disaster Management Plan;<br>◗ Well educated, trained and equipped SES and Volunteer Marine Rescue teams;<br>◗ Council Site Preparation Plans; | ◗ Identify the scope of the plan;<br>◗ Identify the context of the plan and key areas that are more; susceptible to the event.<br>◗ Identify critical vulnerabilities;<br>◗ Identify critical information requirements;<br>◗ Identify and list command and control;<br>◗ Identify and list the roles and responsibilities, this includes: the preparation, response and recovery phase and identify who has what responsibilities in each phase;<br>◗ Each sub plan should include a visual matrix of key tasks that are associated with the event;<br>◗ A decision tree should be a visual aid provided in the sub plans; and |

| Hazard | Specific Sub Plan Inclusions | General Sub Plan Inclusions |
|---|---|---|
| | ◗ Catchment Management Plan;<br>◗ Bank vegetation management;<br>◗ Council Planning Scheme;<br>◗ Current review of evacuation centres, transport of the frail, elderly and evacuated personnel and medical assistance needs;<br>◗ Small supply of emergency equipment/ generators;<br>◗ Consultation with key agencies about their Disaster Mitigation Plans;<br>◗ Insurance, emergency response and Federal & State Government Assistance;<br>◗ Review previous flood response plans and strategy meeting minutes;<br>◗ Establish a Flood Committee to assess risk and invest in non-desktop flood response rehearsals;<br>◗ Increase community awareness of what reported flood heights actually mean for individual property owners. Flood heights are typically reported in terms of levels relative to the local flood gauge however, there is poor awareness of what this means in terms of flood extent and the relativity of property floor levels to the reported flood level. It is recommended that potentially affected properties have a plaque in their electricity box which indicates the ground level, floor level and the height of historical flood levels in units relative to the local flood gauge;<br>◗ Undertake a survey of vulnerable communities (eg nursing homes to determine which have backup emergency generators and which don't);<br>◗ Create a database of where backup generators may be available;<br>◗ Improve existing flood maps based on most recent flood studies;<br>◗ Update flood studies based on existing floodplain conditions, undertake gap analysis and improve mapping across all significant waterways;<br>◗ Store street signage alerts (eg detour signs) and road block items at various locations around the city so they can be more easily accessed during flood;<br>◗ Need for vulnerable communities to review and improve flood response plans (eg need for generator backup);<br>◗ Need to identify central receiving logistic point for food deliveries;<br>◗ Improved security at emergency accommodation facilities;<br>◗ Need for current hardcopies of street maps at all flood response centres so non-local personnel can quickly gain bearings;<br>◗ Provision of portable communication towers; | ◗ A communications plan should be identified for the community. Each stage of the event should be clearly outlined with exactly what information can be released. (Community Resilience Strategy). |

| Hazard | Specific Sub Plan Inclusions | General Sub Plan Inclusions |
|---|---|---|
| | ◗ Upgrade the immunity of critical access roads;<br>◗ Lobby to legislate ability to recoup rescue costs and prosecute those that ignore road closure signage; and<br>◗ Seek improvements from communication providers to provide better services, maintenance and protection of infrastructure. | |
| **DM Sub Plans recommended for selected communities such as Moore Park and Woodgate, state forests, Goodnight Scrubs and Promiseland** | | |
| Bushfire | ◗ Investigate small cool burns after good wet seasons while the ground is still moist;<br>◗ Encourage double blade width fire breaks around properties;<br>◗ Develop burn-off strategy (after wet years) when there is still plenty of moisture in the ground. Cool mosaic burns are recommended to control fuel loads and control woody weeds;<br>◗ Large green road map/sign for road closure, charging those who ignore road closures the full cost of rescue;<br>◗ DES and SES support for training;<br>◗ Prepare a detailed bushfire management plan that includes evacuation plans for at risk communities or precincts;<br>◗ Educate public on bush fire behaviours;<br>◗ Encourage site based bushfire mitigation strategies ie. Stay and fight or flee;<br>◗ Condition developments in high risk areas to include bush fire protection devices such as roof top sprinklers, back up water tanks and generators;<br>◗ Condition developments in high risk areas to use fire resistant designs and materials such as concrete, earth mounds/walls etc;<br>◗ All stations grade a fire break around their boundaries each year;<br>◗ Fence lines and exit tracks in various directions from homesteads are graded each year;<br>◗ Training and reliance on local knowledge;<br>◗ Graziers largely practice full range of sound fire preparation strategies;<br>◗ Rural fire brigade;<br>◗ Manage overgrown allotments;<br>◗ Active Local Disaster Management Plan and rehearsals public education on risks and expected actions;<br>◗ Responsibility for fuel monitoring (National Parks & forest conservation, Council controlled land);<br>◗ Managing ignition source (fire weather warnings, fire bans & stats of fire emergency fire, permit to burn and area closures); | ◗ Identify the scope of the plan;<br>◗ Identify the context of the plan and key areas that are more susceptible to the event;<br>◗ Identify critical vulnerabilities;<br>◗ Identify critical information requirements;<br>◗ Identify and list command and control;<br>◗ Identify and list the roles and responsibilities, this includes: the preparation, response and recovery phase and identify who has what responsibilities in each phase;<br>◗ Each sub plan should include a visual matrix of key tasks that are associated with the event;<br>◗ A decision tree should be a visual aid provided in the sub plans; and<br>◗ A communications plan should be identified for the community. Each stage of the event should be clearly outlined with exactly |

| Hazard | Specific Sub Plan Inclusions | General Sub Plan Inclusions |
|---|---|---|
| | ◗ Council Planning Scheme;<br>◗ Managing fuel( prescribed burning, smoke management, monitoring & forecasting fuel condition);<br>◗ Presence of fire breaks and other mitigation strategies around residential property and outbuildings;<br>◗ Vegetation management - fire breaks and trails, I-zones;<br>◗ QFRS risk assessments and data;<br>◗ hazard monitoring activities;<br>◗ Community Education (QFRS schools);<br>◗ Home School education;<br>◗ ABC radio/ media-local televised news;<br>◗ FPQ (resources)-local power company- summer preparedness and planning other natural area Council, fire resources from QPWS;<br>◗ Local recovery committees;<br>◗ Managing fire (fire detection and reporting, conventional response resources, aerial attack, fire weather and incident management);<br>◗ Social Infrastructure Strategy;<br>◗ Local power company (disconnect and reconnect);<br>◗ Telecommunications carriers repair and temporary mobile phone tower capabilities;<br>◗ Council LDMG/ EMQ/ Department of communities;<br>◗ ABC Radio;<br>◗ Communications with fire crews on ground; and<br>◗ Well educated, trained and equipped Rural Fire Services, supported by SES teams and other agencies. | what information can be released. (Community Resilience Strategy). |

## 3.2 Other Recommendations

The following recommendations are made to support the Risk Hazard Risk Assessment process:

- **Community Resilience Plans / Strategies.** Resilience Plans are recommended to refer to http://hardenup.org/ for preparedness for local community resilience.
- **Volunteer Organisations.** Choose a volunteer coordinator to support Council such as Volunteering Queensland http://www.volunteeringqld.org.au/web/ .
- **Annual Review of Risk Register.** Conduct Review of Risk Assessment Annually to assess changes to likelihood, consequence and overall risk rating based on local or global conditions (i.e. climate and weather system fluctuations, population / demographic fluctuations etc).
- **Interoperability between Regions.** It is recommended communication and coordination with adjoining regions and agencies to provide a Regional approach to Preparedness, Response and Recovery (i.e. representation on adjoining LDMG and DDMG meetings etc).

# Appendices

# Appendix A Hazard Risk Assessment

## Bundaberg Regional Council Natural Hazard Risk Assessment (2012)

### Likelihood Assessment

| Risk | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 - East Coast Low Pressure System | LIKELY | LIKELY | LIKELY | LIKELY | LIKELY | LIKELY | POSSIBLE | POSSIBLE | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY |
| 02 - Thunderstorm | ALMOST CERTAIN | ALMOST CERTAIN | ALMOST CERTAIN | LIKELY | POSSIBLE | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | POSSIBLE | LIKELY | LIKELY |
| 03 - Tropical Cyclone (Cat 1/2/3 ) | LIKELY | LIKELY | LIKELY | POSSIBLE | UNLIKELY | IMPROBABLE | IMPROBABLE | IMPROBABLE | IMPROBABLE | UNLIKELY | POSSIBLE | POSSIBLE |
| 04 - Tropical Cyclone (Cat 4/5 ) | POSSIBLE | POSSIBLE | POSSIBLE | RARE | IMPROBABLE | IMPROBABLE | IMPROBABLE | IMPROBABLE | IMPROBABLE | IMPROBABLE | POSSIBLE | POSSIBLE |
| 05 - Flood | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE |
| 06 - Tornado | POSSIBLE | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | RARE | RARE | UNLIKELY | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE |
| 07 - Earthquake | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY |
| 08 - Landslide (Erosion) | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY |
| 09 - Drought | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE |
| 10 - Bushfire (Rural and Interface Areas) | LIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | POSSIBLE | POSSIBLE | LIKELY | LIKELY |
| 11 - Pandemic | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE |
| 12 - Extreme High Temperatures (>36 degrees, >2 days)* | LIKELY | POSSIBLE | POSSIBLE | POSSIBLE | RARE | RARE | RARE | RARE | UNLIKELY | POSSIBLE | LIKELY | LIKELY |
| 13 - Insect or Exotic Animal/Plant Disease | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE | POSSIBLE |
| 14 - Storm tide | UNLIKELY | UNLIKELY | UNLIKELY | RARE | IMPROBABLE | IMPROBABLE | IMPROBABLE | IMPROBABLE | IMPROBABLE | IMPROBABLE | RARE | RARE |
| 15- Tsunami | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY | UNLIKELY |
| 16 - Algal Bloom | RARE | RARE | RARE | RARE | RARE | RARE | RARE | RARE | RARE | RARE | RARE | RARE |

| Likelihood Rating Scale | | | | | |
|---|---|---|---|---|---|
| IMPROBABLE | RARE | UNLIKELY | POSSIBLE | LIKELY | ALMOST CERTAIN |

* Based on available Bureau of Meteorology Data

## Bundaberg Regional Council Natural Hazard Risk Assessment (2012)

## Consequence Assessment

| Risk | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 - East Coast Low Pressure System | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE |
| 02 - Thunderstorm | MINOR | MINOR | MINOR | MINOR | MINOR | MINOR | MINOR | MINOR | MINOR | MINOR | MINOR | MINOR |
| 03 - Tropical Cyclone (Cat 1/2/3 ) | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE |
| 04 - Tropical Cyclone (Cat 4/5 ) | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR |
| 05 - Flood | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR |
| 06 - Tornado | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR |
| 07 - Earthquake | CAT | CAT | CAT | CAT | CAT | CAT | CAT | CAT | CAT | CAT | CAT | CAT |
| 08 - Landslide (Erosion) | MINOR | MINOR | MINOR | MINOR | MINOR | MINOR | MINOR | MINOR | MINOR | MINOR | MINOR | MINOR |
| 09 - Drought | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR |
| 10 - Bushfire (Rural and Interface Areas) | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE |
| 11 - Pandemic | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR |
| 12 - Extreme High Temperatures (>36 degrees, >2 days)* | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE |
| 13 - Insect or Exotic Animal/Plant Disease | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR |
| 14 - Storm tide | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR |
| 15- Tsunami | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR | MAJOR |
| 16 - Algal Bloom | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE | MODERATE |

* Based on available Bureau of Meteorology Data

## Bundaberg Regional Council Natural Hazard Risk Assessment (2012)

### Overall Residual Risk Rating

| Risk | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 - East Coast Low Pressure System | HIGH 66 | HIGH 66 | HIGH 66 | HIGH 66 | HIGH 66 | HIGH 66 | MEDIUM 54 | MEDIUM 54 | MEDIUM 51 | MEDIUM 51 | MEDIUM 51 | MEDIUM 51 |
| 02 - Severe Thunderstorm / Electrical Storm | MEDIUM 48 | MEDIUM 48 | MEDIUM 48 | MEDIUM 45 | LOW 27 | LOW 24 | LOW 24 | LOW 24 | LOW 24 | LOW 27 | MEDIUM 45 | MEDIUM 45 |
| 03 - Tropical Cyclone (Cat 1/2/3) | HIGH 66 | HIGH 66 | HIGH 66 | MEDIUM 54 | MEDIUM 51 | LOW 30 | LOW 30 | LOW 30 | LOW 30 | MEDIUM 51 | MEDIUM 54 | MEDIUM 54 |
| 04 - Tropical Cyclone (Cat 4/5 ) | HIGH 72 | HIGH 72 | HIGH 72 | MEDIUM 51 | LOW 36 | LOW 36 | LOW 36 | LOW 36 | LOW 36 | LOW 36 | HIGH 72 | HIGH 72 |
| 05 - Flood | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 |
| 06 - Tornado / Dust Storm | HIGH 72 | MEDIUM 60 | MEDIUM 60 | MEDIUM 60 | MEDIUM 60 | MEDIUM 57 | MEDIUM 57 | MEDIUM 60 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 |
| 07 - Earthquake | HIGH 78 | HIGH 78 | HIGH 78 | HIGH 78 | HIGH 78 | HIGH 78 | HIGH 78 | HIGH 78 | HIGH 78 | HIGH 78 | HIGH 78 | HIGH 78 |
| 08 - Landslide (Erosion) | LOW 24 | LOW 24 | LOW 24 | LOW 24 | LOW 24 | LOW 24 | LOW 24 | LOW 24 | LOW 24 | LOW 24 | LOW 24 | LOW 24 |
| 09 - Drought | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 |
| 10 - Bushfire (rural and Interface Areas) | HIGH 66 | MEDIUM 51 | MEDIUM 51 | MEDIUM 51 | MEDIUM 51 | MEDIUM 51 | MEDIUM 51 | MEDIUM 51 | MEDIUM 54 | MEDIUM 54 | HIGH 66 | HIGH 66 |
| 11 - Pandemic | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 |
| 12 - Extreme High Temperatures (>36 degrees, >2 days) | HIGH 66 | MEDIUM 54 | MEDIUM 54 | MEDIUM 54 | LOW 33 | LOW 33 | LOW 33 | LOW 33 | MEDIUM 51 | MEDIUM 54 | HIGH 66 | HIGH 66 |
| 13-Insect or Exotic Animal/Plant Disease | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 | HIGH 72 |
| 14 - Storm tide | MEDIUM 60 | MEDIUM 60 | MEDIUM 60 | MEDIUM 57 | LOW 36 | LOW 36 | LOW 36 | LOW 36 | LOW 36 | LOW 36 | MEDIUM 57 | MEDIUM 57 |
| 15-Tsunami | MEDIUM 60 | MEDIUM 60 | MEDIUM 60 | MEDIUM 60 | MEDIUM 60 | MEDIUM 60 | MEDIUM 60 | MEDIUM 60 | MEDIUM 60 | MEDIUM 60 | MEDIUM 60 | MEDIUM 60 |
| 16-Algal Bloom | LOW 30 | LOW 30 | LOW 30 | LOW 30 | LOW 30 | LOW 30 | LOW 30 | LOW 30 | LOW 30 | LOW 30 | LOW 30 | LOW 30 |

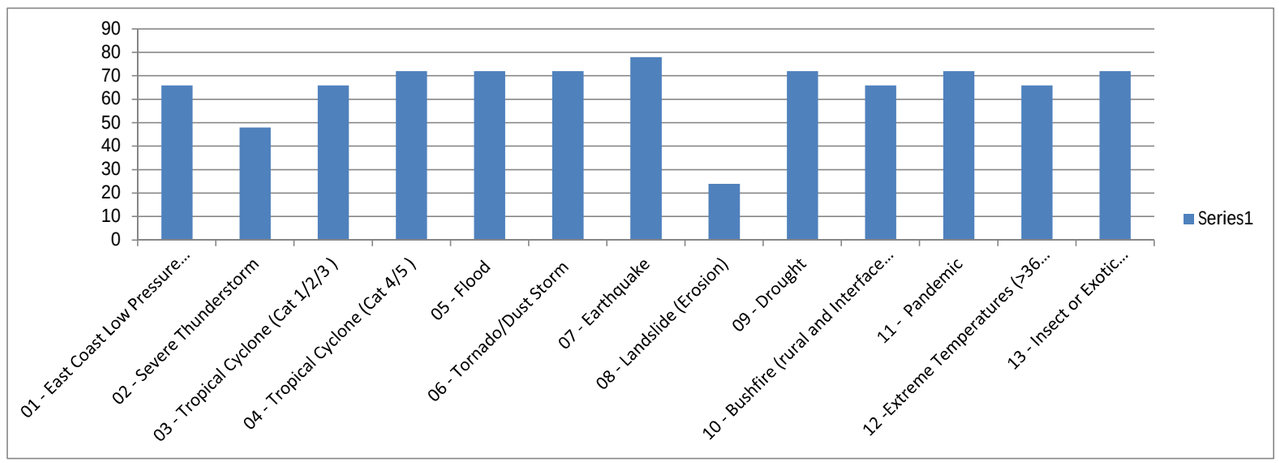
* Based on available Bureau of Meteorology Data

| LOW (3-39) | MEDIUM (42-63) | HIGH (66-81) | EXTREME (84-90) |
|---|---|---|---|

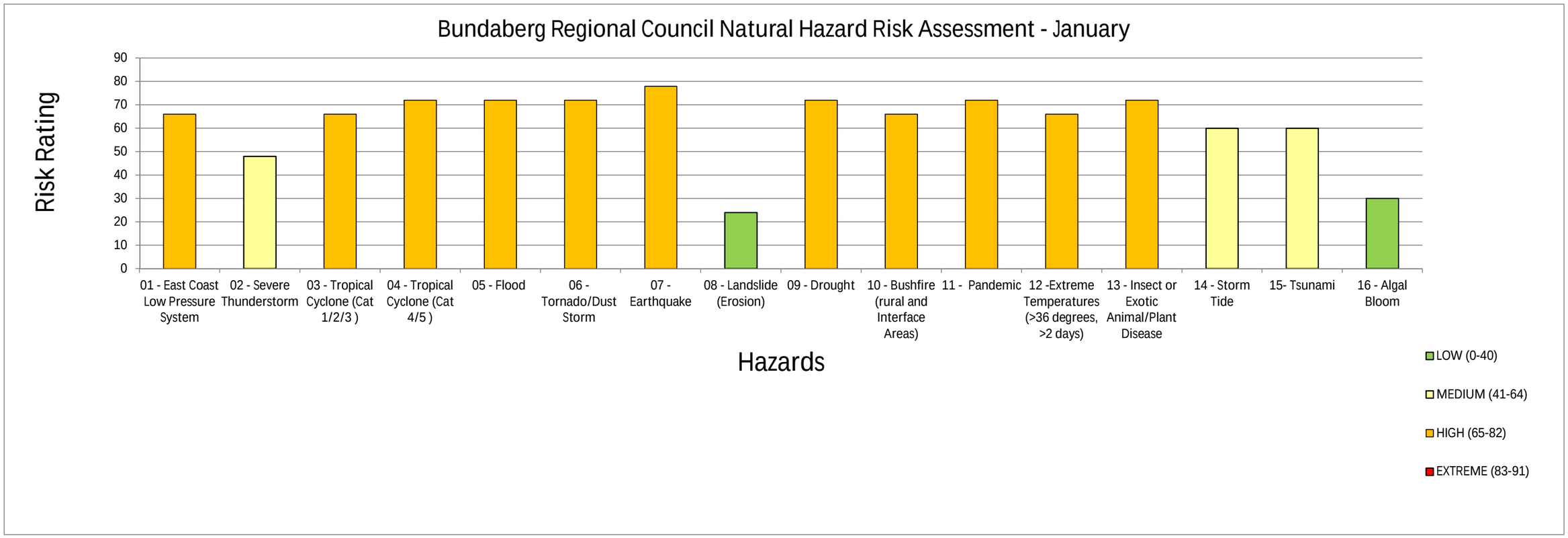
| Bundaberg Regional Council Natural Hazard Risk Assessment | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Overall Risk Residual Rating | | | | | | | | | | | | |
| Risk | January | February | March | April | May | June | July | August | September | October | November | December |
| 01 - East Coast Low Pressure System | 66 | 66 | 66 | 66 | 66 | 66 | 54 | 54 | 51 | 51 | 51 | 51 |
| 02 - Severe Thunderstorm | 48 | 48 | 48 | 45 | 27 | 24 | 24 | 24 | 24 | 27 | 45 | 45 |
| 03 - Tropical Cyclone (Cat 1/2/3 ) | 66 | 66 | 66 | 54 | 51 | 30 | 30 | 30 | 30 | 51 | 54 | 54 |
| 04 - Tropical Cyclone (Cat 4/5 ) | 72 | 72 | 72 | 51 | 36 | 36 | 36 | 36 | 36 | 36 | 72 | 72 |
| 05 - Flood | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 |
| 06 - Tornado/Dust Storm | 72 | 60 | 60 | 60 | 60 | 57 | 57 | 60 | 72 | 72 | 72 | 72 |
| 07 - Earthquake | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| 08 - Landslide (Erosion) | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| 09 - Drought | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 |
| 10 - Bushfire (rural and Interface Areas) | 66 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 54 | 54 | 66 | 66 |
| 11 - Pandemic | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 |
| 12 -Extreme Temperatures (>36 degrees, >2 days) | 66 | 54 | 54 | 54 | 33 | 33 | 33 | 33 | 51 | 54 | 66 | 66 |
| 13 - Insect or Exotic Animal/Plant Disease | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 |
| 14 - Storm Tide | 60 | 60 | 60 | 57 | 36 | 36 | 36 | 36 | 36 | 36 | 57 | 57 |
| 15- Tsunami | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| 16 - Algal Bloom | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |

## Global Maximums and Minimums for Risk Categories

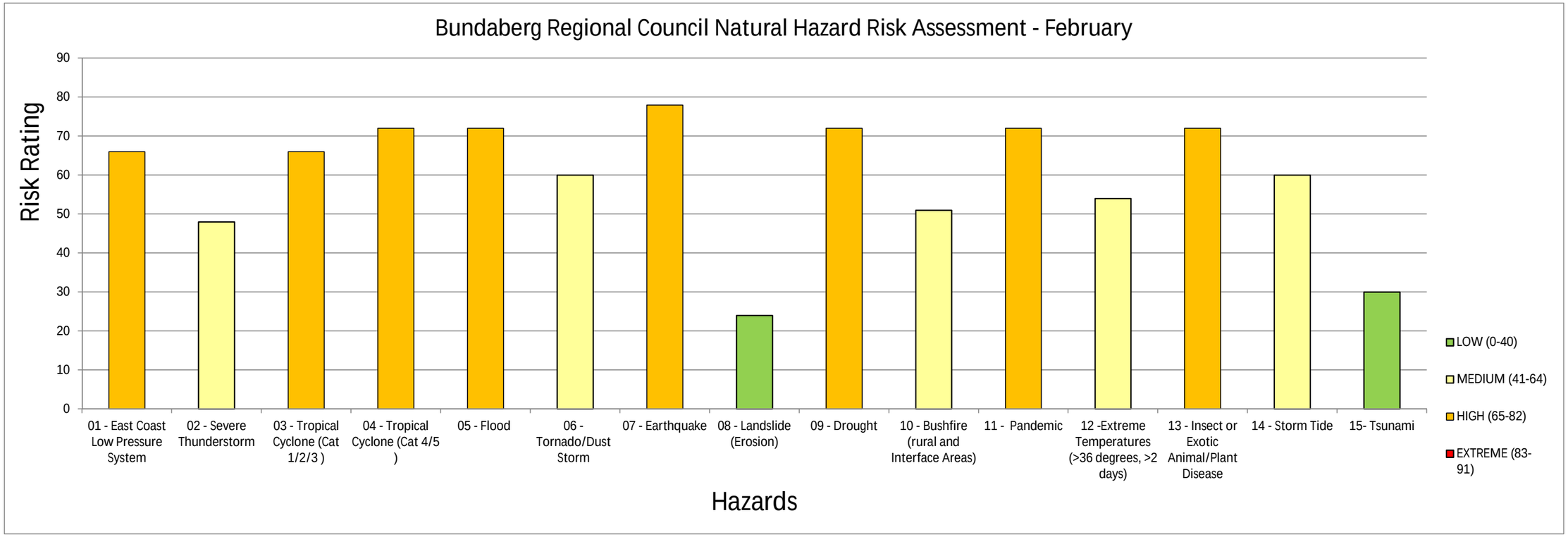
| LOW (0-40) | | MEDIUM (41-64) | | HIGH (65-82) | | EXTREME (83-91) | |
|---|---|---|---|---|---|---|---|
| MIN | MAX | MIN | MAX | MIN | MAX | MIN | MAX |
| 0 | 40 | 41 | 64 | 65 | 82 | 83 | 91 |



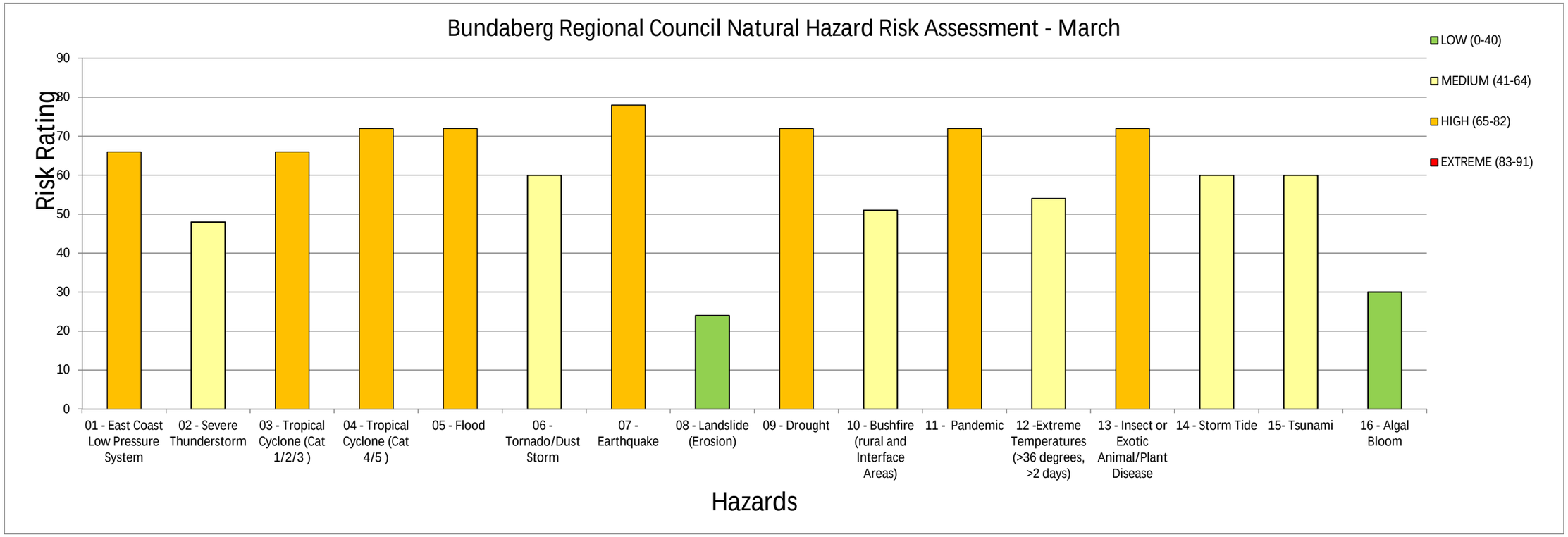
| | | | | | |
|---|---|---|---|---|---|
| | Minimum | 0 | 41 | 65 | 83 |
| | Maximum | 40 | 64 | 82 | 91 |
| Risk | January | Between 0 and 40 | Between 41 and 64 | Between 65 and 82 | Between 83 and 91 |
| 01 - East Coast Low Pressure System | 66 | #N/A | #N/A | 66 | #N/A |
| 02 - Severe Thunderstorm | 48 | #N/A | 48 | #N/A | #N/A |
| 03 - Tropical Cyclone (Cat 1/2/3 ) | 66 | #N/A | #N/A | 66 | #N/A |
| 04 - Tropical Cyclone (Cat 4/5 ) | 72 | #N/A | #N/A | 72 | #N/A |
| 05 - Flood | 72 | #N/A | #N/A | 72 | #N/A |
| 06 - Tornado/Dust Storm | 72 | #N/A | #N/A | 72 | #N/A |
| 07 - Earthquake | 78 | #N/A | #N/A | 78 | #N/A |
| 08 - Landslide (Erosion) | 24 | 24 | #N/A | #N/A | #N/A |
| 09 - Drought | 72 | #N/A | #N/A | 72 | #N/A |
| 10 - Bushfire (rural and Interface Areas) | 66 | #N/A | #N/A | 66 | #N/A |
| 11 - Pandemic | 72 | #N/A | #N/A | 72 | #N/A |
| 12 -Extreme Temperatures (>36 degrees, >2 days) | 66 | #N/A | #N/A | 66 | #N/A |
| 13 - Insect or Exotic Animal/Plant Disease | 72 | #N/A | #N/A | 72 | #N/A |
| 14 - Storm Tide | 60 | #N/A | 60 | #N/A | #N/A |
| 15- Tsunami | 60 | #N/A | 60 | #N/A | #N/A |
| 16 - Algal Bloom | 30 | 30 | #N/A | #N/A | #N/A |



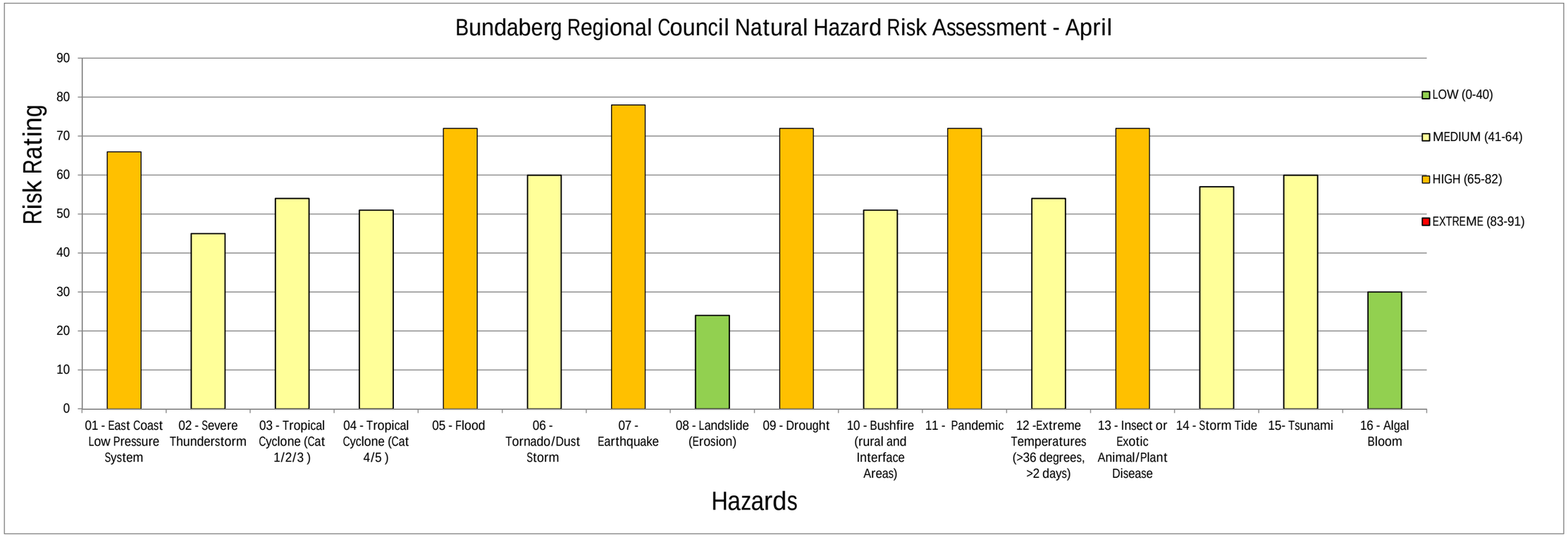
| | | | | | |
|---|---|---|---|---|---|
| | Minimum | 0 | 41 | 65 | 83 |
| | Maximum | 40 | 64 | 82 | 91 |
| Risk | February | Between 0 and 40 | Between 41 and 64 | Between 65 and 82 | Between 83 and 91 |
| 02 - Severe Thunderstorm | 66 | #N/A | #N/A | 66 | #N/A |
| 03 - Tropical Cyclone (Cat 1/2/3 ) | 48 | #N/A | 48 | #N/A | #N/A |
| 04 - Tropical Cyclone (Cat 4/5 ) | 66 | #N/A | #N/A | 66 | #N/A |
| 05 - Flood | 72 | #N/A | #N/A | 72 | #N/A |
| 06 - Tornado/Dust Storm | 72 | #N/A | #N/A | 72 | #N/A |
| 07 - Earthquake | 60 | #N/A | 60 | #N/A | #N/A |
| 08 - Landslide (Erosion) | 78 | #N/A | #N/A | 78 | #N/A |
| 09 - Drought | 24 | 24 | #N/A | #N/A | #N/A |
| 10 - Bushfire (rural and Interface Areas) | 72 | #N/A | #N/A | 72 | #N/A |
| 11 - Pandemic | 51 | #N/A | 51 | #N/A | #N/A |
| 12 -Extreme Temperatures (>36 degrees, >2 days) | 72 | #N/A | #N/A | 72 | #N/A |
| 13 - Insect or Exotic Animal/Plant Disease | 54 | #N/A | 54 | #N/A | #N/A |
| 14 - Storm Tide | 72 | #N/A | #N/A | 72 | #N/A |
| 15- Tsunami | 60 | #N/A | 60 | #N/A | #N/A |
| 16 - Algal Bloom | 30 | 30 | #N/A | #N/A | #N/A |



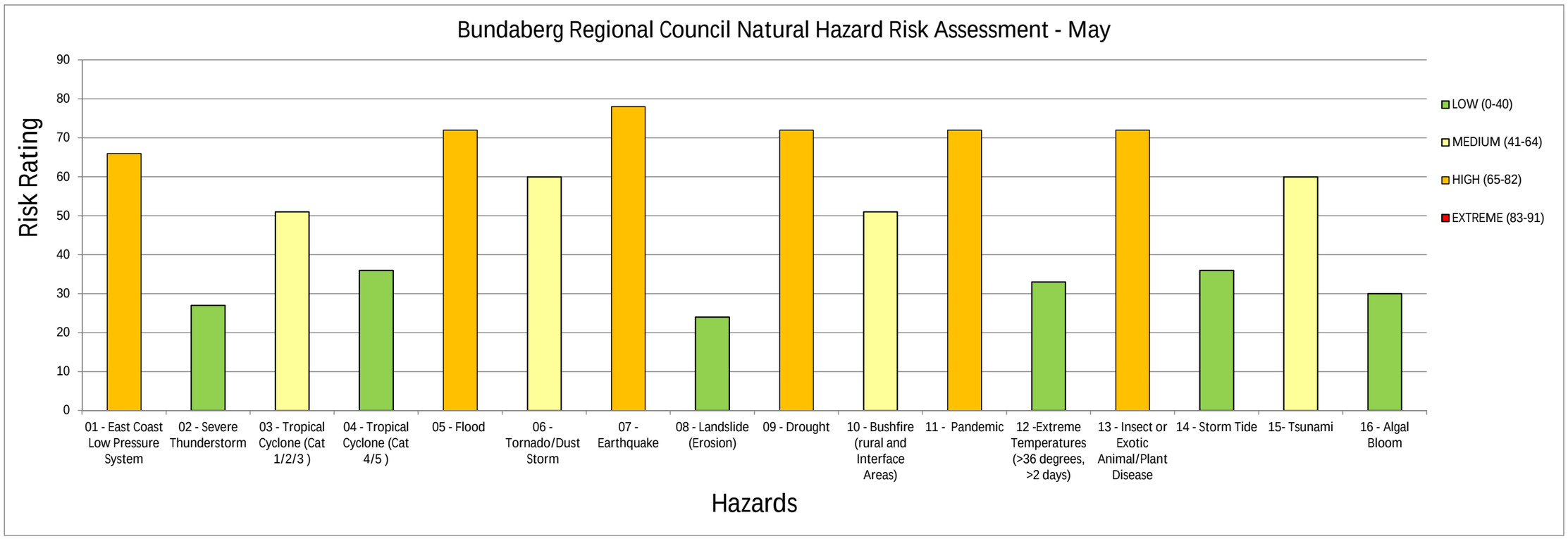
| | | | | | |
|---|---|---|---|---|---|
| | Minimum | 0 | 41 | 65 | 83 |
| | Maximum | 40 | 64 | 82 | 91 |
| Risk | March | Between 0 and 40 | Between 41 and 64 | Between 65 and 82 | Between 83 and 91 |
| 01 - East Coast Low Pressure System | 66 | #N/A | #N/A | 66 | #N/A |
| 02 - Severe Thunderstorm | 48 | #N/A | 48 | #N/A | #N/A |
| 03 - Tropical Cyclone (Cat 1/2/3 ) | 66 | #N/A | #N/A | 66 | #N/A |
| 04 - Tropical Cyclone (Cat 4/5 ) | 72 | #N/A | #N/A | 72 | #N/A |
| 05 - Flood | 72 | #N/A | #N/A | 72 | #N/A |
| 06 - Tornado/Dust Storm | 60 | #N/A | 60 | #N/A | #N/A |
| 07 - Earthquake | 78 | #N/A | #N/A | 78 | #N/A |
| 08 - Landslide (Erosion) | 24 | 24 | #N/A | #N/A | #N/A |
| 09 - Drought | 72 | #N/A | #N/A | 72 | #N/A |
| 10 - Bushfire (rural and Interface Areas) | 51 | #N/A | 51 | #N/A | #N/A |
| 11 - Pandemic | 72 | #N/A | #N/A | 72 | #N/A |
| 12 -Extreme Temperatures (>36 degrees, >2 days) | 54 | #N/A | 54 | #N/A | #N/A |
| 13 - Insect or Exotic Animal/Plant Disease | 72 | #N/A | #N/A | 72 | #N/A |
| 14 - Storm Tide | 60 | #N/A | 60 | #N/A | #N/A |
| 15- Tsunami | 60 | #N/A | 60 | #N/A | #N/A |
| 16 - Algal Bloom | 30 | 30 | #N/A | #N/A | #N/A |



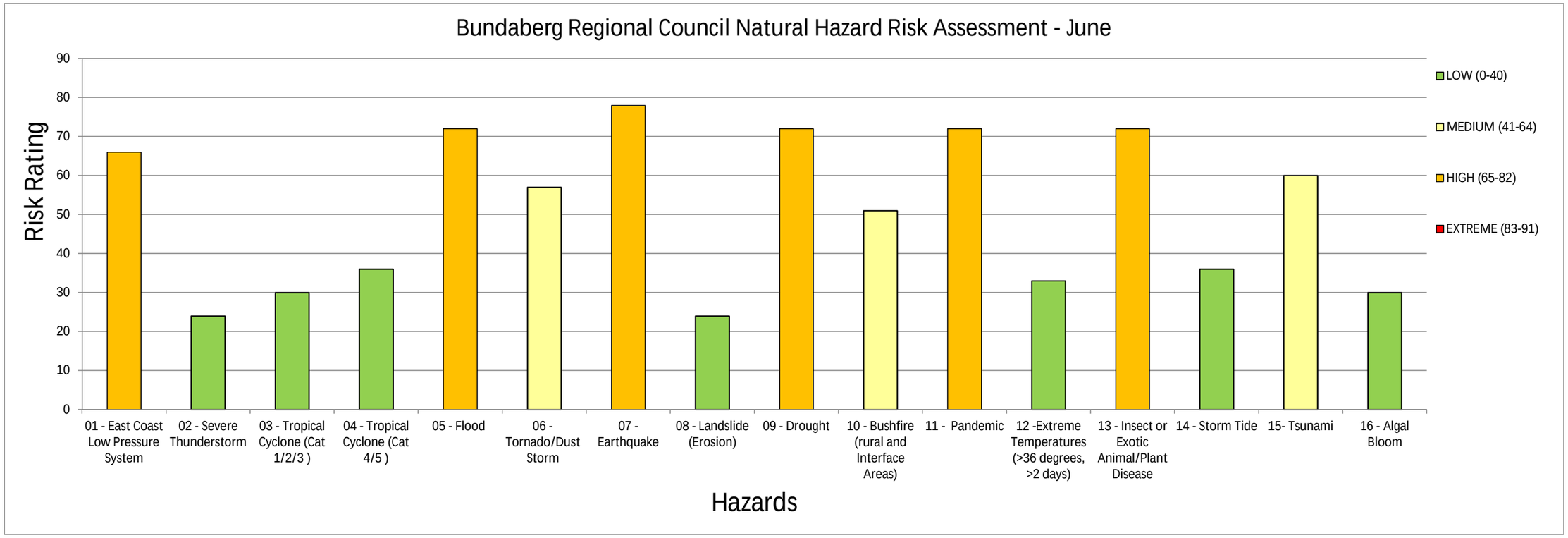
| | | | | | |
|---|---|---|---|---|---|
| | Minimum | 0 | 41 | 65 | 83 |
| | Maximum | 40 | 64 | 82 | 91 |
| Risk | April | Between 0 and 40 | Between 41 and 64 | Between 65 and 82 | Between 83 and 91 |
| 01 - East Coast Low Pressure System | 66 | #N/A | #N/A | 66 | #N/A |
| 02 - Severe Thunderstorm | 45 | #N/A | 45 | #N/A | #N/A |
| 03 - Tropical Cyclone (Cat 1/2/3 ) | 54 | #N/A | 54 | #N/A | #N/A |
| 04 - Tropical Cyclone (Cat 4/5 ) | 51 | #N/A | 51 | #N/A | #N/A |
| 05 - Flood | 72 | #N/A | #N/A | 72 | #N/A |
| 06 - Tornado/Dust Storm | 60 | #N/A | 60 | #N/A | #N/A |
| 07 - Earthquake | 78 | #N/A | #N/A | 78 | #N/A |
| 08 - Landslide (Erosion) | 24 | 24 | #N/A | #N/A | #N/A |
| 09 - Drought | 72 | #N/A | #N/A | 72 | #N/A |
| 10 - Bushfire (rural and Interface Areas) | 51 | #N/A | 51 | #N/A | #N/A |
| 11 - Pandemic | 72 | #N/A | #N/A | 72 | #N/A |
| 12 -Extreme Temperatures (>36 degrees, >2 days) | 54 | #N/A | 54 | #N/A | #N/A |
| 13 - Insect or Exotic Animal/Plant Disease | 72 | #N/A | #N/A | 72 | #N/A |
| 14 - Storm Tide | 57 | #N/A | 57 | #N/A | #N/A |
| 15- Tsunami | 60 | #N/A | 60 | #N/A | #N/A |
| 16 - Algal Bloom | 30 | 30 | #N/A | #N/A | #N/A |



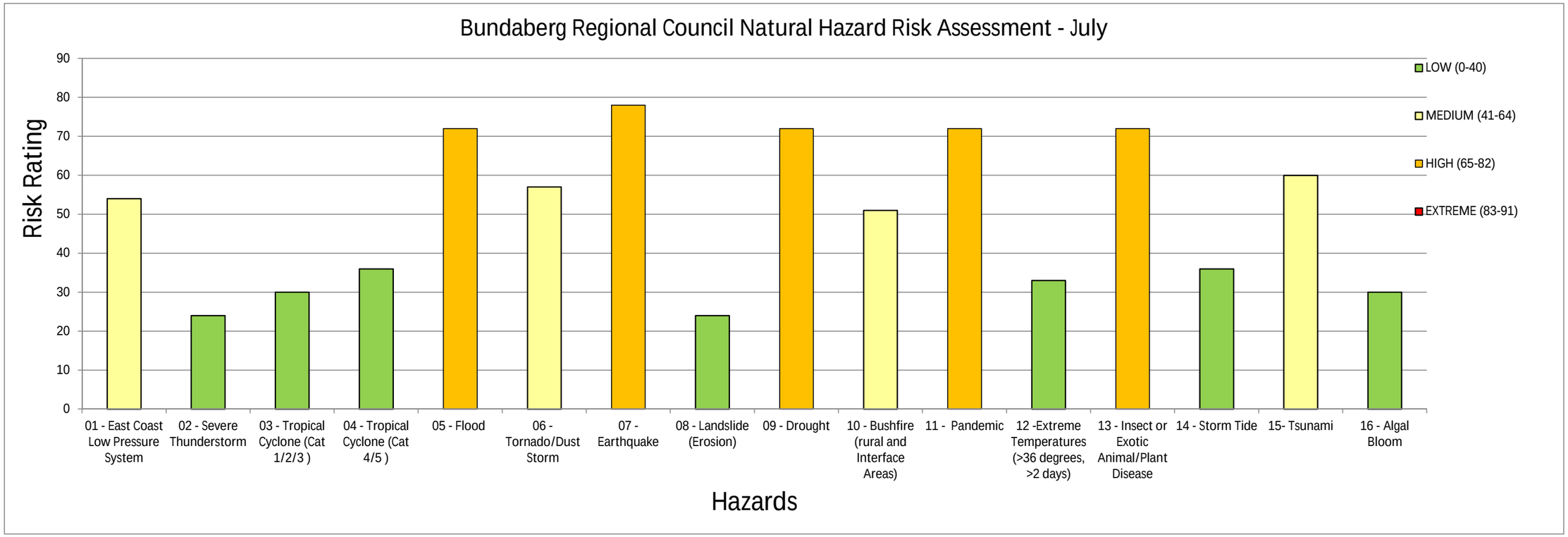
| | Minimum | 0 | 41 | 65 | 83 |
|---|---|---|---|---|---|
| | Maximum | 40 | 64 | 82 | 91 |
| Risk | May | Between 0 and 40 | Between 41 and 64 | Between 65 and 82 | Between 83 and 91 |
| 01 - East Coast Low Pressure System | 66 | #N/A | #N/A | 66 | #N/A |
| 02 - Severe Thunderstorm | 27 | 27 | #N/A | #N/A | #N/A |
| 03 - Tropical Cyclone (Cat 1/2/3 ) | 51 | #N/A | 51 | #N/A | #N/A |
| 04 - Tropical Cyclone (Cat 4/5 ) | 36 | 36 | #N/A | #N/A | #N/A |
| 05 - Flood | 72 | #N/A | #N/A | 72 | #N/A |
| 06 - Tornado/Dust Storm | 60 | #N/A | 60 | #N/A | #N/A |
| 07 - Earthquake | 78 | #N/A | #N/A | 78 | #N/A |
| 08 - Landslide (Erosion) | 24 | 24 | #N/A | #N/A | #N/A |
| 09 - Drought | 72 | #N/A | #N/A | 72 | #N/A |
| 10 - Bushfire (rural and Interface Areas) | 51 | #N/A | 51 | #N/A | #N/A |
| 11 - Pandemic | 72 | #N/A | #N/A | 72 | #N/A |
| 12 -Extreme Temperatures (>36 degrees, >2 days) | 33 | 33 | #N/A | #N/A | #N/A |
| 13 - Insect or Exotic Animal/Plant Disease | 72 | #N/A | #N/A | 72 | #N/A |
| 14 - Storm Tide | 36 | 36 | #N/A | #N/A | #N/A |
| 15- Tsunami | 60 | #N/A | 60 | #N/A | #N/A |
| 16 - Algal Bloom | 30 | 30 | #N/A | #N/A | #N/A |



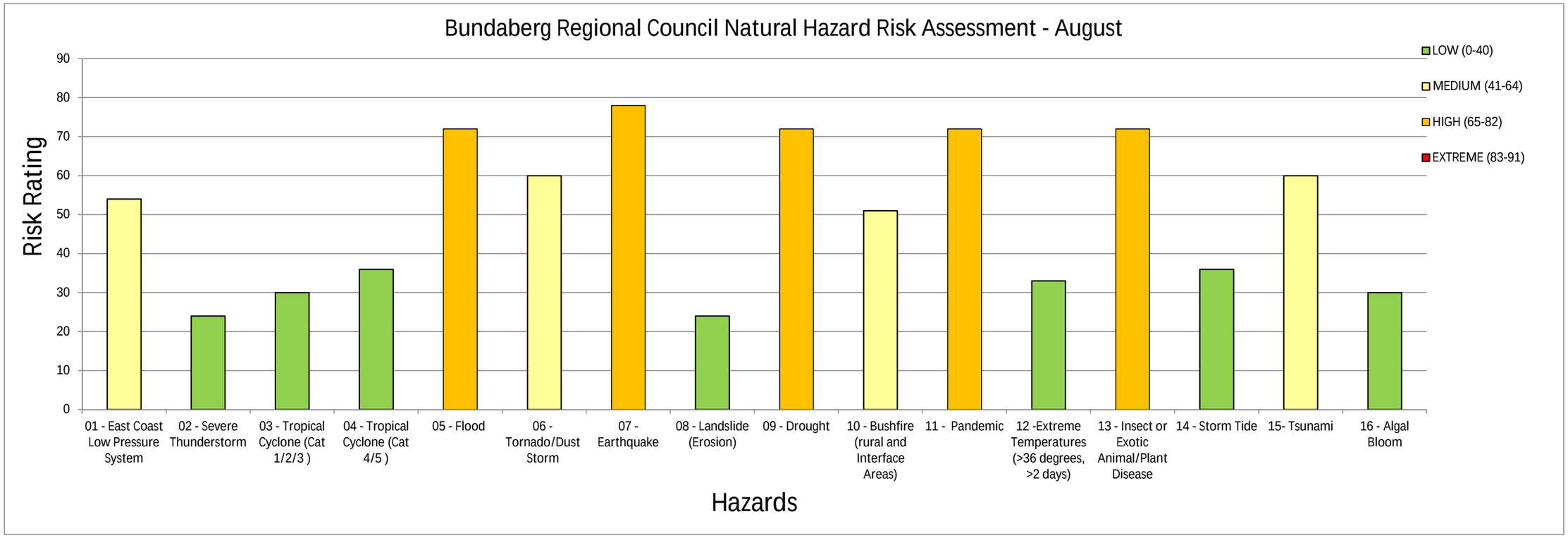
| | Minimum | 0 | 41 | 65 | 83 |
|---|---|---|---|---|---|
| | Maximum | 40 | 64 | 82 | 91 |
| Risk | June | Between 0 and 40 | Between 41 and 64 | Between 65 and 82 | Between 83 and 91 |
| 01 - East Coast Low Pressure System | 66 | #N/A | #N/A | 66 | #N/A |
| 02 - Severe Thunderstorm | 24 | 24 | #N/A | #N/A | #N/A |
| 03 - Tropical Cyclone (Cat 1/2/3 ) | 30 | 30 | #N/A | #N/A | #N/A |
| 04 - Tropical Cyclone (Cat 4/5 ) | 36 | 36 | #N/A | #N/A | #N/A |
| 05 - Flood | 72 | #N/A | #N/A | 72 | #N/A |
| 06 - Tornado/Dust Storm | 57 | #N/A | 57 | #N/A | #N/A |
| 07 - Earthquake | 78 | #N/A | #N/A | 78 | #N/A |
| 08 - Landslide (Erosion) | 24 | 24 | #N/A | #N/A | #N/A |
| 09 - Drought | 72 | #N/A | #N/A | 72 | #N/A |
| 10 - Bushfire (rural and Interface Areas) | 51 | #N/A | 51 | #N/A | #N/A |
| 11 - Pandemic | 72 | #N/A | #N/A | 72 | #N/A |
| 12 -Extreme Temperatures (>36 degrees, >2 days) | 33 | 33 | #N/A | #N/A | #N/A |
| 13 - Insect or Exotic Animal/Plant Disease | 72 | #N/A | #N/A | 72 | #N/A |
| 14 - Storm Tide | 36 | 36 | #N/A | #N/A | #N/A |
| 15- Tsunami | 60 | #N/A | 60 | #N/A | #N/A |
| 16 - Algal Bloom | 30 | 30 | #N/A | #N/A | #N/A |



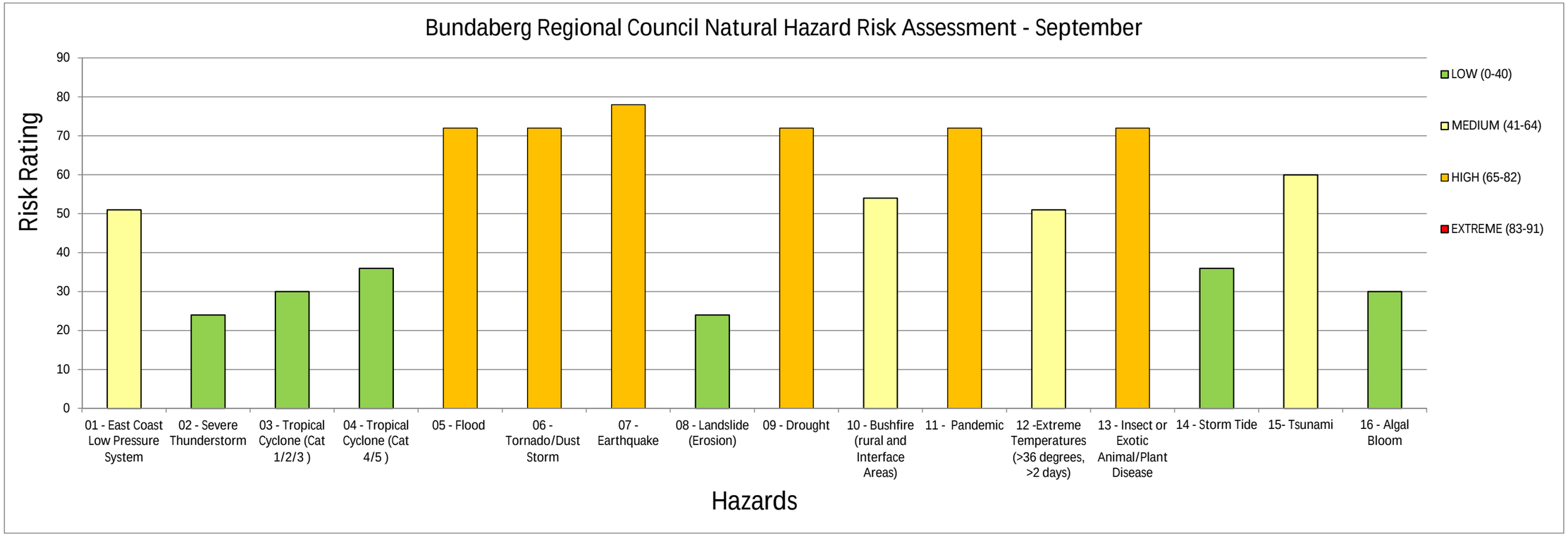
| | Minimum | 0 | 41 | 65 | 83 |
|---|---|---|---|---|---|
| | Maximum | 40 | 64 | 82 | 91 |
| Risk | July | Between 0 and 40 | Between 41 and 64 | Between 65 and 82 | Between 83 and 91 |
| 01 - East Coast Low Pressure System | 54 | #N/A | 54 | #N/A | #N/A |
| 02 - Severe Thunderstorm | 24 | 24 | #N/A | #N/A | #N/A |
| 03 - Tropical Cyclone (Cat 1/2/3 ) | 30 | 30 | #N/A | #N/A | #N/A |
| 04 - Tropical Cyclone (Cat 4/5 ) | 36 | 36 | #N/A | #N/A | #N/A |
| 05 - Flood | 72 | #N/A | #N/A | 72 | #N/A |
| 06 - Tornado/Dust Storm | 57 | #N/A | 57 | #N/A | #N/A |
| 07 - Earthquake | 78 | #N/A | #N/A | 78 | #N/A |
| 08 - Landslide (Erosion) | 24 | 24 | #N/A | #N/A | #N/A |
| 09 - Drought | 72 | #N/A | #N/A | 72 | #N/A |
| 10 - Bushfire (rural and Interface Areas) | 51 | #N/A | 51 | #N/A | #N/A |
| 11 - Pandemic | 72 | #N/A | #N/A | 72 | #N/A |
| 12 -Extreme Temperatures (>36 degrees, >2 days) | 33 | 33 | #N/A | #N/A | #N/A |
| 13 - Insect or Exotic Animal/Plant Disease | 72 | #N/A | #N/A | 72 | #N/A |
| 14 - Storm Tide | 36 | 36 | #N/A | #N/A | #N/A |
| 15- Tsunami | 60 | #N/A | 60 | #N/A | #N/A |
| 16 - Algal Bloom | 30 | 30 | #N/A | #N/A | #N/A |



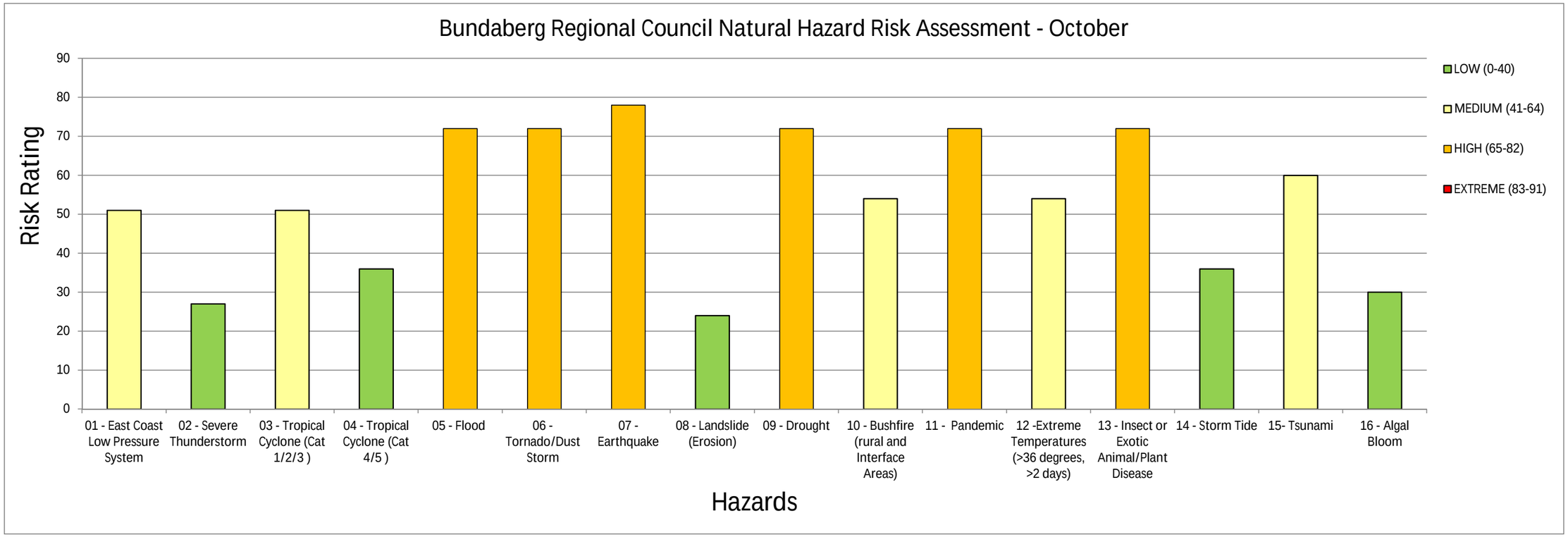
| | | | | | |
|---|---|---|---|---|---|
| | Minimum | 0 | 41 | 65 | 83 |
| | Maximum | 40 | 64 | 82 | 91 |
| Risk | August | Between 0 and 40 | Between 41 and 64 | Between 65 and 82 | Between 83 and 91 |
| 01 - East Coast Low Pressure System | 54 | #N/A | 54 | #N/A | #N/A |
| 02 - Severe Thunderstorm | 24 | 24 | #N/A | #N/A | #N/A |
| 03 - Tropical Cyclone (Cat 1/2/3 ) | 30 | 30 | #N/A | #N/A | #N/A |
| 04 - Tropical Cyclone (Cat 4/5 ) | 36 | 36 | #N/A | #N/A | #N/A |
| 05 - Flood | 72 | #N/A | #N/A | 72 | #N/A |
| 06 - Tornado/Dust Storm | 60 | #N/A | 60 | #N/A | #N/A |
| 07 - Earthquake | 78 | #N/A | #N/A | 78 | #N/A |
| 08 - Landslide (Erosion) | 24 | 24 | #N/A | #N/A | #N/A |
| 09 - Drought | 72 | #N/A | #N/A | 72 | #N/A |
| 10 - Bushfire (rural and Interface Areas) | 51 | #N/A | 51 | #N/A | #N/A |
| 11 - Pandemic | 72 | #N/A | #N/A | 72 | #N/A |
| 12 -Extreme Temperatures (>36 degrees, >2 days) | 33 | 33 | #N/A | #N/A | #N/A |
| 13 - Insect or Exotic Animal/Plant Disease | 72 | #N/A | #N/A | 72 | #N/A |
| 14 - Storm Tide | 36 | 36 | #N/A | #N/A | #N/A |
| 15- Tsunami | 60 | #N/A | 60 | #N/A | #N/A |
| 16 - Algal Bloom | 30 | 30 | #N/A | #N/A | #N/A |



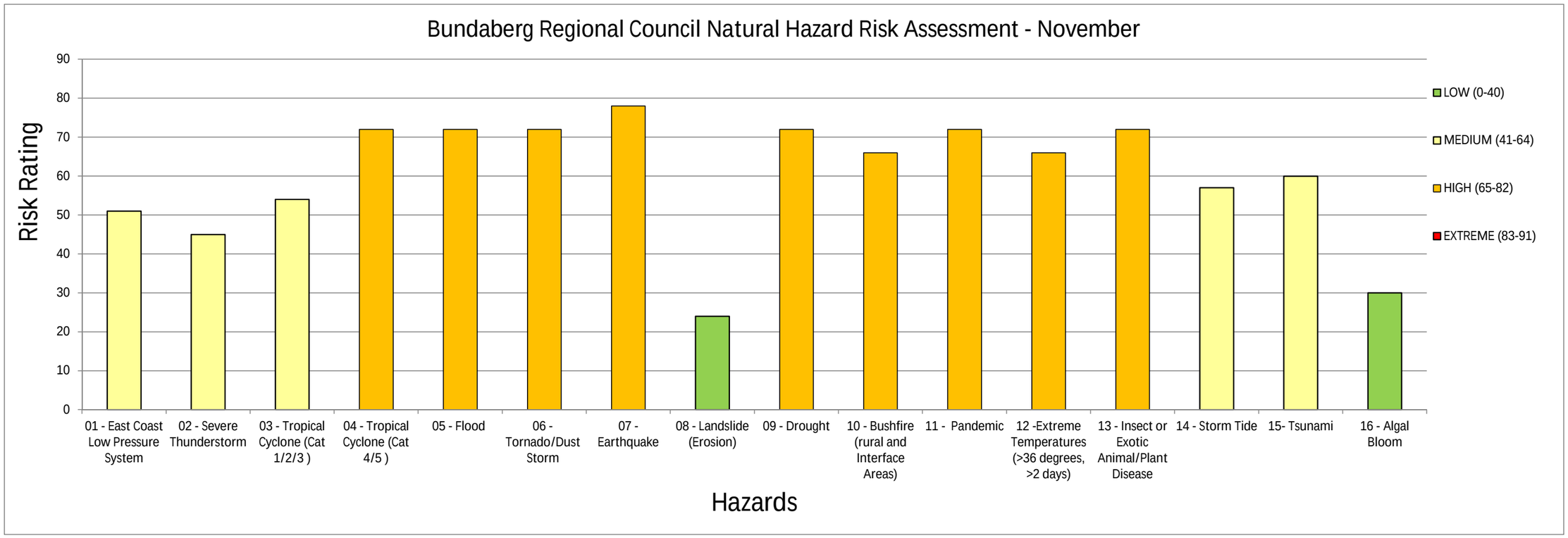
| | | | | | |
|---|---|---|---|---|---|
| | Minimum | 0 | 41 | 65 | 83 |
| | Maximum | 40 | 64 | 82 | 91 |
| Risk | September | Between 0 and 40 | Between 41 and 64 | Between 65 and 82 | Between 83 and 91 |
| 01 - East Coast Low Pressure System | 51 | #N/A | 51 | #N/A | #N/A |
| 02 - Severe Thunderstorm | 24 | 24 | #N/A | #N/A | #N/A |
| 03 - Tropical Cyclone (Cat 1/2/3 ) | 30 | 30 | #N/A | #N/A | #N/A |
| 04 - Tropical Cyclone (Cat 4/5 ) | 36 | 36 | #N/A | #N/A | #N/A |
| 05 - Flood | 72 | #N/A | #N/A | 72 | #N/A |
| 06 - Tornado/Dust Storm | 72 | #N/A | #N/A | 72 | #N/A |
| 07 - Earthquake | 78 | #N/A | #N/A | 78 | #N/A |
| 08 - Landslide (Erosion) | 24 | 24 | #N/A | #N/A | #N/A |
| 09 - Drought | 72 | #N/A | #N/A | 72 | #N/A |
| 10 - Bushfire (rural and Interface Areas) | 54 | #N/A | 54 | #N/A | #N/A |
| 11 - Pandemic | 72 | #N/A | #N/A | 72 | #N/A |
| 12 -Extreme Temperatures (>36 degrees, >2 days) | 51 | #N/A | 51 | #N/A | #N/A |
| 13 - Insect or Exotic Animal/Plant Disease | 72 | #N/A | #N/A | 72 | #N/A |
| 14 - Storm Tide | 36 | 36 | #N/A | #N/A | #N/A |
| 15- Tsunami | 60 | #N/A | 60 | #N/A | #N/A |
| 16 - Algal Bloom | 30 | 30 | #N/A | #N/A | #N/A |



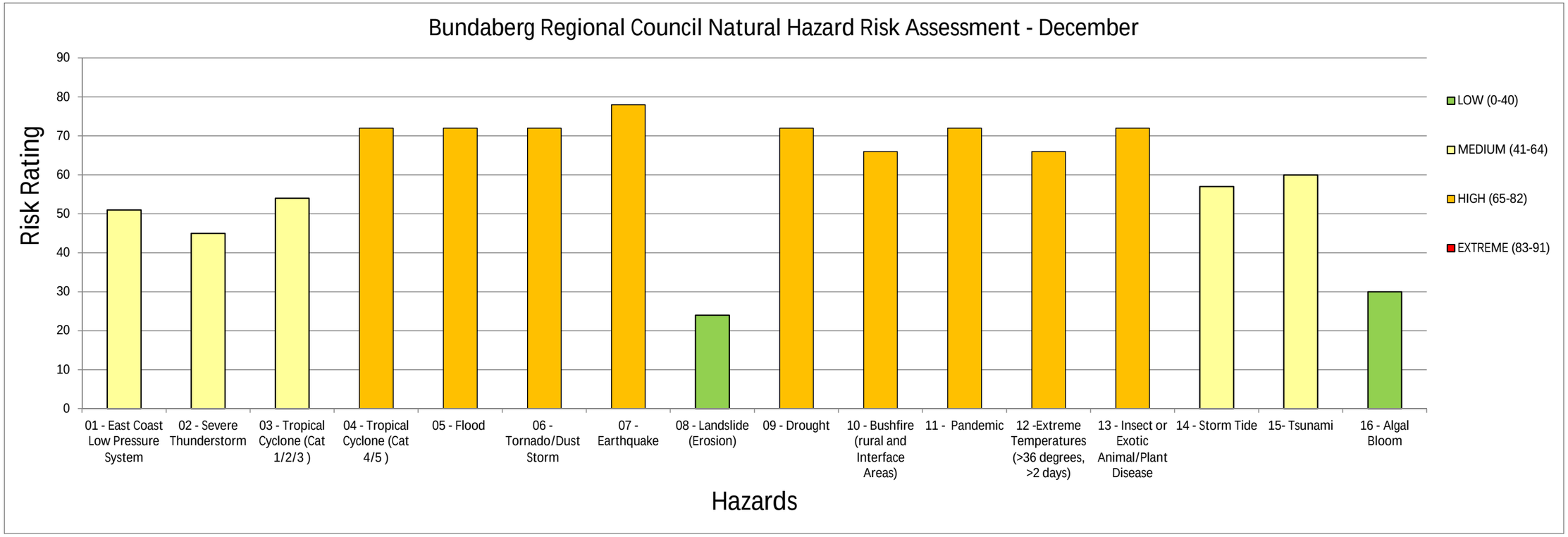
| | | | | | |
|---|---|---|---|---|---|
| | Minimum | 0 | 41 | 65 | 83 |
| | Maximum | 40 | 64 | 82 | 91 |
| Risk | October | Between 0 and 40 | Between 41 and 64 | Between 65 and 82 | Between 83 and 91 |
| 01 - East Coast Low Pressure System | 51 | #N/A | 51 | #N/A | #N/A |
| 02 - Severe Thunderstorm | 27 | 27 | #N/A | #N/A | #N/A |
| 03 - Tropical Cyclone (Cat 1/2/3 ) | 51 | #N/A | 51 | #N/A | #N/A |
| 04 - Tropical Cyclone (Cat 4/5 ) | 36 | 36 | #N/A | #N/A | #N/A |
| 05 - Flood | 72 | #N/A | #N/A | 72 | #N/A |
| 06 - Tornado/Dust Storm | 72 | #N/A | #N/A | 72 | #N/A |
| 07 - Earthquake | 78 | #N/A | #N/A | 78 | #N/A |
| 08 - Landslide (Erosion) | 24 | 24 | #N/A | #N/A | #N/A |
| 09 - Drought | 72 | #N/A | #N/A | 72 | #N/A |
| 10 - Bushfire (rural and Interface Areas) | 54 | #N/A | 54 | #N/A | #N/A |
| 11 - Pandemic | 72 | #N/A | #N/A | 72 | #N/A |
| 12 -Extreme Temperatures (>36 degrees, >2 days) | 54 | #N/A | 54 | #N/A | #N/A |
| 13 - Insect or Exotic Animal/Plant Disease | 72 | #N/A | #N/A | 72 | #N/A |
| 14 - Storm Tide | 36 | 36 | #N/A | #N/A | #N/A |
| 15- Tsunami | 60 | #N/A | 60 | #N/A | #N/A |
| 16 - Algal Bloom | 30 | 30 | #N/A | #N/A | #N/A |



| | | | | | |
|---|---|---|---|---|---|
| | Minimum | 0 | 41 | 65 | 83 |
| | Maximum | 40 | 64 | 82 | 91 |
| Risk | November | Between 0 and 40 | Between 41 and 64 | Between 65 and 82 | Between 83 and 91 |
| 01 - East Coast Low Pressure System | 51 | #N/A | 51 | #N/A | #N/A |
| 02 - Severe Thunderstorm | 45 | #N/A | 45 | #N/A | #N/A |
| 03 - Tropical Cyclone (Cat 1/2/3 ) | 54 | #N/A | 54 | #N/A | #N/A |
| 04 - Tropical Cyclone (Cat 4/5 ) | 72 | #N/A | #N/A | 72 | #N/A |
| 05 - Flood | 72 | #N/A | #N/A | 72 | #N/A |
| 06 - Tornado/Dust Storm | 72 | #N/A | #N/A | 72 | #N/A |
| 07 - Earthquake | 78 | #N/A | #N/A | 78 | #N/A |
| 08 - Landslide (Erosion) | 24 | 24 | #N/A | #N/A | #N/A |
| 09 - Drought | 72 | #N/A | #N/A | 72 | #N/A |
| 10 - Bushfire (rural and Interface Areas) | 66 | #N/A | #N/A | 66 | #N/A |
| 11 - Pandemic | 72 | #N/A | #N/A | 72 | #N/A |
| 12 -Extreme Temperatures (>36 degrees, >2 days) | 66 | #N/A | #N/A | 66 | #N/A |
| 13 - Insect or Exotic Animal/Plant Disease | 72 | #N/A | #N/A | 72 | #N/A |
| 14 - Storm Tide | 57 | #N/A | 57 | #N/A | #N/A |
| 15- Tsunami | 60 | #N/A | 60 | #N/A | #N/A |
| 16 - Algal Bloom | 30 | 30 | #N/A | #N/A | #N/A |



| | | | | | |
|---|---|---|---|---|---|
| | Minimum | 0 | 41 | 65 | 83 |
| | Maximum | 40 | 64 | 82 | 91 |
| Risk | December | Between 0 and 40 | Between 41 and 64 | Between 65 and 82 | Between 83 and 91 |
| 01 - East Coast Low Pressure System | 51 | #N/A | 51 | #N/A | #N/A |
| 02 - Severe Thunderstorm | 45 | #N/A | 45 | #N/A | #N/A |
| 03 - Tropical Cyclone (Cat 1/2/3 ) | 54 | #N/A | 54 | #N/A | #N/A |
| 04 - Tropical Cyclone (Cat 4/5 ) | 72 | #N/A | #N/A | 72 | #N/A |
| 05 - Flood | 72 | #N/A | #N/A | 72 | #N/A |
| 06 - Tornado/Dust Storm | 72 | #N/A | #N/A | 72 | #N/A |
| 07 - Earthquake | 78 | #N/A | #N/A | 78 | #N/A |
| 08 - Landslide (Erosion) | 24 | 24 | #N/A | #N/A | #N/A |
| 09 - Drought | 72 | #N/A | #N/A | 72 | #N/A |
| 10 - Bushfire (rural and Interface Areas) | 66 | #N/A | #N/A | 66 | #N/A |
| 11 - Pandemic | 72 | #N/A | #N/A | 72 | #N/A |
| 12 -Extreme Temperatures (>36 degrees, >2 days) | 66 | #N/A | #N/A | 66 | #N/A |
| 13 - Insect or Exotic Animal/Plant Disease | 72 | #N/A | #N/A | 72 | #N/A |
| 14 - Storm Tide | 57 | #N/A | 57 | #N/A | #N/A |
| 15- Tsunami | 60 | #N/A | 60 | #N/A | #N/A |
| 16 - Algal Bloom | 30 | 30 | #N/A | #N/A | #N/A |



# Appendix B Risk Register

## Table 1: Natural Hazard Risk Register

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | |
| **Risk 01: East Coast Low Pressure System:**<br>**East Coast Low Pressure System traverses the coastline causing severe weather impacting directly on the region (winter cyclone event).**<br><br>**People impacts – immediate:**<br>• Potential for numerous serious injuries, especially electrocution from powerlines, fires<br>• Evacuation problems – lack of helicopters<br>• Injury to members of the community and those assisting<br>• Impact on family pets<br>• Impact of power and communication loss especially on the aged and disabled<br>• Power failure may cause food spoilage and impact the health of people on home ventilation/dialysis<br>• People not receiving the warning<br>• Sightseers and tourists becoming stranded<br>• Children may not be able to reach home<br>• Restrict ability of emergency vehicles to access critical sites<br>• Elderly residents may not be able to obtain medication and supplies<br>• Accommodation limitations<br>• Impact of power loss, especially on the disabled<br>**People impacts – strategic:**<br>• Degraded provision of essential and community services<br>**Environmental impacts – immediate:**<br>• Damage to fauna and flora, diminished landscape, reduced biodiversity<br>• Damage to pastoral land, food and seed stock<br>• Vegetation damage<br>• Flooding<br>• Swift water risks<br>• Damage to the natural amenity<br>• Loss of flora, fauna and associated habitats<br>• Run off and Siltation<br>**Environmental impacts – strategic:**<br>• Flow on effects to tourism and associated industries<br>• Spread of weed seed (mesquite, acacia)<br>• Reduced biodiversity<br>• Fewer natural habitats<br>• Reduced quality and condition of soil<br>**Economy impacts – immediate:**<br>• Tourism, agriculture, general industry and commercial activity likely to have significant impact based on extent of damage<br>• Business continuity<br>• Ability of the commercial business to respond during and post event<br>• Ability to access funds<br>• Short term loss of services<br>**Economy impacts – strategic:**<br>• Longer term loss of employment<br>• Loss of income<br>• Loss of stock<br>• Loss of trade (temporary)<br>• Impact on tourism as amenities damaged<br>• Minor damage to marine based industries (boats, wharves, beaches)<br>**Governance impacts – immediate:**<br>• Disruption to communications<br>• Minor damage to Council facilities<br>• Resources available through SES, Police etc.<br>• Disruption to communications and accessibility of some areas<br>• Inability of Council to meet demands for effluent, water supply and garbage services<br>• Road access limitations<br>**Governance impacts – strategic:**<br>• Lack of knowledge of responsive strategies<br>• Time and day of event requires consideration in terms of warning strategy<br><br>**Content continues on the next page.** | **Other impacts and consequences:**<br>• None<br><br>**Any Locations more susceptible to hazard:**<br>• Nil identified | **Preventive and preparedness controls:**<br>• Power/Communications providers keep systems well maintained and protected<br>• Register of high risk people<br>• Evacuation of flood prone communities (especially high risk patients) Differentiate shelters and evacuation centres- educate public through press releases and flyers<br>• Usually have 3-4 days warning of an event, and need to keep monitoring and tracking intensity and direction<br>• Some reliance on communications and ability to operate remotely<br>• Dedicated evacuation centre, cyclone rated<br>• Generators for water supply and wastewater – both have telemetry<br>• Updating website detailing information<br>• DTMR website details road closures,ability for Council to update directly. Engineers make the calls regarding road closures<br>• DTMR and councils currently working to coordinate and integrate road closures<br>• Comprehensive and rehearsed Local Disaster Management Plan<br>• Active Counter Disaster planning<br>• Well educated, trained and equipped SES and Volunteer Marine Rescue teams<br>• Council site preparation plans (inc. Vehicles etc.)<br>• Pre-cyclone season education and consultation<br>• Catchment management plan<br>• Bank vegetation management<br>• Council Planning Scheme<br>• Current review of evacuation centres, transport of the frail, elderly and evacuated personnel and medical assistance needs<br>• Small supply of emergency equipment/generators<br>• Consultation with key agencies about their disaster mitigation plans<br>• Building codes and regulations<br>• Early warning systems including BoM early radio warning of approaching natural disaster<br>• Promote adequate public awareness of danger associated with events<br>• Provide public advice on procedure for protection of structures<br>• Erosion and sediment control measures to be incorporated at all construction sites<br>• Endevor to provide water and sewerage services are well protected from potential storm events<br>• Ensure that emergency facilities have back-up power supplies<br>• Encourage remote communication technologies<br><br>**Response and recovery controls:**<br>• Insurance, emergency response and Federal & State Gov't Assistance<br>• Early movement of frail, disabled and those requiring electronic medical support to safe respite centres (vulnerable community)<br>• Assist emergency organisations/services in providing relief to residents of damaged homes, eg emergency repairs, shelter, food.<br>• Rehabilitate damaged areas and provide temporary shelther for drenched fauna<br>• Relocate fauna<br>• Businesses to submit application to State and/or Federal Government for disaster relief<br>• Clearing of vegitation that could fall onto roads<br>• Clean up programme, free to dispose of rubbish in local rubbish dumps and free roadside collection in some areas | **Comments on adequacy / effectiveness:**<br>• None | | | | • Improve Catchment Management Plan<br>• Improve Community Resilience Strategy and Action Plan Improved communication plan that would encourage residents to clear debris and secure buildings with timely reminders (residents are already conscious to these strategies)<br>• Improved weather warning system to warn people of potential events. Need the ability to contact, and be contacted by all outlying properties, bulk text messaging or calling.<br>• Higher cyclone rating for essential buildings<br>• Training of others to fulfil roles of those cut off – succession planning<br>• Look at ways to improve remote operation via various methods and communications<br>• Formalise list of helicopter operators<br>• Improved, regularly updated register of high risk people<br>• On-going training and familiarity of new roles on LDMG through meetings, exercise environments<br>• Formalise systems to continually update the website (pre-event and post-event), the DTMR website<br>• Direct communications via email regarding road closures, ensuring all key people are included on the email<br>• Improve community communications, especially to allay fears and reduce concerns<br>• Formalise wet season approach including essential services and requirements<br>• Construction of flood free access to all areas<br>• System to educate the community on the impact of cyclone related flood events | • **Community Resilience Plans / Strategies.** Resilience Plans are recommended to refer to http://hardenup.org/ for preparedness for local community resilience<br>• Volunteer Organisations. Choose a volunteer coordinator to support Council such as Volunteering Queensland http://www.volunteeringqld.org.au/web/<br>• **Annual Review of Risk Register.** Conduct Review of Risk Assessment Annually to assess changes to likelihood, consequence and overall risk rating based on local or global conditions (i.e. climate and weather system fluctuations, population / demographic fluctuations etc)<br>• **Interoperability between Regions.** Recommended communication and coordination with adjoining regions and agencies to provide a Regional approach to Preparedness, Response and Recovery (i.e. representation on adjoining LDMG and DDMG meetings etc) |
| | | | People | Moderate | Likely | High - 66 | |
| | | | Environment | Moderate | Likely | High - 66 | |
| | | | Economy | Moderate | Likely | High - 66 | |
| | | | Governance | Minor | Likely | Medium - 45 | |
| | | | Social / Community | Moderate | Likely | High - 66 | |
| | | | Infrastructure | Moderate | Likely | High - 66 | |
| | | | **Comments on seasonal variation to risk:**<br>• Possible: July to August<br>• Likely: January - June<br>• Unlikely: September to December | | | | |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | | |
| **Risk 01: East Coast Low Pressure System (cont.):**<br><br>**Social / Community impacts – immediate:**<br>• Impact on the health/hospital systems<br>• Psychological factors on community scale<br>• Community services not functioning<br>• Panic/concern amongst the community<br>• Domestic violence<br>• Alcohol abuse<br>• Theft and presence of looters<br>• Inappropriate actions of tourists and sightseers<br>• Short term community dislocation due to impassable roads<br>**Social / Community impacts – strategic:**<br>• Impact of limited insurance cover on the community<br>• Lack of preparedness of the community<br>• Health of the community<br>**Infrastructure impacts – immediate:**<br>• Damage from flood waters<br>• Damage to Council infrastructure (roads, bridges, culverts, fences etc..)<br>• Property damage<br>• Ability of the utility services to function<br>• Impact on ability to provide telecommunications<br>• Impact on ability to provide potable water<br>• Roads blocked/homes damaged - vegetation<br>• Requirements for emergency accommodation<br>• Impact of falling power lines and poles<br>**Infrastructure impacts – strategic:**<br>• Coastal property damage or destruction<br>• Potential for damage to or degraded services to critical infrastructure including hospitals, airport and water treatment and delivery<br>• Long term loss of services and recovery time | | | | | | | | |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | |
| **Risk 02 - Severe Thunderstorm / Electrical Storm:**<br>**Severe storm including lightening, flash flooding, hail and strong winds in a concentrated small area causing widespread damage to property and infrastructure. Occurs without warning – (people are often at home) – can last 20 -30 min in evening**<br>**People impacts – immediate:**<br>• Potential for loss of life and numerous serious injuries, especially electrocution from powerlines, fires<br>• Long term displacement / Homelessness<br>• Evacuation problems – lack of helicopters<br>• Injury to members of the community and those assisting<br>• Impact on family pets, and injury<br>• Impact of power and communication loss especially on the aged and disabled<br>• Power failure may cause food spoilage and impact the health of people on home ventilation/dialysis<br>• People not willing to leave<br>• People providing services are cut off from those with needs<br>**People impacts – strategic:**<br>• Enduring impact across social, economic and service access based on widespread destruction<br>• Degraded provision of essential and community services<br>**Environmental impacts – immediate:**<br>• Widespread destruction of fauna and flora, diminished landscape, reduced biodiversity<br>• Widespread destruction of pastoral land, food and seed stock<br>• Trees down –very localised<br>• Erosion<br>• Vegetation damage<br>• Flooding<br>• Swift water risks<br>• Damage to the natural amenity<br>**Environmental impacts – strategic:**<br>• Flow on effects to tourism and associated industries<br>• Spread of weed seed<br>• Could occur in larger event<br>• Short Flash flooding<br>**Economy impacts – immediate:**<br>• Tourism, agriculture, general industry and commercial activity likely to have significant impact based on extent of damage<br>• Ability of the commercial business to respond during and post event<br>• Infrastructure -scouring , washouts<br>**Economy impacts – strategic:**<br>• Longer term loss of employment<br>• Impact of economic loss on the community and service providers post event<br>• Access for the community to Insurers<br>• Impact of limited insurance cover on the community<br>• Loss of income<br>• Loss of stock<br>• Loss of trade (temporary and permanent)<br>• Impact on tourism as amenities damaged<br>**Governance impacts – immediate:**<br>• Functionality of Council may be questioned if catastrophic damage includes a number of council buildings, depots and broad ability to provide an effective response<br>• Resources available through SES, Police etc.<br>• Disruption to communications and accessibility of some areas<br>• Letter of complaints - Short term<br>**Governance impacts – strategic:**<br>• Lack of knowledge of responsive strategies<br><br>**Content continues on the next page.** | **Other impacts and consequences:**<br>• Flash flooding<br><br>**Any Locations more susceptible to hazard:**<br>• Area through Avondale in South West direction past Pine Creek and north of Childers<br>• Refer to BOM lighting maps | **Preventive and preparedness controls:**<br>• Power/Communications providers keep systems well maintained and protected<br>• Register of high risk people<br>• Evacuation of flood prone communities (especially high risk patients) Differentiate shelters and evacuation centres- educate public through press releases and flyers<br>• Some reliance on communications and ability to operate remotely<br>• Dedicated evacuation centre, cyclone rated<br>• Generators for water supply and wastewater – both have telemetry<br>• Updating website detailing information<br>• DTMR website details road closures,ability for Council to update directly. Engineers make the calls regarding road closures<br>• TMR and councils currently working to coordinate and integrate road closures<br>• Communication – Bomb site<br>• Preparation –well known<br>• Comprehensive and rehearsed Local Disaster Management Plan<br>• Active Counter Disaster planning<br>• Well educated, trained and equipped SES and Volunteer Marine Rescue teams<br>• Council site preparation plans (inc. Vehicles etc.)<br>• Pre-cyclone season education and consultation<br>• Catchment management plan<br>• Bank vegetation management<br>• Council Planning Scheme<br>• Current review of evacuation centres, transport of the frail, elderly and evacuated personnel and medical assistance needs<br>• Small supply of emergency equipment/generators<br>• Consultation with key agencies about their disaster mitigation plans<br>• Building codes and regulations<br>• Early warning systems including BoM early radio warning of approaching natural disaster<br>• Promote adequate public awareness of danger associated with events.<br>• Provide public advice on procedure for protection of structures<br>• Erosion and sediment control measures to be incorporated at all construction sites<br>• Ensure that water and sewerage services are well protected from potential storm events<br>• Ensure that emergency facilities have back-up power supplies<br>• Construction of flood free access to all areas<br>• Clearing of vegitation that could fall onto roads<br>• Encourage remote communication technologies<br><br>**Response and recovery controls:**<br>• Insurance, emergency response and Federal & State Gov't Assistance<br>• Early movement of frail, disabled and those requiring electronic medical support to safe respite centres<br>• Assist emergency organisations/services in providing relief to residents of damaged homes, eg emergency repairs, shelter, food.<br>• Rehabilitate damaged areas and provide temporary shelther for drenched fauna<br>• Relocate fauna<br>• Businesses to submit application to State and/or Federal Government for disaster relief | **Comments on adequacy / effectiveness:**<br>• None<br><br>People — Minor — Almost certain — Medium -48<br>Environment — Insignificant — Almost certain — Medium --42<br>Economy — Insignificant — Almost certain — Medium --42<br>Governance — Insignificant — Almost certain — Medium --42<br>Social / Community — Insignificant — Almost certain — Medium --42<br>Infrastructure — Minor — Almost certain — Medium --48<br><br>**Comments on seasonal variation to risk:**<br>• Likely: between November and April<br>• Almost Certain:January to March | | • Improve Catchment Management Plan<br>• Improve Community Resilience Strategy and Action Plan Improved communication plan that would encourage residents to clear debris and secure buildings with timely reminders (residents are already conscious to these strategies)<br>• Improved weather warning system to warn people of potential events. Need the ability to contact, and be contacted by all outlying properties, bulk text messaging or calling<br>• Higher cyclone rating for essential buildings<br>• Training of others to fulfil roles of those cut off – succession planning<br>• Look at ways to improve remote operation via various methods and communications<br>• Formalise list of chopper operators<br>• Improved, regularly updated register of high risk people<br>• Ongoing training and familiarity of new roles on LDMG through meetings, exercise environments<br>• Formalise systems to continually update the website (pre-event and post-event), the DTMR website<br>• Direct communications via email regarding road closures, ensuring all key people are included on the email<br>• Improve community communications, especially to allay fears and reduce concerns<br>• Formalise wet season approach including essential services and requirements | • **Community Resilience Plans / Strategies.** Resilience Plans are recommended to refer to http://hardenup.org/ for preparedness for local community resilience<br>• Volunteer Organisations. Choose a volunteer coordinator to support Council such as Volunteering Queensland http://www.volunteeringqld.org.au/web/<br>• **Annual Review of Risk Register.** Conduct Review of Risk Assessment Annually to assess changes to likelihood, consequence and overall risk rating based on local or global conditions (i.e. climate and weather system fluctuations, population / demographic fluctuations etc)<br>• **Interoperability between Regions.** Recommended communication and coordination with adjoining regions and agencies to provide a Regional approach to Preparedness, Response and Recovery (i.e. representation on adjoining LDMG and DDMG meetings etc) |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | | |
| **Risk 02 - Severe Thunderstorm / Electrical Storm (cont.):**<br>**Social / Community impacts – immediate:**<br>• Ability of health/hospital systems to cope with emergency situations<br>• Psychological factors on community scale<br>• Community services not functioning<br>• Panic/concern amongst the community, loss of confidence and trust<br>• Domestic violence<br>• Alcohol abuse<br>• Theft and presence of looters<br>• Inappropriate actions of tourists and sightseers<br>• Loss of services<br>**Social / Community impacts – strategic:**<br>• Impact of limited insurance cover on the community<br>• Lack of preparedness of the community<br>• Health of the community<br>**Infrastructure impacts – immediate:**<br>• Building damages- Total destruction<br>• Infrastructure damaged or destroyed by fires<br>• Power infrastructure- major destruction,<br>• Impact on ability to provide telecommunications<br>• Impact on ability to provide potable water<br>• Roads blocked/homes damaged - vegetation<br>• Airports<br>• Requirements for emergency accommodation<br>• Impact of falling power lines and poles<br>• Ability of the utility services to function<br>• Impact of structural damage<br>**Infrastructure impacts – strategic:**<br>• Long term loss of services and recovery time | | | | | | | | |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | |
| **Risk 03 – Cyclone (Cat 1/2/3):**<br>**Cyclone crossing the region:**<br>**People impacts – immediate:**<br>• Potential for numerous serious injuries, especially electrocution from powerlines, fires<br>• Evacuation problems – lack of helicopters<br>• Injury to members of the community and those assisting<br>• Impact on family pets<br>• Impact of power and communication loss especially on the aged and disabled<br>• Power failure may cause food spoilage and impact the health of people on home ventilation/dialysis<br>• People not receiving the warning<br>• Sightseers and tourists becoming stranded<br>• Children may not be able to reach home<br>• Restrict ability of emergency vehicles to access critical sites<br>• Elderly residents may not be able to obtain medication and supplies<br>• Accommodation limitations<br>• Impact of power loss, especially on the disabled<br>• Wind damage<br>• Power outage<br>• More widespread<br>• Looking after floods<br>**People impacts – strategic:**<br>• Degraded provision of essential and community services<br>• Sugar field - 1 year<br>Macadamia - 5-7 years (30% of economy)<br>• Tourism Industry<br>**Environmental impacts – immediate:**<br>• Damage to fauna and flora, diminished landscape, reduced biodiversity<br>• Damage to pastoral land, food and seed stock<br>• Vegetation damage<br>• Flooding<br>• Swift water risks<br>• Damage to the natural amenity<br>• Loss of flora, fauna and associated habitats<br>• Run off and Siltation<br>**Environmental impacts – strategic:**<br>• Flow on effects to tourism and associated industries<br>• Spread of weed seed (mesquite, acacia)<br>• Reduced biodiversity<br>• Fewer natural habitats<br>• Reduced quality and condition of soil<br>**Economy impacts – immediate:**<br>• Tourism, agriculture, general industry and commercial activity likely to have significant impact based on extent of damage<br>• Business continuity<br>• Ability of the commercial business to respond during and post event<br>• Ability to access funds<br>• Short term loss of services<br>**Economy impacts – strategic:**<br>• Longer term loss of employment<br>• Loss of income<br>• Loss of stock<br>• Loss of trade (temporary)<br>• Impact on tourism as amenities damaged<br>• Minor damage to marine based industries (boats, wharves, beaches)<br>**Governance impacts – immediate:**<br>• Disruption to communications<br>• Minor damage to Council facilities<br>• Resources available through SES, Police etc.<br>• Disruption to communications and accessibility of some areas<br>• Inability of Council to meet demands for effluent, water supply and garbage services<br>• Road access limitations<br>**Governance impacts – strategic:**<br>• Lack of knowledge of responsive strategies<br>• Time and day of event requires consideration in terms of warning strategy<br><br>**Content continues on the next page.** | **Other impacts and consequences:**<br><br>**Any Locations more susceptible to hazard:**<br>• Storm surge and flooding – 48 hours<br>• Woodgate more park<br>• Coastal communities<br>• Refer to BOM cyclone site | **Preventive and preparedness controls:**<br>• Power/Communications providers keep systems well maintained and protected<br>• Yes for updated stormwater significance shortly<br>• Evacuation of flood prone communities (especially high risk patients) Differentiate shelters and evacuation centres- educate public through press releases and flyers<br>• Usually have 3-4 days warning of an event, and need to keep monitoring and tracking intensity and direction<br>• Some reliance on communications and ability to operate remotely<br>• Dedicated evacuation centre, cyclone rated<br>• Generators for water supply and wastewater – both have telemetry<br>• Updating website detailing information<br>• DTMR website details road closures,ability for Council to update directly. Engineers make the calls regarding road closures<br>• DTMR and councils currently working to coordinate and integrate road closures<br>• Comprehensive and rehearsed Local Disaster Management Plan<br>• Active Counter Disaster planning<br>• Well educated, trained and equipped SES and Volunteer Marine Rescue teams<br>• Council site preparation plans (inc. Vehicles etc.)<br>• Pre-cyclone season education and consultation<br>• Catchment management plan<br>• Bank vegetation management<br>• Council Planning Scheme<br>• Current review of evacuation centres, transport of the frail, elderly and evacuated personnel and medical assistance needs<br>• Small supply of emergency equipment/generators<br>• Consultation with key agencies about their disaster mitigation plans<br>• Building codes and regulations – may change to incorporate<br>• Early warning systems including BoM early radio warning of approaching natural disaster<br>• Promote adequate public awareness of danger associated with events<br>• Provide public advice on procedure for protection of structures<br>• Erosion and sediment control measures to be incorporated at all construction sites<br>• Endeavor to provide water and sewerage services are well protected from potential storm events<br>• Ensure that emergency facilities have back-up power supplies<br>• Encourage remote communication technologies<br><br>**Response and recovery controls:**<br>• Insurance, emergency response and Federal & State Gov't Assistance<br>• Early movement of frail, disabled and those requiring electronic medical support to safe respite centres<br>• Assist emergency organisations/services in providing relief to residents of damaged homes, eg emergency repairs, shelter, food.<br>• Rehabilitate damaged areas and provide temporary shelther for drenched fauna<br>• Relocate fauna<br>• Businesses to submit application to State and/or Federal Government for disaster relief.<br>• Clearing of vegitation that could fall onto roads<br>• Clean up programme, free to dispose of rubbish in local rubbish dumps and free roadside collection in some areas | **Comments on adequacy / effectiveness:**<br>• None<br><br>People – Moderate – Likely – High - 66<br>Environment – Moderate – Likely – High - 66<br>Economy – Moderate – Likely – High - 66<br>Governance – Minor – Likely – Medium - 45<br>Social / Community – Moderate – Likely – High - 66<br>Infrastructure – Moderate – Likely – High - 66<br><br>**Comments on seasonal variation to risk:**<br>• Possible between November, December and April<br>• Likely January - March<br>• Refer to BOM cyclone history | • Improve Catchment Management Plan<br>• Improve Community Resilience Strategy and Action Plan Improved communication plan that would encourage residents to clear debris and secure buildings with timely reminders (residents are already conscious to these strategies)<br>• Improved weather warning system to warn people of potential events. Need the ability to contact, and be contacted by all outlying properties, bulk text messaging or calling.<br>• Higher cyclone rating for essential buildings<br>• Training of others to fulfil roles of those cut off – succession planning<br>• Look at ways to improve remote operation via various methods and communications<br>• Formalise list of chopper operators<br>• Improved, regularly updated register of high risk people<br>• On-going training and familiarity of new roles on LDMG through meetings, exercise environments<br>• Formalise systems to continually update the website (pre-event and post-event), the DTMR website<br>• Direct communications via email regarding road closures, ensuring all key people are included on the email<br>• Improve community communications, especially to allay fears and reduce concerns<br>• Formalise wet season approach including essential services and requirements<br>• Construction of flood free access to all areas<br>• System to educate the community on the impact of cyclone related flood events<br>• Clearing of vegetation that could fall onto roads<br>• Review of building codes and regulations<br>• Clearing of vegetation that could fall onto roads<br>• Review of building codes and regulations | • Prioritisation: Difficult after some some reality starts to return<br>• Flood<br>• Coordination through LDMG<br>• Free to go to dump<br>• **Community Resilience Plans / Strategies.** Resilience Plans are recommended to refer to http://hardenup.org/ for preparedness for local community resilience<br>• Volunteer Organisations. Choose a volunteer coordinator to support Council such as Volunteering Queensland http://www.volunteeringqld.org.au/web/<br>• **Annual Review of Risk Register.** Conduct Review of Risk Assessment Annually to assess changes to likelihood, consequence and overall risk rating based on local or global conditions (i.e. climate and weather system fluctuations, population / demographic fluctuations etc)<br>• **Interoperability between Regions.** Recommended communication and coordination with adjoining regions and agencies to provide a Regional approach to Preparedness, Response and Recovery (i.e. representation on adjoining LDMG and DDMG meetings etc) |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | | |
| **Risk 03 – Cyclone (Cat 1/2/3): (cont.)**<br>**Social / Community impacts – immediate:**<br>• Impact on the health/hospital systems<br>• Psychological factors on community scale<br>• Community services not functioning<br>• Panic/concern amongst the community<br>• Domestic violence<br>• Alcohol abuse<br>• Theft and presence of looters<br>• Inappropriate actions of tourists and sightseers<br>• Short term community dislocation due to impassable roads<br>**Social / Community impacts – strategic:**<br>• Impact of limited insurance cover on the community<br>• Lack of preparedness of the community<br>• Health of the community<br>**Infrastructure impacts – immediate:**<br>• Damage from flood waters<br>• Damage to Council infrastructure (roads, bridges, culverts, fences etc..)<br>• Property damage<br>• Ability of the utility services to function<br>• Impact on ability to provide telecommunications<br>• Impact on ability to provide potable water<br>• Roads blocked/homes damaged - vegetation<br>• Requirements for emergency accommodation<br>• Impact of falling power lines and poles<br>**Infrastructure impacts – strategic:**<br>• Coastal property damage or destruction<br>• Potential for damage to or degraded services to critical infrastructure including hospitals, airport and water treatment and delivery<br>• Long term loss of services and recovery time | | | | | | | | |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | |

## Risk 04 – Cyclone(Cat 4/5):

**Cyclone crossing the region:**

**People impacts – immediate:**
- Potential for loss of life and numerous serious injuries, especially electrocution from powerlines, fires
- Long term displacement / Homelessness
- Evacuation problems – lack of helicopters
- People not willing to leave
- Injury to members of the community and those assisting
- Impact on family pets
- Impact of power and communication loss especially on the aged and disabled
- Power failure may cause food spoilage and impact the health of people on home ventilation/dialysis
- People not receiving the warning
- Sightseers and tourists becoming stranded
- Restrict ability of emergency vehicles to access critical sites
- People providing services are cut off from those with needs
- Elderly residents may not be able to obtain medication and supplies
- Accommodation limitations
- Impact of power loss, especially on the disabled

**People impacts – strategic:**
- Degraded provision of essential and community services
- Enduring impact across social, economic and service access based on widespread destruction

**Environmental impacts – immediate:**
- Widespread destruction of fauna and flora, diminished landscape, reduced biodiversity
- Widespread destruction of pastoral land, food and seed stock
- Erosion
- Vegetation damage
- Flooding
- Swift water risks
- Damage to the natural amenity
- Loss of flora, fauna and associated habitats
- Run off and Siltation

**Environmental impacts – strategic:**
- Flow on effects to tourism and associated industries
- Spread of weed seed (mesquite, acacia)
- Reduced biodiversity
- Fewer natural habitats
- Reduced quality and condition of soil

**Economy impacts – immediate:**
- Tourism, agriculture, general industry and commercial activity likely to have significant impact based on extent of damage
- Business continuity
- Short term loss of employment within the community
- Ability of the commercial business to respond during and post event
- Ability to access funds
- Short term loss of services

**Economy impacts – strategic:**
- Longer term loss of employment
- Impact of economic loss on the community and service providers post event
- Access for the community to Insurers
- Impact of limited insurance cover on the community
- Loss of income
- Loss of stock
- Loss of trade (temporary and permanent)
- Impact on tourism as amenities damaged and reputation lost
- Damage to marine based industries (boats, wharves, beaches)
- Damage to the sugar cane (1 year) and macadamia nut (potentially 7 years to re-establish) industries

**Content continues on the next page.**

**Other impacts and consequences:**
- Storm surge prior to cyclone
- Flooding

**Any Locations more susceptible to hazard:**
- Low lying coastal communities such as Moore Park and Woodgate
- Communities those are easily isolated, often only having one access road into and out of the area. Typical small coastal or isolated rural communities
- Refer to BOM for historical cyclone tracking

**Preventive and preparedness controls:**
- Power/Communications providers keep systems well maintained and protected
- Register of high risk people
- Evacuation of flood prone communities (especially high risk patients) Differentiate shelters and evacuation centres- educate public through press releases and flyers
- Usually have 3-4 days warning of an event, and need to keep monitoring and tracking intensity and direction
- Some reliance on communications and ability to operate remotely
- Dedicated evacuation centre, cyclone rated
- Generators for water supply and wastewater – both have telemetry
- Updating website detailing information
- DTMR website details road closures,ability for Council to update directly. Engineers make the calls regarding road closures
- TMR and councils currently working to coordinate and integrate road closures
- Comprehensive and rehearsed Local Disaster Management Plan
- Active Counter Disaster planning
- Well educated, trained and equipped SES and Volunteer Marine Rescue teams
- Council site preparation plans (inc. Vehicles etc.)
- Pre-cyclone season education and consultation
- Catchment management plan
- Bank vegetation management
- Council Planning Scheme
- Current review of evacuation centres, transport of the frail, elderly and evacuated personnel and medical assistance needs
- Small supply of emergency equipment/generators
- Consultation with key agencies about their disaster mitigation plans
- Building codes and regulations
- Early warning systems including BoM early radio warning of approaching natural disaster
- Promote adequate public awareness of danger associated with events
- Provide public advice on procedure for protection of structures
- Erosion and sediment control measures to be incorporated at all construction sites
- Endevor to provide water and sewerage services are well protected from potential storm events
- Ensure that emergency facilities have back-up power supplies
- Encourage remote communication technologies

**Response and recovery controls:**
- Insurance, emergency response and Federal & State Gov't Assistance
- Early movement of frail, disabled and those requiring electronic medical support to safe respite centres
- Assist emergency organisations/services in providing relief to residents of damaged homes, eg emergency repairs, shelter, food.
- Rehabilitate damaged areas and provide temporary shelther for drenched fauna
- Relocate fauna
- Businesses to submit application to State and/or Federal Government for disaster relief.
- Clearing of vegitation on roads
- Clean up programme, free to dispose of rubbish in local rubbish dumps and free roadside collection in some areas

**Comments on adequacy / effectiveness:**
- None

| | Adequacy / Effectiveness | Consequence | Likelihood | Risk |
|---|---|---|---|---|
| People | | Major | Possible | High - 72 |
| Environment | | Major | Possible | High - 72 |
| Economy | | Major | Possible | High - 72 |
| Governance | | Moderate | Possible | High - 72 |
| Social / Community | | Major | Possible | High - 72 |
| Infrastructure | | Major | Possible | High - 72 |

**Comments on seasonal variation to risk:**
- Possible: November to March
- Refer to BOM cyclone history

- Improve Catchment Management Plan
- Improve Community Resilience Strategy and Action Plan Improved communication plan that would encourage residents to clear debris and secure buildings with timely reminders (residents are already conscious to these strategies)
- Improved weather warning system to warn people of potential events. Need the ability to contact, and be contacted by all outlying properties, bulk text messaging or calling
- Higher cyclone rating for essential buildings
- Training of others to fulfil roles of those cut off – succession planning
- Look at ways to improve remote operation via various methods and communications
- Formalise list of chopper operators
- Improved, regularly updated register of high risk people
- Ongoing training and familiarity of new roles on LDMG through meetings, exercise environments
- Formalise systems to continually update the website (pre-event and post-event), the DTMR website
- Direct communications via email regarding road closures, ensuring all key people are included on the email
- Improve community communications, especially around understanding expectations during the events
- Improve internal communications
- System to educate the community on the impact of cyclone related flood events
- Formalise wet season approach including essential services and requirements
- Clearing of vegitation that could fall onto roads
- Review of building codes and regulations
- Educate communities on being more prepared for events. Thus allowing them to be more self sufficient

- **Community Resilience Plans / Strategies.** Resilience Plans are recommended to refer to http://hardenup.org/ for preparedness for local community resilience
- Volunteer Organisations. Choose a volunteer coordinator to support Council such as Volunteering Queensland http://www.volunteeringqld.org.au/web/
- **Annual Review of Risk Register.** Conduct Review of Risk Assessment Annually to assess changes to likelihood, consequence and overall risk rating based on local or global conditions (i.e. climate and weather system fluctuations, population / demographic fluctuations etc)

**Interoperability between Regions.** Recommended communication and coordination with adjoining regions and agencies to provide a Regional approach to Preparedness, Response and Recovery (i.e. representation on adjoining LDMG and DDMG meetings etc)

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | | |
| **Risk 04 – Cyclone (Cat 4/5): (cont.)**<br>**Governance impacts – immediate:**<br>• Functionality of Council may be questioned if catastrophic damage includes a number of council buildings, depots and broad ability to provide an effective response<br>• Resources available through SES, Police etc<br>• Disruption to communications and accessibility of some areas<br>• Inability of Council to meet demands for effluent, water supply and garbage services<br>• Road access limitations<br>**Governance impacts – strategic:**<br>• Lack of knowledge of responsive strategies<br>• Time and day of event requires consideration in terms of warning strategy<br>**Social / Community impacts – immediate:**<br>• Impact on the health/hospital systems<br>• Psychological factors on community scale<br>• Community services not functioning<br>• Panic/concern amongst the community<br>• Domestic violence<br>• Alcohol abuse<br>• Theft and presence of looters<br>• Inappropriate actions of tourists and sightseers<br>• Short term community dislocation due to impassable roads<br>**Social / Community impacts – strategic:**<br>• Impact of limited insurance cover on the community<br>• Lack of preparedness of the community<br>• Health of the community<br>**Infrastructure impacts – immediate:**<br>• Damage from flood waters<br>• Damage to Council infrastructure (roads, bridges, culverts, fences etc..)<br>• Property damage<br>• Ability of the utility services to function<br>• Major destruction power infrastructure<br>• Impact on ability to provide telecommunications<br>• Impact on ability to provide potable water<br>• Roads blocked/homes damaged - vegetation<br>• Requirements for emergency accommodation<br>• Ability of the utility services to function<br>• Impact of structural damage<br>• Airports<br>**Infrastructure impacts – strategic:**<br>• Coastal property damage or destruction<br>• Potential for damage to or degraded services to critical infrastructure including hospitals, airport and water treatment and delivery<br>• Long term loss of services and recovery time | | | | | | | | |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|
| | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | | |
| **Risk 05 – Flood:**<br>**Flood (Local, Regional, Riverine) directly or indirectly impacting on the region**<br><br>**People impacts – immediate:**<br>• Potential for loss of life and numerous serious injuries, especially drowning<br>• Long term displacement / Homelessness<br>• Evacuation problems – lack of helicopters<br>• Injury to members of the community and those assisting<br>• Impact on family pets, and injury<br>• Impact of power and communication loss especially on the aged and disabled<br>• Power failure may cause food spoilage and impact the health of people on home ventilation/dialysis<br>• People not willing to leave<br>• People providing services are cut off from those with needs<br>• Tourists/motorists stranded in remote areas with no communications<br>• Loss of road transport impacting on access to critical goods and services such as medicines and medical supplies<br>• Children not able to reach families (schools cut off in flooding)<br>• Damage or loss of contents<br>• Food and clean water shortages<br>• Boats loss off marina, especially in town reach<br>• Damage from boat<br><br>**People impacts – strategic:**<br>• Ongoing stress and anxiety, post-traumatic stress in those affected by flooding<br>• Enduring impact across social, economic and service access based on widespread destruction<br>• Degraded provision of essential and community services<br>• Long term effect on tourism and events<br><br>**Environmental impacts – immediate:**<br>• Stock Loss and food to standard animals -Agforce<br>• Contaminated waterways and land areas - debris, chemicals, fuels, sewerage, damage to river banks;<br>• Impact of vegetation on restricting flood waters<br>• Change of path of river run off and siltation<br>• Erosion and sediment transport- Sediment and debris transport during flow of water<br>• Widespread destruction of fauna and flora, diminished landscape, reduced biodiversity<br>• Widespread destruction of pastoral land, food and seed stock<br>• Swift water risks<br>• Damage to the natural amenity<br><br>**Environmental impacts – strategic:**<br>• Reduced biodiversity<br>• Fewer natural habitats<br>• Spread of infectious human, animal and plant diseases<br><br>**Economy impacts – immediate:**<br>• Tourism, agriculture, general industry and commercial activity likely to have significant impact based on extent of damage<br>• Business continuity<br>• Short term loss of employment within the community<br>• Ability of the commercial business to respond during and post event<br>• Ability to access funds<br><br>**Economy impacts – strategic:**<br>• Longer term loss of employment<br>• Impact of economic loss on the community and service providers post event<br>• Access for the community to Insurers<br>• Impact of limited insurance cover on the community<br>• Loss of income<br>• Loss of stock<br>• Loss of livestock<br>• Loss of trade (temporary and permanent)<br>• Impact on tourism as amenities damaged<br>• Significant cost involved in repairing, restoring buildings and replacing contents<br>• Significant cost involved in replacing livestock<br>• Reduced soil quality and condition in local area resulting in difficulty in replanting crops<br><br>**Content continues on the next page** | **Other impacts and consequences:**<br>• Isolation:<br>• Security issues in evacuation centres<br>• Approx 400 people<br>• Number of houses under water<br>• Sugar sheds – category 5<br>• Pets in response centres<br>• Mobile towers going down<br>• Cash<br>• Clean up rubbish and stuffs from people houses<br>• People coming to watch<br><br>**Any Locations more susceptible to hazard:**<br>• **Refer to recent BOM flood data / events for Bundaberg Region** | **Preventive and preparedness controls:**<br>• External flood warning system (former DERM managed) – 3 choppers<br>• Existing natural and man-made levees, flood bypasses, channel improvements, retention basins and flood mitigation dams<br>• Flood studies and mapping- response mapping critical assets<br>• Land use controls (such as zoning and the removal of existing buildings) and building restrictions (such as establishing minimum floor levels and raising buildings) in relation to development on flood-prone land<br>• Power/Communications providers keep systems well maintained and protected<br>• Register of high risk people<br>• Evacuation of flood prone communities (especially high risk patients) Differentiate shelters and evacuation centres- educate public through press releases and flyers<br>• Usually have 3-4 days warning of an event, and need to keep monitoring and tracking intensity and direction<br>• Some reliance on communications and ability to operate remotely<br>• Dedicated evacuation centre, cyclone rated<br>• Generators for water supply and wastewater – both have telemetry<br>• Updating website detailing information<br>• DTMR website details road closures, ability for Council to update directly. Engineers make the calls regarding road closures<br>• TMR and councils currently working to coordinate and integrate road closures<br>• Comprehensive and rehearsed Local Disaster Management Plan<br>• Well educated, trained and equipped SES and Volunteer Marine Rescue teams<br>• Council site preparation plans (include vehicles etc.)<br>• Pre-cyclone season education and consultation<br>• Catchment management plan<br>• Bank vegetation management<br>• Council Planning Scheme<br>• Current review of evacuation centres, transport of the frail, elderly and evacuated personnel and medical assistance needs<br>• Small supply of emergency equipment/generators<br>• Consultation with key agencies about their disaster mitigation plans<br>• Building codes and regulations<br>• Early warning systems including BoM early radio warning of approaching natural disaster<br>• Promote adequate public awareness of danger associated with flood waters<br>• Take all reasonable measures to provide appropriate warnings on depths of flood warnings on roads<br>• Provide catch rails/ropes downstream from areas subject to inundation<br>• Install warning signs<br>• Promote public awareness of potential for diseases to spread<br>• Ensure public inoculated against diseases where possible<br>• Relocate heritage buildings in high risk areas<br>• Ensure adequate awareness of potential for landslides to occur in area<br>• Promote self-sustainable power sources for key infrastructure eg solar panels<br>• Ensure water and sewerage services are well protected from potential flood events<br><br>**Response and recovery controls:**<br>• Insurance, emergency response and Federal & State Gov't Assistance<br>• Early movement of frail, disabled and those requiring electronic medical support to safe respite centres<br>• Barricade flood waters off to stop public access<br>• Rehabilitate damaged areas and provide temporary shelter for detached fauna<br>• Ensure public are advised on issue relating to vector control/ or management following a flood/storm surge event<br>• Council to undertake vector control programs after events<br>• Businesses to submit application to State and/or Federal Government for disaster relief. | **Comments on adequacy / effectiveness:**<br>• None<br><br>People — Major — Possible — **High 72**<br>Environment — Minor — Possible — **Low 27**<br>Economy — Major — Possible — **High 72**<br>Governance — Minor — Possible — **Low 27**<br>Social / Community — Moderate — Possible — **Medium 54**<br>Infrastructure — Major — Possible — **High 72**<br><br>**Comments on seasonal variation to risk:**<br>• For the risk assessment, flood was taken as an event that could occur throughout the year and has not been broken down seasonally. Noting that Climate Change, Cyclone season and other weather events contribute towards flooding | | • DM Sub Plans recommended for selected communities such as Moore Park and Woodgate<br>• Upgrade of roads, particularly flood prone or boggy sections<br>• Lobby to legislate ability to recoup rescue costs and prosecute those that ignore road closure signage<br>• Seek improvements from communications providers to provide better services, maintenance and protection of infrastructure<br>• Develop 'stock evacuation routes' from flood prone to higher ground. Cooperative approach needed among neighbours, may be facilitated through Landcare<br>• Ensure proposed earthworks receive full hydrological analysis and are certified neutral such that they do not hold back floodwaters (may incur extra costs of major development works, but necessary to avoid exacerbating water retention in flood-prone areas)<br>• Develop communication plan that would encourage residents to clear debris and secure buildings with timely reminders (residents are already conscious to these strategies)<br>• Develop a weather warning system to warn people of potential events. Need the ability to contact, and be contacted by all outlying properties, bulk text messaging or calling. Investigate various communication problems<br>• Training of others to fulfil roles of those cut off – succession planning<br>• Look at ways to improve remote operation via various methods and communications<br>• Formalise list of chopper operators<br>• Evacuation Plan to be developed as part of Disaster Management Plan in conjunction with TMR<br>• Backup generation for wastewater<br>• Improved veterinary services, more locally based<br>• Improved, regularly updated register of high risk people<br>• On-going training and familiarity of new roles on LDMG through meetings, exercise environments<br>• Formalise systems to continually update the website (pre-event and post-event), the DTMR website, and more 'live' photos from webcam<br>• Direct communications via email regarding road closures, ensuring all key people are included on the email<br>• Improve community communications, especially to allay fears and reduce concerns<br>• Formalise wet season approach including essential services and requirements<br>• Review emergency action plans by Sun Water and Ergon Energy<br>• Public understanding of roles of different agencies e.g. Port corporation<br>• Contact<br>• Roles and responsibilities<br>• MSQ does letter drop explaining responsibly<br>• Resupply of provisions for boats organised by MSQ<br>• Will order boats to leave river<br>• Distribution of flood warnings<br>• Understanding of flood heights by public<br>• Require better flood modelling outside of Bundaberg City Area –e.g. : Gerambolyan Creek, Bungadoo Pine Creek<br>• Improved awareness of impact of dams on downstream times/levels<br>• E.g. Paradise, Boondooma, Bjelke Petersen Dam<br>• Duration of inundation for key roads (Currawong Road)<br>• More signage/ road closed | • Communication with police at grass roots as opposed to Disaster Management Group<br>• Critical upgrades of road network for evacuation or restocking – multiple agencies<br>• **Community Resilience Plans / Strategies.** Resilience Plans are recommended to refer to http://hardenup.org/ for preparedness for local community resilience<br>• Volunteer Organisations. Choose a volunteer coordinator to support Council such as Volunteering Queensland http://www.volunteeringqld.org.au/web/<br>• **Annual Review of Risk Register.** Conduct Review of Risk Assessment Annually to assess changes to likelihood, consequence and overall risk rating based on local or global conditions (i.e. climate and weather system fluctuations, population / demographic fluctuations etc)<br>• **Interoperability between Regions.** Recommended communication and coordination with adjoining regions and agencies to provide a Regional approach to Preparedness, Response and Recovery (i.e. representation on adjoining LDMG and DDMG meetings etc) |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | | |
| **Risk 05 – Flood (cont.):**<br>**Governance impacts – immediate:**<br>• Functionality of Council may be questioned if catastrophic damage includes a number of council buildings, depots and broad ability to provide an effective response<br>• Resources available through SES, Police etc.<br>• Disruption to communications and accessibility of some areas<br>**Governance impacts – strategic:**<br>• Lack of knowledge of responsive strategies<br>**Social / Community impacts – immediate:**<br>• Ability of health/hospital systems to cope with emergency situations<br>• Psychological factors on community scale<br>• Community services not functioning<br>• Panic/concern amongst the community, loss of confidence and trust<br>• Domestic violence<br>• Alcohol abuse<br>• Theft and presence of looters<br>• Inappropriate actions of tourists and sightseers<br>• Loss of services<br>**Social / Community impacts – strategic:**<br>• Impact of limited insurance cover on the community<br>• Lack of preparedness of the community<br>• Health of the community<br>**Infrastructure impacts – immediate:**<br>• Substation disabled in Q100 event<br>• Physical damage to critical Infrastructure including buildings, power transmission, roads, railways, public transport networks, industrial areas<br>• Highway cut off<br>• Sewer Pump stations (secondary issue) can take a day or so to get up after event<br>• Building damage<br>• Impact on ability to provide telecommunications<br>• Impact on ability to provide potable water<br>• Roads blocked/homes damaged - vegetation<br>• Requirements for emergency accommodation<br>• Impact of falling power lines and poles<br>• Ability of the utility services to function<br>• Impact of structural damage<br>**Infrastructure impacts – strategic:**<br>• Long term loss of services and recovery time<br>• Medium term strain on accommodation for affected people | | | | | | | | |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | |
| **Risk 06 – Tornado/Dust Storm (winds exceeding 160kmh):**<br>**A tornado directly impacts on people, properties and infrastructure in the Region.**<br>**People impacts – immediate:**<br>• Multiple fatalities and serious injuries depending on warning time, location and intensity of the event.<br>• Psychological impact of experiencing a disaster event and potential loss of friends, family members, pets, livelihoods<br>**People impacts – strategic:**<br>• Enduring social and emotional impacts on mental health<br>**Environmental impacts – immediate:**<br>• Isolated impact on flora and fauna<br>• Wider impacts on ecosystems depending on the associated weather events and extent of damage<br>• Potential for contamination of waterways and land if man-made structures are damaged (sewerage or chemical releases etc.)<br>**Environmental impacts – strategic:**<br>• Longer term recovery of ecosystems required if damage is extensive<br>**Economy impacts – immediate:**<br>• Immediate costs of infrastructure damaged during the event - housing, commercial and industrial complexes, small business<br>• Damage to critical Infrastructure and dependent essential services including energy, water treatment and supply, sewerage, telecommunications, food supply, medical services etc<br>• Loss of stock and crops<br>• Flow on impact of tourism and associated industries (restaurants, tours, accommodation etc.)<br>• Potential for damage to airports, port/wharf facilities etc.<br>• Access to cash and electronic banking services<br>**Economy impacts – strategic:**<br>• Temporary loss of employment within the community<br>• Physical costs associated with rebuilding and restocking small businesses<br>• Potential decline in tourism related revenue if widespread damage to accommodation, airport, restaurants etc<br>• Agriculture impacts may take 2-3 years to fully recover (eg. Banana industry following Cyclone Yasi in 2011)<br>• Potential for closure of small businesses unable to recover or uninsured<br>• Potential medium term positive impact for construction sector<br>**Governance impacts – immediate:**<br>• Minor Impacts to resources available through emergency service organisations<br>• Potential for some loss of confidence in Government preparation and response strategies<br>• Minor risk of law and order issues if some communities are isolated<br>• Disruption to communications may impede governance activities in the short term<br>**Governance impacts – strategic:**<br>• Potential for positive impact if increased awareness and preparedness activities undertaken by the community<br>• Enhance profile of Emergency Services and volunteer organisations<br><br>**Content continues on the next page** | **Other impacts and consequences:**<br>• None<br><br>**Any Locations more susceptible to hazard:**<br>• None | **Preventive and preparedness controls:**<br>• Severe weather warning and alert systems<br>• Communication of risks through media<br>• Building regulations and codes<br>• Integrated Disaster Management arrangements<br>• Land use controls<br>• Business Continuity Planning<br>• Legislative basis for Disaster Management and Emergency Management arrangements<br>• Comprehensive Local Disaster Management Plan and supporting plans including Evacuation plan and Community resilience Strategy<br>• Inter-agency relationships<br>• Evacuation Plans and Evacuation Centre capabilities<br>• Community Resilience Strategy<br>• Prepositioning of Emergency resources such as power supply (generators) for essential services (water treatment, hospitals etc.)<br>• Pre-disaster season preparation of infrastructure sites (clearing debris, checking drains, roads etc.)<br><br>**Response and recovery controls:**<br>• Emergency service support<br>• Local services (medical clinics, hospitals, psychology services, Salvation Army, Red Cross)<br>• Insurances (Health, Life, Vehicle, House and Contents), Government emergency assistance programs<br>• National and International aid programs<br>• Recovery committee consideration of available activities and resources to assist environmental recovery<br>• Government relief initiatives (tax breaks)<br>• Donations and funding grants for redevelopment<br>• Mutual support between regions and districts if required (additional Police, (SES) crews etc.)<br>• Well trained full time and volunteer organisations (SES, Surf Lifesaving, Marine Rescue, etc.)<br>• Disaster Response Chaplains<br>• Existing social networks at neighbourhood and community levels<br>• (LDCC) resource allocation for the protection of priority infrastructure<br>• Activation of Business Continuity plans by infrastructure owners and operators | **Comments on adequacy / effectiveness:**<br>• None | | | • Building codes to mitigate increased wind speeds | • **Community Resilience Plans / Strategies.** Resilience Plans are recommended to refer to http://hardenup.org/ for preparedness for local community resilience<br>• Volunteer Organisations. Choose a volunteer coordinator to support Council such as Volunteering Queensland http://www.volunteeringqld.org.au/web/<br>• **Annual Review of Risk Register.** Conduct Review of Risk Assessment Annually to assess changes to likelihood, consequence and overall risk rating based on local or global conditions (i.e. climate and weather system fluctuations, population / demographic fluctuations etc)<br>• **Interoperability between Regions.** Recommended communication and coordination with adjoining regions and agencies to provide a Regional approach to Preparedness, Response and Recovery (i.e. representation on adjoining LDMG and DDMG meetings etc) |
| | | | People | Major | Possible | High 72 | | |
| | | | Environment | Major | Possible | High 72 | | |
| | | | Economy | Major | Possible | High 72 | | |
| | | | Governance | Moderate | Possible | Medium 54 | | |
| | | | Social / Community | Major | Possible | High 72 | | |
| | | | Infrastructure | Major | Possible | High 72 | | |
| | | | **Comments on seasonal variation to risk:**<br>• Possible in Spring and early Summer | | | | | |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | | |
| **Risk 06 – Tornado/Dust Storm (winds exceeding 160kmh)(cont.):**<br>**Social / Community impacts – immediate:**<br>• Immediate impacts from loss of family/friends lives, destruction of personal property and livelihoods, degradation in community services<br>• Disruption to normal social activities (sporting events, markets, community celebrations etc.)<br>• Disruption of access to community facilities (clubs, libraries, halls, open spaces)<br>**Social / Community impacts – strategic:**<br>• Residual collective mental health and social issues if numerous fatalities and/or extensive damage to properties and infrastructure<br>• Potential positive impact through increased connectivity between community members from adversity and experiences<br>**Infrastructure impacts – immediate:**<br>• First order damage to critical and key infrastructure throughout the region<br>• Potential for second order effects of adjacent regions and infrastructure (eg. Bruce Highway cut, airport closed etc.)<br>• Dependency on service providers to reduce impact on energy, water, telecommunications, transport infrastructure<br>**Infrastructure impacts – strategic:**<br>• Longer term recovery strategies required to guide priorities, capital expenditure etc.<br>• Consideration of infrastructure locations and susceptibility to future disaster events - opportunity to relocate or improve resilience | | | | | | | | |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | |
| **Risk 07 – Earthquake:**<br>**A major earthquake above 5.0 Richter occurs resulting in significant casualties and damage.**<br>**People impacts – immediate:**<br>• Potential for multiple fatalities and serious injuries depending on warning time, location and intensity of the event.<br>• Psychological impact of experiencing a disaster event and potential loss of friends, family members, pets, livelihoods, homes<br>• Reliance on aid for food and water<br>• Access to emergency services are reduced<br>• Limited travel ability<br>**People impacts – strategic:**<br>• Enduring social and emotional impacts on mental and physical health<br>• Frustration at delays in returning to normal lifestyle<br>**Environmental impacts – immediate:**<br>• Isolated impact on flora and fauna<br>• Potential for wider impacts on ecosystems depending on extent of damage and second order effects (dam failure, fires etc.)<br>• Potential for contamination of waterways and land if man-made structures are damaged (sewerage or chemical releases etc.)<br>**Environmental impacts – strategic:**<br>• Longer term recovery of ecosystems required if damage is extensive<br>• Liquefaction<br>**Economy impacts – immediate:**<br>• Immediate costs of infrastructure damaged during the event - housing, commercial and industrial complexes, small business<br>• Damage to critical Infrastructure and dependent essential services including energy, water treatment and supply, sewerage, telecommunications, food supply, medical services etc.<br>• Flow on impact of tourism and associated industries (restaurants, tours, accommodation etc.)<br>• Potential for damage to airports, port/wharf facilities etc.<br>• Access to cash and electronic banking services<br>**Economy impacts – strategic:**<br>• Loss of employment within the community<br>• Physical costs associated with rebuilding and restocking small businesses<br>• Potential decline in tourism related revenue if widespread damage to accommodation, airport, restaurants etc<br>• Potential for closure of businesses unable to recover or uninsured<br>• Potential medium term positive impact for construction sector<br>**Governance impacts – immediate:**<br>• Minor Impacts; Resources available through emergency service organisations<br>• Potential for some loss of confidence in Government preparation and response strategies<br>• Minor risk of law and order issues if some communities are isolated<br>• Disruption to communications may impede governance activities in the short term<br>**Governance impacts – strategic:**<br>• Potential for positive impact if increased awareness and preparedness activities undertaken by the community; hardening of infrastructure<br>• Enhance profile of Emergency Services and volunteer organisations<br>**Social / Community impacts – immediate:**<br>• Immediate impacts from loss of family/friends lives, destruction of personal property and livelihoods, degradation in community services<br>• Disruption to normal social activities (sporting events, markets, community celebrations etc.)<br>• Disruption of access to community facilities (clubs, libraries, halls, open spaces)<br>**Social / Community impacts – strategic:**<br>• Residual collective mental health and social issues if numerous fatalities and/or extensive damage to properties and infrastructure<br>• Potential positive impact through increased connectivity between community members from adversity and experiences<br><br>**Content continues on the next page** | **Other impacts and consequences:**<br>• Tim Fischer Bridge<br>• Paradise Dam<br>• Fred Height<br>• Bridges – general<br>• Tallon<br>• Kennedy<br><br>**Any Locations more susceptible to hazard:**<br>• Bundaberg township due to density of population and infrastructure<br>• Port<br>• Airport<br>• Rail Station<br>• Mt Perry/ Mt Rawdon – cyanide<br>• Bundaberg Rum – storage of substance such as ethanol | **Preventive and prepared ness controls:**<br>• National and international monitoring and alert systems (USGS, Geoscience Australia etc.)<br>• Communication of risks through media<br>• Building regulations and codes<br>• Integrated Disaster Management arrangements<br>• Land use controls<br>• Business Continuity Planning<br>• Legislative basis for Disaster Management and Emergency Management arrangements<br>• Comprehensive Local Disaster Management Plan and supporting plans including Evacuation plan and Community resilience Strategy<br>• Inter-agency relationships<br>• Evacuation Plans and Evacuation Centres<br>• Community Resilience Strategy<br>• Prepositioning of Emergency resources such as power supply (generators) for essential services (water treatment, hospitals etc.)<br>• Pre-disaster season preparation of infrastructure sites (clearing debris, checking drains, roads etc.)<br>• Ensure public awareness of potential for diseases to spread<br>• Ensure public inoculated against disease where possible<br>• Ensure Council is able to call on the services of qualified personnel to assess building damage<br>• Encourage local businesses to develop the ability to work remotely<br>• Critical facilities should ensure that all equipment eg, communication, electricity, etc. meet appropriate earthquake design standards and backup power is available on site<br>• Ensure emergency services have access to a range of vehicles eg, boats, 4WD, quad bikes, helicopters, etc.<br><br>**Response and recovery controls:**<br>• Emergency service support<br>• Local services (medical clinics, hospitals, psychology services, Salvation Army, Red Cross)<br>• Insurances (Health, Life, Vehicle, House and Contents), Government emergency assistance programs<br>• National and International aid programs<br>• Recovery committee consideration of available activities and resources to assist environmental recovery<br>• Government relief initiatives (tax breaks)<br>• Donations and funding grants for redevelopment<br>• Mutual support between regions and districts if required (additional Police, SES crews etc.)<br>• Well trained full time and volunteer organisations (SES, Surf Lifesaving, Marine Rescue, etc.)<br>• Disaster Response Chaplains<br>• Existing social networks at neighbourhood and community levels<br>• (LDCC) resource allocation for the protection of priority infrastructure Activation of Business Continuity plans by infrastructure owners and operators<br>• Rehabilitate damaged areas and provide temporary shelter for detached fauna<br>• Relocate fauna<br>• Businesses to submit application to state and/or Federal Government for disaster relief<br>• Dam operators have emergency Action Plans – legislative requirement<br>• QDMA (Queensland DM arrangements) provide an effective framework | **Comments on adequacy / effectiveness:**<br>• None<br><br>People: Catastrophic / Unlikely / **High 78**<br>Environment: Minor / Unlikely / **Low 24**<br>Economy: Major / Unlikely / **Medium 60**<br>Governance: Major / Unlikely / **Medium 60**<br>Social / Community: Major / Unlikely / **Medium 60**<br>Infrastructure: Major / Unlikely / **Medium 60**<br><br>**Comments on seasonal variation to risk:**<br>• Analysis based on data available | | | • DM Sub Plans recommended for the areas of Bundaberg city and surrounding communities, transport infrastructure (rail, airport, port, bridges), large industrial storage (Bundy Rum).<br>• Identification of high risk buildings and seismic strengthen programme<br>• Existing study 2001 (Jack Rynn, Phd)<br>• 6.3 1918-offshore Gladstone<br>• 6.1 -1935 – Gayndah<br>• 1 in 5 years - 7.5 on Richter scale<br>• More data to ground likelihood<br>• Emergency alert pre formed message polygons | • Whilst most of Australia is rated as having a "low-risk" status with regard to earthquake hazard the historical data of this assumption is of relatively short duration. Historically, quite a number of seismic disturbances have occurred along the eastern seaboard of Queensland from the Gold Coast in the south, through to Daintree in the north. These have been relatively low in magnitude<br>• The region has experienced earthquakes of up to 6.23 off the coast and 5.8 south of Gladstone in the early part of the 20th Century and other minor tremors.<br>• Whilst loss of life and severe property damage has not been evident following these disturbances the consequences of a severe happening such as Newcastle 1989 has proven the necessity of planning for just that type of disaster.<br>• Amongst other factors, the impact of earthquake events is also dependent on local geological conditions.<br>• The potential exists for the region to suffer seismic activity. In such an event masonry structures are most probable sources of injury to persons and large structures such as the power station could be affected. There is also the potential for interruption to water and sewerage services<br>• **Community Resilience Plans / Strategies.** Resilience Plans are recommended to refer to http://hardenup.org/ for preparedness for local community resilience<br>• Volunteer Organisations. Choose a volunteer coordinator to support Council such as Volunteering Queensland http://www.volunteeringqld.org.au/web/<br>• **Annual Review of Risk Register.** Conduct Review of Risk Assessment Annually to assess changes to likelihood, consequence and overall risk rating based on local or global conditions (i.e. climate and weather system fluctuations, population / demographic fluctuations etc)<br>• **Interoperability between Regions.** Recommended communication and coordination with adjoining regions and agencies to provide a Regional approach to Preparedness, Response and Recovery (i.e. representation on adjoining LDMG and DDMG meetings etc) |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | | |
| **Risk 07 – Earthquake (cont.):**<br>**Infrastructure impacts – immediate:**<br>• First order damage to critical and key infrastructure throughout the region<br>• Potential for second order effects of adjacent regions and infrastructure (eg. Bruce Highway cut, airport closed etc.)<br>• Dependency on service providers to reduce impact on energy, water, telecommunications, transport infrastructure<br>**Infrastructure impacts – strategic:**<br>• Longer term recovery strategies required to guide priorities, capital expenditure etc.<br>• Consideration of infrastructure locations and susceptibility to future disaster events - opportunity to relocate or improve resilience | | | | | | | | |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | |

## Risk 08 – Landslide (including Erosion):

**A large scale landslide of rock, debris and earth within the region directly impacts on the community, accessibility and infrastructure.**

**People impacts – immediate:**
- Potential for multiple fatalities and serious injuries depending on warning time, location and intensity of the event. Psychological impact of experiencing a disaster event and potential loss of friends, family members, pets, livelihoods etc. if lanslide was a large one impacting on urban or township areas (eg. Childers, Hummack)

**People impacts – strategic:**
- Enduring social and emotional impacts on mental health – if fatalities are widespread
- Willingness to remain in area

**Environmental impacts – immediate:**
- Isolated impact on flora and fauna
- Potential for wider impacts on ecosystems depending on the associated weather events (floods etc.) and extent of damage
- Potential for contamination of waterways and land if man-made structures are damaged (sewerage or chemical releases etc.)

**Environmental impacts – strategic:**
- Impact likely to be isolated to immediate area of landslide and limited in nature.

**Economy impacts – immediate:**
- Immediate costs of infrastructure damaged during the event - housing, commercial and industrial complexes, small business
- Damage to critical Infrastructure and dependent essential services including energy, water treatment and supply, sewerage, telecommunications, food supply, medical services etc.
- Loss of stock and crops
- Flow on impact of tourism and associated industries (restaurants, tours, accommodation etc.);
- Access to cash and electronic banking services if infrastructure damaged;

**Economy impacts – strategic:**
- Temporary loss of employment within the community
- Physical costs associated with rebuilding and restocking small businesses
- Potential decline in tourism related revenue if widespread damage to accommodation, airport, restaurants etc.
- Potential for closure of small businesses unable to recover or uninsured
- Potential medium term positive impact for construction sector;

**Governance impacts – immediate:**
- Minor Impacts; Resources available through emergency service organisations
- Potential for some loss of confidence in Government preparation and response strategies
- Minor risk of law and order issues if some communities are isolated
- Disruption to communications may impede governance activities in the short term;

**Governance impacts – strategic:**
- Potential for positive impact if increased awareness and preparedness activities undertaken by the community
- Enhance profile of Emergency Services and volunteer organisations;

**Social / Community impacts – immediate:**
- Immediate impacts from loss of family/friends lives, destruction of personal property and livelihoods, degradation in community services
- disruption to normal social activities (sporting events, markets, community celebrations etc.)
- Disruption of access to community facilities (clubs, libraries, halls, open spaces);

**Social / Community impacts – strategic:**
- Residual collective mental health and social issues if numerous fatalities and/or extensive damage to properties and infrastructure
- Potential positive impact through increased connectivity between community members from adversity and experiences;
- Lacking good landslip mapping (> 15 %) – Not a broad scale study

**Content continues on the next page**

**Other impacts and consequences:**

**Any Locations more susceptible to hazard:**
- Childers
- Hummock (Suburb of Bundy)
- Branyan (maybe)
- Major transport routes (Rail and road)

**Preventive and preparedness controls:**
- Monitoring of contributing conditions (heavy rainfall, earthquakes etc.)
- AGSO studies and analysis; building regulations and codes
- integrated Disaster Management arrangements;
- Land use controls
- Business Continuity Planning;
- Legislative basis for Disaster Management and Emergency Management arrangements
- Comprehensive Local Disaster Management Plan and supporting plans including Evacuation plan and Community resilience Strategy
- inter-agency relationships;
- Evacuation Plans and Evacuation Centre capabilities
- Community Resilience Strategy;
- Prepositioning of Emergency resources such as power supply (generators) for essential services (water treatment, hospitals etc.)
- Pre-disaster season preparation of infrastructure sites (clearing debris, checking drains, roads etc.)
-

**Response and recovery controls:**
- Emergency service support; local services (medical clinics, hospitals, psychology services, Salvation Army, Red Cross);
- Insurances (Health, Life, Vehicle, House and Contents),
- Government emergency assistance programs
- National and International aid programs
- Recovery committee consideration of available activities and resources to assist environmental recovery
- Government relief initiatives (tax breaks)
- Donations and funding grants for redevelopment
- Mutual support between regions and districts if required (additional Police, SES crews etc.) - Council 2 council
- Well trained full time and volunteer organisations (SES, Surf Lifesaving, etc.) – Rural fire Service
- Disaster Response Chaplains
- Existing social networks at neighbourhood and community levels
- (LDCC) resource allocation for the protection of priority infrastructure
- Activation of Business Continuity plans by infrastructure owners and operators

**Comments on adequacy / effectiveness:**
- None

| | Adequacy / Effectiveness | Consequence | Likelihood | Risk |
|---|---|---|---|---|
| People | | Minor | Unlikely | Low 24 |
| Environment | | Minor | Unlikely | Low 24 |
| Economy | | Minor | Unlikely | Low 24 |
| Governance | | Minor | Unlikely | Low 24 |
| Social / Community | | Minor | Unlikely | Low 24 |
| Infrastructure | | Minor | Unlikely | Low 24 |

**Comments on seasonal variation to risk:**
- None
- Note a wet weather event can contribute

- Landslip mapping throughout the region
- Planning scheme overlays
- DTMR landslip data and LDMG plans

- **Community Resilience Plans / Strategies.** Resilience Plans are recommended to refer to http://hardenup.org/ for preparedness for local community resilience
- Volunteer Organisations. Choose a volunteer coordinator to support Council such as Volunteering Queensland http://www.volunteeringqld.org.au/web/
- **Annual Review of Risk Register.** Conduct Review of Risk Assessment Annually to assess changes to likelihood, consequence and overall risk rating based on local or global conditions (i.e. climate and weather system fluctuations, population / demographic fluctuations etc)
- **Interoperability between Regions.** Recommended communication and coordination with adjoining regions and agencies to provide a Regional approach to Preparedness, Response and Recovery (i.e. representation on adjoining LDMG and DDMG meetings etc)

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | | |
| **Risk 08 – Landslide (cont.):**<br>**Infrastructure impacts – immediate:**<br>• First order damage to critical and key infrastructure throughout the region<br>• Potential for second order effects of adjacent regions and infrastructure (eg. highway cut, airport closed etc.)<br>• Dependency on service providers to reduce impact on energy, water, telecommunications, transport infrastructure;<br>**Infrastructure impacts – strategic:**<br>• Longer term recovery strategies required to guide priorities, capital expenditure etc.<br>• Consideration of infrastructure locations and susceptibility to future disaster events - opportunity to relocate or improve resilience | | | | | | | | |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | |
| **Risk 09 - Prolonged Drought:**<br>**A period of at least 3 years of extremely low rainfall, low humidity and degraded accessibility of water supplies directly impacting on the .**<br><br>**People impacts – immediate:**<br>• The lack of a rapid onset or dangerous incident minimises immediate impact on people.<br>• Psychological impact of a prolonged drought may be complex.<br><br>**People impacts – strategic:**<br>• Enduring social and emotional impacts on mental health, particularly if livelihood is impacted (farms, agriculture etc.).<br><br>**Environmental impacts – immediate:**<br>• Widespread impact on flora and fauna<br>• Potential for wider impacts on ecosystems depending on the duration and intensity of the drought<br><br>**Environmental impacts – strategic:**<br>• Longer term recovery of ecosystems required if damage is extensive<br><br>**Economy impacts – immediate:**<br>• Moderate immediate impact on economy - agriculture and livestock industries affected initially and flow on effects to other industries (transport sector, export trade etc.)<br><br>**Economy impacts – strategic:**<br>• Temporary loss of employment within the community<br>• Agriculture impacts may take 2-3 years to fully recover (eg. Banana industry following Cyclone Yasi in 2011)<br>• Potential for closure of small businesses unable to recover or uninsured<br><br>**Governance impacts – immediate:**<br>• Potential for loss of confidence in Government preparation and response strategies<br><br>**Governance impacts – strategic:**<br>• Increased unemployment and dependence of aid may lead to increased social issues at the regional level<br><br>**Social / Community impacts – immediate:**<br>• Gradual degradation in community services if population and funding relocate from rural or remote areas<br>**Social / Community impacts – strategic:**<br>• Residual collective mental health and social issues if numerous bankruptcies declared<br>• Suicide rate increases<br><br>**Infrastructure impacts – immediate:**<br>• Minimal immediate impact<br>**Infrastructure impacts – strategic:**<br>• Longer term recovery strategies required to guide priorities, capital expenditure etc.<br>• Consideration of infrastructure locations and susceptibility to future disaster events - opportunity to relocate or improve resilience | **Other impacts and consequences:**<br>• None<br><br>**Any Locations more susceptible to hazard:**<br>• None | **Preventive and preparedness controls:**<br>• Weather warning and monitoring systems<br>• Communication of risks through media<br>• Land use control<br>• Business Continuity Planning<br>• Comprehensive and rehearsed Local Disaster Management Plan<br>• Resource management strategies at State level - eg. Water Management<br>• Water security programs (desalination plants, reservoirs etc.)<br><br>**Response and recovery controls:**<br>• Local services (medical clinics, hospitals, psychology services, Salvation Army, Red Cross)<br>• Insurances (Health, Life, Vehicle, House and Contents), Government assistance programs<br>• Recovery committee consideration of available activities and resources to assist environmental recovery<br>• Government relief initiatives (tax breaks)<br>• Donations and funding grants for redevelopment<br>• Federal and State Government grants and tax break initiatives<br>• Existing social networks at neighbourhood and community levels | **Comments on adequacy / effectiveness:**<br>• None<br><br>People: Major / Possible / **High 72**<br>Environment: Major / Likely / **High 75**<br>Economy: Major / Likely / **High 75**<br>Governance: Moderate / Possible / **Medium 54**<br>Social / Community: Moderate / Possible / **Medium 54**<br>Infrastructure: Insignificant / Unlikely / **Low 9**<br><br>**Comments on seasonal variation to risk:**<br>• None | | | • Identify altenrtive water supplies for domestic, agricultural and commercial purposes | • Funding arrangements probably make this NOT a DM issue<br>• However: implications for resupply<br>• Drought declaration vs disaster declaration<br>• **Community Resilience Plans / Strategies.** Resilience Plans are recommended to refer to http://hardenup.org/ for preparedness for local community resilience<br>• Volunteer Organisations. Choose a volunteer coordinator to support Council such as Volunteering Queensland http://www.volunteeringqld.org.au/web/<br>• **Annual Review of Risk Register.** Conduct Review of Risk Assessment Annually to assess changes to likelihood, consequence and overall risk rating based on local or global conditions (i.e. climate and weather system fluctuations, population / demographic fluctuations etc)<br>• **Interoperability between Regions.** Recommended communication and coordination with adjoining regions and agencies to provide a Regional approach to Preparedness, Response and Recovery (i.e. representation on adjoining LDMG and DDMG meetings etc) |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | |
| **Risk 10 - Bushfire (Rural, Urban/Rural Interface):**<br>**Extreme or Catastrophic rated bushfire within the region requiring external resources to control and that has significant impact on people, infrastructure, the environment and economy.**<br>**People impacts – immediate:**<br>• Potential for injury, death, smoke inhalation etc... most likely from those attending the fire<br>• Increase in asthma cases<br>• People affected may require evacuation<br>• People affected may need to be provided with temporary accommodation and be supplied basic necessities eg, food, water, clothing, etc..<br>• Increased number of abandoned domestic animals and therefore number of stray animals and animal death. Associated personal trauma from loss of domestic animals<br>• Reduced access to emergency services delaying treatment<br>• Residents may rely on aid for food and water<br>**People impacts – strategic:**<br>• People affected may experience long-term financial hardship due to high cost involved in repairing homes<br>• People affected may suffer post-disaster trauma and depression from loss of personal belongings and homes<br>**Environmental impacts – immediate:**<br>• Loss of pasture<br>• Fewer natural habitats<br>• Reduced biodiversity<br>**Environmental impacts – strategic:**<br>• Natural grasses open to infestation from other types<br>**Economy impacts – immediate:**<br>• Loss of crop/stock (e.g. farm, plantation etc..)<br>• Loss of pastures<br>• Loss of feed stocks<br>• Loss of large plantation area<br>• Farm buildings<br>**Economy impacts – strategic:**<br>• Badly damaged/burnt buildings will require significant costs to repair or may be too badly damaged to repair.<br>• Businesses, such as farmers whose buildings are damaged from fire face hardship with a period of inability to continue business-as-usual activities<br>• Significant costs to replace damaged crops<br>**Governance impacts – immediate:**<br>• Any casualties will impact police and health services<br>• Uncontrolled burns impacting on residential communities will require emergency services<br>**Governance impacts – strategic:**<br>• None | **Other impacts and consequences:(Note below)**<br>• Isolation<br>• Resupply<br>• Roads into some areas will not accommodate large QFS vehicles<br>• Bruce Highway cut e.g. Ca<br>• Cadalba State forest<br>• Fires at Bundaberg can close Bruce Highway<br><br>**Any Locations more susceptible to hazard:**<br>• Goodnight scrubs<br>• Abbotsford<br>• Mandura St Forest<br>• Waterloo<br>• Promised Land<br>• Moore Park(North) close proximity to urban area<br>• One road in communities<br>• Woodgate - Stranded by Greg<br>• “people”<br>• Buxton –one road in, not as dense as Moore Park<br>• “people”<br>• Gaeta – infrastructure<br>• Electra/ Pine Creek – “people” | **Preventive and preparedness controls:**<br>• All stations grade a fire break around their boundaries each year<br>• Fence lines and exit tracks in various directions from homesteads are graded each year<br>• Training and reliance on local knowledge<br>• Graziers largely practice full range of sound fire preparation strategies<br>• Rural fire brigade<br>• Manage overgrown allotments<br>• Active Local Disaster Management Plan and rehearsals public education on risks and expected actions<br>• Responsibility for fuel monitoring (National parks & forest conservation, council controlled land)<br>• Managing ignition source (fire weather warnings, fire bans & stats of fire emergency fire, permit to burn, area closures)<br>• Bushfire control is on the agenda for major State agencies<br>• Council Planning Scheme<br>• Managing fuel( prescribed burning, smoke management, monitoring & forecasting fuel condition)<br>• Presence of fire breaks and other mitigation strategies around residential property and outbuildings<br>• Vegetation management - fire breaks and trails, I-zones<br>• QRFS/QFRS risk assessments and data<br>• Hazard monitoring activities<br>• Community Education (QFRS schools)<br>• Home School education<br>• ABC radio/Media-local televised news.<br>• FPQ (resources)- Local power company- summer preparedness and planning Other natural area Council, fire resources from QPWS<br>• Well educated, trained and equipped Rural Fire Services, supported by SES teams and other agencies<br>• Social Infrastructure Strategy<br>• Evacuation plan and centres<br>• Ensure buildings in fire risk areas are built to a fireproof standard or require extensive areas cleared around buildings to provide safe refuge<br>• Provide information on minimising the effects of smoke inhalation<br>• Provide information on procedures for protection of property<br>• Ensure that critical facilities eg, repeater stations for radio, telecommunications, etc. have appropriate fire protection if located in bushfire risk areas, including back-up power if required<br><br>**Response and recovery controls:**<br>• Evacuate areas in the vicinity of the fire<br>• Local recovery committees<br>• Managing fire (fire detection & reporting, convectional response resources, aerial attack, fire weather, incident management)<br>• Insurance<br>• Federal & State Government Assistance<br>• QRFS<br>• Local government (Council) FPQ QPS QPWS<br>• Local power company (Disconnect and Reconnect)<br>• Telecommunications carriers repair and temporary mobile phone tower capabilities<br>• Council LDMG/EMQ/Dept of Communities<br>• ABC Radio<br>• Communications with fire crews on ground<br>• Assist emergency organisations/services in providing relief to residents of damaged houses eg, emergency repairs, shelters, food.<br>• Rehabilitate damaged areas and provide temporary shelter for detached fauna<br>• Relocate fauna<br>• Business to submit application to State and/or Federal Government for disaster relief | **Comments on adequacy / effectiveness:** SES Gin Gin controller, also considers higher levels of likelihood (Gaeta = benchmark) | | | | • DM Sub Plans recommended for selected communities such as Moore Park, Woodgate, state forests, Goodnight Scrubs and Promiseland<br>• Investigate small cool burns after good wet seasons while the ground is still moist<br>• Encourage double blade width fire breaks around towns and properties<br>• Develop 10% burn-off strategy (after wet years) when there is still plenty of moisture in the ground. Cool mosaic burns are recommended to control fuel loads and control woody weeds<br>• Large green road map/sign for road closure, charging those who ignore road closures the full cost of rescue<br>• DES and SES support for training<br>• Get rural brigades renamed and re-established/ Recruitment FRS<br>• Match roads / QFRS vehicles and risk – i.e make roads capable of carrying QFRS vehicles (prioritise by risk)<br>• Exercise with QFRS, e.g.: LDMG activate with QFRS<br>• (prepared - extending on current process<br>• Transparency of QFRS /RFS planning exercise and other mitigation (current)<br>• Boats from Gladstone for possible beach loadings/ wade out<br>• Involvement of SLSQ (proposed)<br>• Replace wooden infrastructure with concrete/ steel<br>• Buffer fibre –optic cabling | • Gaeta - significant impact in 2009; impact : economic (pastures burnt out)<br>• Issue : resupply of fodder<br>• Because of controlled burns at Cordalba and Kintiana State forest, Woodgate and Cordalba communities are buffered from larger effects of bushfires<br>• Move into “ Preventative and preparedness controls<br>• Fires of Bundaberg area<br>• Problem:<br>• *Lack of RFS brigades*<br>• *Lack of volunteers*<br>• *Manduran*<br>• *Lack of roads*<br>• Moore Park<br>• Air support – bucket is not appropriate: suitable bucket is in Brisbane, subject to needs analysis<br>• **Community Resilience Plans / Strategies.** Resilience Plans are recommended to refer to http://hardenup.org/ for preparedness for local community resilience<br>• Volunteer Organisations. Choose a volunteer coordinator to support Council such as Volunteering Queensland http://www.volunteeringqld.org.au/web/<br>• **Annual Review of Risk Register.** Conduct Review of Risk Assessment Annually to assess changes to likelihood, consequence and overall risk rating based on local or global conditions (i.e. climate and weather system fluctuations, population / demographic fluctuations etc)<br>• **Interoperability between Regions.** Recommended communication and coordination with adjoining regions and agencies to provide a Regional approach to Preparedness, Response and Recovery (i.e. representation on adjoining LDMG and DDMG meetings etc) |
| | | | People | Minor | Likely | Medium 54 | |
| | | | Environment | Moderate | Likely | High 66 | |
| | | | Economy | Moderate | Likely | High 66 | |
| | | | Governance | Minor | Likely | Medium 45 | |
| | | | Social / Community | Minor | Likely | Medium 45 | |
| | | | Infrastructure | Moderate | Likely | High 66 | |
| | | | **Comments on seasonal variation to risk:**<br>• Main fire risk usually possible September and October and likely November and December, January possible if late monsoon. A prior heavy wet season increases the fuel load and likelihood of wildfire | | | | |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | | |
| **Risk 10 - Bushfire (Rural, Urban/Rural Interface) (cont.):**<br>**Social / Community impacts – immediate:**<br>• Physical isolation of communities<br>• Disruption to communication services - inability to contact family/friends<br>• Sudden dependence on local networks for survival/support<br>• Loss of social Infrastructure - sporting clubs, pools, community centres etc<br>• Temporary displacements<br>• Temporary service loss<br>• Single industry failure consequences<br>**Social / Community impacts – strategic:**<br>• None<br>**Infrastructure impacts – immediate:**<br>• Damage or destruction of key utilities infrastructure including communications, power, water, sewerage, garbage damage or loss of buildings enabling key services (health, education, financial, food, fuel)<br>• Closed airport<br>• Loss/Damage to power lines and communication towers<br>• Destruction of houses, small businesses, contamination of water supplies<br>**Infrastructure impacts – strategic:**<br>• Damage to rail network - impact on adjacent regions for passenger and freight operations<br>• Increased demand for temporary accommodation<br>• Increased pressure on remaining infrastructure<br>• Potential for spike in diseases based on degraded sanitation<br>• Fibre –optics (Cabling)<br>• Wooden infrastructure (e.g. bridges, poles)<br>• Phone towers | | | | | | | | |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | |
| **Risk 11 – Pandemic and other contagious diseases (Human Diseases Outbreak):**<br>**Pandemic resulting in moderate number of fatalities and second order impacts on the health systems, business, infrastructure and community functionality.**<br><br>**People impacts – immediate:**<br>• >100% occupancy of medical facilities(current) - no scaling)<br>• Widespread illness or death<br>• Key personnel looking after family and decreased productivity<br>• Rural communities-less contact<br>• Vulnerable people (elderly, young, sick- notified<br>• Reduction in skilled staff (40% planning figures)<br>• Fear/panic<br>• Inability for emergency services to provide assistance to the community(Saturation of services)<br><br>**People impacts – strategic:**<br>• Enduring social impacts of isolation and high mortality rate for small community<br>• Personal awareness and prevention actually reduced case proportions(increased in productivity)<br><br>**Environmental impacts – immediate:**<br>• Could be a cause itself<br>• Infrastructure decline (waste management)<br>• Low density living<br>• Water supply impacts<br><br>**Environmental impacts – strategic:**<br>• No identified strategic impact on environment<br>• Vector control<br><br>**Economy impacts – immediate:**<br>• Supply chain( no drivers, not rampant)<br>• Panic buying - empty out supermarkets<br>• Tourism decline<br>• Casual workforce without income (e.g. backpackers)<br>• Local businesses declined or decreased in revenues<br>• Expensive decontamination of infrastructure<br><br>**Economy impacts – strategic:**<br>• Waves of impact on the economy(12 months period)<br>• Businesses close permanently<br><br>**Governance impacts – immediate:**<br>• Decreased availability of health staff/ police/ govt services- public order<br>• Health lead but LDMG role requires clarification<br>• Failure in management process for single fatality<br>• Notifications and data collection - Health capacity<br>• Duty of care - staff and volunteers (Wide Bay volunteers)- vaccination management<br><br>**Governance impacts – strategic:**<br>• Prioritisation of local needs against State/ National<br><br>**Social / Community impacts – immediate:**<br>• Education facilities- parents not at work<br>• Isolation from strategically content/family - force people apart<br>• Disruption to normal community<br>• Large fatalities-Mental health impacts<br>**Social / Community impacts – strategic:**<br>• Residual collective health and social issues if numerous fatalities or extended isolation of communities<br>• Food rationing or fuel rationing<br>• Integrate into community Relief programs e.g. Pandemic Planning checklist for small businesses in the Pandemic Guide for Local Govt.<br><br>**Infrastructure impacts – immediate:**<br>• Increased reliance on communication networks and increased reliance on home delivery services- food and medicines<br>• Limited morgue facilities (fridge trucks)<br>• Sewerage/water/contamination/ traffic management<br>• Essential roles of LDMG to continue<br><br>**Infrastructure impacts – strategic:**<br>• Non-essential services cut (elective surgery)<br>• Supply chain- fuel etc | **Other impacts and consequences:**<br>• None<br><br>**Any Locations more susceptible to hazard:**<br>• Shut down wards etc.<br>• Panic buying impacts on communities up to 100 km<br>• Fresh fruit and vegetable industry | **Preventive and preparedness controls:**<br>• Queensland Health Pandemic Plan<br>• Monitoring of international indicators and health authorities<br>• Public Health plans<br>• Workplace practices e.g. WP<br>• Comprehensive and rehearsed Local Disaster Management Plan<br>• Integrated Disaster Management arrangements<br>• National and State Pandemic plans<br>• Stockpile of vaccination /treatments (covered in above plans)<br>• Govt vaccination programs-old and young<br>• Business continuity plans(Health, food etc.)<br>• Quarantine Act (in extremis) Govt power to stop travel etc.<br>• Essential staff vaccination Plan<br>• Containment of ships if suspect<br>• Vector control/eradication program<br>• WHO monitoring global trends<br>• Handouts for arriving passengers / visitors<br>• Awareness campaigns - National and State - Hotline/website<br>• Salt Marsh mosquitoes and water treatment of still water -tanks, creeks and lakes<br>• LDMG Health Sub plan<br>• C2C<br><br>**Response and recovery controls:**<br>• PPE for workers and public<br>• Personal isolation -stay @home<br>• Activation of workplace and community pandemic plans<br>• Emergency service support<br>• Local services (medical clinics, hospitals, psychology services, Salvation Army, Red Cross)<br>• Reduced workplace<br>• Flu clinics- keep away from hospitals<br>• SHUT DOWN of population contact points - school, sporting events and clubs<br>• Quarantine Areas<br>• Community recovery Centres/ flu clinics<br>• Local networks- check on neighbours<br>• Screening of incoming PAX-isolation<br>• State and national Reponses(Additional police, military and Red Cross)<br>• NGOs<br>• Ensure there are sufficient hospital and first aid personnel to provide medical services/advice to the residents that are affected<br>• Establish a temporary/makeshift hospital facility to act as an inoculation clinic, if a permanent or mobile facility is not available<br>• Establish a temporary/makeshift hospital facility to act as a quarantine area for those affected, if disease is infectious and potentially lethal<br>• Decontamination of contaminated buildings<br>• Individuals who were in contaminated buildings should be advised to undergo medical checks to ensure their health is unaffected<br>• Businesses to submit application to State and/or Federal Government for disaster relief<br>• Ensure the community is notified of the event promptly through media notices to prevent the spread of false information. Media notices should identify the source (if possible), what may have caused the problem and the steps being taken to rectify the problem | **Comments on adequacy / effectiveness:**<br>• None<br><br>People — Major — Possible — **High- 72**<br>Environment — Moderate — Possible — **Medium -54**<br>Economy — Major — Possible — **High - 72**<br>Governance — Moderate — Possible — **Medium - 54**<br>Social / Community — Minor — Possible — **Low- 27**<br>Infrastructure — Moderate — Possible — **Medium - 54**<br><br>**Comments on seasonal variation to risk:**<br>• None | • Investigate plans for WH&S for all agencies<br>• To be reinforced - community consultation and advice<br>• To include the C2C plan into the LDMP<br>• Desk top scenario<br>• Hospital Disaster Plan to be included in the LDMG (e.g. Tuesday) – SES has Workforce<br>• Review in relation to pandemic and epidemic<br>• Communication issues; alternative to elderly population multimedia<br>• Need to test channel 34 Emergency services UHF<br>• Information dispersal (Use of multimedia)<br>• Increase economics impacts to 12 months<br>• Inductions<br>• Volunteer management System (prefer outsource)<br>• Recommend website<br>• To be used by QLD Health<br>• Adequate IT support (I.e. Twitter, Facebook)<br>• Standardisation of messages / single source<br>• Supply of appropriate PPE<br>• Economic: are there low interest loans, financial advisors available?<br>• BCP need to identify an encompass Pandemic/ Epidemic as part of succession plans to reduce risk (e.g. Health Plan) – low/medium | • Amend definition<br>• Amend % on risk management Table under “People” major<br>• E.g.: bird flu, swine flu, dengue, Ross River<br>• Japanese encephalitis, Barmah forest<br>• Chikungunya<br>• Noroux Virus<br>• List of vulnerable populations (BRC)<br>• Authentication messaging by lead agency or appointment (DM)<br>• FIFO population and transient community spread<br>• **Community Resilience Plans / Strategies.** Resilience Plans are recommended to refer to http://hardenup.org/ for preparedness for local community resilience<br>• Volunteer Organisations. Choose a volunteer coordinator to support Council such as Volunteering Queensland http://www.volunteeringqld.org.au/web/<br>• **Annual Review of Risk Register.** Conduct Review of Risk Assessment Annually to assess changes to likelihood, consequence and overall risk rating based on local or global conditions (i.e. climate and weather system fluctuations, population / demographic fluctuations etc)<br>• **Interoperability between Regions.** Recommended communication and coordination with adjoining regions and agencies to provide a Regional approach to Preparedness, Response and Recovery (i.e. representation on adjoining LDMG and DDMG meetings etc) |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | |
| **Risk 12 - Extreme High Temperature Event(>36 degrees, >2 days):**<br>**A prolonged period of excessive heat resulting in a significant increase in mortality rates, degraded infrastructure assurance and health system pressures. Queensland Health :heat wave is at least 48 hours> 32.5 degrees Celsius, 80 %**<br>**People impacts – immediate:**<br>• Potential for multiple fatalities and serious sickness depending on duration of the heat event especially young and elderly<br>**People impacts – strategic:**<br>• Enduring social and emotional impacts on mental health<br>• Willingness to remain in area<br>**Environmental impacts – immediate:**<br>• Isolated impact on stock flora and fauna if acute shortage of above ground water (for stock) and extreme temperatures persist<br>**Environmental impacts – strategic:**<br>• Bushfire<br>**Economy impacts – immediate:**<br>• Immediate costs of damage to Infrastructure such as power transmission network overloads, melting roads etc.<br>• Impact on small business if population decreases normal social and economic activity<br>• Damage to dependent essential services including energy, water treatment and supply, sewerage, telecommunications, food supply, medical services etc.<br>**Economy impacts – strategic:**<br>• Long term effects of above, costs of repair<br>**Governance impacts – immediate:**<br>• Potential for some loss of confidence in Council preparation and response strategies<br>• Disruption to communications may impede governance activities in the short term<br>**Governance impacts – strategic:**<br>• Potential for positive impact if increased awareness and preparedness activities undertaken by the community<br>• Enhance profile of Emergency Services, LDMG and volunteer organisations<br>**Social / Community impacts – immediate:**<br>• Immediate impacts from loss of family/friends lives, degradation in community services and provision of health services<br>• Disruption to normal social activities (sporting events, markets, community celebrations etc.)<br>• Disruption of access to community facilities (clubs, libraries, halls, open spaces) if closed due to power outages etc.<br>**Social / Community impacts – strategic:**<br>• Residual collective mental health and social issues if numerous fatalities<br>• Potential positive impact through increased connectivity between community members from adversity and experiences<br>**Infrastructure impacts – immediate:**<br>• First order damage to critical and key infrastructure throughout the region<br>• Potential for second order effects of adjacent regions and infrastructure (eg. Flinders Highway damaged or closed, airport closed etc.)<br>• Buckled railway lines affecting rail transport and increasing possibility of derailment<br>• Water usage increased<br>• Dependency on service providers to reduce impact on energy, water, telecommunications, transport infrastructure<br>**Infrastructure impacts – strategic:**<br>• Longer term recovery strategies required to guide priorities, capital expenditure etc.<br>• Consideration of infrastructure locations and susceptibility to future disaster events - opportunity to improve resilience | **Other impacts and consequences:**<br>• None<br><br>**Any Locations more susceptible to hazard:**<br>• None | **Preventive and preparedness controls:**<br>• Power/Communications providers keep systems well maintained and protected<br>• WH&S policies in business<br>• Comprehensive and rehearsed Local Disaster Management Plan<br>• School closure protocols for extreme temperatures<br>• Prepositioning of Emergency resources such as power supply (generators) for essential services (water treatment, hospitals, wastewater pump station etc.)<br>• Pre-disaster season preparation of infrastructure sites<br><br>**Response and recovery controls:**<br>• >36 degrees public services and schools when aircon fails<br>• >40 degrees BoM mark for extreme temperature initiating community resilience plan, heat policy for outdoor staff<br>• >44 degrees initiates LDMG processes regarding awareness/ communication<br>• Community health nurse/ Community Development officer<br>• Resources available through emergency service organisations<br>• Business continuity plan activation by critical infrastructure owners and operators<br>• Emergency service support<br>• local services (medical clinics, hospitals, NWQ Allied Health)<br>• Mutual support between regions and districts if required (additional Police, SES crews etc.)<br>• Well trained full time and volunteer organisations (SES, etc.)<br>• Existing social networks at neighbourhood and community levels<br>• LDCC resource allocation for the protection of priority infrastructure<br>• QLD Health must rapidly designate advice (legislated responsibility) | **Comments on adequacy / effectiveness:**<br>• None | | | • Check redundancy of medical services<br>• Work with local business to make sure that high risk people get preferential priority for repairs<br>• Sort out privacy details such that details can be shared with other authorities<br>• Business continuity planning<br>• Develop Community Resilience Strategy<br>• Investigate social services / chaplaincy options<br>• Advice from QLD Health | • Extreme temperature event would occur over the entire part of the country meaning that other Councils may need the same external resources simultaneously<br>• Known historical instances of people affected or dying from heat<br>• There is no universal definition of a heatwave although in a general sense it can be defined as a prolonged period of excessive heat.<br>• The term is relative to the usual weather in the area. Temperatures that people from a hotter climate consider normal can be termed a heat wave in a cooler area if they are outside the normal climate pattern for that area. The term is applied both to routine weather variations and to extraordinary spells of heat which may occur only once a century. Severe heat waves have potential to cause crop failures, deaths from hyperthermia, and widespread power outages due to increased use of air conditioning.<br>• The difficulty in defining a heat wave in Australia has been in establishing an appropriate heat index with an acceptable event threshold and duration, and relating it to the climatology of the area under investigation<br>• **Community Resilience Plans / Strategies.** Resilience Plans are recommended to refer to http://hardenup.org/ for preparedness for local community resilience<br>• Volunteer Organisations. Choose a volunteer coordinator to support Council such as Volunteering Queensland http://www.volunteeringqld.org.au/web/<br>• **Annual Review of Risk Register.** Conduct Review of Risk Assessment Annually to assess changes to likelihood, consequence and overall risk rating based on local or global conditions (i.e. climate and weather system fluctuations, population / demographic fluctuations etc)<br>• **Interoperability between Regions.** Recommended communication and coordination with adjoining regions and agencies to provide a Regional approach to Preparedness, Response and Recovery (i.e. representation on adjoining LDMG and DDMG meetings etc) |
| | | | People | Moderate | Possible | Medium 54 | |
| | | | Environment | Moderate | Possible | Medium 54 | |
| | | | Economy | Moderate | Possible | Medium 54 | |
| | | | Governance | Moderate | Possible | Medium 54 | |
| | | | Social / Community | Moderate | Possible | Medium 54 | |
| | | | Infrastructure | Moderate | Possible | Medium 54 | |
| | | | **Comments on seasonal variation to risk:**<br>• Likely November – January<br>• Possible February to April<br>• Rare May – August<br>• Unlikely September<br>• Refer to BOM historical data | | | | |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | |
| **Risk 13 – Insect or Exotic Plant/Animal Disease:**<br>**Transmissible disease or condition that degrades the health or productivity of a plant or animal (e.g. foot and mouth, fruit fly, screw worm). Rapid outbreak, wider ground impact on species and industries. Insect infestation**<br>**People impacts – immediate:**<br>• Physical effects if transmission occurs between man and animal<br>• Isolation/fencing/confinement to area-no move orders<br>• Psychological impact of loss of stock/animals-livelihood<br>**People impacts – strategic:**<br>• Cultural heritage, recreation and social amenity<br>**Environmental impacts – immediate:**<br>• Large quantity of animal disposal- land contamination<br>• Water tables and monitoring- loss of crops and agriculture<br>• Widespread landscape damage<br>• Impact on biodiversity<br>• Decreased productivity (bee production and derived products from apiculture- crop yields and pollination<br>• Trade implications:<br>• Loss of international recognition of disease freedom with resultant import and export policies affected<br>• Loss of international markets, loss of consumer and market confidence.<br>• Introduced species which are grown for bio fuels may become invasive and threaten native plants<br>**Environmental impacts – strategic:**<br>• Agricultural lands with high productive values may be rendered useless by the proliferation of exotic plants becoming weeds.<br>**Economy impacts – immediate:**<br>• Restocking animals costing lots of money<br>• Chickens-mass livestock death<br>• Zoo, tourism, reef staying point(mainly rural/hinterland- trail rides<br>• Horse racing Studs<br>• Cattle/Pork industry - associated industries (cheese, milk etc.)<br>• Reputation<br>• Local industry<br>• Eradication and control costs to industry<br>• Fruit flies may pose problems to the fruit growing regions<br>• Community losses, human health affected (medical costs)<br>• Increased unemployment<br>**Economy impacts – strategic:**<br>• Tourism and lifestyle industries may be affected to a certain extent if the affected area is quarantined and access to them is restricted.<br>• Loss of man power in racing industries<br>• Loss of bees may prove to be very costly for the agricultural and horticultural industries - the Varroa mite parasite affecting bees all around the world and cost to eradicate the disease from Australia/NZ is estimated to be about $ 55-70 million<br>**Governance impacts – immediate:**<br>• Enforcement of slaughters/isolation/aquaculture( and control) – fishing industry (Red claw)<br>• External political control and influence<br>• (DDMG/DPI)-Biosecurity Queensland/ State control links-different priorities<br>• Monitoring regime imposed by State/ national Authorities<br>• Examples of emergency animal diseases which the local Biosecurity and Local government need to tackle at earliest : Screwworm fly (exotic), Bovine spongiform encephalopathy (Mad Cow Disease- exotic, foot and mouth disease, highly pathogenic avian influenza-exotic, anthrax- endemic, Australian bat lyssavirus- endemic, rabies-exotic and Hendra virus.<br>**Governance impacts – strategic:**<br>• The Local Disease Control Centre (LDCC) requiring more labour to cope with emergency outbreaks in the local district (Biosecurity - decisions to be taken by the Chief Veterinary Officer on strategic approach and the number of staff required<br>• SDCHQ (State Disease Control Headquarters) established under the direction of the Chief Veterinary Officer - located at 80 Ann St, Brisbane<br>**Content continues on the next page.** | **Other impacts and consequences:**<br>• None<br>**Any Locations more susceptible to hazard:**<br>• Cane growers impact from Smut in peak season<br>• Poultry Farms<br>• Cattle<br>• Avocadoes<br>• Macadamias<br>• Citrus<br>• Lychees | **Preventive and preparedness controls:**<br>• Early detection for diseases is considered as an important step in preventing spread of diseases e.g. the Hendra virus and the foot and mouth disease. Feral animal control may help to stop proliferation of diseases - responsibility of Biosecurity Queensland<br>• Preventive approach from concern parties is the best approach towards issues of biosecurity. Prevention of weeds and diseases<br>• Physical isolation-Australian-international (AQIS)<br>• Federal legislation<br>• Comprehensive and rehearsed Local Disaster Management Plan<br>• Eradication measures (state required-Declared plants- land holders and councils)<br>• Monitor and reporting(local government);<br>• Airport-organic material control. Emergency Animal Disease response Agreement (EADRA) ratified by Australia's governments and livestock industries to ensure rapid and efficient response to animal disease incursions to Australia;<br>• QDMS (Queensland Disaster Management Plan) operating at 3 distinct levels - local, disaster district and state government. also the SDCG , the state level working body of the SDMG (State Disaster Management Plan).<br>• Public education- threats about invasive species of plants and animals at all levels;<br>• Education for refs- early detection<br>• Pest eradication proposals- wild pigs, cats, dogs and other feral animals;<br>• Animal control regulations (Local laws);<br>• According to the Biosecurity Australia three levels of government, various committees, a diverse range of industries, a large number of<br>• Businesses, natural resource management groups, other community groups and individuals.<br>• Public education- Publication of fact sheets from Biosecurity QLD<br>**Response and recovery controls:**<br>• Emergency Animal disease (EAD) and its sub plans to be consulted.<br>• Quarantine of animals and properties infected. The department of Emergency Services (now Emergency Management Queensland (EMQ ). Other plans to be taken into account -AUSVETPLAN (National) QLDVETPLAN, BEOM-Biosecurity emergency Operations Manual and the AQUAVETPLAN (National).<br>• Different phases of action from Biosecurity officers- Investigation phase, Alert phase ,operational phase and Stand down phase<br>• Slaughter of livestock<br>• Testing of animals<br>• Population Health officers (QLD health)<br>• Strategic involvement of different bodies should be clearly defined within 5 years according to the Strategy plan 2009-2014 of DEEDI.<br>• Biosecurity QLD Set up of local disease control centre | **Comments on adequacy / effectiveness:**<br>• None<br>People — Minor — Possible — **Low 27**<br>Environment — Moderate — Possible — **Medium 54**<br>Economy — Major — Possible — **High 72**<br>Governance — Minor — Possible — **Low 27**<br>Social / Community — Moderate — Possible — **Medium 54**<br>Infrastructure — Insignificant — Possible — **Low 12**<br>**Comments on seasonal variation to risk:**<br>• None | | • DM Sub Plans recommended for localised areas thoughout the region<br>• Local government need to have in place a local government emergency risk management strategies and emergency plans which can help to deal with emergencies.<br>• Local government fits into national emergency management through the Queensland DPI & F (now DEEDI)<br>• Need to source local plan<br>• Investigate means of line of credit for loss of crop and livestock | • Examples include:<br>• Foort and mouth<br>• Cane smut<br>• Avian flu<br>• Equine flu<br>• Hendra<br>• Fungal disease'<br>• Mad cow<br>• Adjoining shires will require support or contamination (C2C)<br>• Significant agricultural community<br>• **Community Resilience Plans / Strategies.** Resilience Plans are recommended to refer to http://hardenup.org/ for preparedness for local community resilience<br>• Volunteer Organisations. Choose a volunteer coordinator to support Council such as Volunteering Queensland http://www.volunteeringqld.org.au/web/<br>• **Annual Review of Risk Register.** Conduct Review of Risk Assessment Annually to assess changes to likelihood, consequence and overall risk rating based on local or global conditions (i.e. climate and weather system fluctuations, population / demographic fluctuations etc)<br>• **Interoperability between Regions.** Recommended communication and coordination with adjoining regions and agencies to provide a Regional approach to Preparedness, Response and Recovery (i.e. representation on adjoining LDMG and DDMG meetings etc) |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | | |
| **Risk 13 – Insect or Exotic Plant/Animal Disease :(cont.)**<br>**Social / Community impacts – immediate:**<br>• Pony Clubs/ recreational activities<br>• Isolation through quarantine(People and small groups)<br>• Impact on the loss of income<br>• Unemployment<br>• The Airport may become the entry point of exotic diseases and pests if the passengers coming via international airports are not screened properly upon their arrival. Also the visitors coming from other airports<br>• Loss of community spirit<br>**Social / Community impacts – strategic:**<br>• None<br>**Infrastructure impacts – immediate:**<br>• Disruption to food chain-Higher impact to region/ shortage of key food<br>• Closure of strategic transport routes<br>• Less timber products on the market if forestry industry is hit by diseases affecting trees.<br>**Infrastructure impacts – strategic:**<br>• Strategic industries and service industries like power, communication, shipping and water supplies may be affected | | | | | | | | |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | |
| **Risk 14 – Storm Tide:**<br>**A storm tide occurs that breaches current natural and physical controls and directly impacts on coastal and riverine communities and infrastructure. 1m above the Highest Average Tide (HAT) level.**<br><br>**People impacts – immediate:**<br>• Serious injuries<br>• Tourists stranded in remote areas with no communications for short periods<br>• Inability for emergency vehicles to access areas<br>• Loss of road transport impacting on access to critical goods and services such as medicines and medical supplies<br>• Loss of homes<br>**People impacts – strategic:**<br>• Impact on coastal communities safety and perception of associated risks<br>• Decrease in financial value of privately owned property<br>**Environmental impacts – immediate:**<br>• Damage to flora and fauna in immediate environs of impact area<br>• Contaminated waterways and land areas - debris, chemicals, fuels, sewerage<br>• Damage to river banks<br>• Impact of vegetation on restricting flood waters<br>• Run off and siltation<br>• Damage to beaches – coastal erosion<br>**Environmental impacts – strategic:**<br>• Long term damage to natural habitats may result in species relocation or loss of numbers<br>**Economy impacts – immediate:**<br>• Significant/ permanent damage to residential, commercial, educational, recreational, cultural and industrial buildings<br>• Damage to stock, commercial operations and small businesses, equipment and facilities<br>• Loss of services<br>• Security of business systems<br>• Insurance claims and re-insurance impact – delays, costs etc.<br>• Ability of the commercial business to respond during and post event<br>**Economy impacts – strategic:**<br>• Long term loss of trade (temporary and permanent)<br>• Possible closure of the business<br>• Loss of employment within the community<br>• Impact of economic loss on the community and service providers post event<br>• Economies based in the region and which rely on tourism and fishing will be affected. Effects will be both long term and short term<br>**Governance impacts – immediate:**<br>• Lack of knowledge of responsive strategies<br>• Disruption to communications<br>• Inability of Council to meet demands for effluent, water supply and garbage services<br>• Isolated communities left without access to police and medical support<br>• Potential for looting and fraud against vulnerable members of the community<br>**Governance impacts – strategic:**<br>• Longer term lack of utilities - impact on quality of life and ability to govern (eg. provision of sanitation, clean water, garbage services etc..)<br>**Social / Community impacts – immediate:**<br>• Physical and communications isolation of people from support networks and families during times of need<br>**Social / Community impacts – strategic:**<br>• Longer term mental health issues for the community following a major natural disaster. The coastal areas tend to be retirement areas. An event such as this could result in people losing everything and never being able to financially recover;<br>• Older people - lost everything.<br>**Infrastructure impacts – immediate:**<br>• Physical damage to critical Infrastructure including buildings, power transmission, roads, industrial areas, water treatment plants and supply networks,<br>• Road access to area cut off<br>**Infrastructure impacts – strategic:**<br>• Medium term strain on accommodation for affected people<br>• Potential to lose significant infrastructure in low lying coastal areas. Could result in a need to relocate smaller towns<br>• All town infrastructures | **Other impacts and consequences:**<br>• Often occurs prior to Cyclone<br><br>**Any Locations more susceptible to hazard:**<br>• Low lying coastal communities, especially those with one access road into and out of the area.<br>• Includes areas such as Moore Park, Walkers Point, Woodgate, Buxton and Harvey Bay, | **Preventive and preparedness controls:**<br>• External flood warning system (DERM managed)<br>• Strong relationships Emergency Services and (LDMG) planning and exercising<br>• Community understanding of risks - generally low.<br>• Existing natural and man-made levees, flood bypasses, channel improvements, retention basins and flood mitigation dams<br>• Business continuity planning<br>• Planning and development controls<br>• Early warning systems for causes of storm tide Cyclones, Severe Weather). Up to five days in advance<br>• Comprehensive and rehearsed Counter Disaster Plan<br>• Evacuation plan and centres<br>• Flood studies and mapping- response mapping critical assets<br>• Land use controls (such as zoning and the removal of existing buildings) and building restrictions (such as establishing minimum floor levels and raising buildings) in relation to development on flood-prone land<br>• Community understanding<br>• Regional health care facilities<br>• State level health care facilities<br>• First response citizens<br>• Locating electrical equipment for critical infrastructure above the flood level to increase the speed of recovery<br>• Due to the localised area effected, there is quite a lot of SES help available<br><br>**Response and recovery controls:**<br>• Early transport of the vulnerable population segments to safe areas<br>• Insurance policies for small businesses and individuals<br>• Coastal hazard adaptation studies - Harvey Bay Fraser Coast (DA approval) | **Comments on adequacy / effectiveness:**<br>• None | | | | • DM Sub Plans recommended for selected communities such as Moore park, Woodgate, Walkers Point, Buxton and Harvey Bay<br>• Coastal Hazard adaption studies<br>• Preventative measures such as flood gates at Wood gate<br>• Changes in planning scheme requirements to prevent residential areas being developed in areas highly susceptible to storm tides<br>• Sub plans developed for high risk communities | • Storm surge not normally isolated event but in combination with cyclone and/ or flooding<br>• Check HAT on mapping particularly for Moore park AHD 1.98 (approx)<br>• **Community Resilience Plans / Strategies.** Resilience Plans are recommended to refer to http://hardenup.org/ for preparedness for local community resilience<br>• Volunteer Organisations. Choose a volunteer coordinator to support Council such as Volunteering Queensland http://www.volunteeringqld.org.au/web/<br>• **Annual Review of Risk Register.** Conduct Review of Risk Assessment Annually to assess changes to likelihood, consequence and overall risk rating based on local or global conditions (i.e. climate and weather system fluctuations, population / demographic fluctuations etc)<br>• **Interoperability between Regions.** Recommended communication and coordination with adjoining regions and agencies to provide a Regional approach to Preparedness, Response and Recovery (i.e. representation on adjoining LDMG and DDMG meetings etc) |
| | | | People | Major | Unlikely | Medium - 60 | |
| | | | Environment | Major | Unlikely | Medium - 60 | |
| | | | Economy | Moderate | Unlikely | Medium - 57 | |
| | | | Governance | Moderate | Unlikely | Medium - 57 | |
| | | | Social / Community | Major | Unlikely | Medium - 60 | |
| | | | Infrastructure | Moderate | Unlikely | Medium - 57 | |
| | | | **Comments on seasonal variation to risk:**<br><br>**Comments on seasonal variation to risk:**<br>• More likely November – April in particular January to March<br>• Refer to BOM cyclone and storm tide history | | | | |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | |
| **Risk 15 - Tsunami:**<br>**A series of large and fast travelling waves generated offshore impact on the Causing widespread casualties and damage.**<br>**People impacts – immediate (should be adequate -warning up to 5 days – (cyclone for holiday season, tourist season):**<br>• People not receiving the warning<br>• Presence of sightseers, tourists and backpackers may interfere with community affairs<br>• Serious injuries<br>• People become trapped /isolated in low lying areas<br>• Threats to life (incl.. road closure volunteers)<br>• Vehicles and trucks ignoring road closed signs and directions<br>• Time and day of event requires consideration in terms of warning strategy<br>• Presence of debris<br>• Impact on the health care services<br>• Requirements for temporary accommodation<br>• Tourists stranded in remote areas with no communications for short periods<br>• Inability for emergency vehicles to access areas<br>• Loss of road transport impacting on access to critical goods and services such as medicines and medical supplies<br>• Loss of homes<br>• Medical issues<br>• Boats<br>• Retire age<br>• Enduring social and emotional impacts on mental health<br>**People impacts – strategic:**<br>• Impact on coastal communities safety and perception of associated risks<br>• Decrease in financial value of privately owned property<br>**Environmental impacts – immediate:**<br>• Localised flooding<br>• Damage to flora and fauna in immediate environs of impact area<br>• Contaminated waterways and land areas - debris, chemicals, fuels, sewerage<br>• Damage to foreshore and river banks<br>• Impact of vegetation on restricting flood waters<br>• Change of path of river<br>• Run off and siltation<br>• Damage to beaches – coastal erosion<br>**Environmental impacts – strategic:**<br>• Long term damage to natural habitats may result in species relocation or loss of numbers<br>**Environmental impacts – strategic:**<br>• Wave propagation because of continental shelf<br>**Economy impacts – immediate:**<br>• Significant/ permanent damage to residential, commercial, educational, recreational, cultural and industrial buildings<br>• Damage to stock, commercial operations and small businesses, equipment and facilities<br>• Loss of services<br>• Security of business systems<br>• Insurance claims and re-insurance impact – delays, costs etc.<br>• Ability of the commercial business to respond during and post event<br>**Economy impacts – strategic:**<br>• Long term loss of trade (temporary and permanent)<br>• Possible closure of the business<br>• Loss of employment within the community<br>• Impact of economic loss on the community and service providers post event<br>• Economies based in the region and which rely on tourism and fishing will be affected. Effects will be both long term and short term<br>**Governance impacts – immediate:**<br>• Lack of knowledge of responsive strategies<br>• Disruption to communications<br>• Inability of Council to meet demands for effluent, water supply and garbage services<br>• Isolated communities left without access to police and medical support<br>• Potential for looting and fraud against vulnerable members of the community<br>**Governance impacts – strategic:**<br>• Longer term lack of utilities - impact on quality of life and ability to govern (eg. provision of sanitation, clean water, garbage services etc.)<br>**Content continues on the next page.** | **Other impacts and consequences:**<br>• None<br>**Any Locations more susceptible to hazard:**<br>• Low lying coastal communities, especially those with one access road into and out of the area.<br>• Includes areas such as Moore Park, Walkers Point, Woodgate, Buxton and Harvey Bay, | **Preventive and preparedness controls:**<br>**First response citizens**<br>• Early warning likely if cause is well away from Australian shores Counter Disaster measures in place<br>• Council Planning Scheme<br>• The NTHA report concludes that most of Queensland's shore is protected by the Great Barrier Reef.<br>• Other natural landscape such as the help in reducing the wave heights from 20m to an estimated 0.6m (estimated calculation that may not be specific to any given location).<br>• Business Continuity Planning<br>• Legislative basis for Disaster Management and Emergency Management arrangements<br>• Comprehensive Local Disaster Management Plan and supporting plans including Evacuation plan and Community resilience Strategy<br>• inter-agency relationships<br>• Evacuation Plans and Evacuation Centre capabilities<br>• Community Resilience Strategy<br>• Prepositioning of Emergency resources such as power supply (generators) for essential services (water treatment, hospitals etc.)<br>• Pre-disaster season preparation of infrastructure sites (clearing debris, checking drains, roads etc.)<br>• The geomorphology of the Queensland state also helps to reduce the effects of the incoming waves during a tsunami<br>• Off shore islands can be helpful in providing enough protection to the main areas of the coastline from tsunami.<br>• Locating electrical above rural area flood levels;<br>• Quite a lot of help available<br>**Response and recovery controls:**<br>• Emergency service support<br>• local services (medical clinics, hospitals, psychology services, Salvation Army, Red Cross)<br>• Insurances (Health, Life, Vehicle, House and Contents),<br>• Government emergency assistance programs<br>• National and International aid programs<br>• Recovery committee consideration of available activities and resources to assist environmental recovery<br>• Government relief initiatives (tax breaks)<br>• Donations and funding grants for redevelopment<br>• Mutual support between regions and districts if required (additional Police, SES crews etc.)<br>• Well trained full time and volunteer organisations (SES, Surf Lifesaving, Marine Rescue, etc..)<br>• Disaster Response Chaplains<br>• existing social networks at neighbourhood and community levels<br>• (LDCC) resource allocation for the protection of priority infrastructure<br>• Activation of Business Continuity plans by infrastructure owners and operators<br>• Maritime Safety | **Comments on adequacy / effectiveness:**<br>• None | | | | • Integrated tsunami warning system<br>• Detailed evacuation planning and rehearsals<br>• Investigate the use of social media for communication and education<br>• Use of portable radio stations<br>• Buoys installed<br>• Discussions with Telco's about costs of warnings(SMS)<br>• Community Service obligation<br>• Social Media<br>• Portable Radio station (ABC) & Telstra | • **Community Resilience Plans / Strategies.** Resilience Plans are recommended to refer to http://hardenup.org/ for preparedness for local community resilience<br>• Volunteer Organisations. Choose a volunteer coordinator to support Council such as Volunteering Queensland http://www.volunteeringqld.org.au/web/<br>• **Annual Review of Risk Register.** Conduct Review of Risk Assessment Annually to assess changes to likelihood, consequence and overall risk rating based on local or global conditions (i.e. climate and weather system fluctuations, population / demographic fluctuations etc)<br>• **Interoperability between Regions.** Recommended communication and coordination with adjoining regions and agencies to provide a Regional approach to Preparedness, Response and Recovery (i.e. representation on adjoining LDMG and DDMG meetings etc) |
| | | | People | Major | Unlikely | Medium - 60 | | |
| | | | Environment | Major | Unlikely | Medium - 60 | | |
| | | | Economy | Moderate | Unlikely | Medium - 51 | | |
| | | | Governance | Moderate | Unlikely | Medium - 51 | | |
| | | | Social / Community | Major | Unlikely | Medium - 60 | | |
| | | | Infrastructure | Moderate | Unlikely | Medium - 51 | | |
| | | | **Comments on seasonal variation to risk:**<br>• None | | | | | |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | | |
| **Risk 15 – Tsunami (cont.):**<br>**Social / Community impacts – immediate:**<br>• Physical and communications isolation of people from support networks and families during times of need<br>• Lack of preparedness of the community<br>• Panic amongst the community<br>**Social / Community impacts – strategic:**<br>• Residual collective mental health and social issues if numerous fatalities and/or extensive damage to properties and infrastructure<br>• Longer term mental health issues for the community following a major natural disaster. The coastal areas tend to be retirement areas. An event such as this could result in people losing everything and never being able to financially recover<br>**Infrastructure impacts – immediate:**<br>• Physical damage to critical Infrastructure including buildings, power transmission, roads, industrial areas, water treatment plants and supply networks,<br>• Potential structural damage<br>• Ability of the utility services to function<br>• Property damage<br>**Infrastructure impacts – strategic:**<br>• Medium term strain on accommodation for affected people<br>• Longer term recovery strategies required to guide priorities, capital expenditure etc.<br>• Consideration of infrastructure locations and susceptibility to future disaster events - opportunity to relocate or improve resilience<br>• telecommunications, transport infrastructure<br>• Potential to lose significant infrastructure in low lying coastal areas. Could result in a need to rebuild or relocate smaller towns | | | | | | | | |

| **Risk Descriptor –** details the main component and provides an example of a risk(s) that may be attributable<br><br>*What are the risks*<br>*For each impact category, what are the immediate impacts, and what are the strategic impacts*<br>*Are any locations more at risk than others* | | **Existing Controls**<br>*What are we doing to avoid the risk or reduce its effect*<br>*What controls are in place to prevent or prepare for the event*<br>*What controls are in place to respond to and recover from an event* | **Current Risk Rating**<br>*Considering adequacy of controls* | | | **Risk Reduction Measures**<br>*What opportunities do we have to develop controls, or improve the effectiveness of existing controls, to further reduce risk* | **Comments** |
|---|---|---|---|---|---|---|---|
| | | Description | Adequacy / Effectiveness | Consequence | Likelihood | Risk | |
| **Risk 16 – Algal Bloom:**<br>**Description**<br><br>**People impacts – immediate:**<br>• People consume contaminated water or come into contact with contaminated water and become severely ill<br>• People consuming contaminated water and dying<br>• Large number of people requiring medical aid<br>• People disgruntled at lack of contingency planning to prevent contaminated water from reaching households<br>• Inconvenience caused to people with no water supply to perform daily activities<br>• Daily activities for public facilities and homes disrupted with no water supply to buildings<br>• Residents not provided with services for an unknown period of time resulting in delay in returning to normal lifestyle<br>• Residents rely on emergency aid for food and water<br>• Residents unable to live at home<br>• Inability for emergency facilities to provide assistance to the community<br><br>**People impacts – strategic:**<br>• None<br><br>**Environmental impacts – immediate:**<br>• Death of wildlife<br>• Spread of disease in wildlife<br>• Treatment of ill animals required<br>• Death of various types of vegetation from weed infestation<br><br>**Environmental impacts – strategic:**<br>• None<br><br>**Economy impacts – immediate:**<br>• Economic loss to farmers using the water source for farm animal drinking<br>• Significant financial loss for local and regional community<br>• Agricultural impacts<br>• Recovery cost of water bodies<br>• Tourism<br><br>**Economy impacts – strategic:**<br>• None<br><br>**Governance impacts – immediate:**<br>• Significant cost required regarding release notices to the public to not consume/use water from taps<br><br>**Governance impacts – strategic:**<br>• Legal action may arise<br><br>**Social / Community impacts – immediate:**<br>• Recreational actiivites<br><br>**Social / Community impacts – strategic:**<br>• None<br><br>**Infrastructure impacts – immediate:**<br>• Water supply shut off while mains are flushed and contaminated water disposed of<br>• Significant cost required to slush mains<br><br>**Infrastructure impacts – strategic:**<br>• None | **Other impacts and consequences:**<br>• None<br><br>**Any Locations more susceptible to hazard:**<br>• None | **Preventive and preparedness controls:**<br>• A potential risk that can be minimised by monitoring of raw water supplies and providing appropriate treatment facilities<br>• Promote adequate public awareness of danger and risks associated with toxic water blooms<br>• Promote the need for development of adequate warning systems of potential for events and local alternatives etc.<br>• Ensure water source used for crop watering is tested regularly<br>• Use of purchased water instead of dam water for crop watering<br>• Have alternative water sources available<br>• Provide treatment capacity against the effects of the bloom<br>• Ensure water tests are performed regularly and in accordance with guideline requirements<br>• Ensure regular maintenance on water supply system is carried out<br><br>**Response and recovery controls:**<br>• Fence off affected areas<br>• Ensure that once contamination has been detected, mains are flushed and contaminated water disposed of<br>• Ensure community is notified of the event promptly through media notices<br>• Undertake a fauna relocation programme from affected area<br>• Ensure the community is notified of the event promptly through media notices. Information should identify the source (if possible), what may have caused the problem and the steps being taken to rectify the problem<br>• Provide other sources of water to the area affected<br>• Transfer water from Paradise to Childers | **Comments on adequacy / effectiveness:**<br>• None<br><br>People: Minor / Rare / **Low 21**<br>Environment: Moderate / Rare / **Low 33**<br>Economy: Minor / Rare / **Low 21**<br>Governance: Insignificant / Rare / **Low 6**<br>Social / Community: Minor / Rare / **Low 21**<br>Infrastructure: Moderate / Rare / **Low 33**<br><br>**Comments on seasonal variation to risk:**<br>• None | | | • Identify alternative water sources<br>• Sunwater to review Risk assessment and provide appropriate advice to the LDMG | • Algal bloom in Paradise Dam and other significant water body impacting on potable and irrigation water supply<br>• What are the down stream effects of an algal bloom<br>• **Community Resilience Plans / Strategies.** Resilience Plans are recommended to refer to http://hardenup.org/ for preparedness for local community resilience<br>• Volunteer Organisations. Choose a volunteer coordinator to support Council such as Volunteering Queensland http://www.volunteeringqld.org.au/web/<br>• **Annual Review of Risk Register.** Conduct Review of Risk Assessment Annually to assess changes to likelihood, consequence and overall risk rating based on local or global conditions (i.e. climate and weather system fluctuations, population / demographic fluctuations etc)<br>• **Interoperability between Regions.** Recommended communication and coordination with adjoining regions and agencies to provide a Regional approach to Preparedness, Response and Recovery (i.e. representation on adjoining LDMG and DDMG meetings etc) |

# Appendix C Hazard Definitions

| Bundaberg Regional Council Natural Hazard Risk Assessment | |
|---|---|
| **Hazard Definitions (2012)** | |
| 01 - East Coast Low Pressure System | East Coast Lows (ECL) are intense low-pressure systems which occur on average several times each year (dominantly in Autumn and Winter) off the eastern coast of Australia, in particular southern Queensland, NSW and eastern Victoria. They generally have much shorter lifetimes than Tropical Cyclones and last only a few days. They develop over the Tasman Sea close to the NSW coast and can intensify rapidly in the overnight period. Unlike Tropical Cyclones, where the warm seas provide the energy source, East Coast Lows are driven by the temperature gradient between the Tasman Sea air and cold air in the high levels of the atmosphere over the continent. They can produce gale to storm-force winds, very heavy rainfall and in some cases coastal inundation. Maximum wind speeds recorded are lower than in severe tropical cyclones (Australian Bureau of Meteorology). NB: The definition for East Coast Lows is not related to Tropical Lows or Depressions as stated above. The region covered by this risk extends from Capricornia Waters to Fraser Island Waters. |
| 02 - Severe Thunderstorm / Electrical Storm | A severe thunderstorm is defined as one which produces: hail with a diameter of 2 cm or more; or wind gusts of 90 km/h or greater; or flash floods; or tornadoes, or any combination of these. Most thunderstorms do not reach the level of intensity needed to produce these dangerous phenomena, but they all produce lightning which can cause death, injury and damage. (Australian Bureau of Meteorology). |
| 03 - Cyclone (CAT 1/2/3) | Tropical Cyclones develop over very warm tropical waters where the sea surface temperature is greater than 26°C. They have relatively long life cycles, typically about a week. Category 1/2/3 cyclone will have wind speeds up to 224 km/k. A tropical cyclone is a tropical depression of sufficient intensity to produce sustained gale force winds (at least 63 km/h). Severe tropical cyclones correspond to the hurricanes or typhoons of other parts of the world (Australian Bureau of Meteorology). The region covered by this risk extends from Capricornia Waters to Fraser Island Waters. |
| 04 - Cyclone (CAT 4/5) | Category 4 and 5 severe tropical cyclones can produce significant property damage with wind speeds over 225km/h near the centre, heavy rainfall and coastal inundation through storm surge. The region covered by this risk extends from Capricornia Waters to Fraser Island Waters. |
| 05 - Flood | A general and temporary condition of partial or complete inundation of normally dry land areas from overflow of inland or tidal waters from the unusual and rapid accumulation or runoff of surface waters from any source (Geoscience Australia). |
| 06 - Tornado/ Dust Storm | The rarest and most violent of severe thunderstorm phenomena are rapidly rotating columns of air that descend in the well-known funnel shape from the base of a storm cloud. A tornado vortex, which can range in width from a few metres to hundreds of metres, usually whirls clockwise (viewed from above) and contains very damaging winds that may reach more than 450 km/h. (Australian Bureau of Meteorology).Dust-storms are for the most part restricted to the drier inland areas of Australia, but occasionally, during widespread drought, they can affect coastal districts. (Bureau of Meteorology definition) |
| 07- Earthquake | An earthquake is the shaking and vibration at the surface of the Earth caused by underground movement along a fault plane or by volcanic activity. The size of earthquakes is determined by measuring the amplitude of the seismic waves recorded on a seismograph. A formula is applied to these which converts them to a magnitude scale, a measure of the energy released by the earthquake (Geoscience Australia). For the purposes of this risk assessment, an earthquake is categorised at least 5.0 Richter with an epicentre close to Bundaberg Region where damage to infrastructure occurs. |
| 08 - Landslide (including Erosion) | A landslide is the movement of rock, debris or earth down a slope. Landslides can be triggered by natural causes, including erosion, or by human activity. They range from a single boulder in a rock fall or topple to tens of millions of cubic metres of material in a debris flow.<br>They result from the failure of the materials which make up the hill slope and are driven by the force of gravity. Landslides are known also as landslips, slumps or slope failure. Some of the most common types of landslide in Australia are earth slides, rock falls and debris flows. Sudden and rapid events are the most dangerous because of a lack of warning and the speed at which material can travel down the slope as well as the force of its resulting impact. Extremely slow landslides might move only millimetres or centimetres a year and can be active over many years. Although this type of landslide is not a threat to people they can cause considerable damage to property (Geoscience Australia). |
| 09 - Prolonged Drought | Drought in general means acute water shortage. Defining the end of a period of rainfall deficiency is a difficult matter, and presents more problems than defining the start. In the content of this risk assessment, a drought is interpreted as a prolonged event that impacts directly on the Bundaberg Region, it's water sources and the linked water grid. |
| 10 - Bushfire (Rural and Interface Areas) | A general term used to describe a fire in vegetation (Australian Fire and Emergency Services Authorities Council). |
| 11 - Pandemic | Pandemic is a global disease outbreak. An influenza pandemic occurs when a new influenza virus emerges and, because there is little or no immunity in the human population, it spreads rapidly from person-to-person over a wide geographical area causing serious illness in a significant proportion of those infected. This contrasts with seasonal influenza which, for most sufferers, is a self-limiting though unpleasant illness that does not endanger life (World Health Organisation). For the purposes of this risk assessment, Pandemic is taken to include all influenza and general disease outbreaks, not just the seasonal flu. |
| 12- Extreme High Temperature Event | A prolonged period of excessive heat. Queensland Health defines this as temperatures exceeding 36 degrees for a period exceeding 2 days. The Bureau of Meteorology also considers exceeding 40 degrees as an extreme event. This unusual and uncomfortable hot weather can impact on human and animal health and cause disruption to community infrastructure such as power supply, public transport and services (Emergency Management Queensland). |
| 13 - Insect or Exotic Animal/Plant Disease | Transmissible disease or condition that degrades the health or productivity of a plant or animal (e.g. foot and mouth, fruit fly, screw worm). Rapid outbreak, wider ground impact on species and industries. Insect infestation |
| 14 - Storm Tide | A storm tide occurs that breaches current natural and physical controls and directly impacts on coastal and riverine communities and infrastructure. 0.5m above the Highest Average Tide (HAT) level. |
| 15 - Tsunami | A series of large and fast travelling waves generated offshore impact on the region's coastline causing widespread casualties and damage. |
| 16 - Algal Bloom | An algal bloom is a rapid increase or accumulation in the population of algae in a freshwater or marine environment resulting in discolouration of the water e.g. from cyanobacteria. Of particular note are harmful algal blooms (HABs), which are algal bloom events involving toxic or otherwise harmful phytoplankton, such blooms often take on a red or brown hue and are known colloquially as red tides. |

# Appendix D Risk Scoring Tables

## Bundaberg Regional Council Natural Hazard Risk Assessment Workshop - Risk Tables

| **Likelihood Ratings** | |
|---|---|
| Almost Certain | The event will occur at least once per year (Average Recurrence Interval < 1 year). |
| Likely | The event could occur at least once every one to ten years. (Average Recurrence Interval 1-10 years). |
| Possible | The event could occur at least once every ten to fifty years. (Average Recurrence Interval 10-50 years). |
| Unlikely | The event could occur at least once every fifty to one hundred years. (Average Recurrence Interval 50-100 years). |
| Rare | The event could occur at least once every one hundred to one thousand years. (Average Recurrence Interval 100-1000 years). |
| Improbable | The event may occur at least once every thousand years or more. (Average Recurrence Interval >1000 years). |

**Consequence Ratings**

| | People | Environment | Economy | Governance | Social/Community | Infrastructure |
|---|---|---|---|---|---|---|
| Insignificant | No known injuries or illnesses. | No or minimal impact on the environment - very limited direct damage to ecosystems or elements of place | Minor financial loss that can be managed within standard financial provisions (eg. insurance), inconsequential disruptions at business level. | Governing entities are able to manage the event within normal parameters, public administration functions without disturbances, public confidence in governance, no media attention. | Inconsequential short term reduction of services, no damages to objects of cultural significance, no adverse emotional and psychological impacts. | Inconsequential short term failure of infrastructure and service delivery, no disruption to the public services and utilities. |
| Minor | Minor injury/illness managed within existing resources (first aid personnel and readily available equipment). | Limited and/or localised impact on the environment that can be readily rectified but effort is still required to minimise. One off recovery effort is required. | Financial loss requiring activation of reserves to cover loss, disruptions at business level leading to isolated cases of loss of employment. | Governing entities manage the event under emergency arrangements, public administration functions with minimal disturbances, isolated expressions of public concern, media coverage within region. | Isolated and temporary cases of reduced services within community, repairable damage to objects of cultural significance, impacts within emotional and psychological capacity of the community. | Isolated cases of short- to mid term failure of infrastructure and service delivery, localised inconvenience to the community and business anticipated to extend up to 72 hours. No long term impact on integrity or operation of the infrastructure. |
| Moderate | Single fatality or permanent incapacity. Multiple serious injury/illnesses requiring professional medical care and/or hospitalisation. Small number of people displaced for <24 hrs. | Isolated but significant cases of impairment or loss of ecosystem functions, intensive efforts for recovery required. Event can be managed under normal procedures. | Direct moderate financial loss in the region requiring adjustments to business strategy to cover loss, disruptions to selected industry sectors leading to isolated cases of business failure and multiple loss of employment. | Governing entities manage the event with considerable diversion from policy, public administration functions limited by focus on critical services, widespread public protests, media coverage within region. | Ongoing reduced services within community, permanent damage to objects of cultural significance, impacts beyond emotional and psychological capacity in some parts of the community. | Mid term failure of (significant) infrastructure and service delivery affecting some parts of the community, widespread inconveniences. Repair/replacement expected to take greater than 72 hours. |
| Major | Multiple fatalities or permanent incapacities (up to 1 per 100 000 for large council and 1-2 lives for small council). Regional health care system stressed. External resources required to contain and resolve the incident. Large number of people displaced for >24 hours. | Severe impairment or loss of ecosystem functions affecting many species or landscapes, progressive environmental damage. | Significant financial loss requiring major changes in business strategy to (partly) cover loss, significant disruptions across industry sectors leading to multiple business failures and loss of employment. | Governing body absorbed with managing the event, public administration struggles to provide merely critical services, loss of public confidence in governance, national level media coverage. State level support required. | Reduced quality of life within community, significant loss or damage to objects of cultural significance, impacts beyond emotional and psychological capacity in large parts of the community. Majority of services unavailable to community. | Mid to long term failure of significant infrastructure and service delivery affecting large parts of the community, external support required. |
| Catastrophic | Widespread loss of lives (at least 1 per 10 000 for large council, >2 lives for small), regional health care system unable to cope, large displacement of people beyond regional capacity to manage. | Widespread severe impairment or loss of ecosystem functions across species and landscapes, irrecoverable environmental damage. Total incongruence with preferred elements of place. | Unrecoverable financial losses. Multiple major industries in the region seriously threatened or disrupted for foreseeable future. Asset destruction across industry sectors leading to widespread business failures and loss of employment. | Governing bodies unable to manage the event, ineffective public administration, loss of public order, widespread unrest and crime. State or national intervention required. Widespread international media coverage. | Community unable to support itself, widespread loss of objects of cultural significance, impacts beyond emotional and psychological capacity in all parts of the community, long term denial of basic community services. | Long term failure of significant infrastructure and service delivery affecting all parts of the community, ongoing external support at large scale required. |

| **Risk Table** | | | **Consequences** | | | | |
|---|---|---|---|---|---|---|---|
| | | | Insignificant | Minor | Moderate | Major | Catastrophic |
| **Likelihood** | Almost Certain | The event will occur at least once per year (Average Recurrence Interval (ARI) < 1 year). | Medium - 42 | Medium - 48 | High - 69 | Extreme - 84 | Extreme - 90 |
| | Likely | The event could occur at least once every one to ten years. (ARI 1-10 years). | Low - 15 | Medium - 45 | High - 66 | High - 75 | Extreme - 87 |
| | Possible | The event could occur at least once every ten to fifty years. (ARI 10-50 years). | Low - 12 | Low - 27 | Medium - 54 | High - 72 | High - 81 |
| | Unlikely | The event could occur at least once every fifty to one hundred years. (ARI 50-100 years). | Low - 9 | Low - 24 | Medium - 51 | Medium - 60 | High - 78 |
| | Rare | The event could occur at least once every one hundred to one thousand years. (ARI 100-1000 years). | Low - 6 | Low - 21 | Low - 33 | Medium - 57 | Medium - 63 |
| | Improbable | The event may occur at least once every thousand years or more. (ARI >1000 years). | Low - 3 | Low - 18 | Low - 30 | Low - 36 | Low - 39 |

# Appendix E References & Resources

| Document Specific Category | Document Title /Description | Report ID | Date | Published by | Web site or link to saved document | Link to saved document (GHD folder) | Study coverage area | Risks described and quantified YES/NO | Relevant to which natural hazard Name | Risk relevance to NERAG YES/NO | Quantifies Hazards (Consequence & Likelihood) YES/NO | Control measures in place to reduce risk Details | Govt or State Requirement YES/NO | Existing Plans in place that would reduce risks Details | Future Plans to reduce risk Details | Key sections | Additional Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1 Legislation & Guidelines** | | | | | | | | | | | | | | | | | |
| **1.1 Commonwealth** | | | | | | | | | | | | | | | | | |
| | AUS Emergency Manual (Evacuation Planning) | Manual No 11 | 2005 | Australia Government | www.ema.gov.au | N:\AU\Birtinya\Projects\41\24860\ | None | **NO** | **-** | **NO** | **NO** | **NO** | **NO** | **-** | **-** | _ | When moving people in hazardous situation, stress is a big factor on |
| | AUS Emergency Manual (Flood Preparadeness) | Manual No. 20 | 2009 | Australia Government | www.ema.gov.au | N:\AU\Birtinya\Projects\41\24860\ | None | **YES** | Flood | YES | YES | NO | NO | **-** | **-** | Chapter 2 - Understanding | Floods impose substantial economic, social and |
| | AUS Emergency Manual (Flood Response) | Mannual No.22 | 2009 | Australia Government | www.ema.gov.au | N:\AU\Birtinya\Projects\41\24860\Resources and References\Statewide | None | **YES** | Flood | YES | YES | NO | NO | - | - | Chapter 3 - Identifying Likely Flood Consequences | • direct damage to residential, commercial, educational, recreational, cultural and industrial buildings, |
| | National Emergency Risk Assessment Guidelines | Exposure Draft O.C | Aug-09 | Australian Emergency | www.ema.gov.au | N:\AU\Birtinya\Projects\41\24860\ | None | **YES** | General | YES | YES | NO | NO | **-** | **-** | | Will use to cathegorize the risks from all documents |
| | National Risk Assessment Guidelines (NERAG) Part 1 -Process | Exposure Draft | Nov-08 | NERAG | www.em.gov.au/Publications | N:\AU\Birtinya\Projects\41\24860\ | None | **YES** | General | _ | YES | NO | NO | **-** | **-** | | |
| | NERAG Part 2 – Guidance Notes | Exposure Draft | Nov-08 | NERAG | www.em.gov.au/Publications | N:\AU\Birtinya\Projects\41\24860\ | None | **YES** | General | | | | | | | | |
| **1.2 State** | | | | | | | | | | | | | | | | | |
| | Disaster Management Act 2003 | Reprint No. 2D | 2003 | The Office of the Queensland | www.legislation.qld.gov.au | N:\AU\Birtinya\Projects\41\24860\ | None | NO | _ | - | NO | NO | YES | _ | _ | | Act for Local government's requirement to establish a Local |
| | Local Goverment Act 2009 | Reprint No. 1C | 8-Apr-11 | The Office of the Queensland | | N:\AU\Birtinya\Projects\41\24860\ | None | NO | _ | _ | _ | _ | _ | _ | _ | | |
| | Sustainable Planning Act 2009 | Reprint No. 1F | 4-Apr-11 | The Office of the Queensland | www.legislation.qld.gov.au/Acts | N:\AU\Birtinya\Projects\41\24860\ | QLD | NO | | NO | NO | _ | YES | _ | _ | | |
| | New Disaster Management Legislation Briefing | Changes for councils and | 1-Nov-10 | The State of Queensland | | N:\AU\Birtinya\Projects\41\24860\ | The State of Queensland | NO | _ | _ | _ | _ | _ | _ | _ | | A copy of the reprint of the legislation is available at: |
| | Disaster Management Strategic Policy Framework | | Dec-10 | Queensland Government | www.disaster.qld.gov | N:\AU\Birtinya\Projects\41\24860\ | None | NO | General | _ | NO | NO | NO | **-** | **-** | Risk Assessment pg 8 | High level Strategic Document |
| | State Planning Policy - Mitigating the adverse affects of Bushfire, Flood & Landslide | SPP 1/03 | 1-Sep-03 | Queensland Government | http://dlgp.qld.gov.au/resources/policy | N:\AU\Birtinya\Projects\41\24860\ | QLD *However, the application of | YES | Flood, Bushfire, | NO | | | | | | | sets out the State's interest in ensuring that the natural hazards of |
| | Disaster Management Guide for Local Government (unable to find reference this document) | | Dec-10 | Queensland Govt Dept of | | **Not Downloaded** | None | NO | | _ | YES | NO | NO | **-** | **-** | | |
| | Local Disaster Management Interim Guidelines | | Aug-11 | Queensland Govt Dept of | | N:\AU\Birtinya\Projects\41\24860\ | The State of Queensland | NO | General | _ | YES | NO | NO | **-** | **-** | | The aim of this document is to support local councils develop disaster |
| | Queensland Disaster Management Planning Guidelines 2005 | | 2005 | Queensland Govt Dept of | www.em.gov.au/Publications | N:\AU\Birtinya\Projects\41\24860\ | None | NO | | | | | | | | | • loss of life;<br>• injury; |
| | District Disaster Management Guidelines | | Dec-10 | Queensland Govt Dept of | www.em.gov.au/Publications | N:\AU\Birtinya\Projects\41\24860\ | None | NO | _ | _ | NO | NO | NO | **-** | **-** | | Reference document that details the changes affecting local Govt in |
| | Operational Planning Guidelines for Local Disaster Management Groups | | 2006 | Queensland Govt Dept of | | N:\AU\Birtinya\Projects\41\24860\ | The State of Queensland | YES | Fire risks, risks to public health | NO | NO | NO | NO | **-** | **-** | | Operational Guide for Disaster Response & Management Groups |
| | Queensland Disaster Management System Overview | | | Emergency Management | www.disaster.qld.gov | N:\AU\Birtinya\Projects\41\24860\ | The State of Queensland | NO | _ | NO | NO | NO | NO | **-** | **-** | | Brief overview of disaster management |
| | South East Queensland Natural Hazards and the risks they pose | | 2001 | AGSO | | N:\AU\Birtinya\Projects\41\24860\ | South Queensland | YES | Floods, Cyclones, | NO | NO | NO | NO | **-** | **-** | | 2001 background infromation document on Natural Hazards |
| | State-Wide Natural Hazard Risk Assessment | | Jul-11 | Queensland Govt Dept of | http://disaster.qld.gov.au | N:\AU\Birtinya\Projects\41\24860\ | None | YES | General | NO | NO | NO | NO | NO | _ | | Assessment into Queensland natural hazards. Overview based on 8 |
| | State Disaster Coordination Centre - Overview of activities July to Dec 2011 | | Dec-11 | Emergency Management | ov.au/Disaster%20Resources/Reports | N:\AU\Birtinya\Projects\41\24860\ | The State of Queensland | NO | _ | NO | NO | NO | NO | NO | _ | | News letter format of the coordination centre's activities over a 6 month |
| | State Disaster Coordination Centre - Overview of activities Jan to June 2011 | | Jun-11 | Emergency Management | ov.au/Disaster%20Resources/Reports | N:\AU\Birtinya\Projects\41\24860\ | The State of Queensland | NO | _ | NO | NO | NO | NO | NO | _ | | News letter format of the coordination centre's activities over a 6 month |
| | State Disaster Management Group Annual Report 2009 - 2010 | No.7 | | Emergency Management | ov.au/Disaster%20Resources/Reports | N:\AU\Birtinya\Projects\41\24860\ | The State of Queensland | NO | General | NO | NO | NO | NO | NO | _ | SPF Element 3 Disaster Risk | Review of activities for 2009 - 2010 |
| **1.2.1 Disaster Management Plans** | | | | | | | | | | | | | | | | | |
| | Queensland State Disaster Management Plan | | 2011 | State Disaster Management | http://disaster.qld.gov.au | N:\AU\Birtinya\Projects\41\24860\ | The State of Queensland | YES | General | NO | NO | NO | NO | **NO** | _ | Hazard Specific Planning 7.3.1 pg | How to catergorise risk |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| **4 Climate Change** | | | | | | | | | | | | | | | | | |
| **4.1** | | | | | | | | | | | | | | | | | |
| | Climate change risk management matrix: a process for assessing impacts, adaptation, risk and vulnerability Workbook | | 2011 | Queensland Govt (Dept of | http://www.longpaddock.qld.gov.au/pr | \\ghdnet\ghd\AU\Birtinya\Projects\ | Queensland | | | | | | | - | - | | A workbook designed to assist Councils develop risk mangement |
| | Climate change scenarios for initial assessment of risk in accordance with risk management guidance | | May-06 | Australian Greenhouse Office,Departmen | ? | \\ghdnet\ghd\AU\Birtinya\Projects\41\24860\Resources and | Australia | | | | | | | | | | General Overview of Climate Change |
| | Climate Change in Queensland: What the Science is Telling Us | ISBN 978-1-7423-0905 | Jun-08 | Queensland Climate Change | http://www.climatechange.qld.gov.au/ | \\ghdnet\ghd\AU\Birtinya\Projects\ | Queensland | | | Flood, Cyclones | | | | | | | |
| | Climate Change Impacts & Risk Mangement: A guide for business & Government | ISBN: 1 921120 56 8 | 2006 | the Australian Greenhouse | ? | \\ghdnet\ghd\AU\Birtinya\Projects\ | | | | Flood, Storm , Cyclone, Storm | | | | | | | |
| | Climate Change Guidance For NHRAs (extract only) | | | | ? | ? | | | | | | | | | | | |

**Referenced for: Bundaberg Regional Council**

| | Document Specific Category | Document Title /Description | Report ID | Date | Published by | Web site or link to saved document | Link to saved document (GHD folder) | Study coverage area | Risks described and quantified YES/NO | Relevant to which natural hazard Details | Risk relevance to NERAG YES/NO | Quantifies Hazards (Consequence & Likelihood) YES/NO | Control measures in place to reduce risk Details | Govt or State Requirement YES/NO | Existing Plans in place that would reduce risks Details | Future Plans to reduce risk Details | Key sections | Additional Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | | |
| | 1.3 Bundaberg Regional Council | | | | | | | | | | | | | | | | | |
| | | Bundaberg Regional Council Local Disaster Management Plan | In Draft Version 1 | Sep-08 | Bundaberg Regional Council | http://bundaberg.qld.gov.au | \\ghdnet\ghd\AU\Brisbane\Projects\41 | Bundaberg Region | YES | Storm Surge, Pandemic, General | - | YES | Sec 3 pg 34 - Buiding Codes / Regulations. | YES | - | - | Annex 5 Risk Management | |
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| 2 | | | | | | | | | | | | | | | | | | |
| | 2 Corporate Plans / Strategy | | | | | | | | | | | | | | | | | |
| | 2.1 Bundaberg Regional Council | | | | | | | | | | | | | | | | | |
| | | Bundaberg Regional Council Corporate Plan 2009 - 2014 | | Dec-08 | Bundaberg Regional Council | http://bundaberg.qld.gov.au | \\ghdnet\ghd\AU\Brisbane\Projects\41 | Bundaberg Shire | | | | | | | | | | |
| | | Isis Shire Planning Scheme | | Jan-07 | Bundaberg Regional Council | http://bundaberg.qld.gov.au | \\ghdnet\ghd\AU\Brisbane\Projects\41 | Isis Shire | | **Flood, Bushfire** | | | | | | | | An example of a Planning Scheme that addresses the requirements of |
| | | Bundaberg City Plan | | Feb-04 | Bundaberg Regional Council | http://bundaberg.qld.gov.au | \\ghdnet\ghd\AU\Brisbane\Projects\41 | Bundaberg City | | **Flood** | | | | | | | | An example of a Planning Scheme that addresses the requirements of |
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| | 3 Hazard Risk Assessments | | | | | | | | | | | | | | | | | |
| | 3.1 | | | | | | | | | | | | | | | | | |
| | | Bundaberg Regional Council Audit & Risk Committee Charter | MC-8-003 Revision 3 | Sep-10 | Bundaberg Regional Council | N/A | \\ghdnet\ghd\AU\Brisbane\Projects\41 | Bundaberg Region | | | | | | | | | | Terms of reference for the Risk managagement committee |
| | | Bundaberg Regional Council Branch Business Plan 2012-14 Commercial Business & Economic Development | | 2011 | Bundaberg Regional Council | N/A | \\ghdnet\ghd\AU\Brisbane\Projects\41 | Bundaberg Region | | | | | | | | | 3. Business Analysis pg12 | Strategic Document focussed on business planning |
| | | Bundaberg Regional Council Branch Business Plan 2012-14 commercial Business & Economic Development: Corporate Support | | 2011 | Bundaberg Regional Council | N/A | \\ghdnet\ghd\AU\Brisbane\Projects\41 | Bundaberg Region | | | | | | | | | None | Overview of Corporate Support |
| | | Bundaberg Regional Council Branch Business Plan 2012-14 commercial Business & Economic: Revenue | | 2011 | Bundaberg Regional Council | N/A | \\ghdnet\ghd\AU\Brisbane\Projects\41 | Bundaberg Region | | | | | | | | | None | Detailed Financial review |
| | | Bundaberg Regional Council Corporate Risk Register | Xls | | Bundaberg Regional Council | N/A | \\ghdnet\ghd\AU\Brisbane\Projects\41 | Bundaberg Region | YES | Flood, Bushfire, Climate Change | - | YES | YES (Assessing State & federal Govt info.) | YES | **New TP Scheme; Environmental Plans** | | Risk #4 | This document directly relates to required outcomes identified in the |
| | | | | | | | | | | | | | | | | | | |
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| 4 | | | | | | | | | | | | | | | | | | |
| | 4 Climate Change | | | | | | | | | | | | | | | | | |
| | 4.2 Bundaberg Regional Council Specific | | | | | | | | | | | | | | | | | |
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# Appendix F Program for HRAW

CLIENTS|PEOPLE|PERFORMANCE

# Bundaberg Regional Council
# Natural Hazard Risk Assessment Workshop

## Supports the Local Disaster Management Plan
## 21st June 2012

# Welcome and Introductions

## Natural Hazard Risk Workshop Coordination Team

- Matthew Dyer – Disaster Management Officer (BRC)
- Workshop Participants

**GHD Disaster Management Consultants**

- Eric Kerr – Project Coordinator/Disaster Management Consultant (GHD)
- Fendall Hill – Senior Consultant Infrastructure Strategy (GHD)
- Nick Patorniti – Town Planner (GHD)
- Rachael Clark – Infrastructure Strategy Consultant (GHD)
- Ben Regan – Senior Flood Plain Consultant (GHD)

**Technical Advisory Team**
Rachael Clark (Assistant Project Manager)
Bruce Harper (Climate Change & Storm Tide)
Paul Priebbenow (Flood)
Brett Shields (Bushfire)
Simon Casey (NERAG)
Fendall Hill (Risk Management)
Chris Teitzel (Town Planning & GIS)
Tina Hatfield (GIS)

# Workshop Administration

## Overview

- Catering, facilities and amenities
- Attendance sheet sign in
- Syndicate Tables (1-3) and Resources
- Mobile Phones are ***WELCOME*** – understanding **Emergency Services** are **on-call** (break out area/verandah)

# Workshop Program

| Thursday , 21 June 2012 | | |
|---|---|---|
| **Timing** | **Activity** | **Participants** |
| 9:45 – 10:00 | Meet at Bundaberg Regional Council – Morning Tea | All |
| 10:00 – 10:15 | **Risk Workshop Introductions** – *(30 min)*<br>• Introduction<br>• Administrative Brief<br>• Project Overview<br>• Workshop Methodology, Objectives & Tools | <br>FH<br>EK<br>FH |
| 10.15 -10:30 | **Establish the Context** – *(30 min)*<br>• Risk Summary<br>• Risk Statements<br>• Confidence Matrix | FH / EK |
| 10:30 – 11:00 | **Syndicate Consideration of Risks (Part 1)**<br>**Risk Identification** – *(40 min)*<br>• Develop Risk Statement<br>• Identify Causes<br>• Identify geographic areas of risk exposure<br>• Consider recent experiences or similar events | Syndicates |
| 11:00 – 12:00 | **Syndicate Consideration of Risks (Part 1)**<br>**Risk Analysis** – *(1 hr)*<br>• Identify and Assess Prevention & Preparation Controls<br>• Consider indicators of a risk event and warning mechanisms<br>• Identify and Assess Response and Recovery Controls<br>• Identify Impacts across 6 categories | Syndicates |

# Workshop Program

| Thursday , 21 June 2012 | | |
|---|---|---|
| 12:00 – 12:30 | **Syndicate Consideration of Risks (Part 1)**<br>**Risk Evaluation** – *(30 min)*<br>• Confirm likelihood, consequence and overall risk rating<br>• Consider Confidence Matrix | Syndicates |
| 12:30 – 12:50 | Lunch (20 min) | All |
| 12:50 – 13:10 | **Syndicate Consideration of Risks (Part 2)**<br>**Risk Identification** – *(20 min)*<br>• Develop Risk Statement<br>• Identify Causes<br>• Identify geographic areas of risk exposure<br>• Consider recent experiences or similar events | Syndicates |
| 13:10 – 14:00 | **Syndicate Consideration of Risks (Part 2)**<br>**Risk Analysis** – *(50 min)*<br>• Identify and Assess Prevention & Preparation Controls<br>• Consider indicators of a risk event and warning mechanisms<br>• Identify and Assess Response and Recovery Controls<br>• Identify Impacts across 6 categories | Syndicates |
| 14:00 – 14:10 | **Syndicate Consideration of Risks (Part 2)**<br>**Risk Evaluation** – *(10 min)*<br>• Confirm likelihood, consequence and overall risk rating<br>• Consider Confidence Matrix | Syndicates |
| 14:10 – 14:45 | **Syndicate Presentation of Risk Outcomes** – *(35 min)*<br>**(10-15 mins per syndicate to summarise the risks considered – will adjust as required)**<br>• Risk Statement<br>• Overview of controls and effectiveness | All |
| | • Risk Rating | |
| 14:45 – 15:30 | **Any Further Work on Risks, Workshop Review and Close** – *(45 min)* | GHD/All |
| 15:30 | Depart | All |

# Workshop Focus

| Syndicate Number | Hazard (*completed if time permits) |
|---|---|
| 1 | • Risk 1: East Coast Low Pressure System*<br>• Risk 2: Severe Thunderstorm<br>• Risks 3/4 Cyclone (categories 1-3 and 4-5)<br>• Risk 5: Flood<br>• Risk 6: Tornado*<br>• Risk 14: Storm tide<br>• Risk 15: Tsunami* |
| 2 | • Risk 7: Earthquake*<br>• Risk 8: Landslide Erosion *<br>• Risk 12: Extreme Temperature<br>• Risk 9: Drought<br>• Risk 10: Bushfire |
| 3 | • Risk 11: Pandemic<br>• Risk 13: Insect or Exotic Animal/Plant Disease<br>• Risk 16: Algal bloom |

# Project Overview

## Purpose of Workshop

The PURPOSE of the *Hazard Risk Assessment Workshop* is to identify, analyse and evaluate the top eleven (11) of sixteen (16) key hazards following the *National Emergency Risk Assessment Guidelines (NERAG)* and *ISO 31000_2009 – Risk Assessment*.

The OUTPUTS from the workshop will directly feed in to the *Hazard Risk Assessment*, providing a layer of information based on local knowledge, experience and technical knowledge from participants.

# Project Overview

| Hazard (*denotes workshop risks) |
| --- |
| Risk 1: East Coast Low Pressure System* |
| Risk 2: Severe Thunderstorm* |
| Risk 3: Cyclone (categories 1-3)* |
| Risk 4: Cyclone (categories 4-5)* |
| Risk 5: Flood* |
| Risk 6: Tornado* |
| Risk 7: Landslide (Erosion)* |
| Risk 8: Earthquake* |
| Risk 9: Drought* |
| Risk 10: Bushfire* |

# Project Overview

| Hazard (*denotes workshop risks) |
| --- |
| Risk 11: Pandemic* |
| Risk 12: Extreme Temperature* |
| Risk 13: Insect or Exotic Animal/Plant Disease* |
| Risk 14: Storm Tide*<br>Risk 15: Tsunami*<br>Risk 16: Algal bloom* |

# Project Overview

## Project Outputs

- **Regional Risk Assessment**
  - Summary of Risks (16)
  - Regional Risk Register
    - Strategic overview to support plans
  - Gap Analysis
    - Examples
      - Community Resilience Strategy / Plan
      - Flood mapping / Warning System
      - Earthquake assessment
    - Updated Local Disaster Management Plans
    - GIS Products / Mapping

# Resources

- Review Participants Handbook
  - GIS Products
  - Relevant Studies and Summaries
  - Hazard Definitions
  - Risk Calendar – Likelihood, Consequence and Risk Rating
  - Other

# Project Overview

**Disaster management systems in Queensland**

In Queensland, the disaster management system operates at three levels:

- local
- district
- state

# Project Overview

## Project Overview

### Council's Disaster Management Roles and Responsibilities

- Under the ***Disaster Management Act 2003*** council is primarily responsible for coordination and management of disaster and emergency events in its local government area, with support from the State through the ***Local Disaster Management Group (LDMG)***

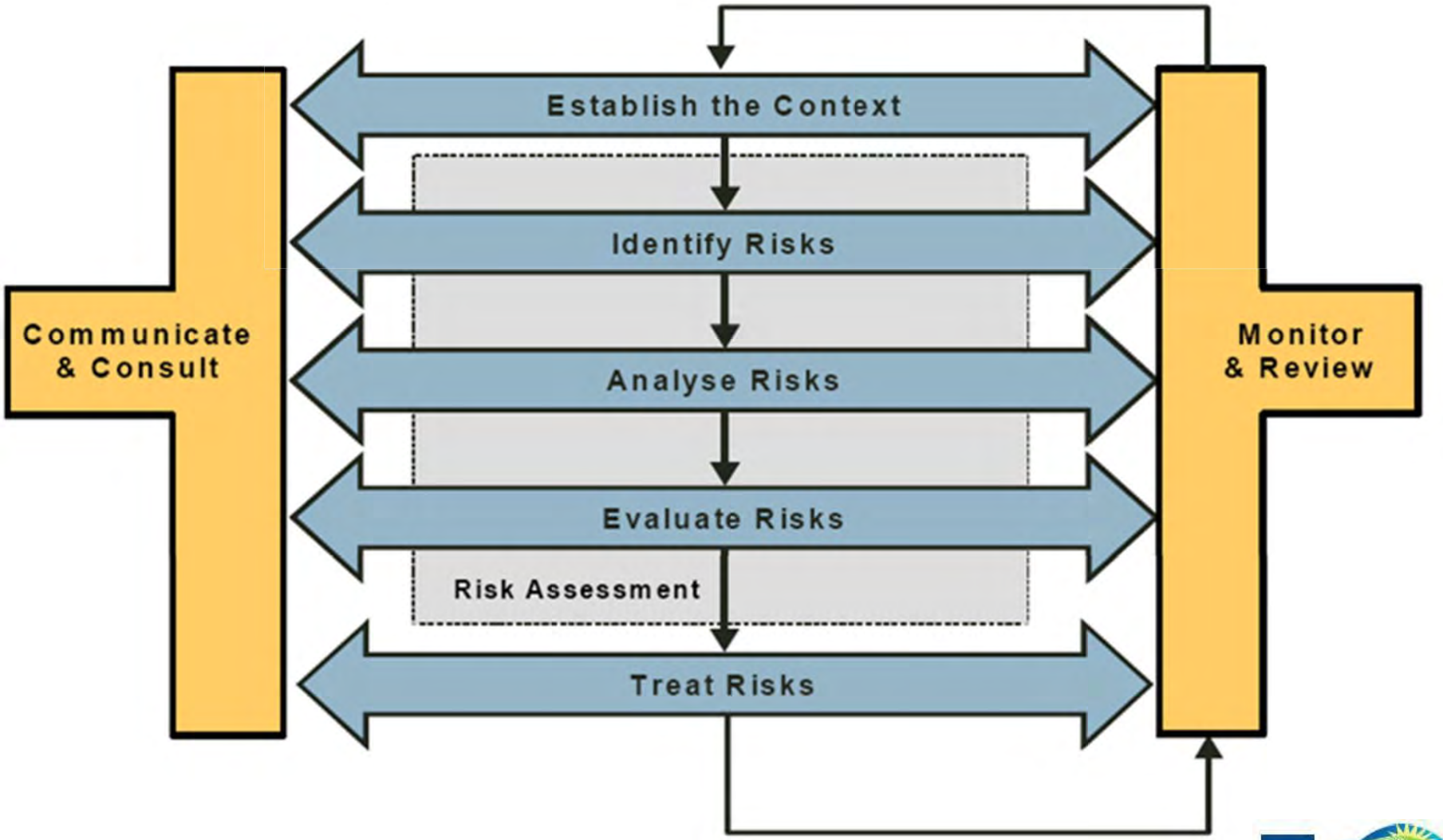
### Council's responsibilities

- Under the Act, council must:
  1. establish a local disaster management group
  2. develop and approve a local disaster management plan
  3. have a disaster response capability
  4. develop a comprehensive approach to disaster management - Prevention / Preparation / Response and Recovery
  5. lead and facilitate local recovery
- **Inputs: Flood Commission Inquiry, QRA Recommendations, BRC Disaster Management Plan and other reference documents**
- **Grants: Natural Disaster Resilience Program (NDRP)**

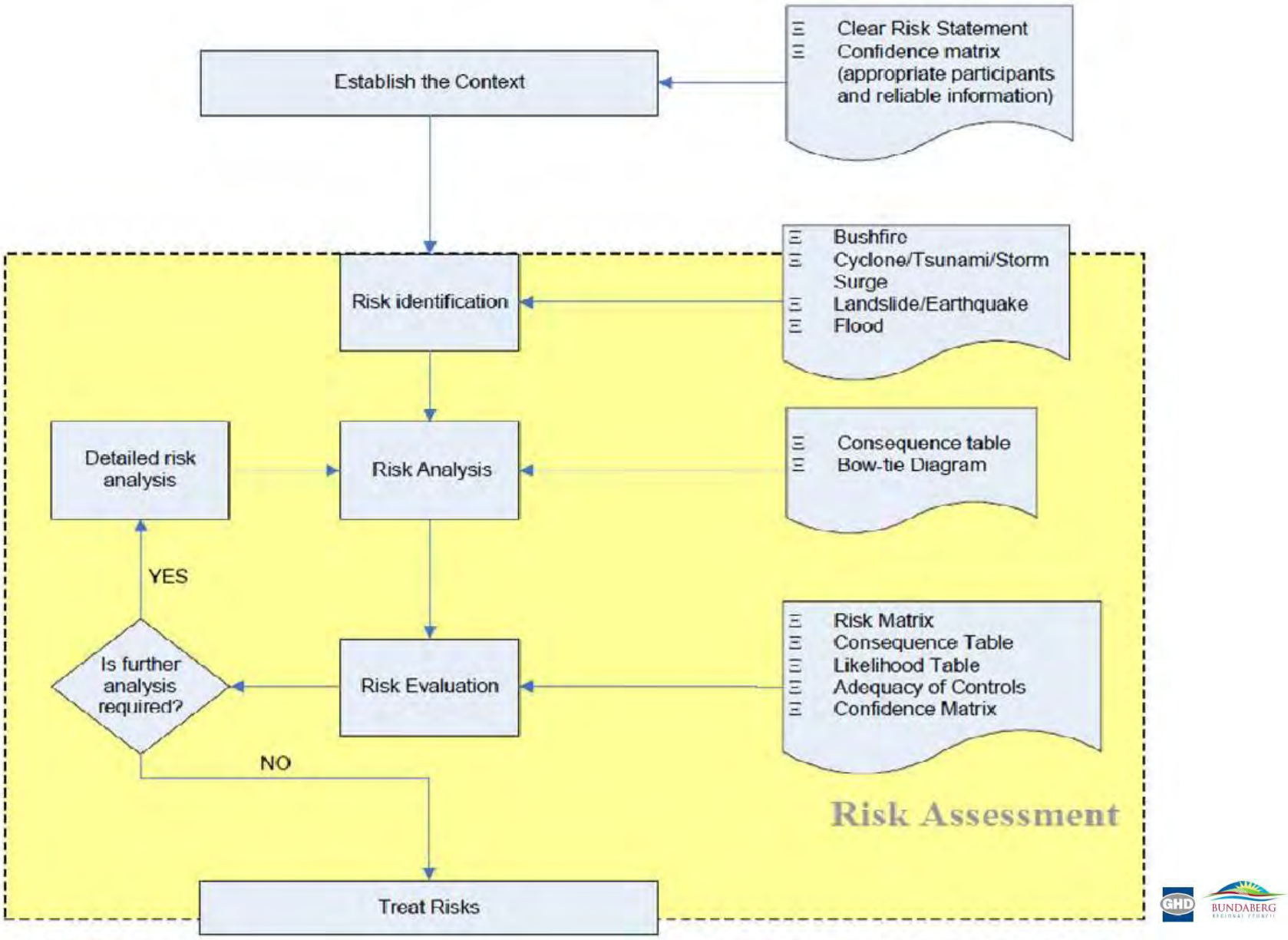
# Methodology & Outcomes

- The Risk Assessment component of the project is being undertaken based on **ISO 31000:2009 – Risk Management**
- Following the methodology detailed in the Draft National Emergency Risk Assessment Guidelines **(NERAG)**
- **Key Considerations**
  - Identifying vulnerabilities (land use, population at risk, infrastructure)
  - Context of impacts - local/regional/state level
  - Consider seasonal variations on impacts

# Project Overview

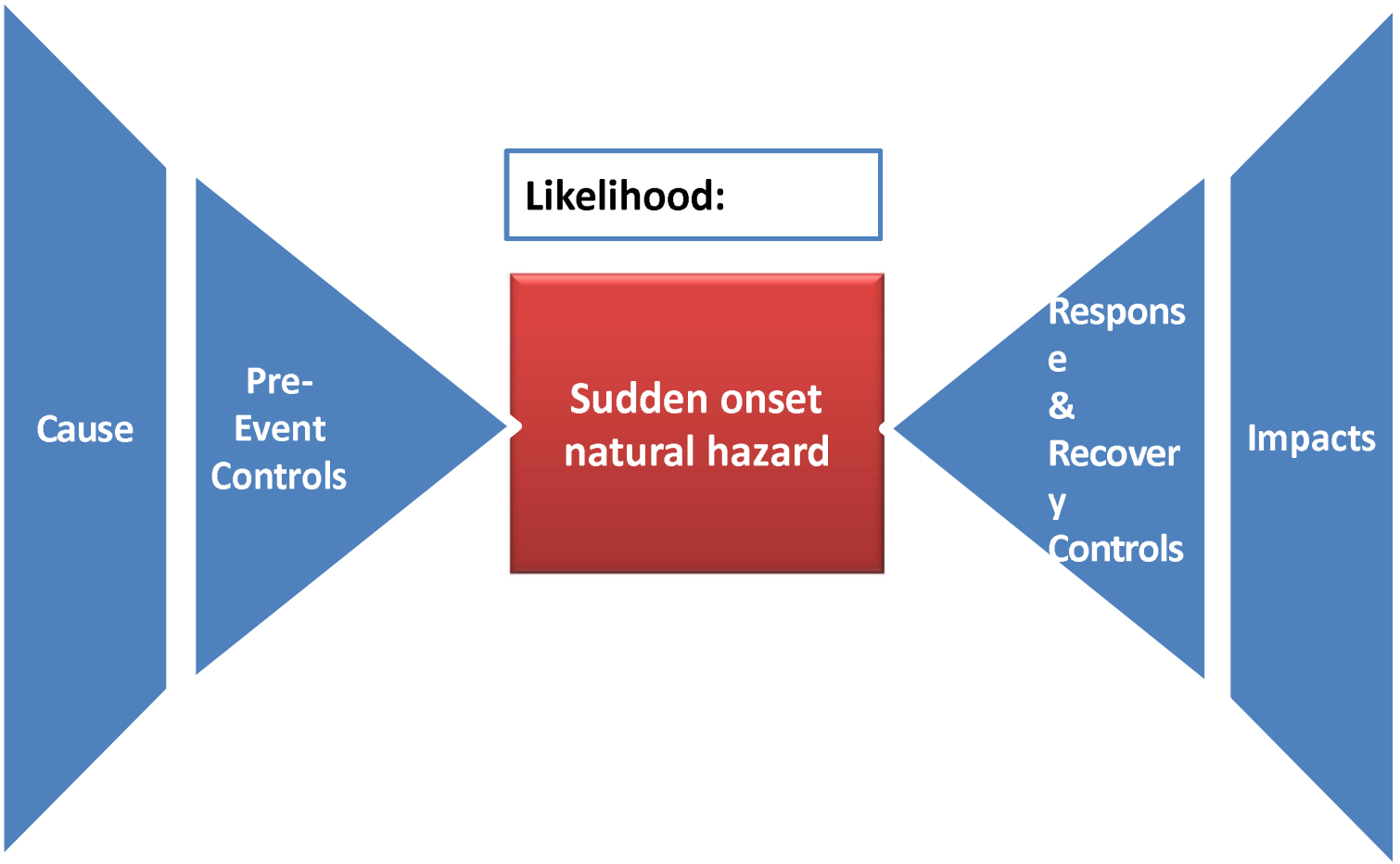


# Methodology & Outcomes (NERAG)



Disaster Hazard Risk Study Project
Risk Workshop - Methodology (Adequacy of Controls)

| | |
|---|---|
| RISK SOURCE: 01 | East Coast Low Pressure System |
| RISK STATEMENT: | |



# Appendix G Attendance Sheet

**BundabergShire Council Natural Hazard Risk Assessment Workshop**
**Attendance Listing as at 21 June 2012**

*Correct as at 20 June 2012*

| Organisation | NAME | POSITION | Phone number | Proposed Syndicate Groups | Attendance Sheet 12 June 2012 (Signature) |
|---|---|---|---|---|---|
| QAS | Daniel Statham – DS | REGIONAL OPERATIONS SUPERVISOR | 0447747301 | 3 | D Statham |
| MSQ | Bob Lowe – BL | AREA MANAGER | 0419729866 | 1 | |
| BRC | Dwayne Honor – DH | | | 1 | |
| Port of Bundaberg | Peter Steele – PS | Supervisor | 0428594233. | 1 | |
| DDMG XO | Grant Marcus – GM,QPS | DDMG XO | | 2 | |
| SES | Ray MacDonough – RM | Gin Gin Local Controller | | 2 | |
| SES | Bill Daniels – BD | Bundaberg Local Controller | 0429632624 | 3 | W E Daniells |
| ERGON | Craig Harris – CH | | | 2 | |
| DoC | Carina Irvine – CI | | | 3 | |
| BRC | James Stanfield – JS | Manager Waste & Recycling | 0417559273 | 1 | |
| EMQ | Jenny Millers - JM | EMQ Area Director | 0407647142 | 2 | J A Millers |
| BRC | Cr David Batt – DB | Deputy Mayor | | 3 | |
| QFRS Rural Fire Service | Tony Johnston – TJ | | | 2 | |
| Woodgate SES | Russell Yates – RY | | | 1 | |
| Transport and Main Roads | Adam Williams – AW MANAGER (CMD) NO PREF | | 0429 141 395 | 1 | |
| BRC | Cr Mal Forman | Mayor | | 1 / 2 / 3 | |
| | Other attendees to be confirmed | | | | |
| BRC | MATT DYER | DMO | | | |
| SES | John Cottam | SES Local controllers/builders | | | |
| BRC | ADAM WYATT | | | 1 | A D Wyatt |
| BRC | JULIE BARAZZA | EHO | 41304292 | | |
| QPS | Grant MARCUS | XO | 0447203392 | 2 | |

| Syndicate Number | Risks (Risks Selected from Priorities 1- 23) | Syndicate Facilitator |
|---|---|---|
| 1 | • Risk 1: East Coast Low Pressure System<br>• Risk 2: Thunderstorm<br>• Risks 3/4 Cyclone (categories 1-3 and 4--5)<br>• Risk 5: Flood<br>• Risk 6: Tornado<br>• Risk 14: Storm tide<br>• Risk 15: Tsunami | |
| 2 | • Risk 7: Earthquake<br>• Risk 9: Landslide (erosion)<br>• Risk 10: Drought<br>• Risk 11 Bushfire | |
| 3 | •Risk 12: Pandemic<br>• Risk 13: Insect or Exotic Animal/Plant Disease<br>• Risk 16: Algal bloom | |

GHD

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Document Status

| Rev No. | Author | Reviewer | | Approved for Issue | | |
|---|---|---|---|---|---|---|
| | | Name | Signature | Name | Signature | Date |
| A | Mithrasen Ramdhayan | Fendall Hill | | Eric Kerr | | 06/09/12 |
| 0 | Mithrasen Ramdhayan | Fendall Hill | | Eric Kerr | | 22/10/12 |
| | | | | | | |

www.ghd.com

# Schedule 4 – Planning Scheme Policy Extract

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(i) a scaled map showing the location of all ecological values including corridors, fauna species habitat including habitat trees, remnant, high value regrowth and non-remnant vegetation overlaying a plan of development. The plan is to include any Water Sensitive Urban Design features, associated stormwater infrastructure, services, roads (noting that a differential GPS or Total Station-EDM must be used to accurately map ecological features);

a. a detailed description of the methods used and assumptions made; and

b. a scaled drawing showing areas surveyed across the site.

### SC6.5.3.5 Flood hazard assessment and mitigation report

(1) This component of the planning scheme policy applies to development which requires assessment against the Flood hazard overlay code.

(2) This component of the planning scheme policy is intended to identify and provide guidance about information that may be required to support a development application where subject to the Flood hazard overlay code.

(3) In particular, compliance with the Flood hazard overlay code may be demonstrated (in part) by the submission of a flood hazard assessment report and/or a flood hazard mitigation report prepared by a competent person in accordance with the following guidelines.

*Flood hazard assessment report*

(4) A flood hazard assessment report is to:-

(a) consider Council's adopted flood and drainage studies for the relevant catchment(s); and

(b) as relevant, include accurate hydrological and hydraulic modelling of the waterway network and assessment of existing flooding and flood levels of major water systems, including modelling of the 50%, 10%, 5%, 1%, 0.5% and 0.2% AEP flood events and the PMF.

Note—Throughout the Bundaberg region, Council owns and maintains a number of hydraulically and hydraulic modeling. On request and signing of a usage agreement this modeling can be made available.

*Flood hazard mitigation report*

(5) A flood hazard mitigation report is to:-

(a) assess the potential impacts of the development on flood hazard;

(b) assess the potential impacts of flood hazard on the development;

(c) recommend strategies to be incorporated into the proposed development to satisfy the outcomes of the Flood hazard overlay code;

(d) describe and evaluate the impact of the proposed mitigation strategies on the existing and likely future use of land and buildings in proximity to the proposed development; and

(e) address the following:-

(i) water quality;

a. waterways, including bank stability;

b. impacts on adjacent properties both upstream and downstream;

c. preferred areas and non-preferred areas on site for various activities, based on the probability of inundation and the volume and velocity of flows;

d. the use of flood resistant materials and construction techniques able to withstand relevant hydraulic and debris loads where appropriate;

e. the location and height of means of ingress and egress, including possible flood-free escape routes;

f. the location and height of buildings, particularly habitable floor areas;
g. structural design, including the design of footings and foundations to take account of static and dynamic loads (including debris loads and any reduced bearing capacity owing to submerged soils);
h. the location and design of plant and equipment, including electrical fittings;
i. access requirements for maintenance of proposed infrastructure;
j. the storage of materials which are likely to cause environmental harm if released as a result of inundation or stormwater flows;
k. the appropriate treatment of water supply, sanitation systems and other relevant infrastructure;
l. relevant management practices, including flood warning and evacuation measures;
m. details of any easements or reserves required for stormwater design; and
n. details of detention/retention storages.

(6) The level of detail required for a particular development application should be determined in consultation with Council's development assessment officers.

### SC6.5.3.6 Traffic impact assessment report

(1) Performance outcome PO2 of **Table 9.3.5.3.2 (Benchmarks for assessable development only)** of the Transport and parking code requires that development involving high trip generating land uses minimises any adverse impacts on surrounding land uses and the external transport network, including by the provision of infrastructure and services to increase the use of public and active transport.

(2) Compliance with this performance outcome of the Transport and parking code may be demonstrated (in part) by the submission of a traffic impact assessment report prepared by a competent person in accordance with the following guidelines.

(3) As a minimum, the traffic impact assessment report should provide:-

(a) an assessment of the traffic generation and movements and/or on-site manoeuvring associated with the proposed development;

(b) an assessment of the proposal and its impacts in the context of the surrounding road network; and

(c) recommendations and/or design solutions to mitigate any traffic impacts associated with the development.

(4) Depending on the nature and scale of the proposed development and the location and characteristics of the development site, the traffic impact assessment report may also need to consider:-

(a) specific measures to ensure the proposal will contribute towards encouraging walking, cycling and greater use of public transport in preference to using private cars;

(b) the need to improve public transport services and infrastructure as a result of the development;

(c) measures to ensure maximum accessibility to public transport, including future expanded services;

(d) a review of the existing and proposed traffic network and traffic operating conditions based on an appropriate planning horizon (with a minimum of 10 years);

(e) the amount of other traffic likely to be generated by the development, particularly in relation to the capacity of the road system in the locality and the probable effect of traffic on the movement of other traffic on the road system. This includes the impact of generated traffic on:-

(i) key nearby intersections;

# Appendix 1 – Table of Amendments

| Date of adoption and effective date | Revision number | Summary of amendments |
|---|---|---|
| Adoption 17/05/2016<br>Effective 23/05/2016 | 2.0 | 1. Amended the flood extent for the Burnett River in Schedules 1 and 2 to reflect the area of land protected by the Technology Park Flood Levee, the Fairymead Road Flood Evacuation Route, and the Bundaberg – Gin Gin Flood Evacuation Route (see Attachment A – Flood Hazard Mitigation Areas maps for details);<br>2. Amended the flood extent for the Burnett River in Schedules 1 and 2 over a number of properties to more accurately reflect the true event (see Attachment B – Minor Burnett River Flood Extent Changes);<br>3. Removed references to the 'draft planning scheme' as the planning scheme is now adopted and in effect. |
| Adoption 16/5/2017<br>Effective 19/5/2017 | 3.0 | 1. Amended the flood extent for the Burnett River in Schedules 1 and 2 over a number of properties to more accurately reflect the true event (see Attachment B – Minor Burnett River Flood Extent Changes);<br>2. Amended the flood extent for both Local and Riverine DFE to account for developments works that have been completed. (see Attachment C – Development Works in the Flood Hazard Area);<br>3. Removed the Rushy Creek Catchment (in vicinity of Melaleuca Court, Redridge) from the results of the Burrum, Cherwell, Isis, Gregory River Flood Study. A more detailed analysis of this catchment is required as the 15m grid size is not providing an acceptable outcome. |
| Adoption 12/12/2017<br>Effective 22/12/2017 | 4.0 | 1. Amended the flood extent for both Local and Riverine DFE to account for developments works that have been completed. (see Attachment C – Development Works in the Flood Hazard Area). |
| Adoption 11/12/2018<br>Effective 11/01/2019 | 5.0 | 1. Amended the flood extent for the Burnett River in Schedules 1 and 2 over a number of properties to more accurately reflect the true event (see Attachment B – Minor Burnett River Flood Extent Changes);<br>2. Amended the flood extent for both Local and Riverine DFE to account for developments works that have been completed. (see Attachment C – Development Works in the Flood Hazard Area). |
| Adoption 17/12/2019<br>Effective 19/12/2019 | 6.0 | 1. Amended the flood extent for the Burnett River in Schedules 1 and 2 over one property to more accurately reflect the true event (see Attachment B – Minor Burnett River Flood Extent Changes);<br>2. Amended the flood extent for both Local and Riverine DFE to account for developments works that have been completed. (see Attachment C – Development Works in the Flood Hazard Area). |
| Adoption 21/12/2021<br>Effective 1/03/2022 | 7.0 | 1. Amended the flood extent for Baffle Creek to replace previously adopted draft results (O2, 2014) with the final results of the Baffle Creek Flood Study (Engeny, 2018);<br>2. Added flood mapping/results for the Rushy Creek Catchment (in Redridge) from the Burrum, Cherwell, Isis, Gregory River Flood Study (GHD, 2015) (results were previously excluded from revision 3.0 awaiting further investigation);<br>3. Amended the flood extent for both Local and Riverine DFE to account for developments works that have been completed. (see Attachment C – Development Works in the Flood Hazard Area). |

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# Attachment A – Flood Hazard Mitigation Areas

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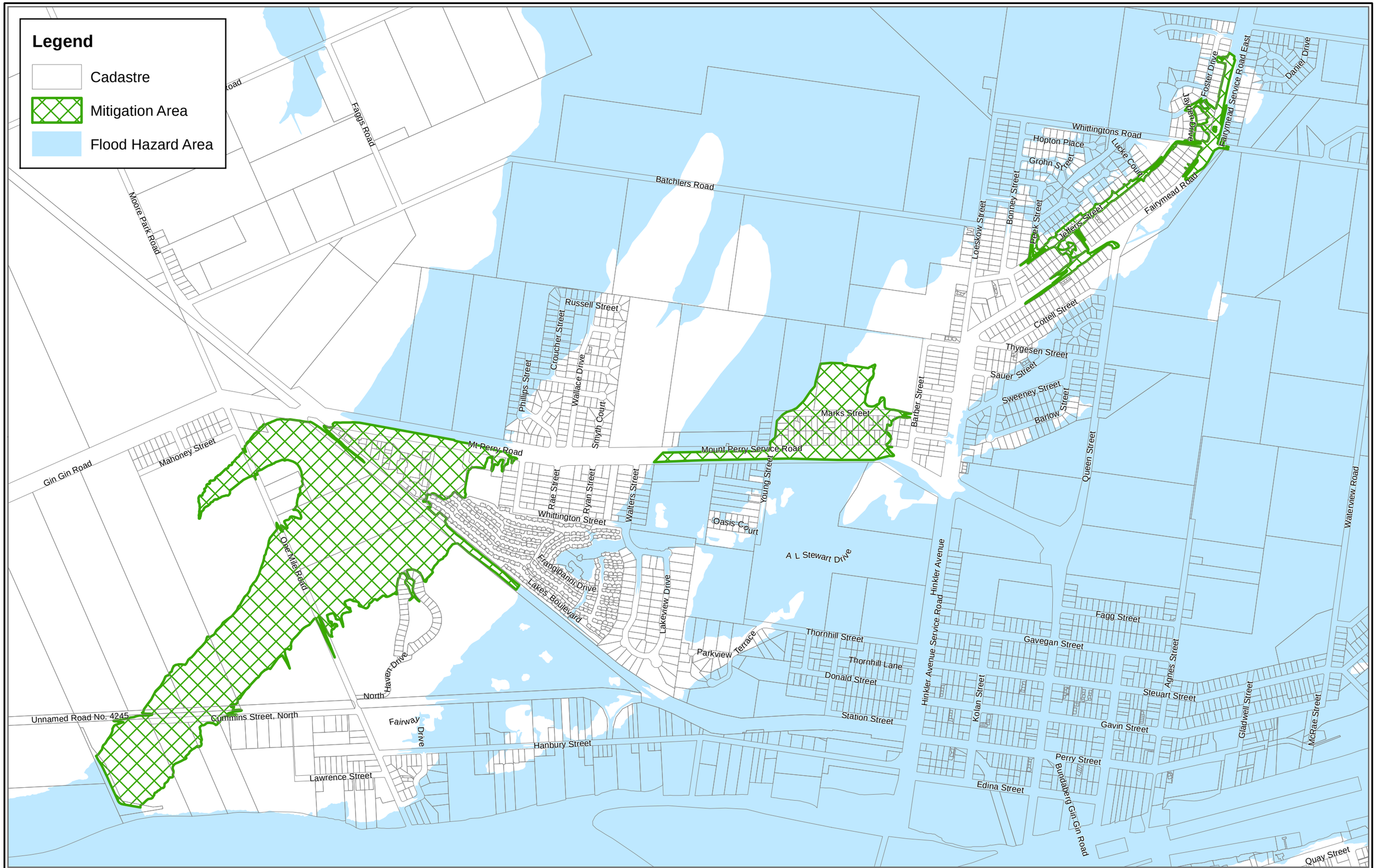


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While every care is taken to ensure the accuracy of this data, the Department of Natural Resources and Mines and the Bundaberg Regional Council makes no representation or warranties about its accuracy, reliability, completeness or stability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the data being inaccurate or incomplete in any way and for any reason.

N

# Flood Hazard Mitigation Areas

BRC Plan No. nnnn Scale 1:12000 on A3 Sheet

Printed By: nicholas.page Date: 4/05/2016

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# Attachment B – Minor Burnett River Flood Extent Changes

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The following changes were
made with Resolution
1/2016

**Property Details:**

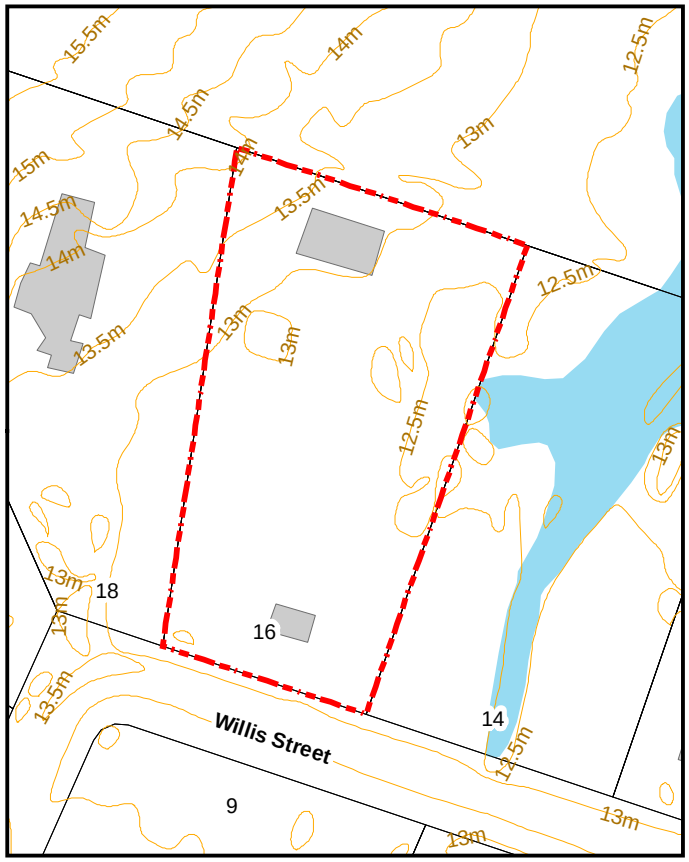
Property Address: *16 Willis ST SHARON*

Plan/Lot: *RP176499/114*

**Details of change:**

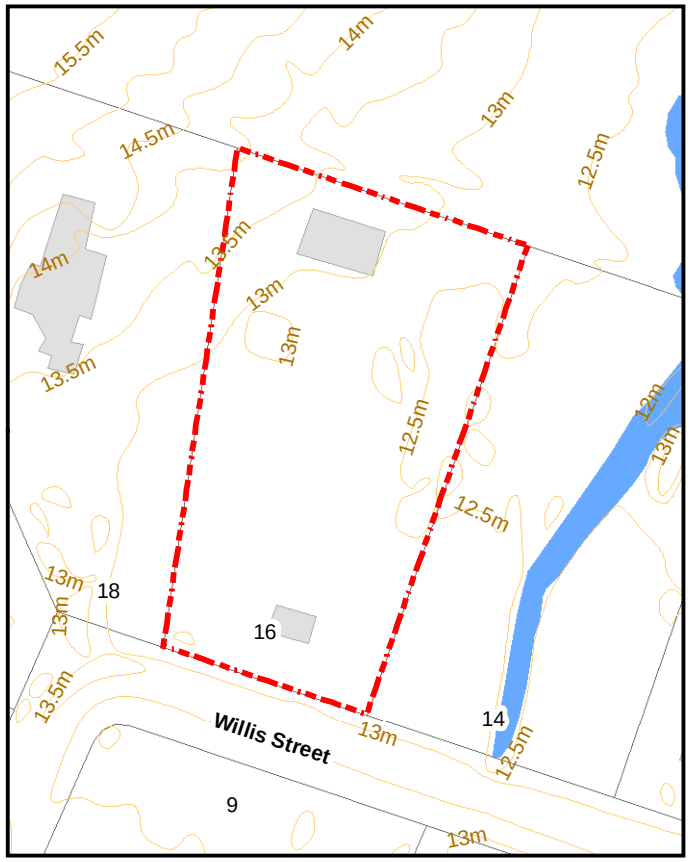
*Property removed from Flood Hazard Area and surrounding flood extent updated.*

## Previous Flood Hazard Area




## Aerial Photography

## New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 — 120

Meters

1:1,761

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

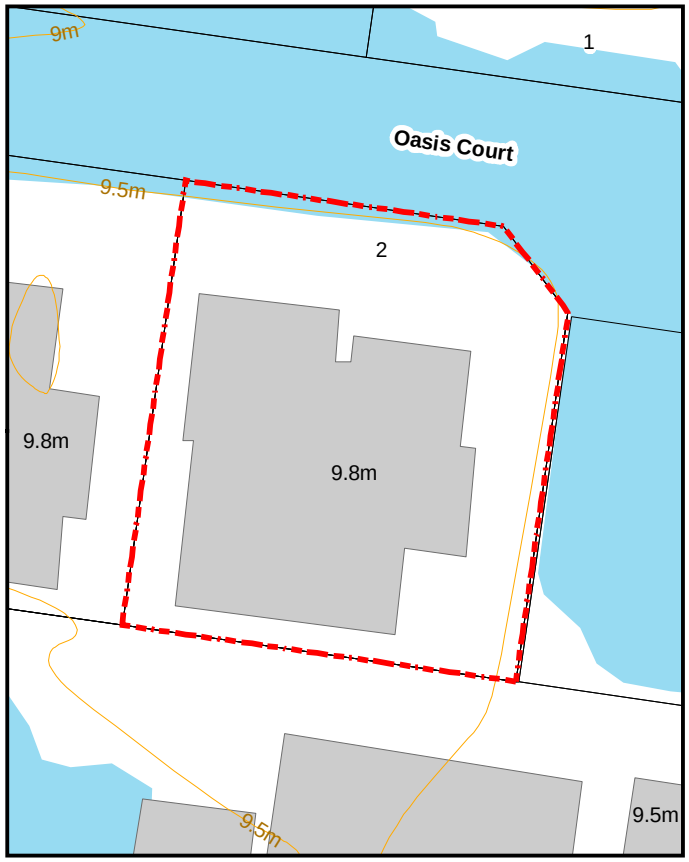
Property Address: *2 Oasis CT BUNDABERG NORTH*

Plan/Lot: *SP199355/15*

**Details of change:**

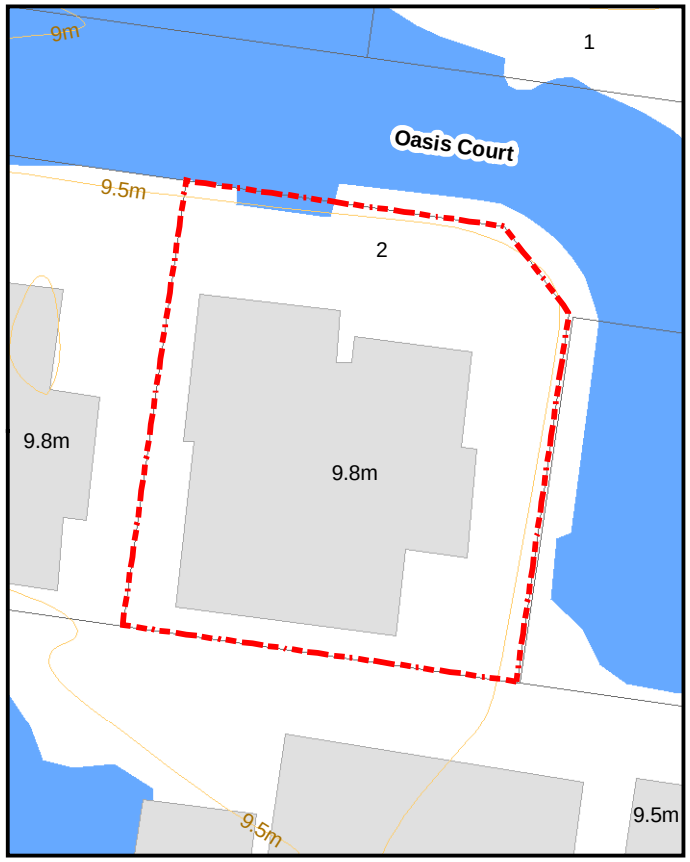
*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

## Previous Flood Hazard Area




## Aerial Photography

## New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 25

Meters

1:410

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

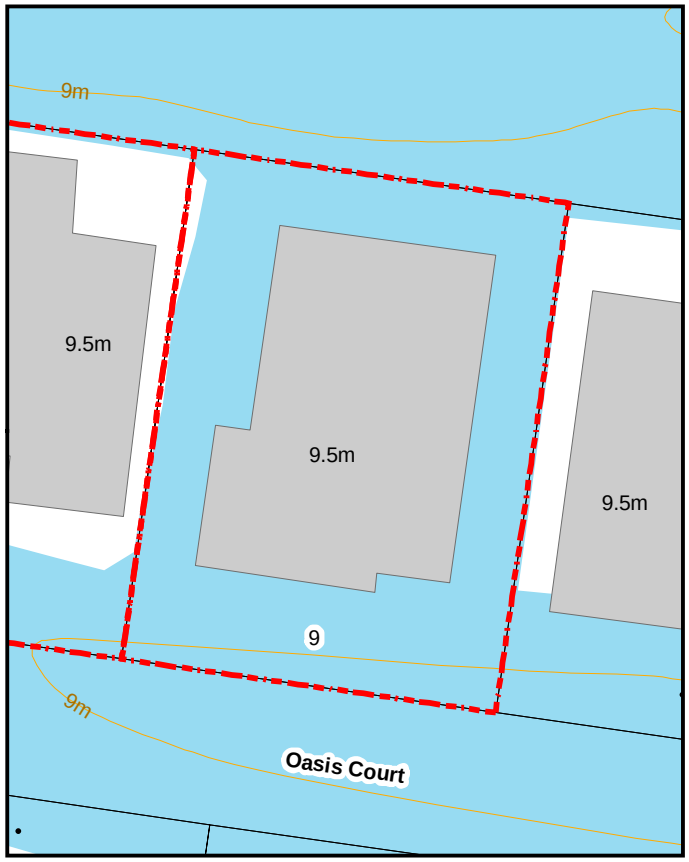
Property Address: *9 Oasis CT BUNDABERG NORTH*

Plan/Lot: *SP199355/7*

**Details of change:**

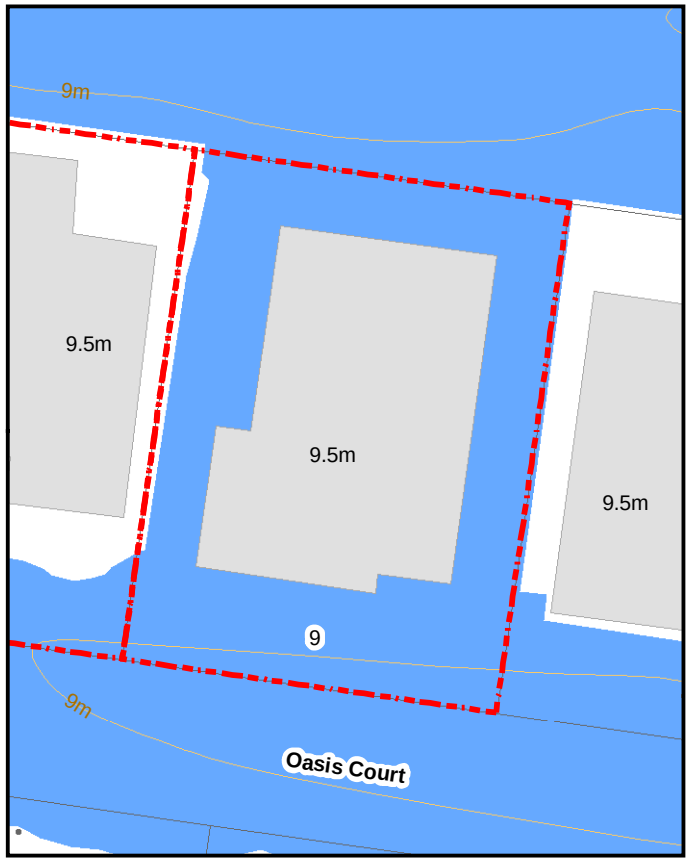
*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

## Previous Flood Hazard Area




## Aerial Photography

## New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 25

Meters

1:400

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

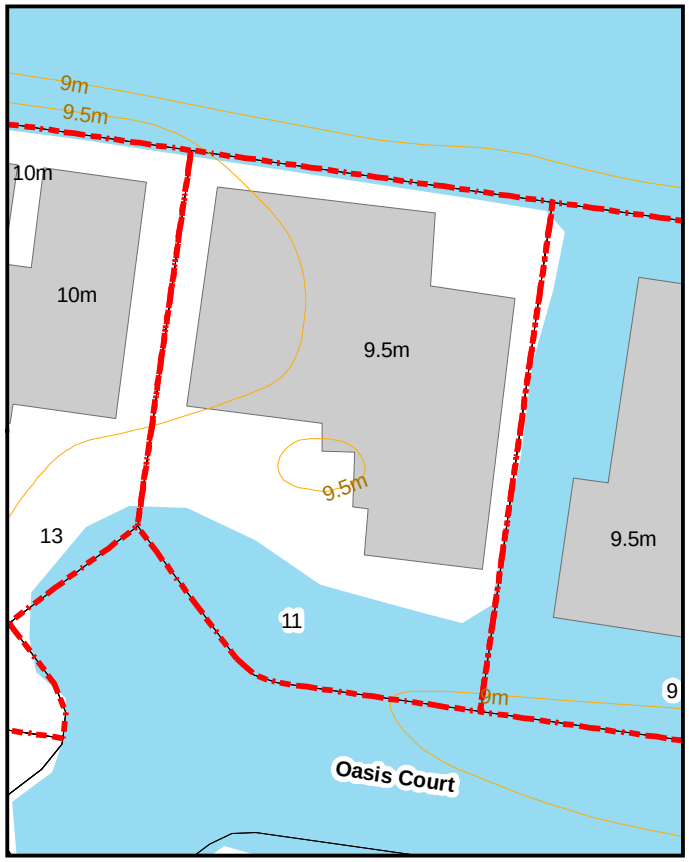
Property Address: *11 Oasis CT BUNDABERG NORTH*

Plan/Lot: *SP199355/8*

**Details of change:**

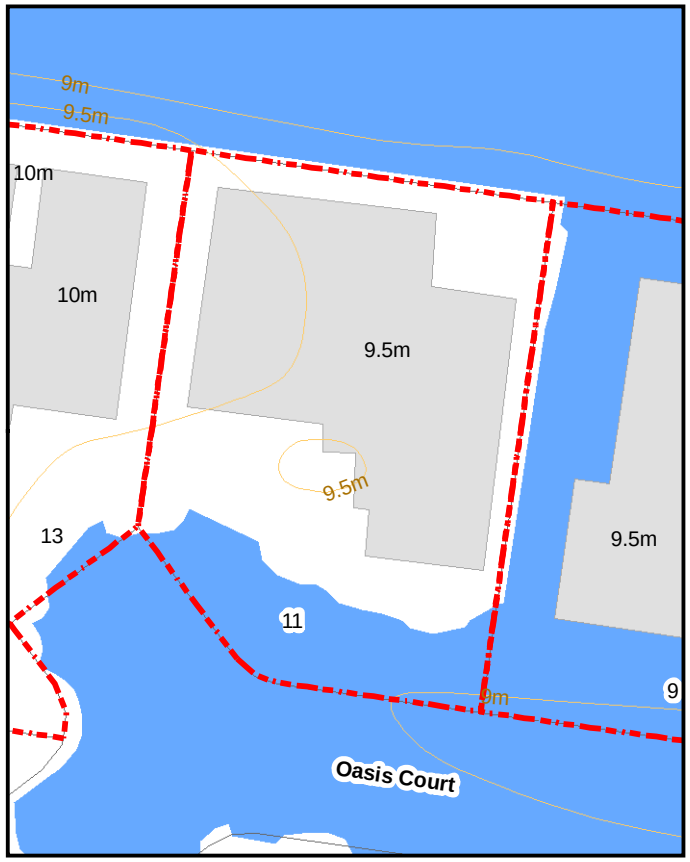
*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

**Previous Flood Hazard Area**




**Aerial Photography**

**New Flood Hazard Area**




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 25

Meters

1:400

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

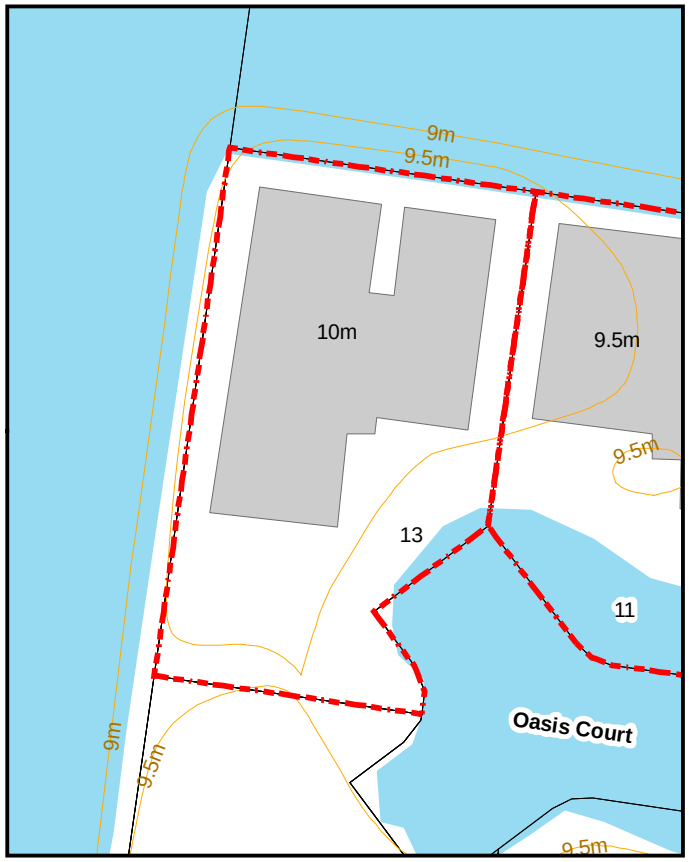
Property Address: *13 Oasis CT BUNDABERG NORTH*

Plan/Lot: *SP199355/9*

**Details of change:**

*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

**Previous Flood Hazard Area**




**Aerial Photography**

**New Flood Hazard Area**

**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 30

Meters

1:450

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

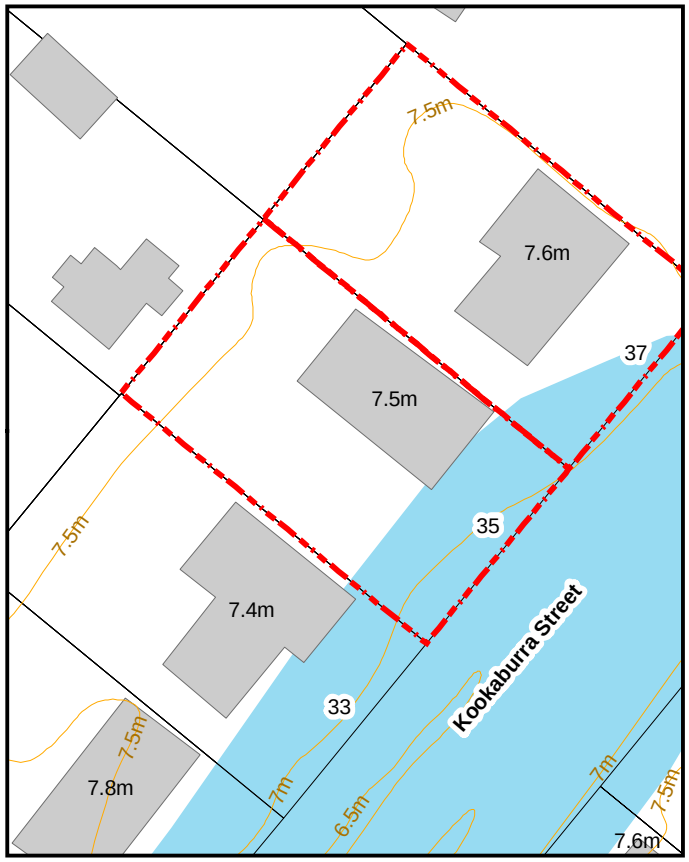
Property Address: *35 Kookaburra ST BUNDABERG NORTH*

Plan/Lot: *RP845740/2*

**Details of change:**

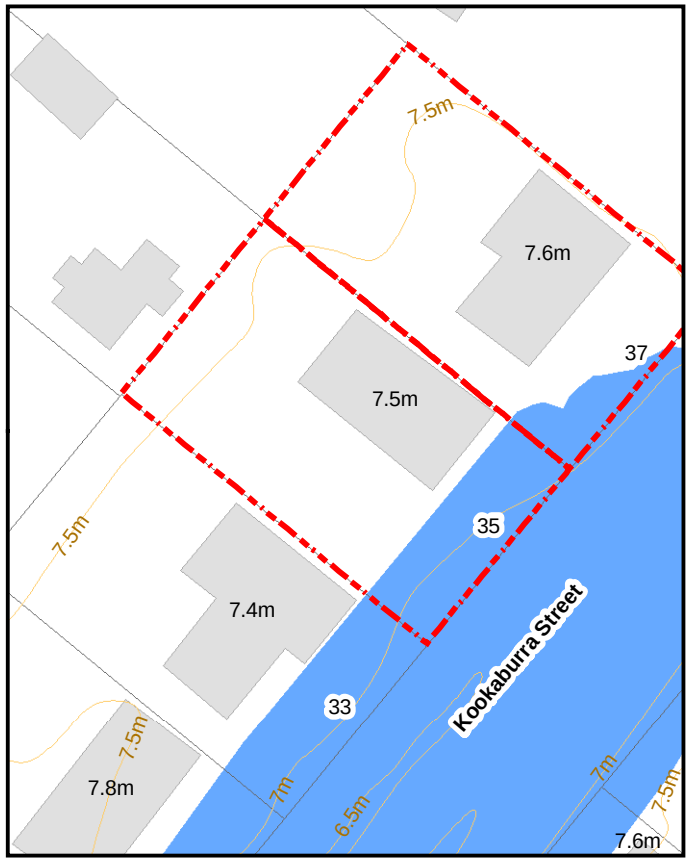
*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

**Previous Flood Hazard Area**




**Aerial Photography**

**New Flood Hazard Area**




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 40

Meters

1:670

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

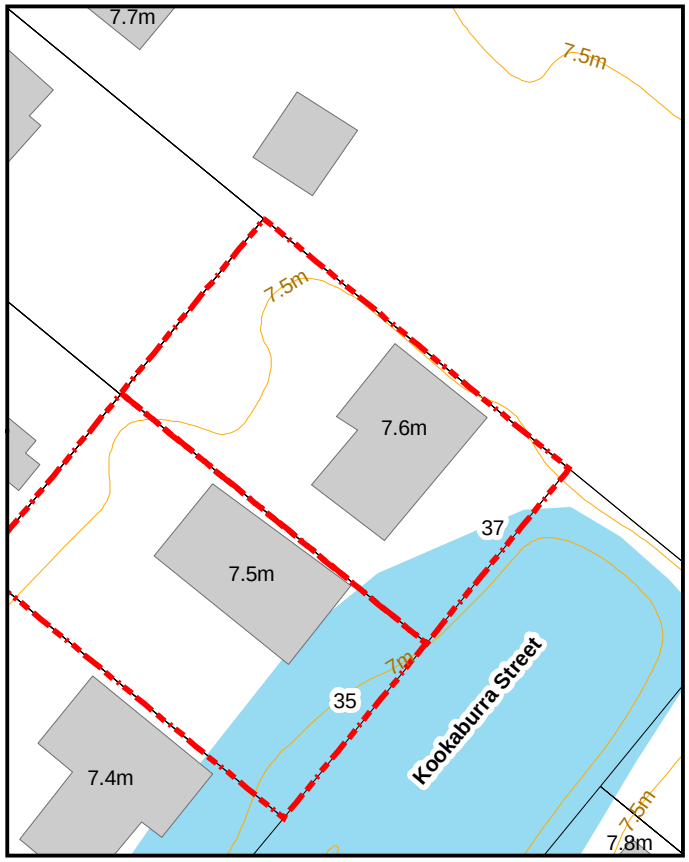
Property Address: *37 Kookaburra ST BUNDABERG NORTH*

Plan/Lot: *RP845740/1*

**Details of change:**

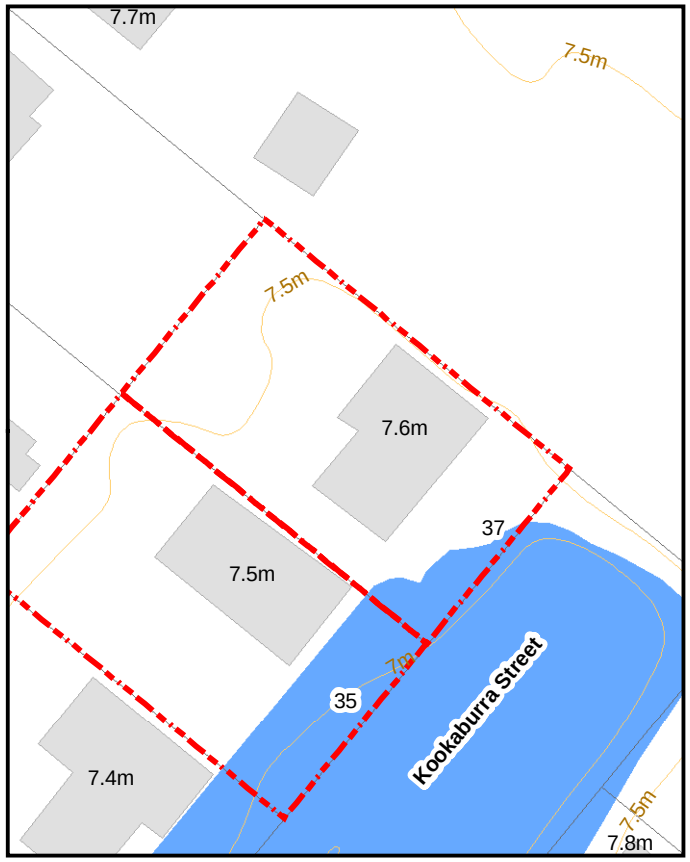
*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

**Previous Flood Hazard Area**




**Aerial Photography**

**New Flood Hazard Area**




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 40

Meters

1:670

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

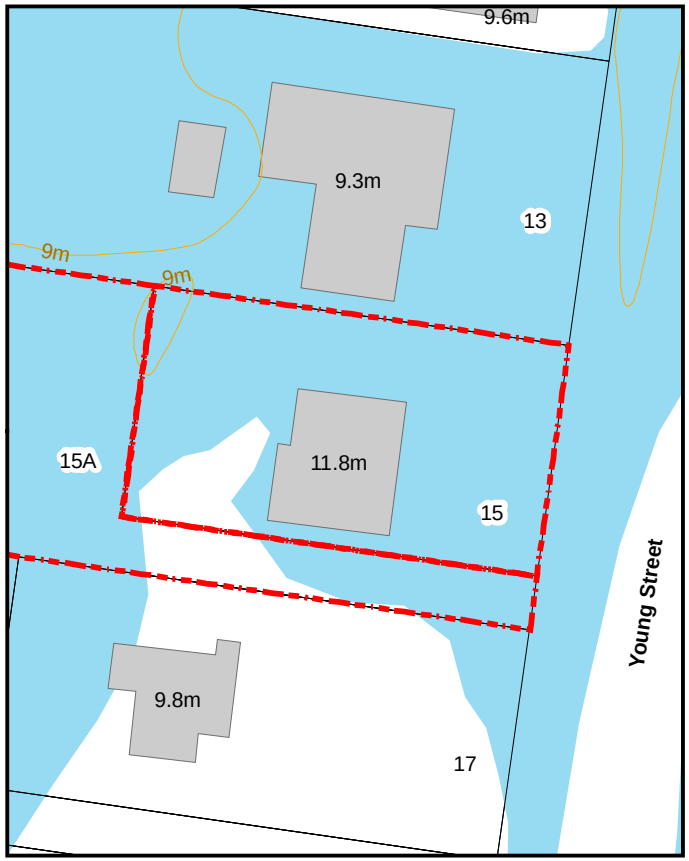
Property Address: *15 Young ST BUNDABERG NORTH*

Plan/Lot: *SP171459/29*

**Details of change:**

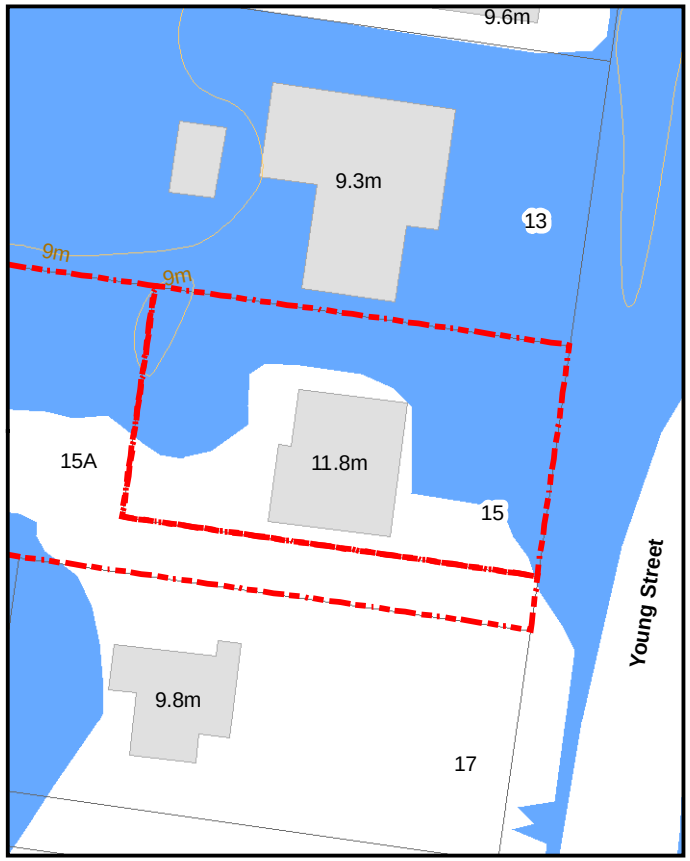
*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

**Previous Flood Hazard Area**




**Aerial Photography**

**New Flood Hazard Area**




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 40

Meters

1:630

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

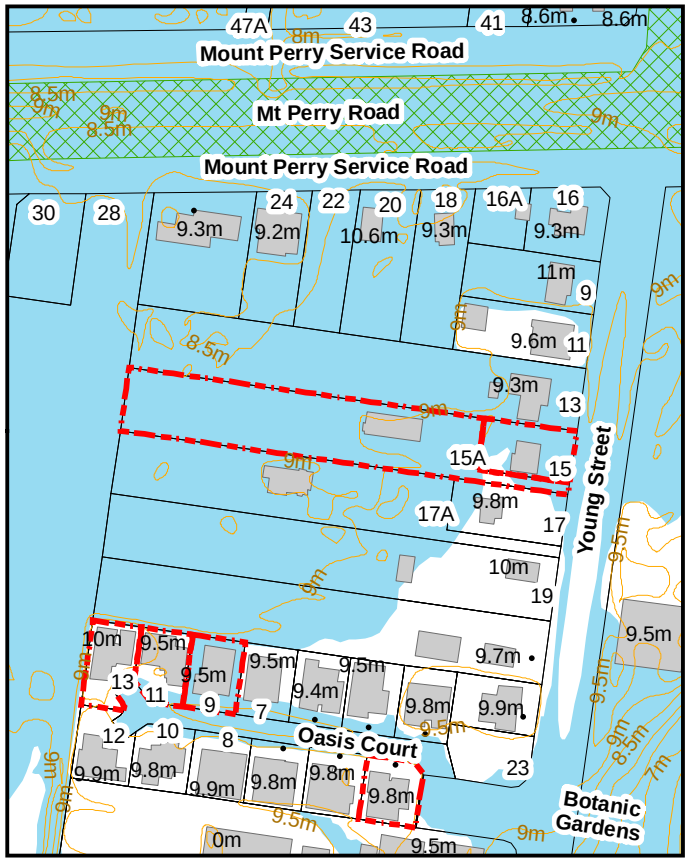
Property Address: *15A Young ST BUNDABERG NORTH*

Plan/Lot: *SP171459/30*

**Details of change:**

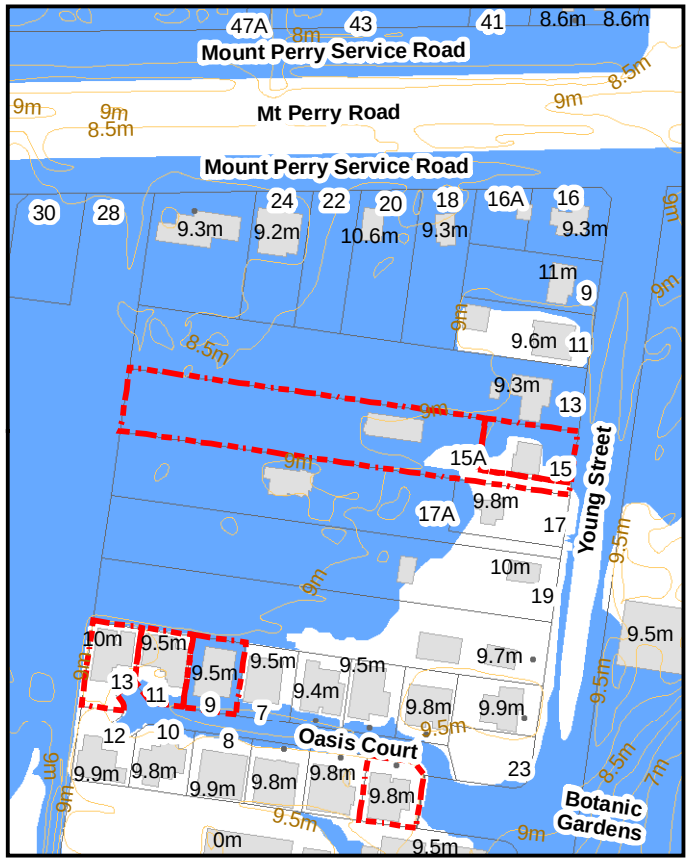
*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

## Previous Flood Hazard Area




## Aerial Photography

## New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 200

Meters

1:2,827

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

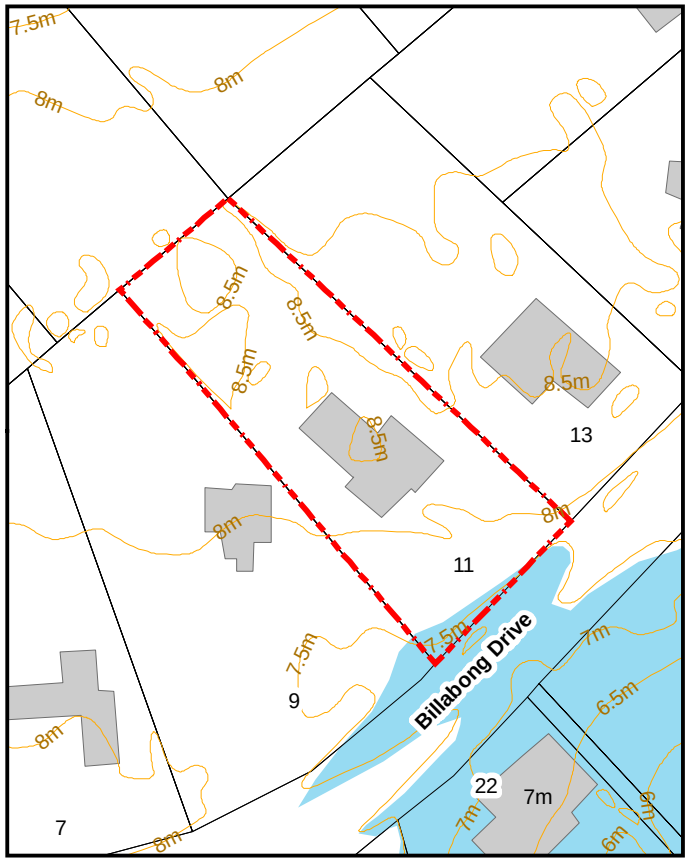
Property Address: *11 Billabong DR GOOBURRUM*

Plan/Lot: *RP225327/50*

**Details of change:**

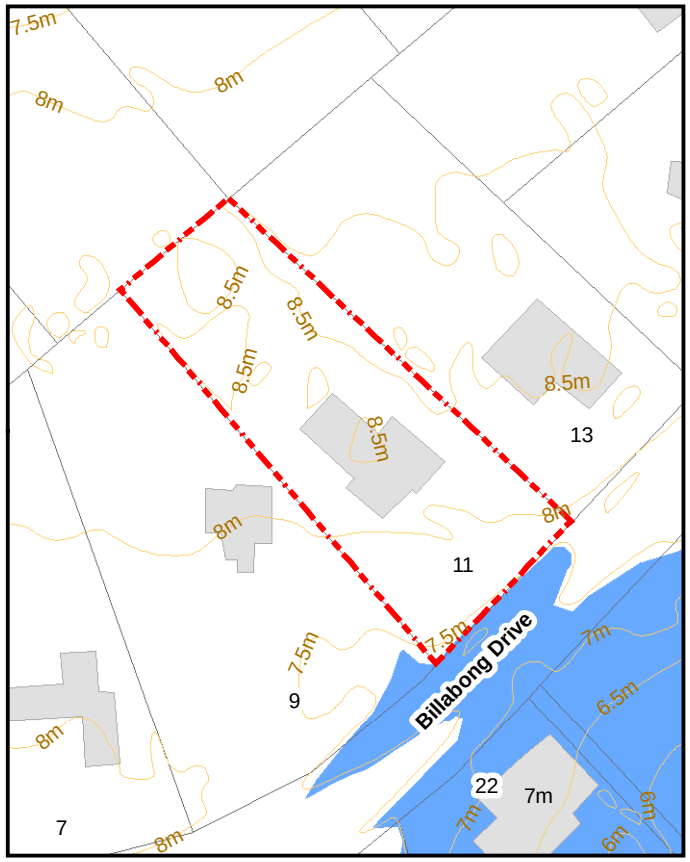
*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

**Previous Flood Hazard Area**




**Aerial Photography**

**New Flood Hazard Area**




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 — 120

Meters

1:1,690

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

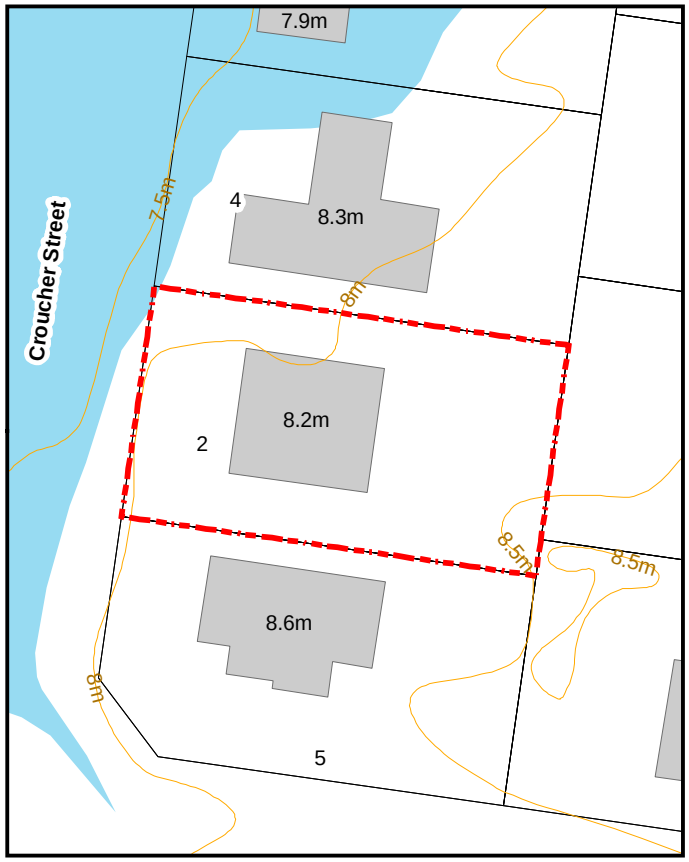
Property Address: *2 Croucher ST BUNDABERG NORTH*

Plan/Lot: *RP144840/43*

**Details of change:**

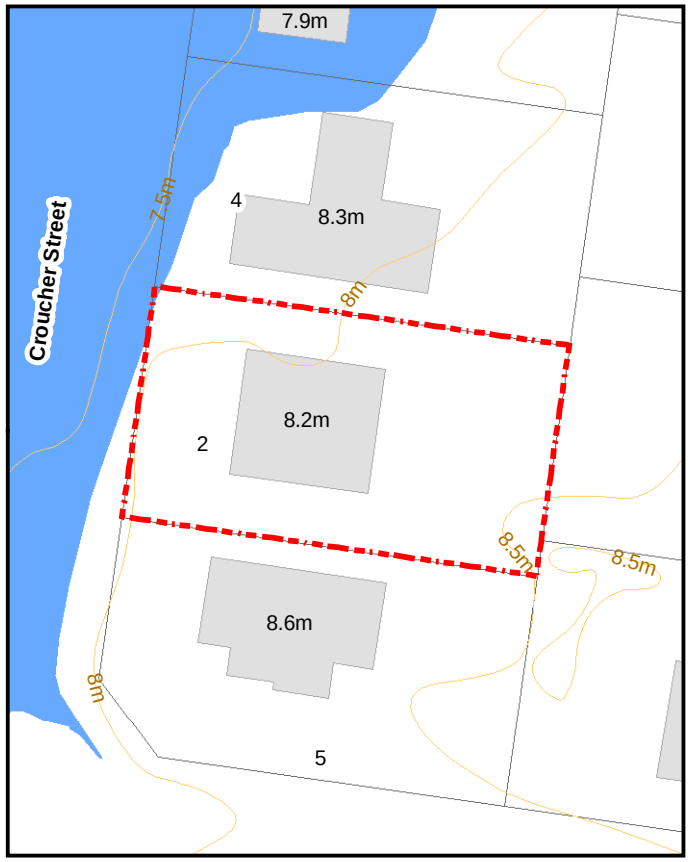
*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

### Previous Flood Hazard Area




### Aerial Photography

### New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 40

Meters

1:650

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

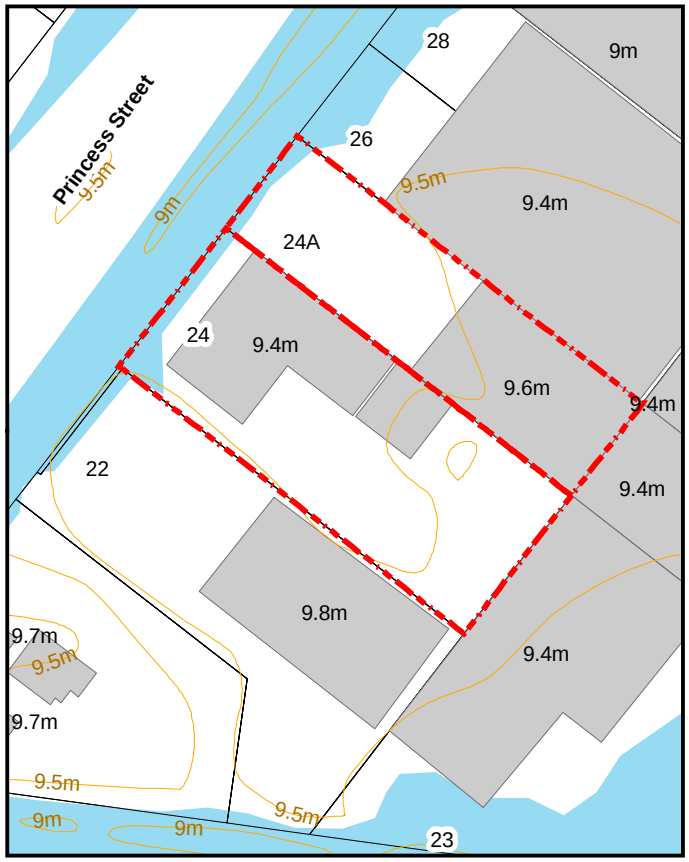
Property Address: *24 Princess ST BUNDABERG EAST*

Plan/Lot: *RP24812/3*

**Details of change:**

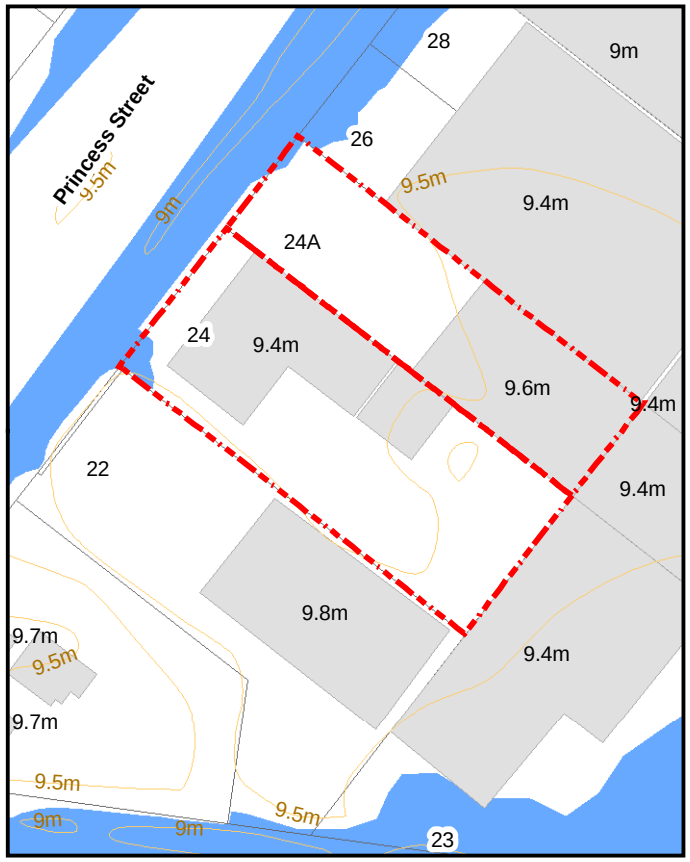
*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

## Previous Flood Hazard Area




## Aerial Photography

## New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 60

Meters

1:870

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

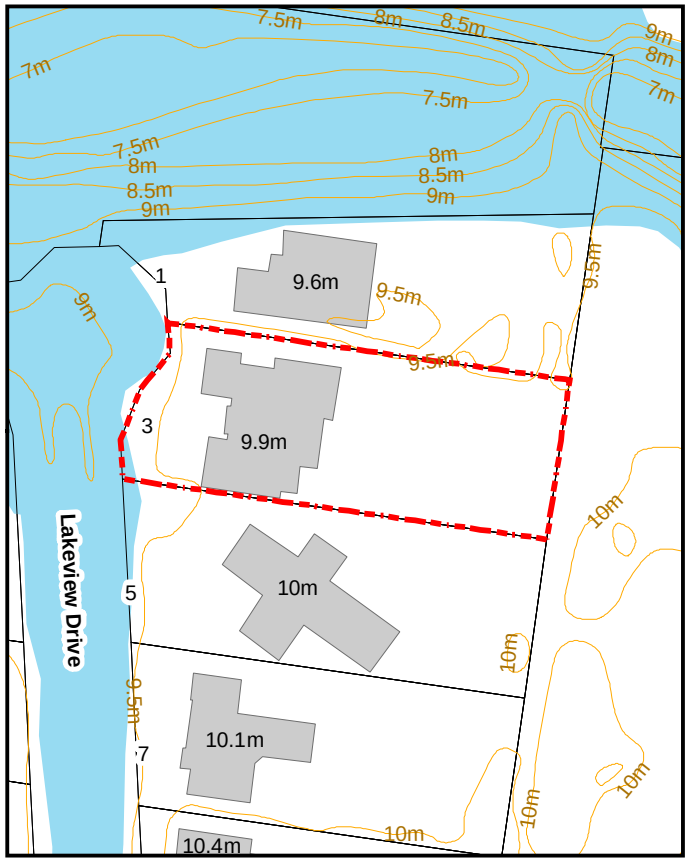
Property Address: *3 Lakeview DR BUNDABERG NORTH*

Plan/Lot: *SP123612/2*

**Details of change:**

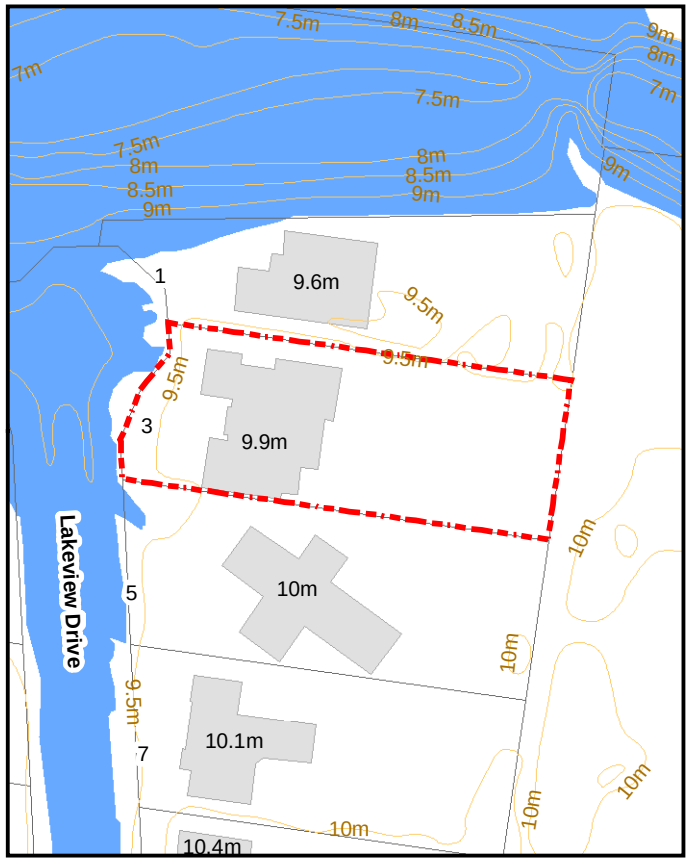
*Property removed from Flood Hazard Area and surrounding flood extent updated.*

## Previous Flood Hazard Area




## Aerial Photography

## New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 — 100

Meters

1:1,407

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

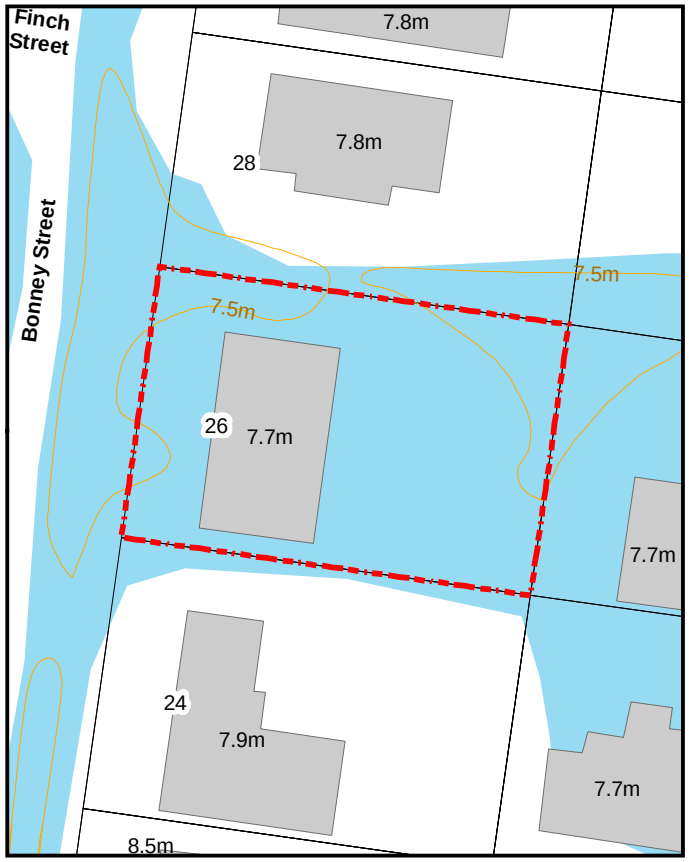
Property Address: *26 Bonney ST BUNDABERG NORTH*

Plan/Lot: *RP156180/9*

**Details of change:**

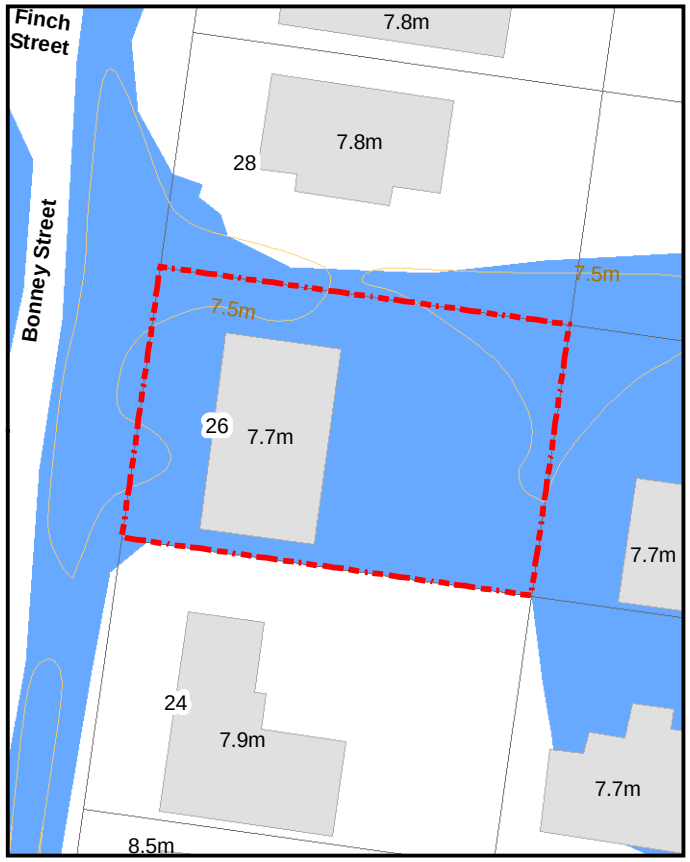
*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

## Previous Flood Hazard Area




## Aerial Photography

## New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 40

Meters

1:640

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

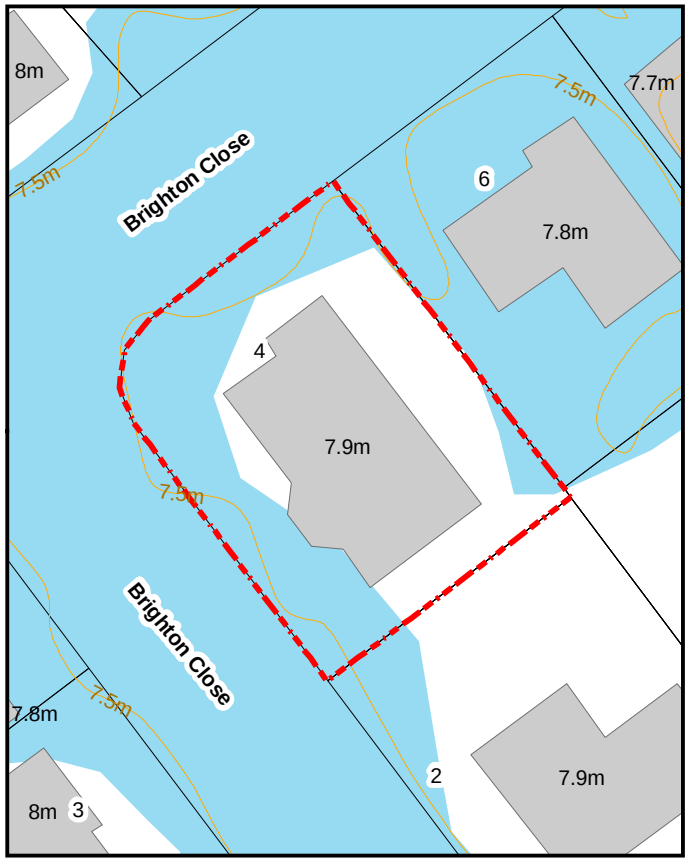
Property Address: *4 Brighton CL BUNDABERG NORTH*

Plan/Lot: *RP887360/61*

**Details of change:**

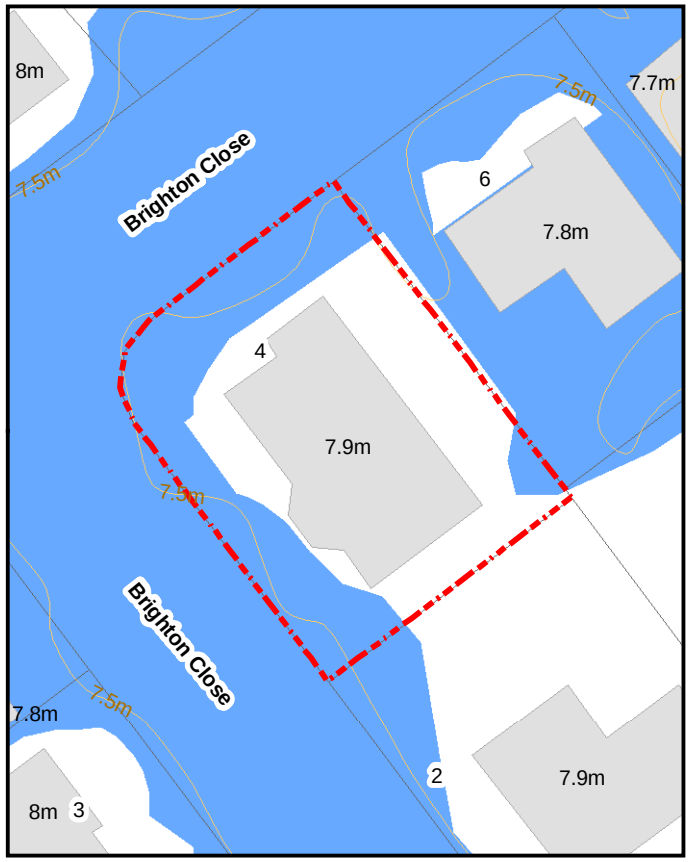
*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

## Previous Flood Hazard Area




## Aerial Photography

## New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 40

Meters

1:620

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

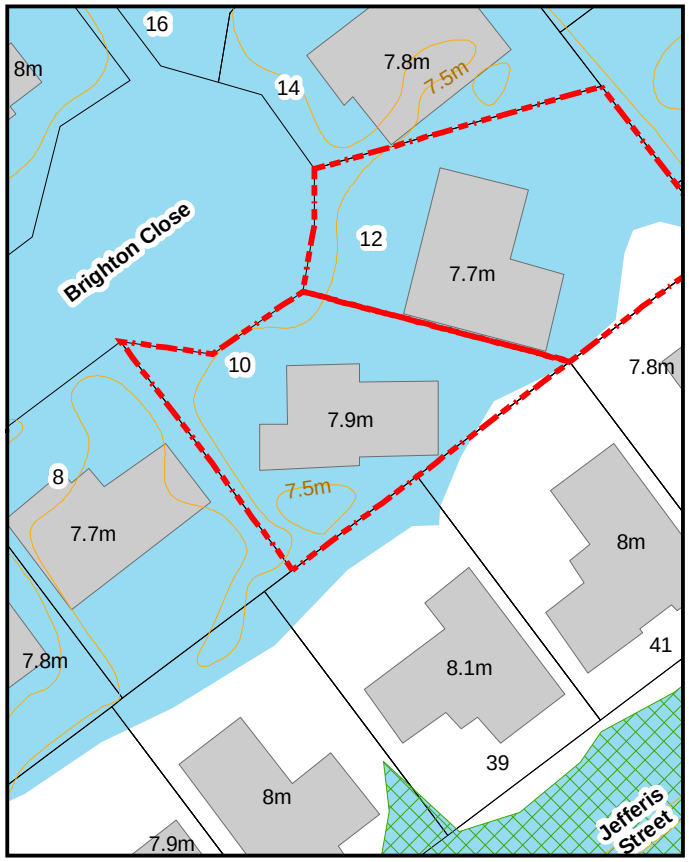
Property Address: *10 Brighton CL BUNDABERG NORTH*

Plan/Lot: *RP887360/58*

**Details of change:**

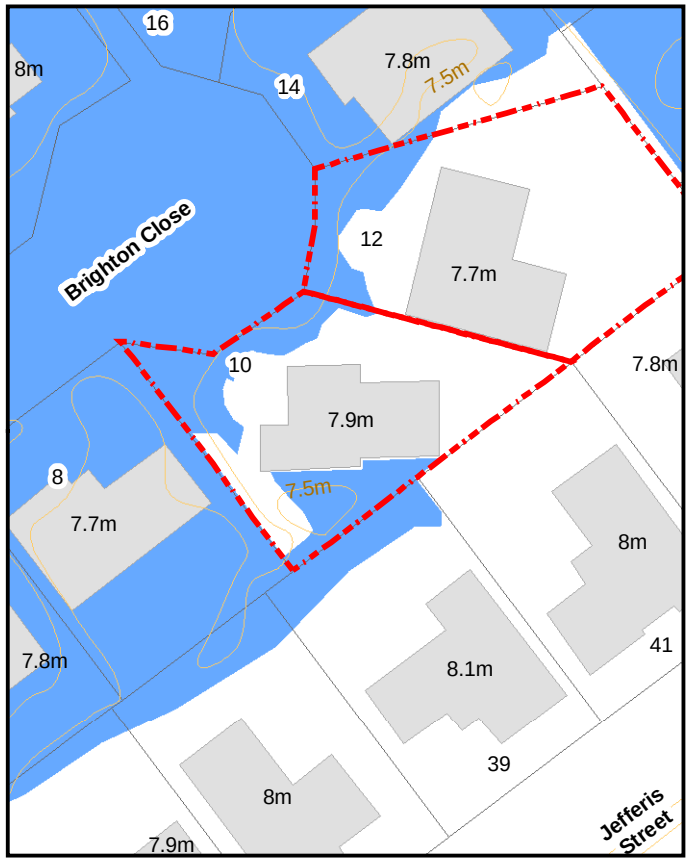
*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

### Previous Flood Hazard Area




### Aerial Photography

### New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 50

Meters

1:829

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

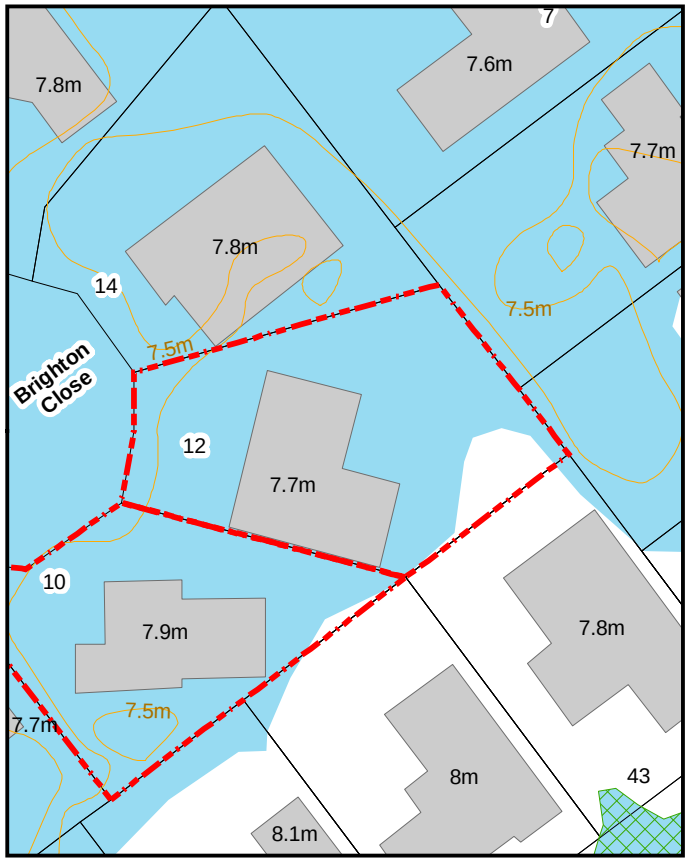
Property Address: *12 Brighton CL BUNDABERG NORTH*

Plan/Lot: *RP887360/57*

**Details of change:**

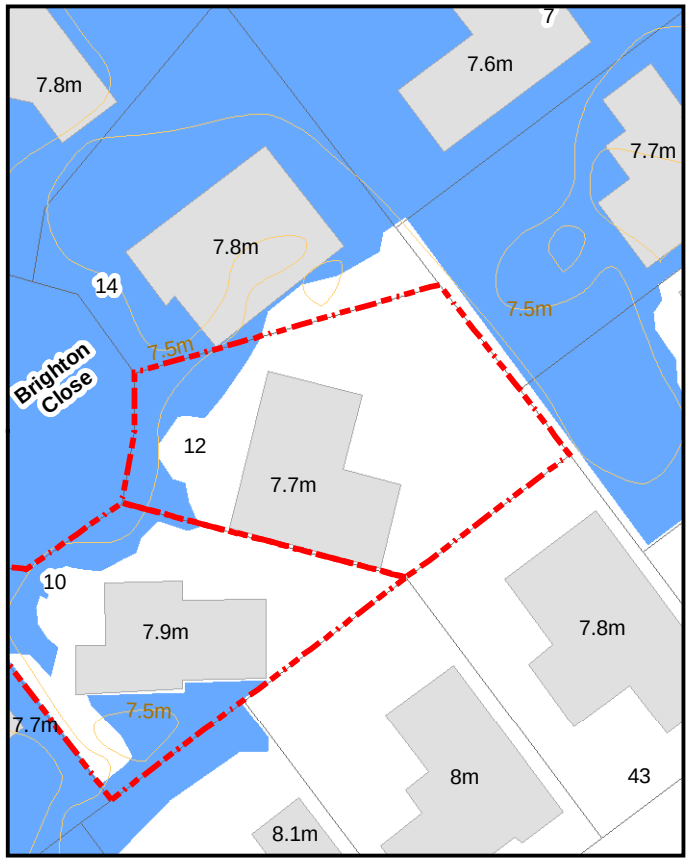
*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

### Previous Flood Hazard Area




### Aerial Photography

### New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 50

Meters

1:780

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

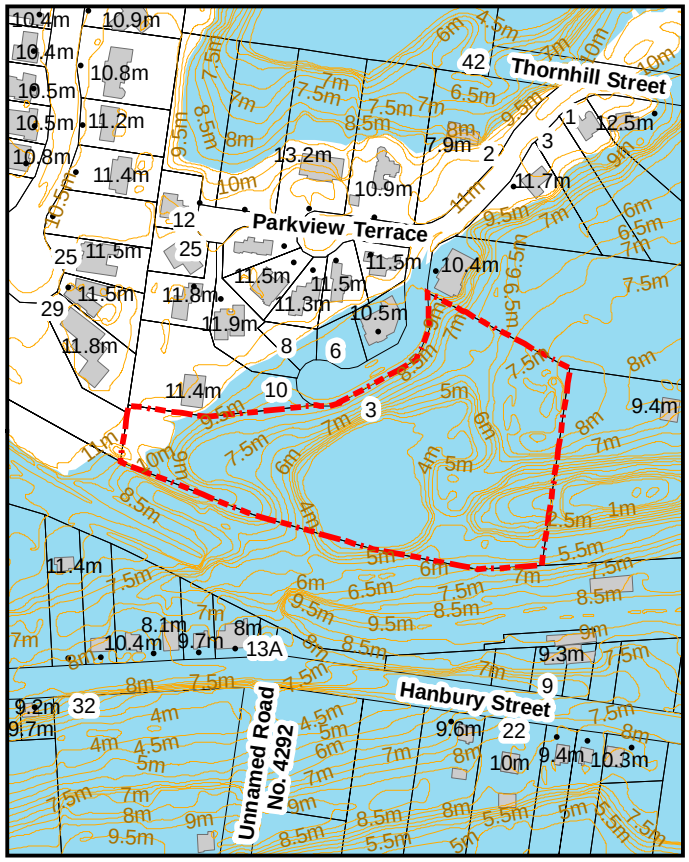
Property Address: *3 Rosewood PL BUNDABERG NORTH*

Plan/Lot: *SP243445/6*

**Details of change:**

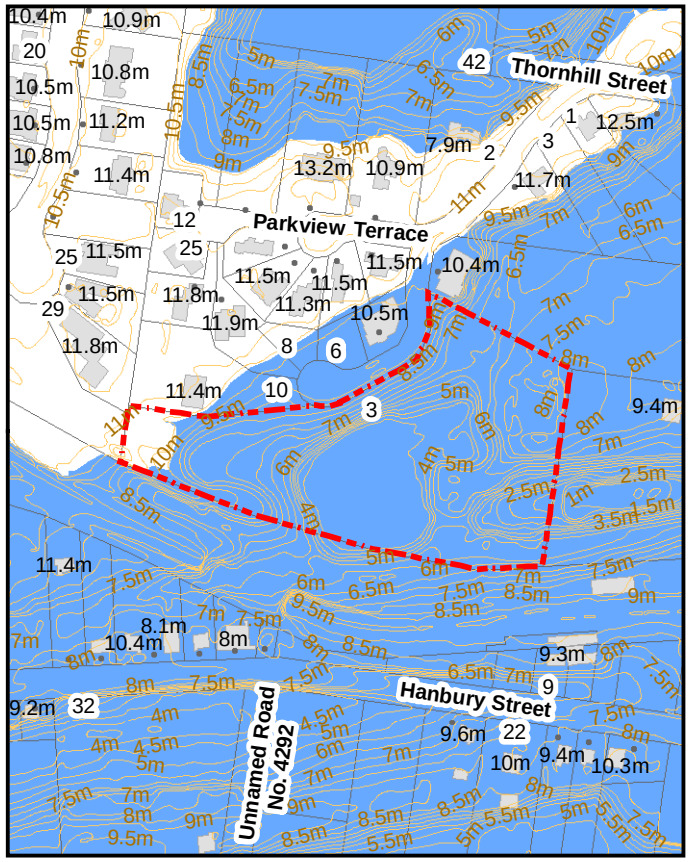
*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

## Previous Flood Hazard Area




## Aerial Photography

## New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 350

Meters

1:4,936

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

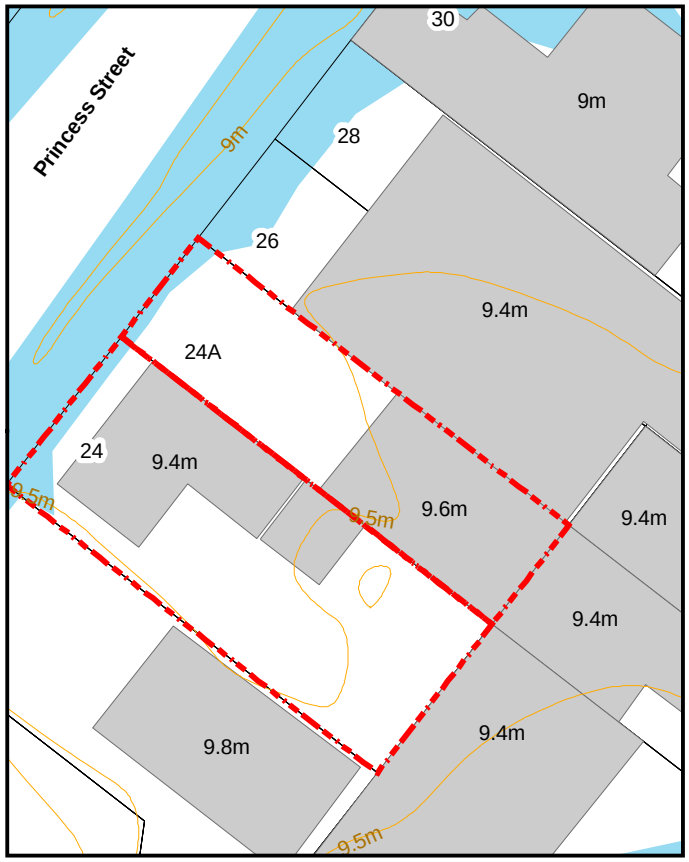
Property Address: *24A Princess ST BUNDABERG EAST*

Plan/Lot: *RP142861/1*

**Details of change:**

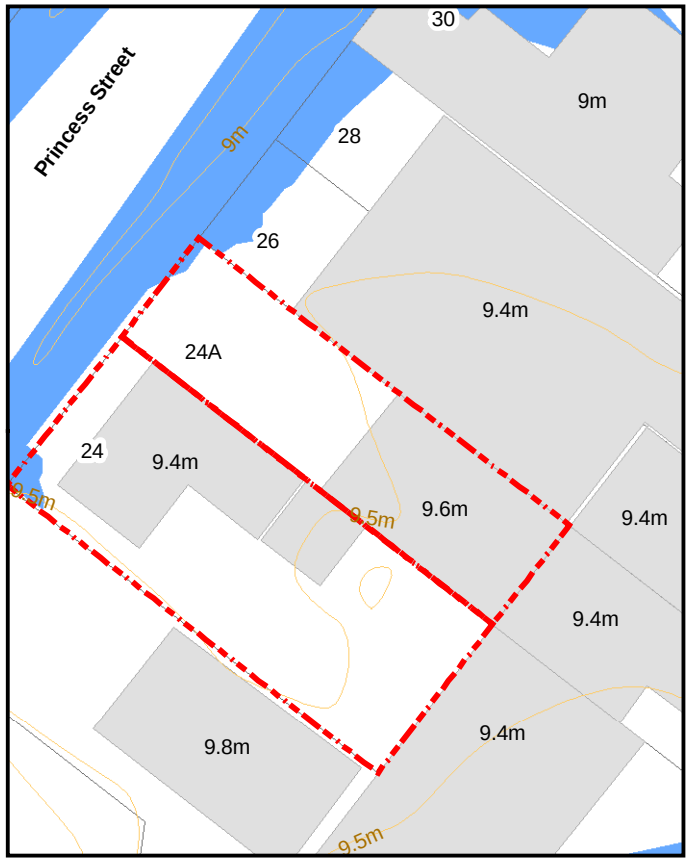
*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

## Previous Flood Hazard Area




## Aerial Photography

## New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 — 50

Meters

1:810

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

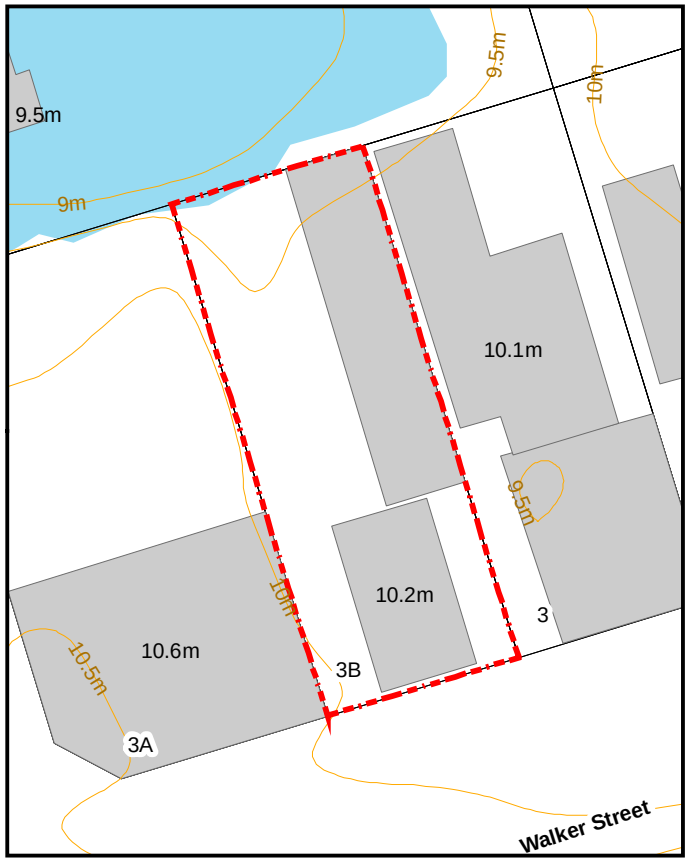
Property Address: *3B Walker ST BUNDABERG SOUTH*

Plan/Lot: *RP101773/2*

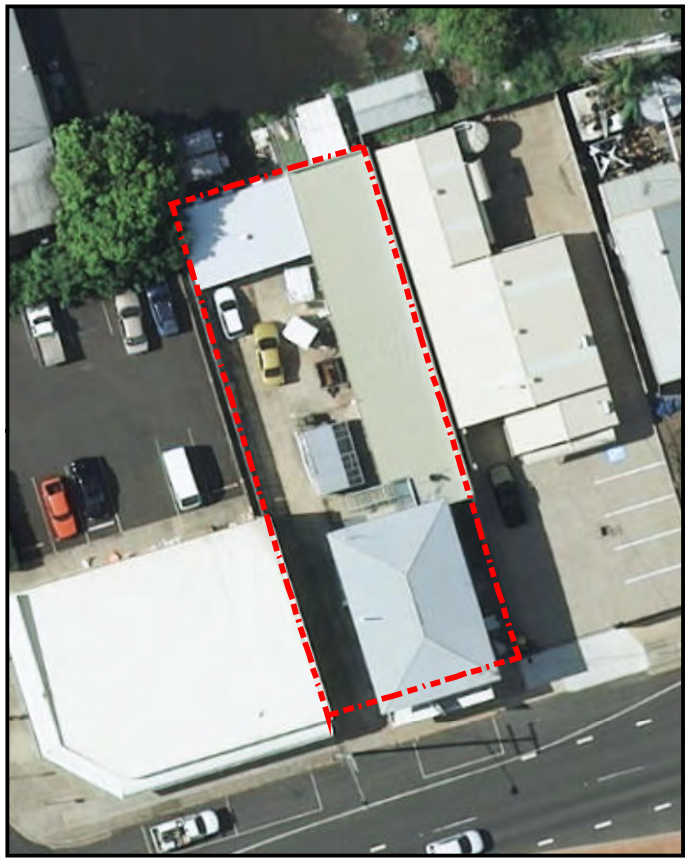
**Details of change:**

*Property removed from Flood Hazard Area and surrounding flood extent updated.*

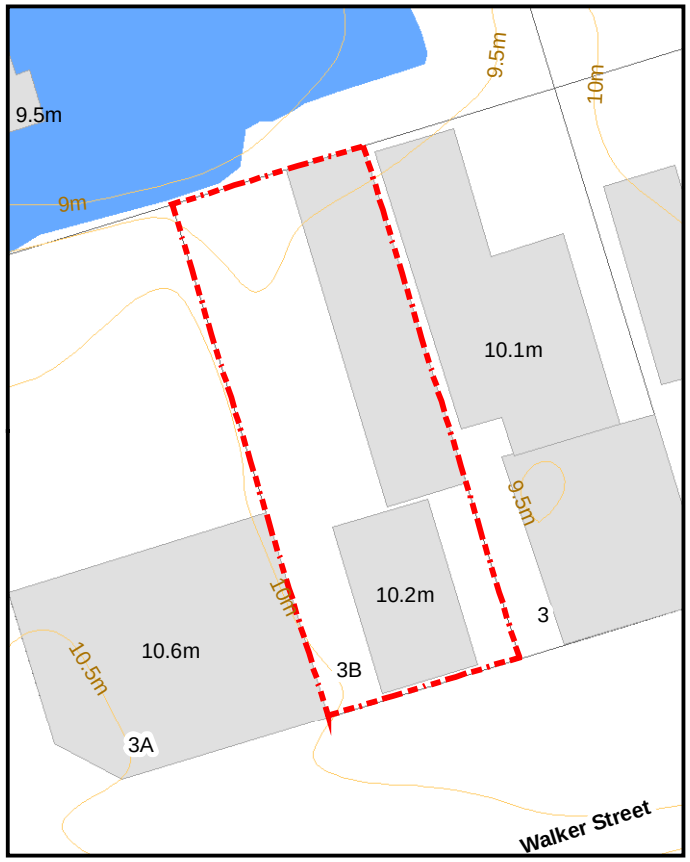
## Previous Flood Hazard Area




## Aerial Photography



## New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 40

Meters

1:570

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

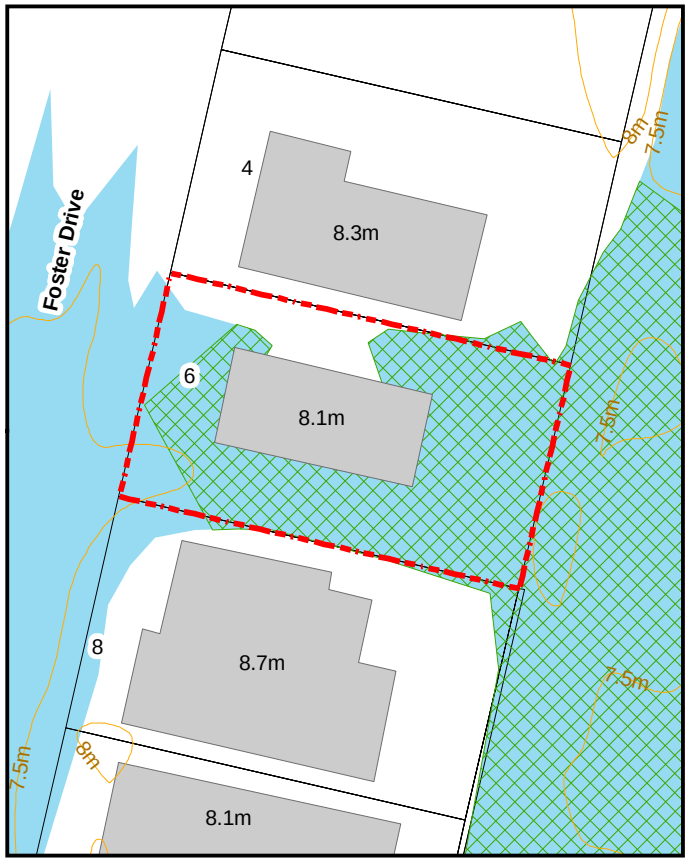
Property Address: *6 Foster DR BUNDABERG NORTH*

Plan/Lot: *SP235155/89*

**Details of change:**

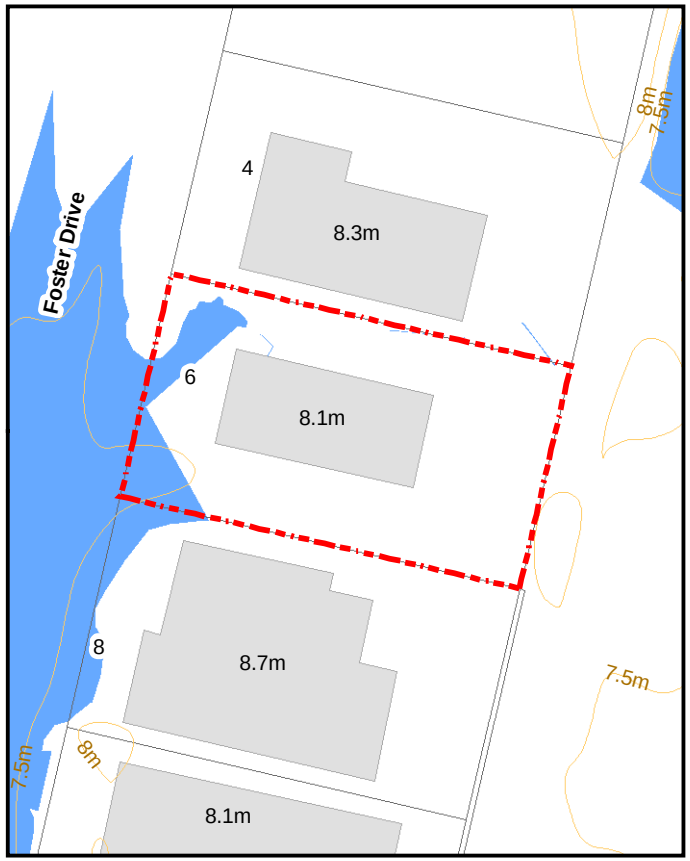
*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

## Previous Flood Hazard Area




## Aerial Photography

## New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 40

Meters

1:692

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

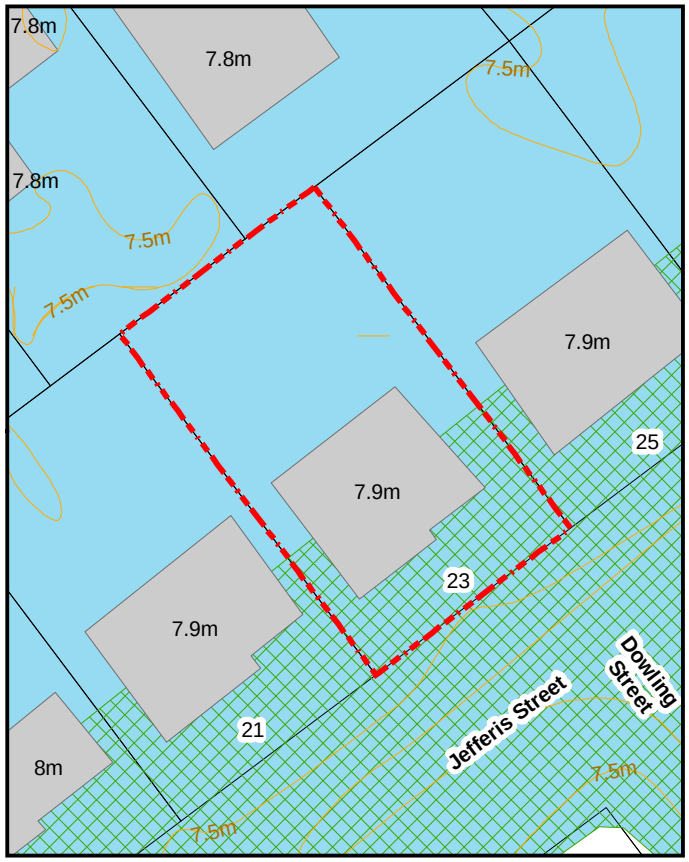
Property Address: *23 Jefferis ST BUNDABERG NORTH*

Plan/Lot: *RP835541/43*

**Details of change:**

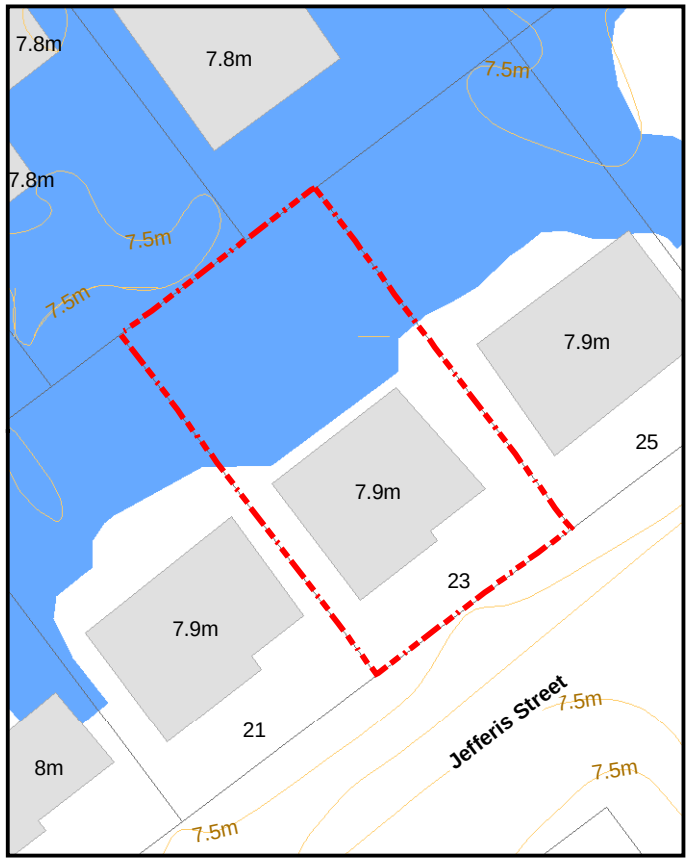
*Minor changes made to the flood extent but property remained in Flood Hazard Area.*

## Previous Flood Hazard Area




## Aerial Photography

## New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 40

Meters

1:621

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

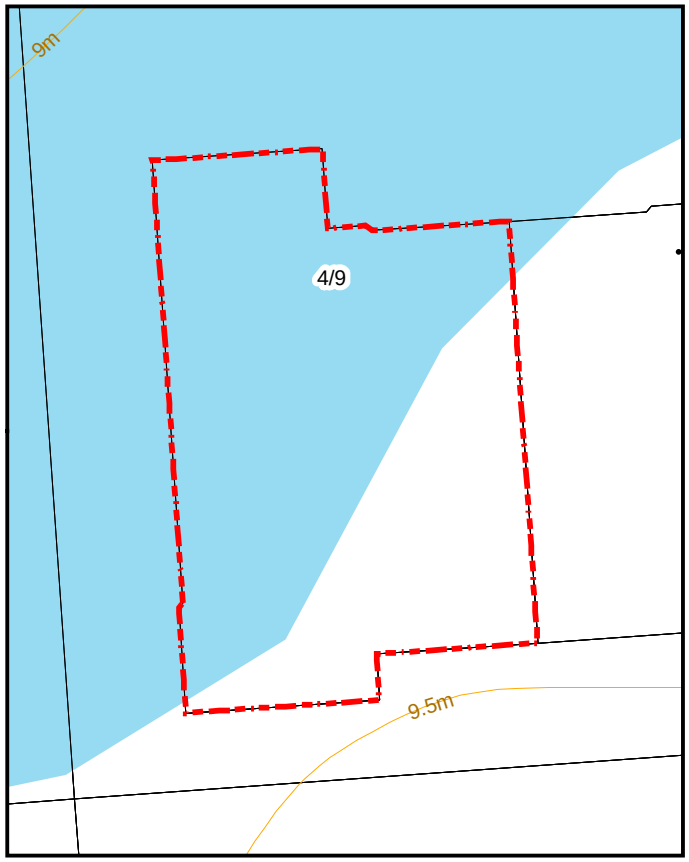
Property Address: *4/9 Robert ST BUNDABERG SOUTH*

Plan/Lot: *SP243476/4*

**Details of change:**

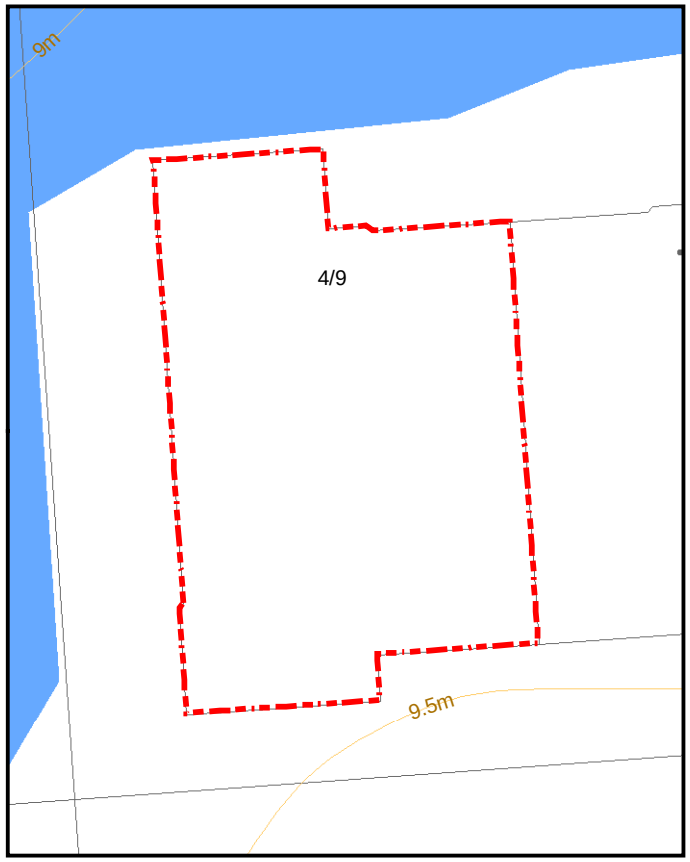
*Unit building removed from Flood Hazard Area and surrounding flood extent updated.*

**Previous Flood Hazard Area**




**Aerial Photography**

**New Flood Hazard Area**




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 10

Meters

1:190

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

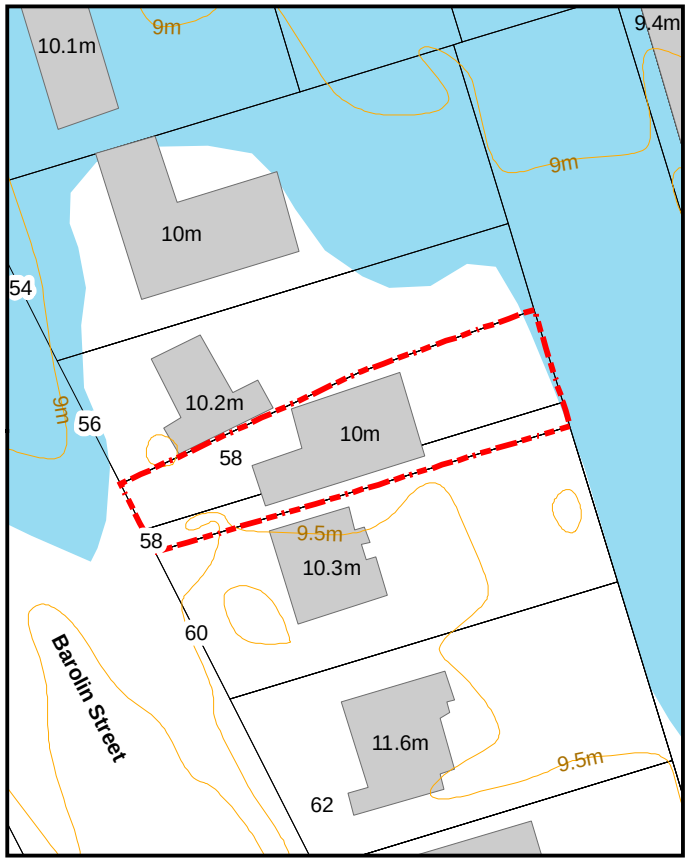
Property Address: *58 Barolin ST BUNDABERG SOUTH*

Plan/Lot: *RP340/1*

**Details of change:**

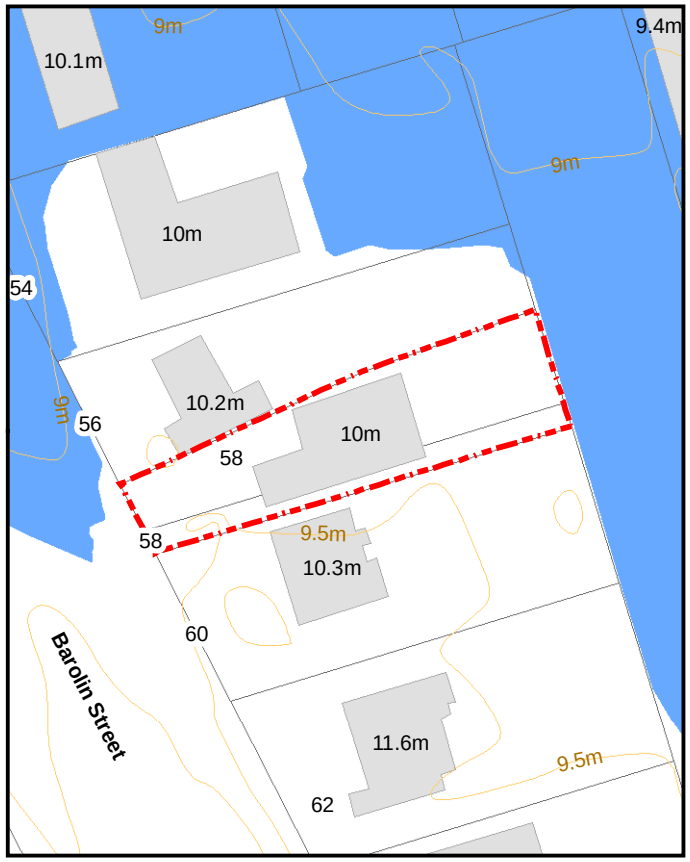
*Property removed from Flood Hazard Area and surrounding flood extent updated.*

## Previous Flood Hazard Area




## Aerial Photography

## New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 60

Meters

1:899

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

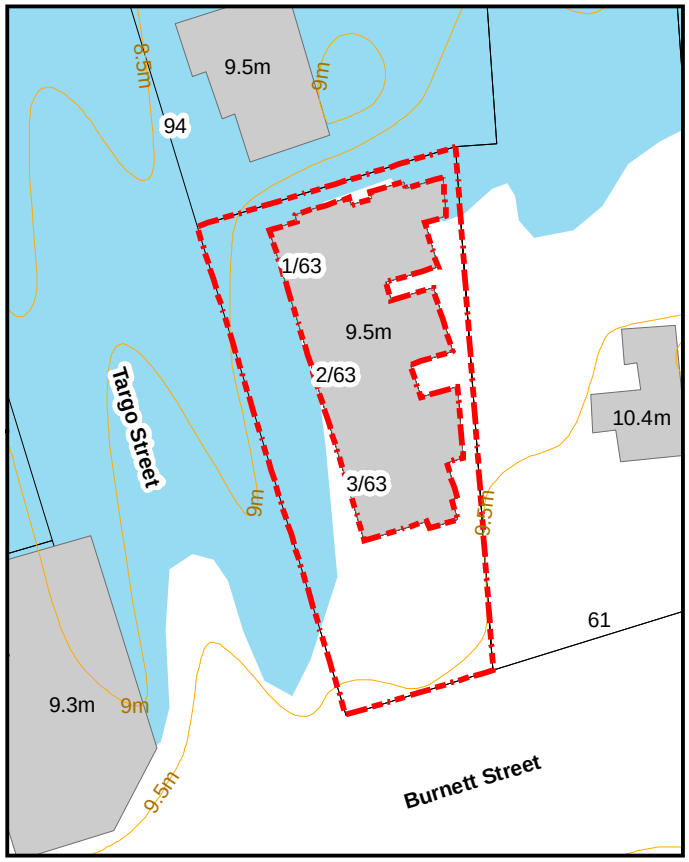
Property Address: *63 Burnett ST BUNDABERG SOUTH*

Plan/Lot: *SP212185/0*

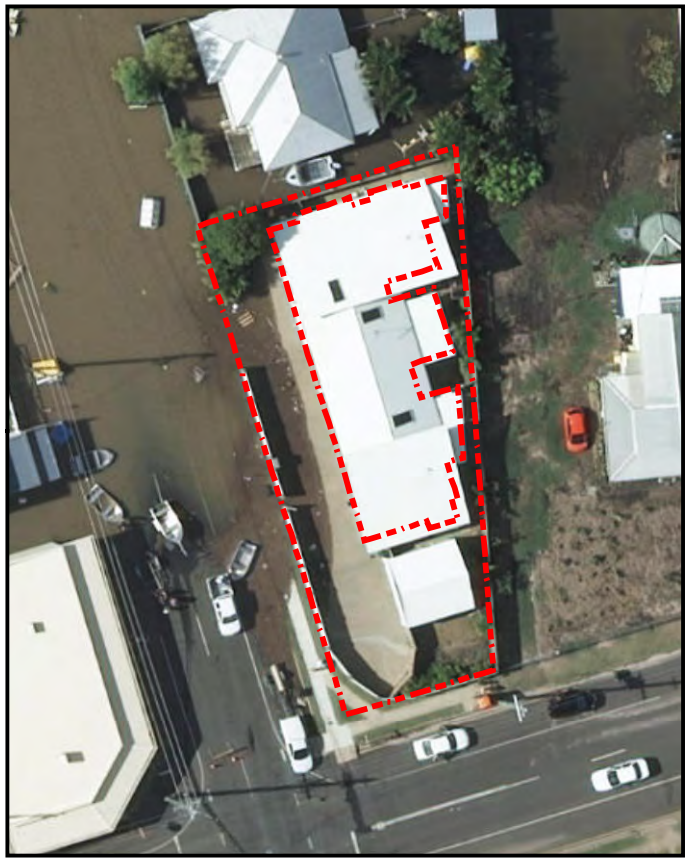
**Details of change:**

*Unit building removed from Flood Hazard Area and surrounding flood extent updated.*

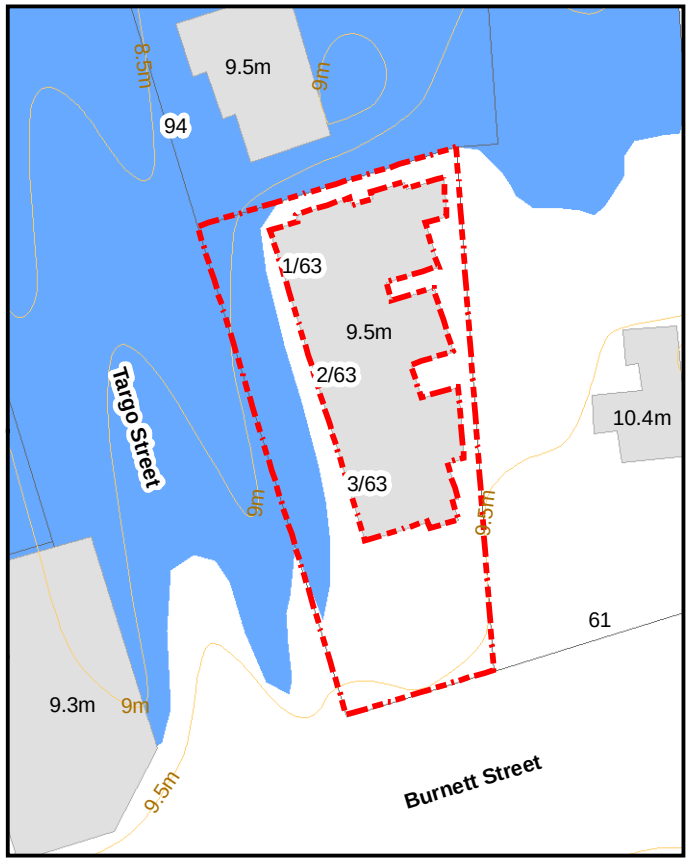
## Previous Flood Hazard Area




## Aerial Photography



## New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 40

Meters

1:660

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

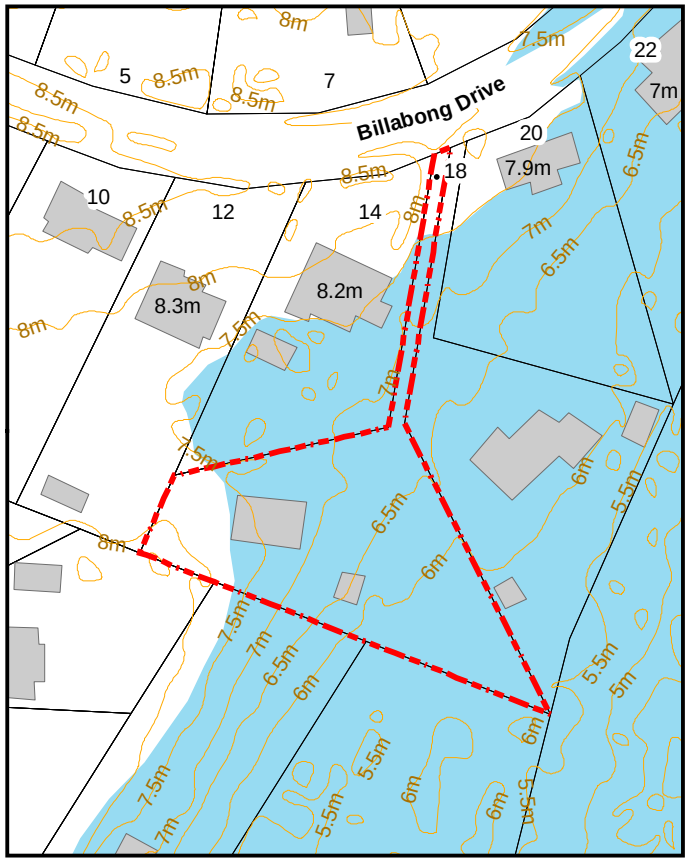
Property Address: *16 Billabong DR GOOBURRUM*

Plan/Lot: *RP225326/33*

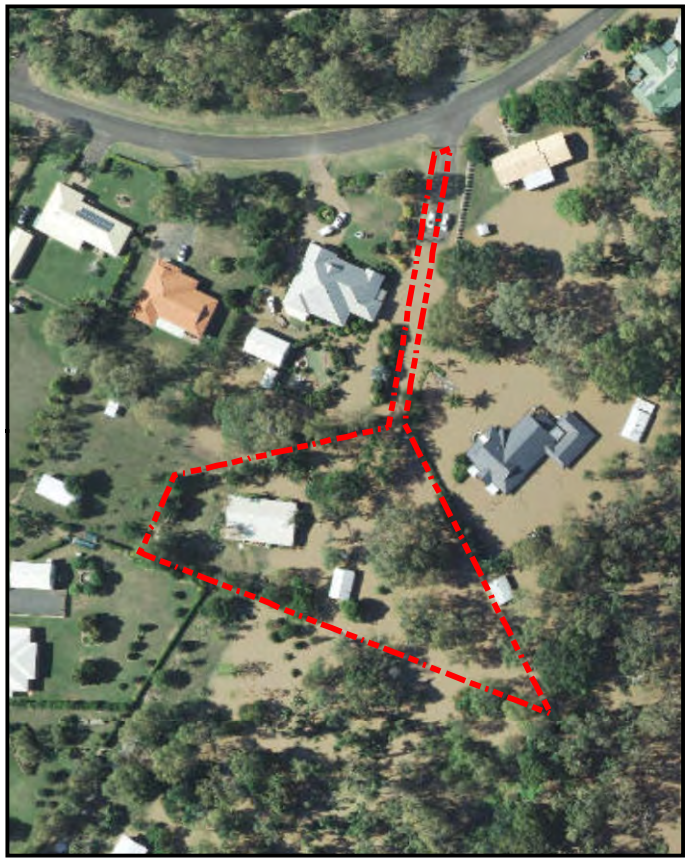
**Details of change:**

*Building footprint removed from Flood Hazard Area and surrounding flood extent updated.*

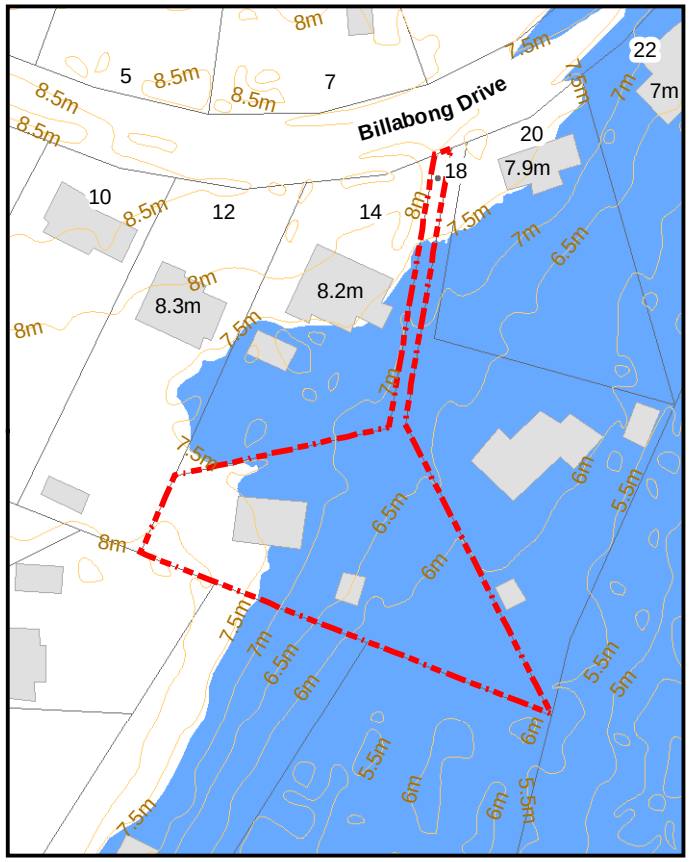
## Previous Flood Hazard Area




## Aerial Photography



## New Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Investigation Property
- Flood Mitigation Area
- Previous Flood Hazard Area
- New Flood Hazard Area

N

0 160

Meters

1:2,283

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

The following changes were
made with Resolution
1/2017

**Property Details:**

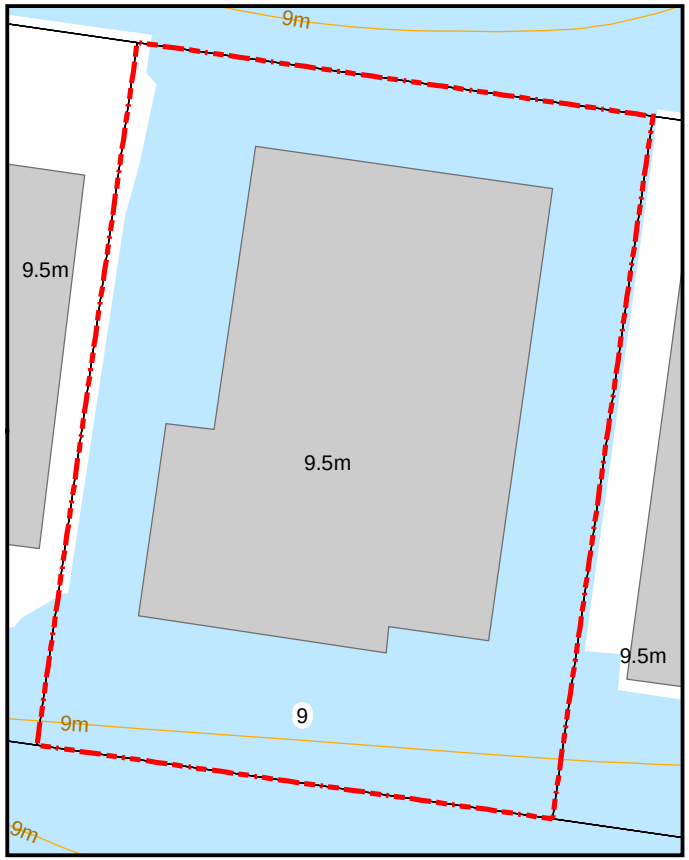
Property Address: *9 Oasis CT BUNDABERG NORTH*

Plan/Lot: *SP199355/7*

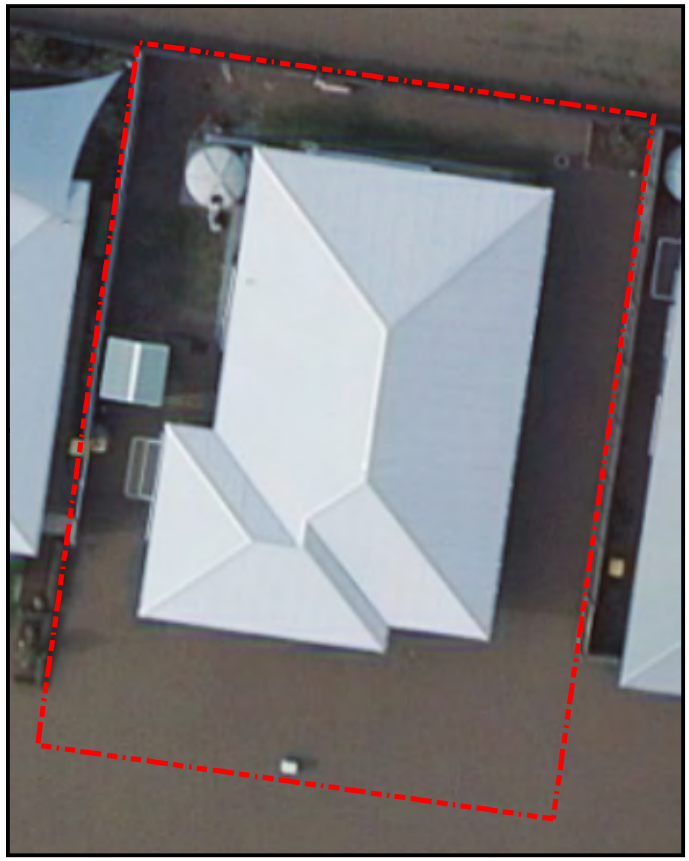
**Recommendation:**

*Property to remain in Flood Hazard Area - update flood extent around building*

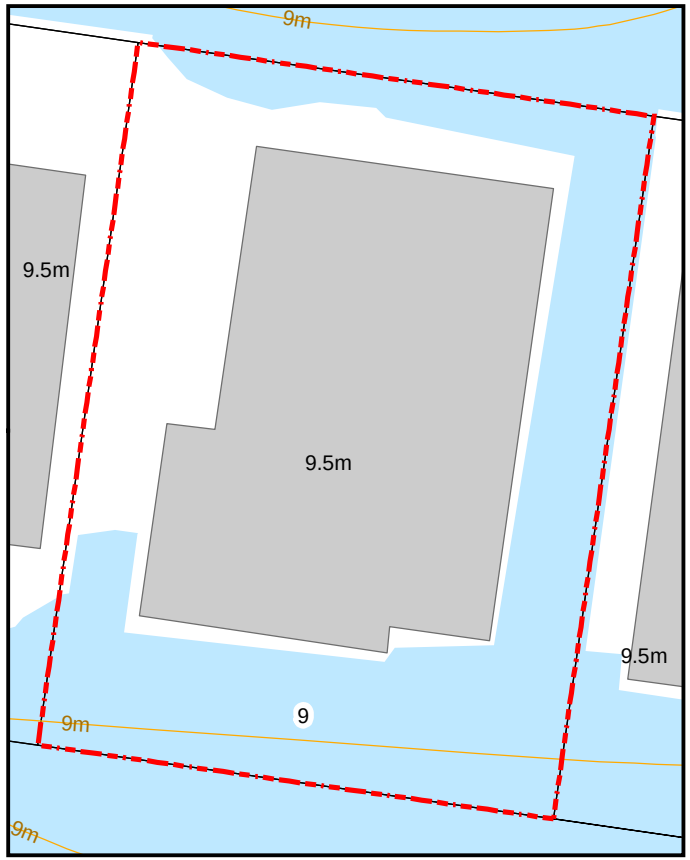
## Current Flood Hazard Area




## Aerial Photography



## Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 20

Meters

1:291

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

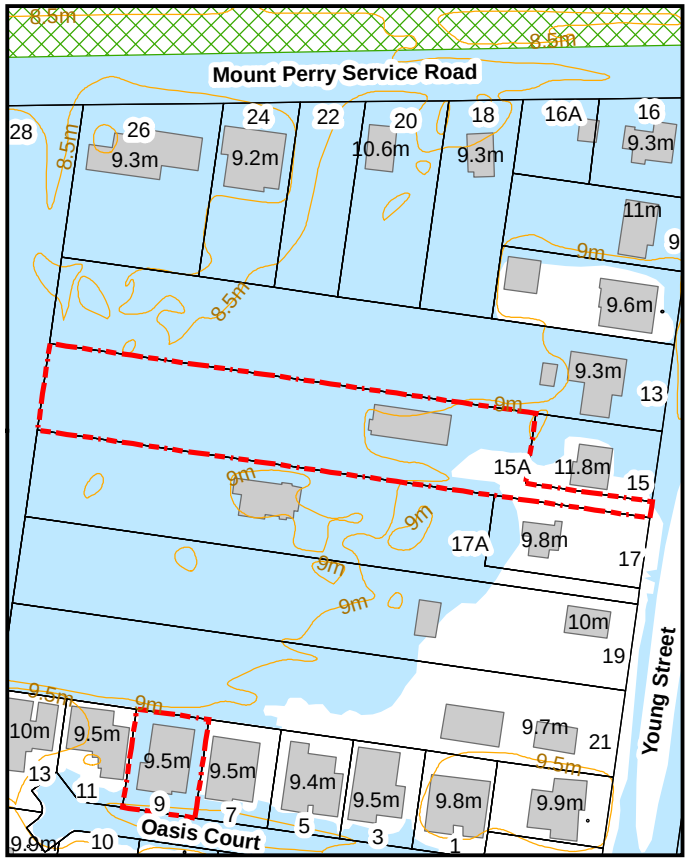
Property Address: *15A Young ST BUNDABERG NORTH*

Plan/Lot: *SP171459/30*

**Recommendation:**

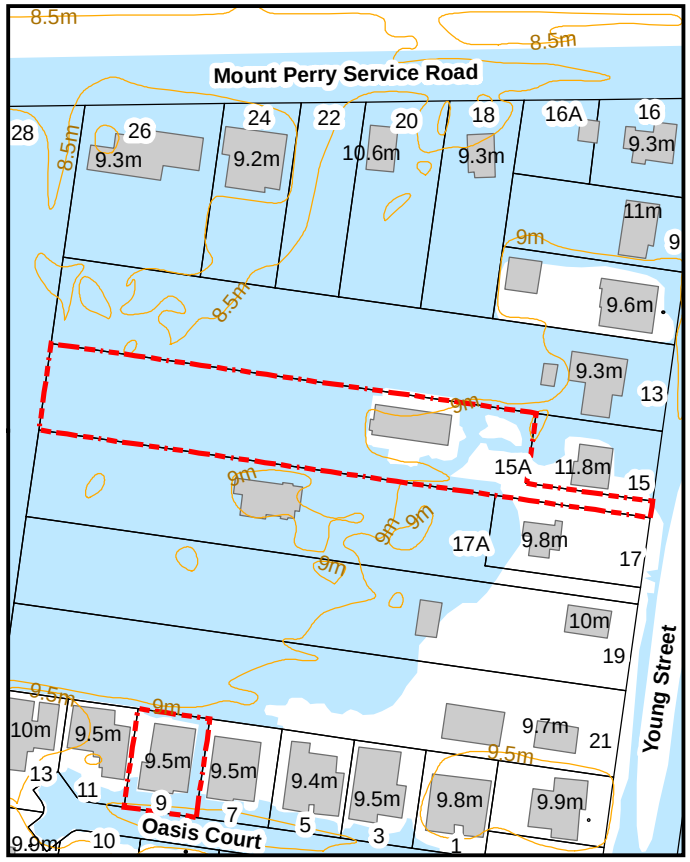
*Property to remain in Flood Hazard Area - update flood extent around building*

## Current Flood Hazard Area




## Aerial Photography

## Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 — 140

Meters

1:2,077

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

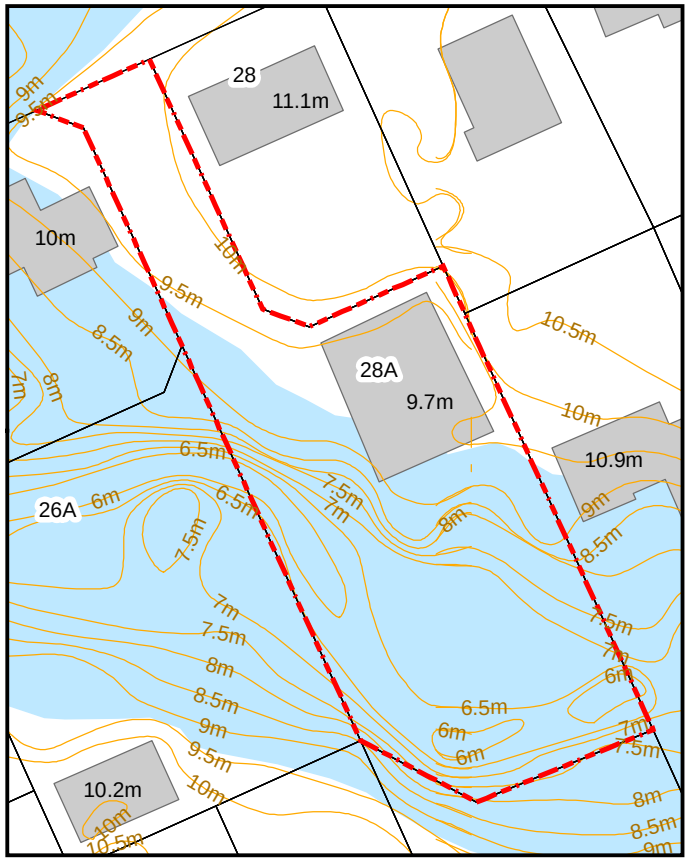
Property Address: *28A FE Walker ST KEPNOCK*

Plan/Lot: *RP179917/2*

**Recommendation:**

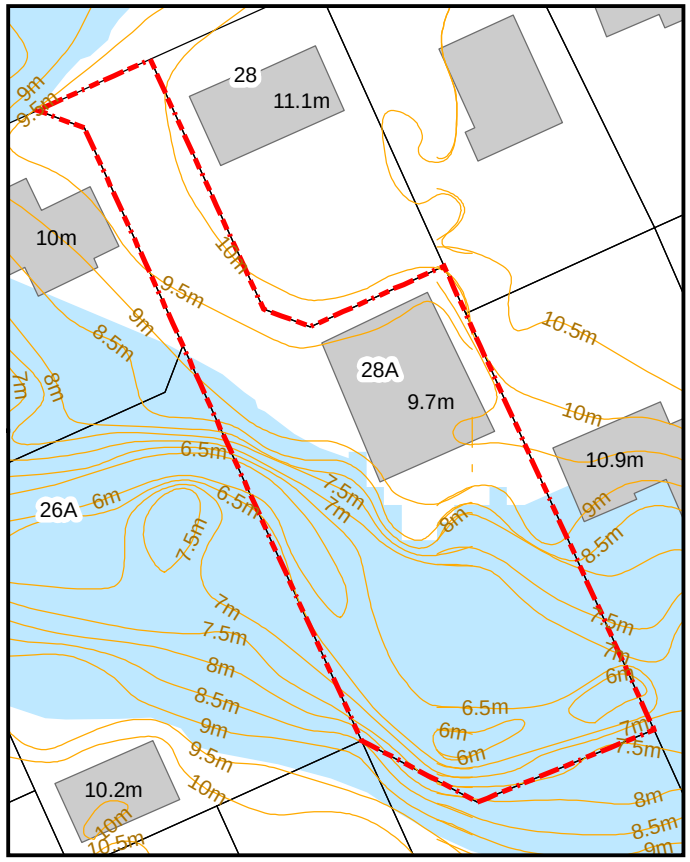
*Update flood extent to match aerial photography. Note: Local flood still affects property too.*

## Current Flood Hazard Area




## Aerial Photography

## Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 — 60

Meters

1:861

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Property Details:**

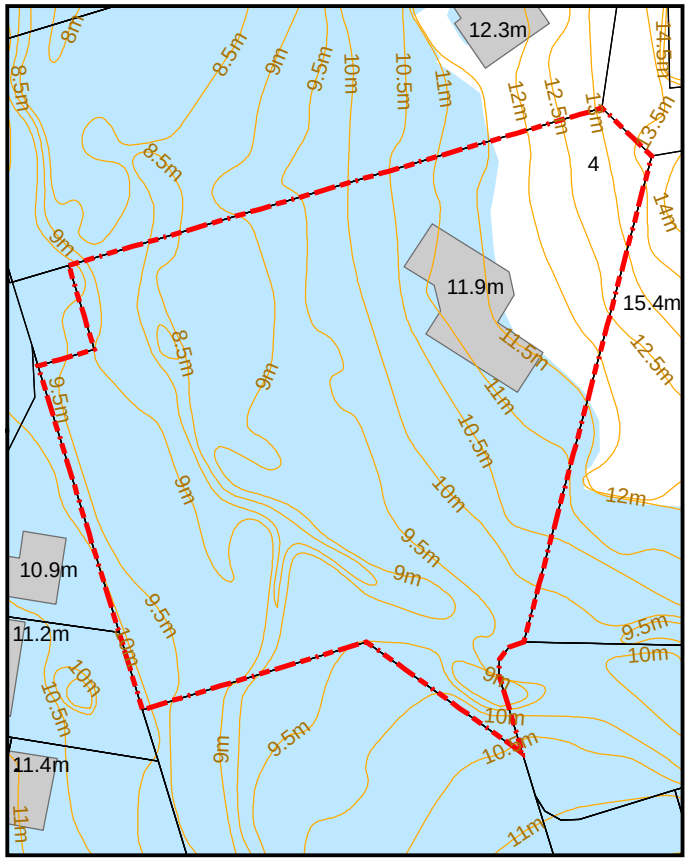
Property Address: *4 Bellwood LANE MILLBANK*

Plan/Lot: *RP228976/4*

**Recommendation:**

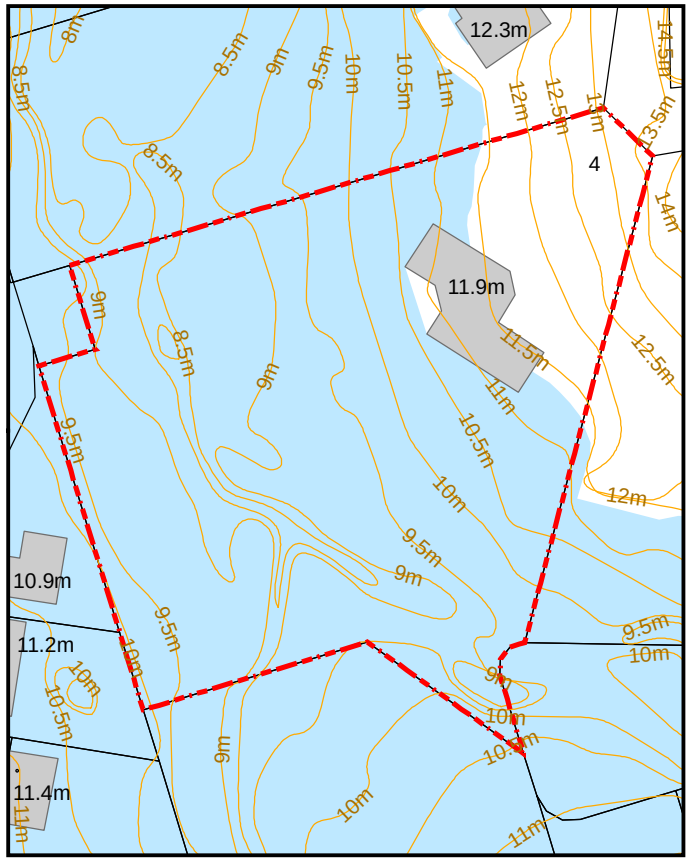
*Update flood extent to match aerial photography.*

## Current Flood Hazard Area




## Aerial Photography

## Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 — 90

Meters

1:1,292

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

The following changes were
made with Resolution
1/2018

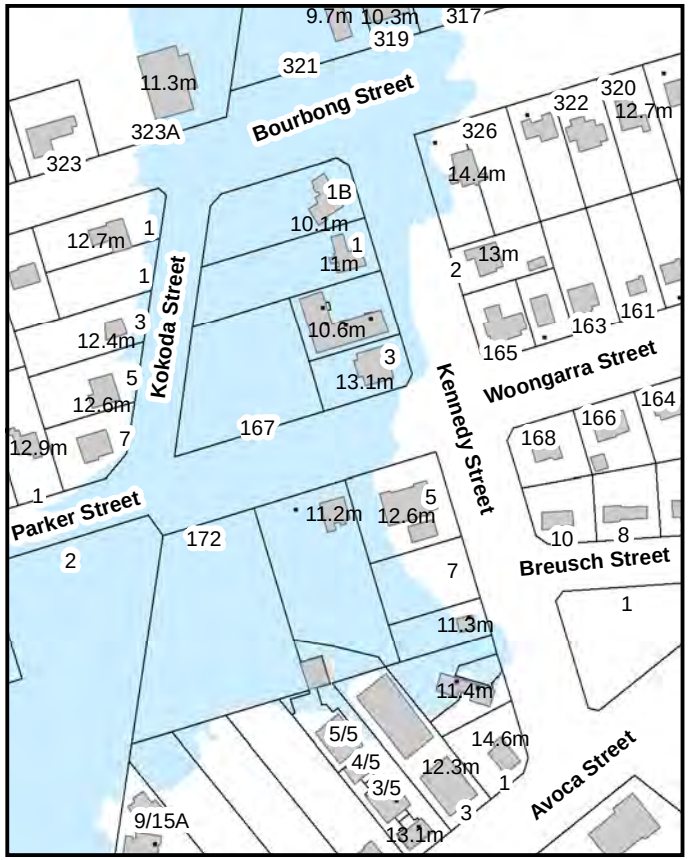
## Proposed Change Details:

Reason for Change: Current Flood Hazard Area is inconsistent with Council's 2013 flood aerial photography.
Council Reference: Objective A3711987

## Description:

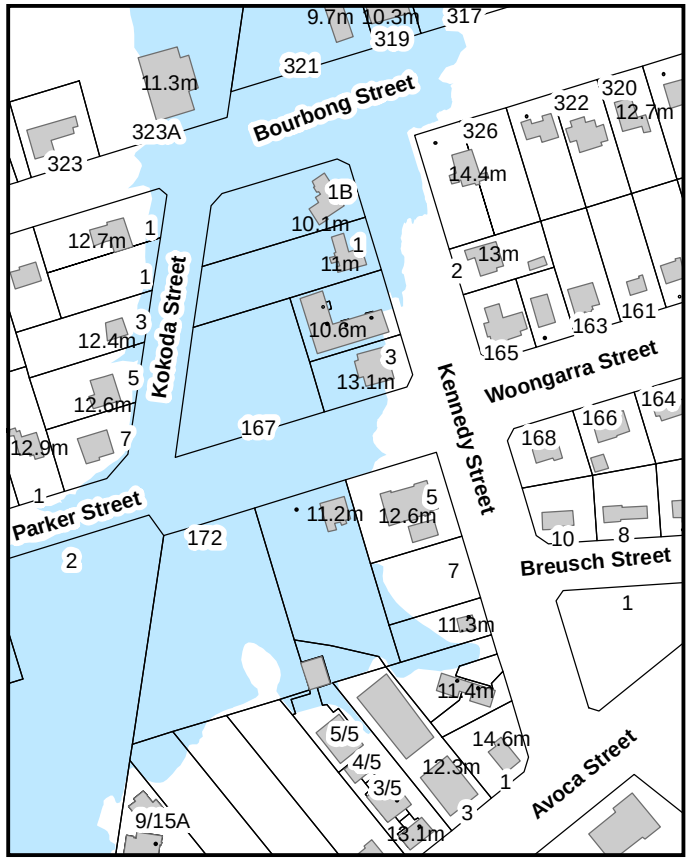
The Burnett River 2013 flood extent in Kennedy Street has been updated to match Council's 2013 flood aerial photography.

### Current Flood Hazard Area




### Flood Aerial Photography (2013)

### Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 — 225

Meters

1:3,200

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

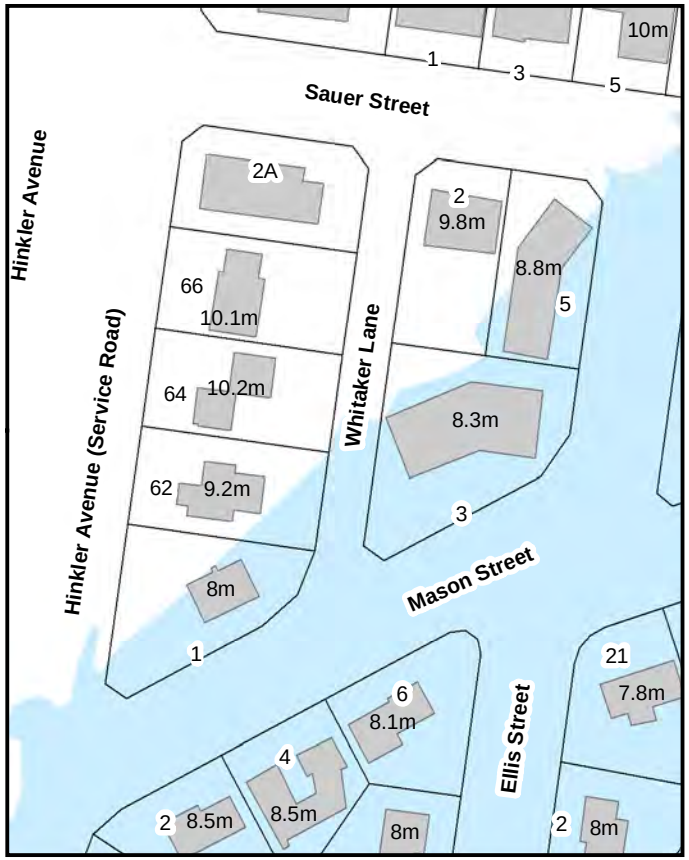
## Proposed Change Details:

Reason for Change: Current Flood Hazard Area is inconsistent with Council's 2013 flood aerial photography.
Council Reference: Objective A3437212

## Description:

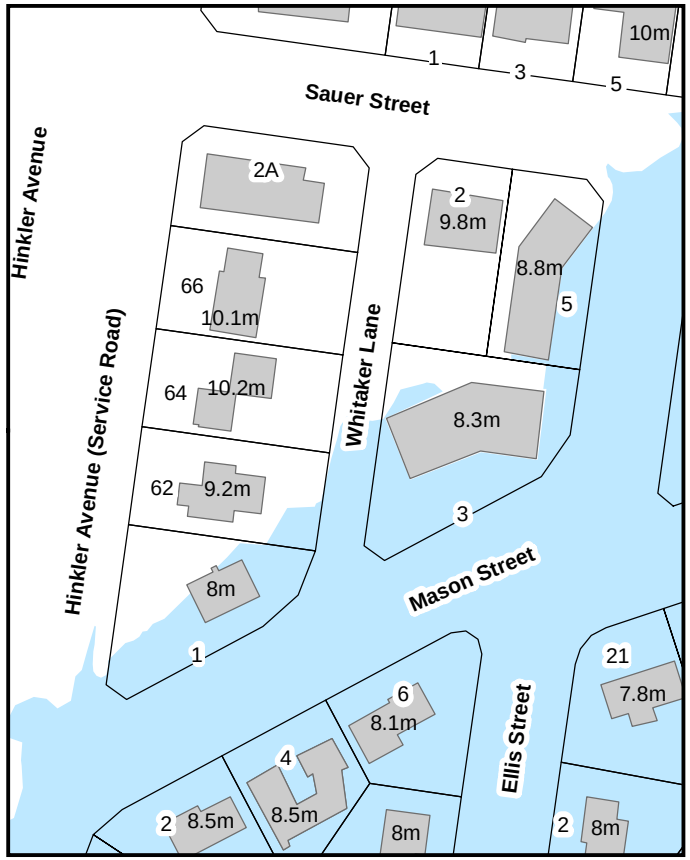
The Burnett River 2013 flood extent in Whitaker Lane and Mason Street has been updated to match Council's 2013 flood aerial photography.

### Current Flood Hazard Area




### Flood Aerial Photography (2013)

### Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 — 110

Meters

1:1,612

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

The following changes were
made with Resolution
1/2019

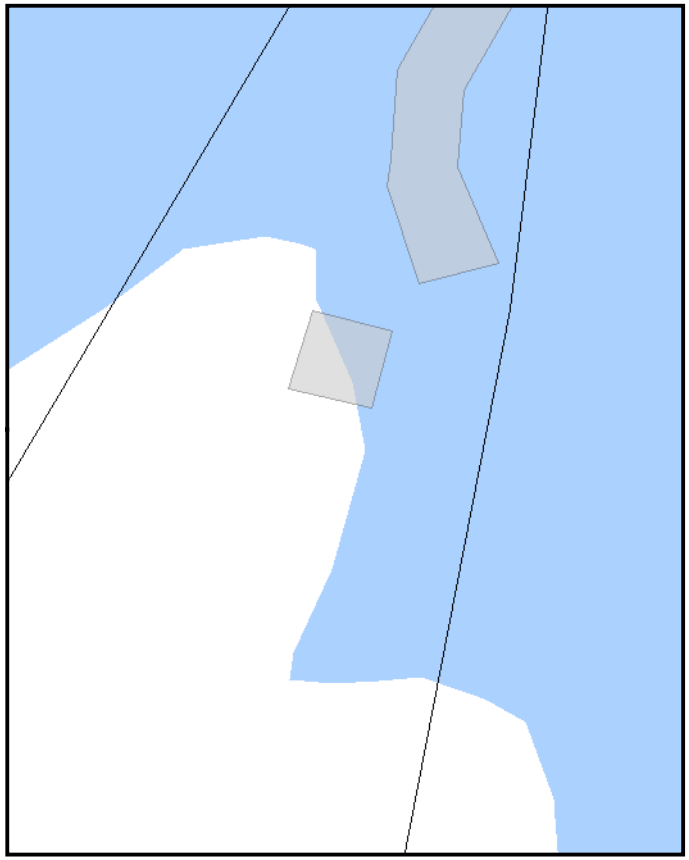
**Proposed Change Details:**

Reason for Change: Flood Hazard Area is different to flood aerial photography
Council Reference: A4876405

**Description:**

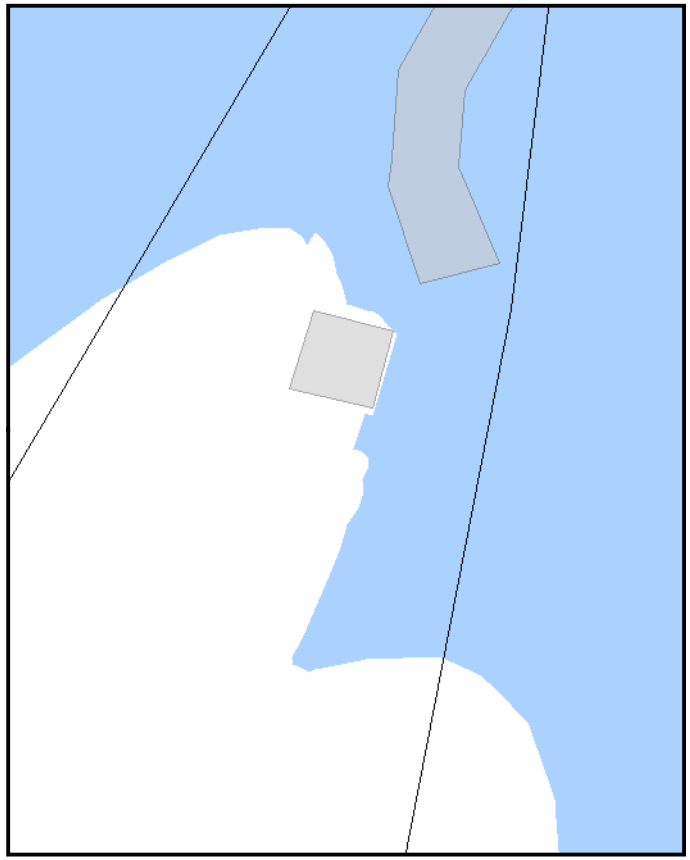
Remove the shed at 75 Woods Road from the Flood Hazard Area to align with the aerial photography from the 2013 Burnett River flood event.

**Current Flood Hazard Area**



**Aerial Photography (2013 Flood)**

**Proposed Flood Hazard Area**



**Legend**

- Contours (0.5m)
- Operational Works in FHA
- Flood Mitigation Area
- Building Footprint (Floor Level)
- Flood Hazard Area

N

0 60

Meters

1:981

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

# Attachment C – Development Works in the Flood Hazard Area

This page has been
intentionally left blank

The following changes were
made with Resolution
1/2017

**Operational Works Details:**

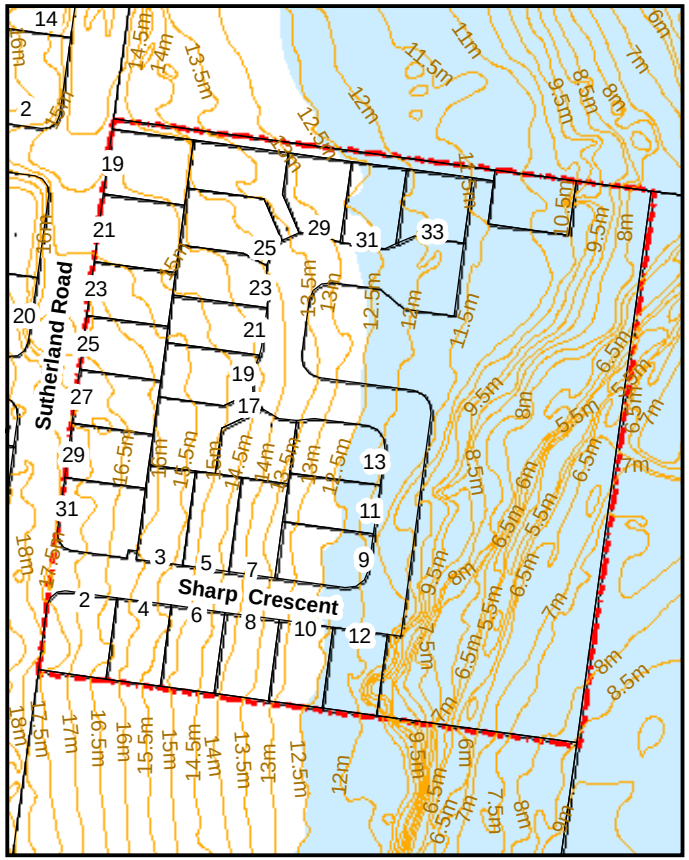
Application Number: *323.2007.00019893.002*

Development: *Residential Subdivision - Branyan by the River Stage 2B - Sharp Crescent (29 Lots)*

**Description:**

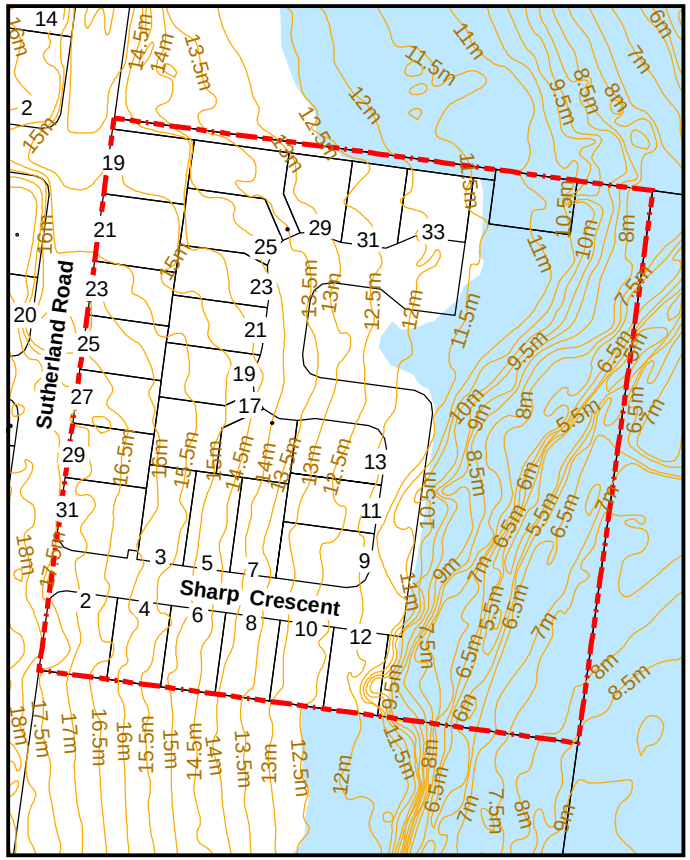
*Affects Burnett River DFE and McCoys Creek DFE.*

## Current Flood Hazard Area




## Aerial Photography (Pre-development)

## Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 — 190

Meters

1:2,771

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Operational Works Details:**

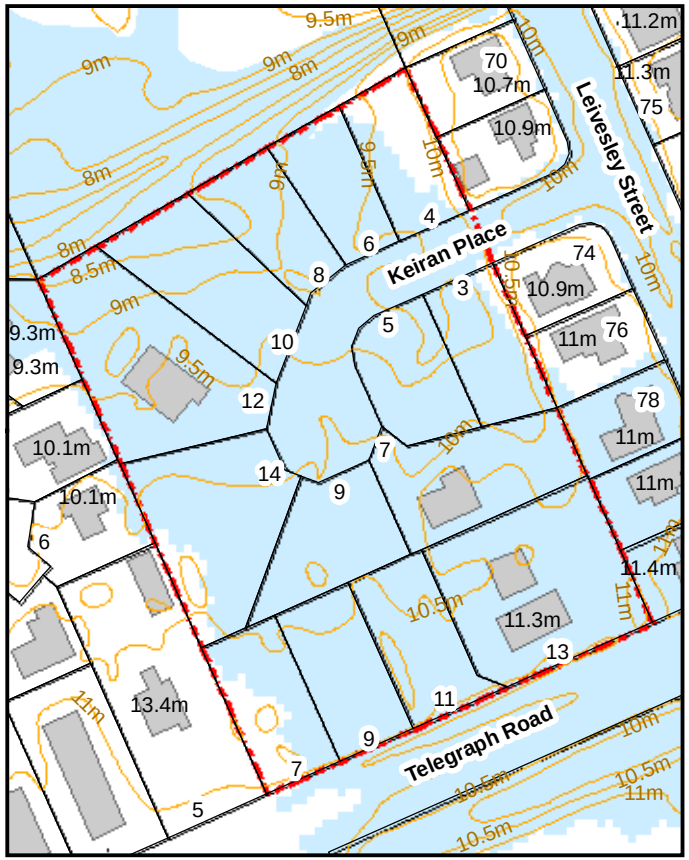
Application Number: *323.2012.00034454.001*

Development: *Residential Subdivision - Delany Development - Keiran Place (14 Lots)*

**Description:**

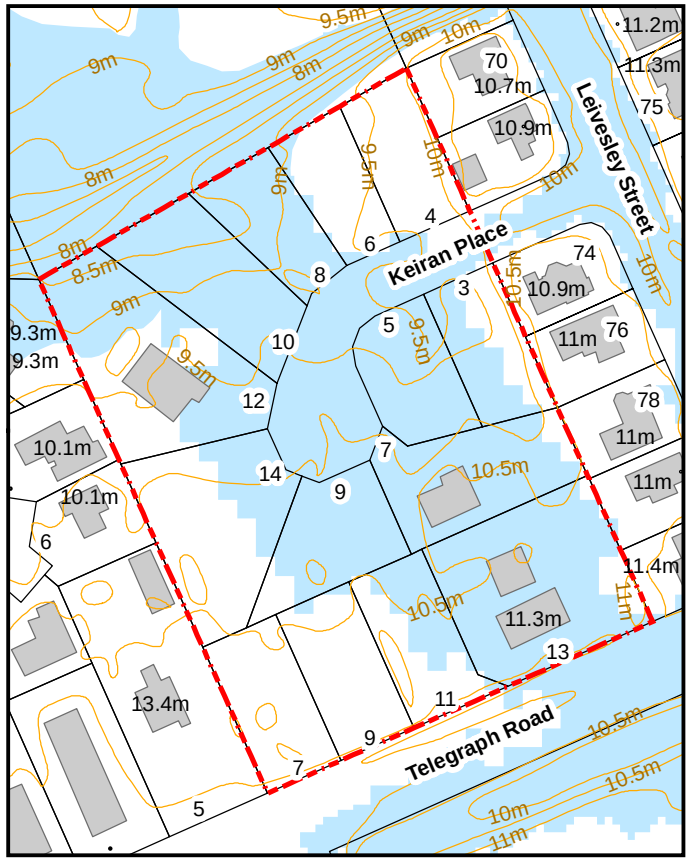
*Affects Burnett River DFE and Bundaberg Creek DFE.*

## Current Flood Hazard Area




## Aerial Photography (Pre-development)

## Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 — 140

Meters

1:1,987

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Operational Works Details:**

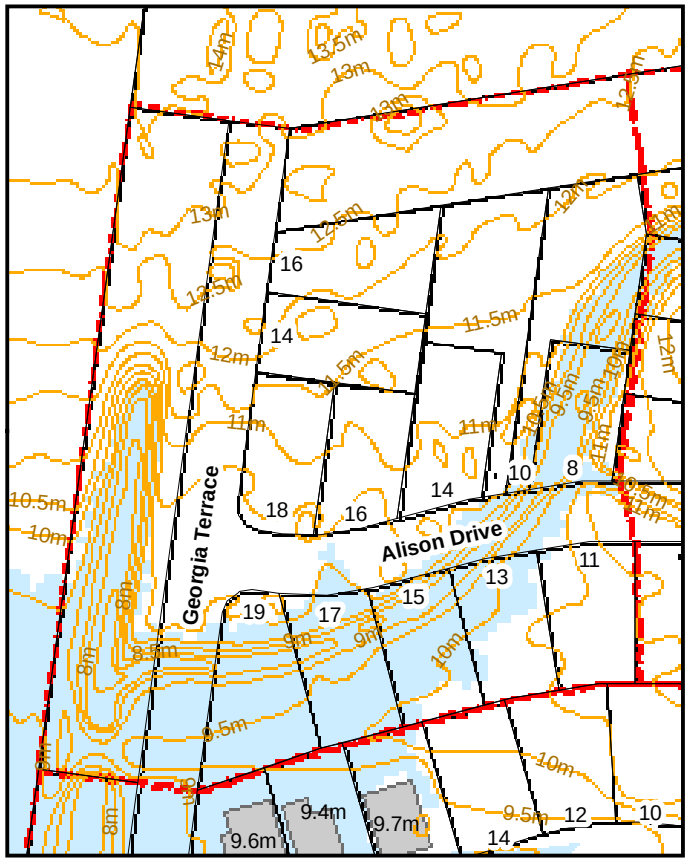
Application Number: *323.2009.00027374.001*

Development: *Residential Subdivision - One Mile Crossing Stage 2A*

**Description:**

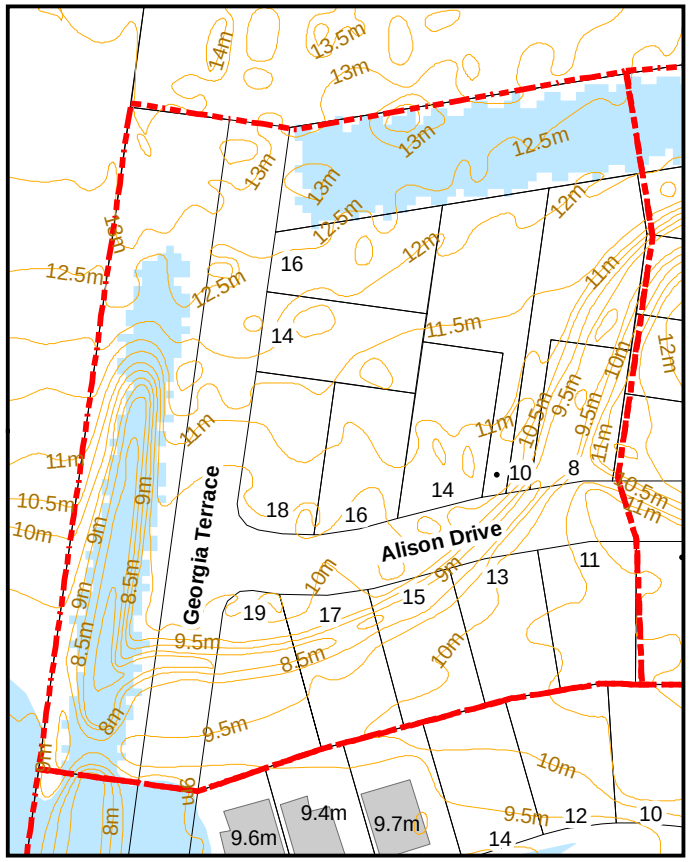
*Affects Burnett River DFE and East Bundaberg Creek DFE.*

## Current Flood Hazard Area




## Aerial Photography (Pre-development)

## Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 130

Meters

1:1,880

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Operational Works Details:**

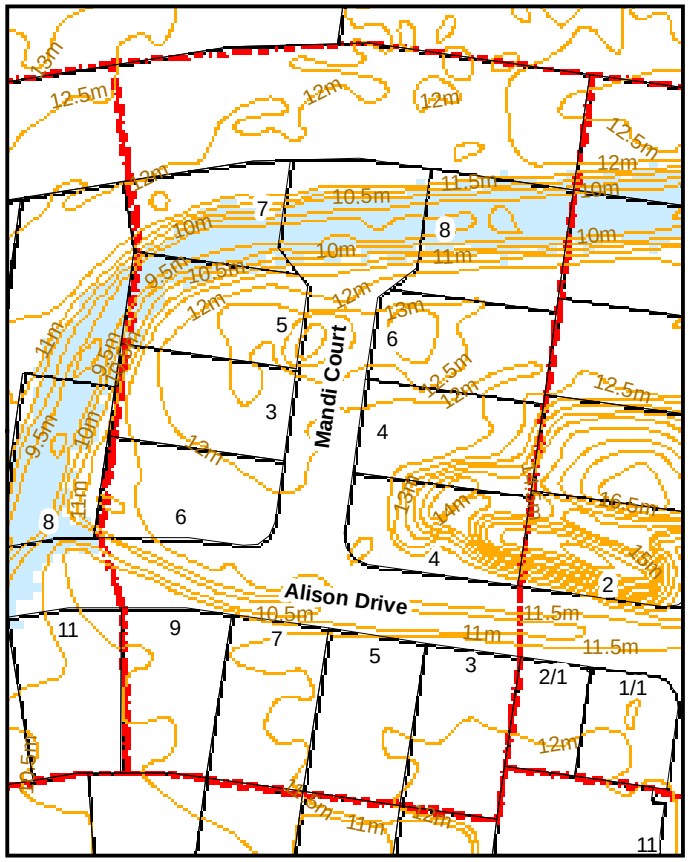
Application Number: *323.2009.00027374.002*

Development: *Residential Subdivision - One Mile Crossing Stage 2B*

**Description:**

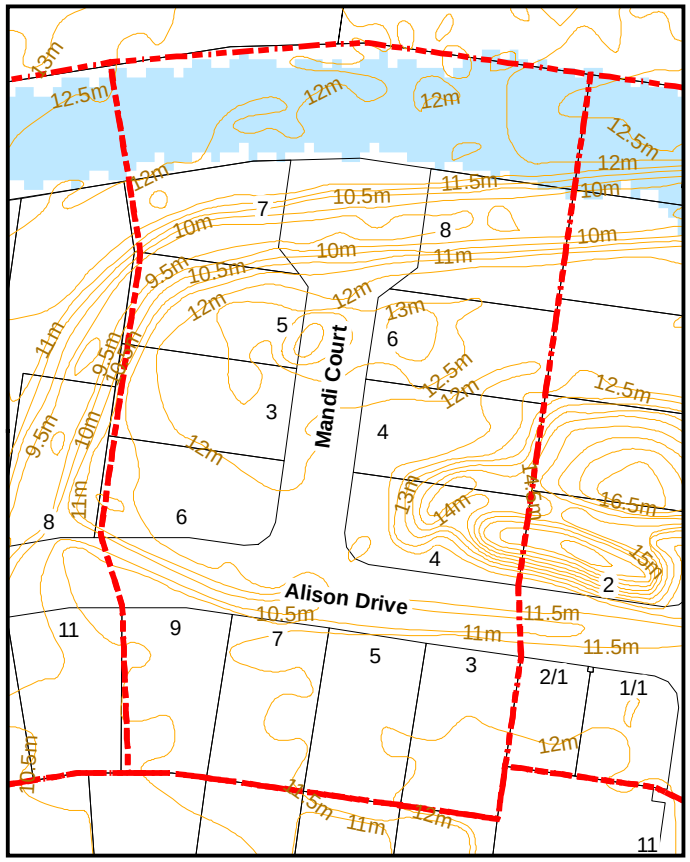
*Affects Burnett River DFE and East Bundaberg Creek DFE.*

## Current Flood Hazard Area




## Aerial Photography (Pre-development)

## Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 — 110

Meters

1:1,623

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Operational Works Details:**

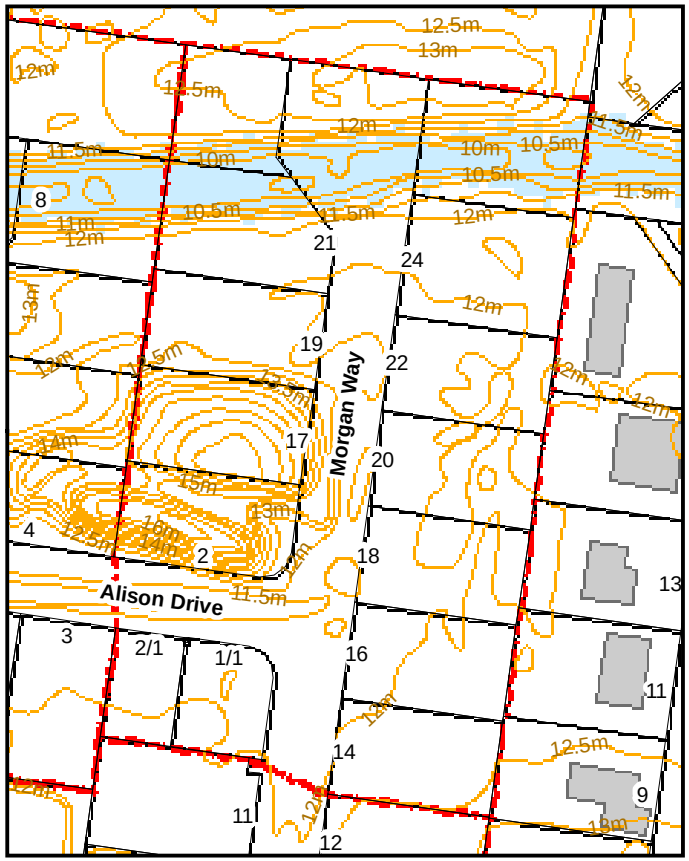
Application Number: *323.2009.00027374.003*

Development: *Residential Subdivision - One Mile Crossing Stage 2C*

**Description:**

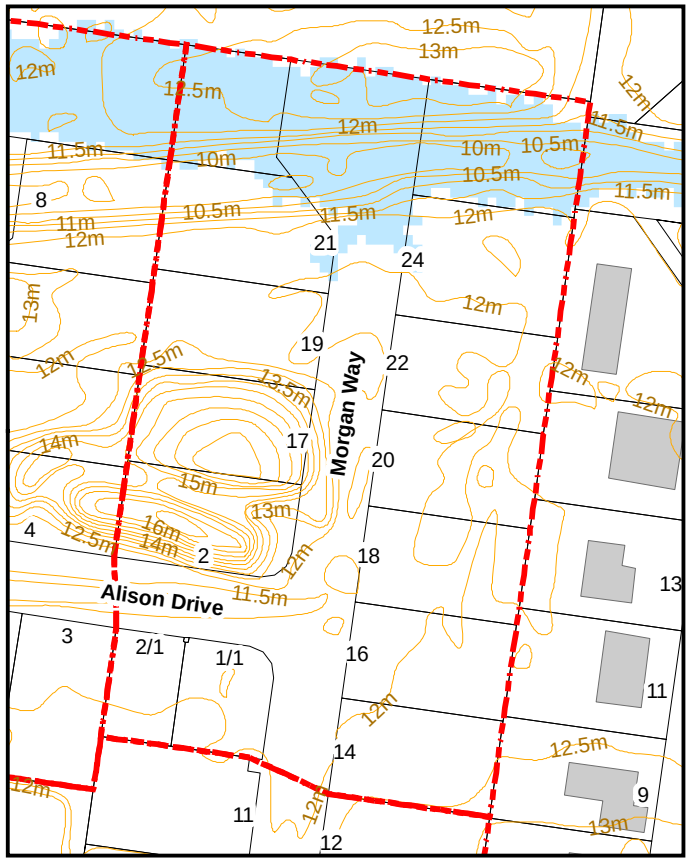
*Affects Burnett River DFE and East Bundaberg Creek DFE.*

## Current Flood Hazard Area




## Aerial Photography (Pre-development)

## Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 — 110

Meters

1:1,624

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Operational Works Details:**

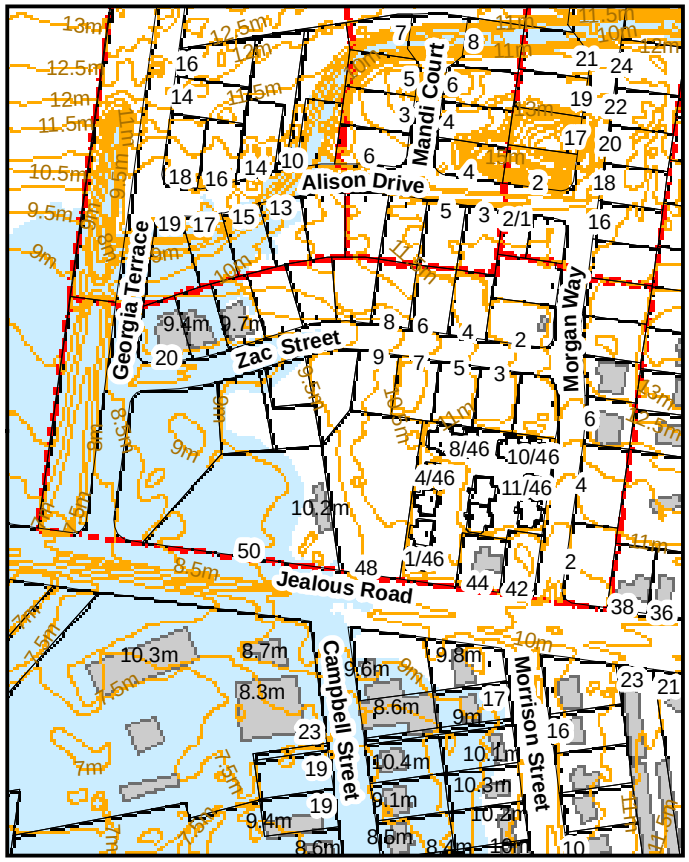
Application Number: *323.2009.00015937.001*

Development: *Residential Subdivision - One Mile Crossing Stage 1 (25 Lots)*

**Description:**

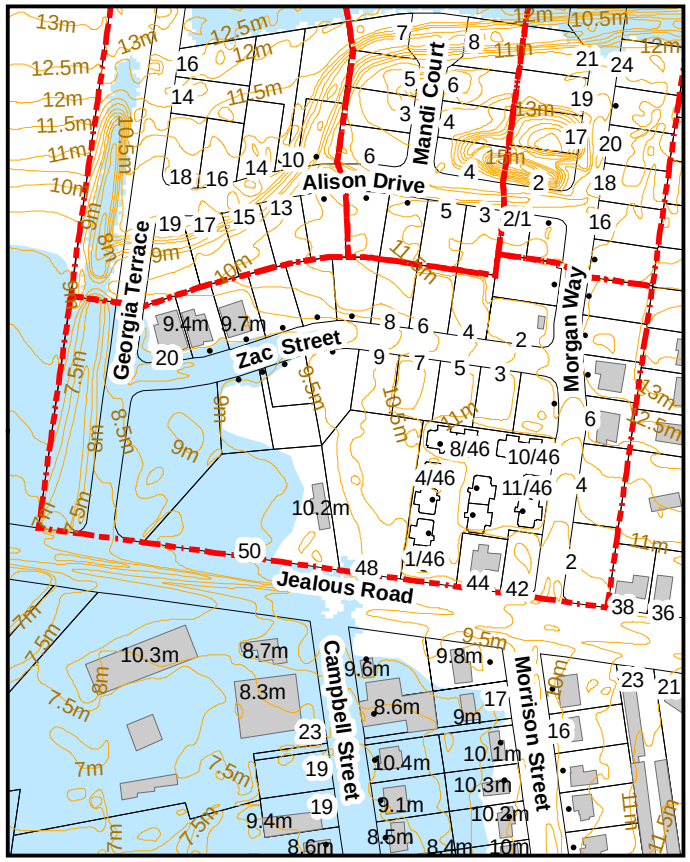
*Affects Burnett River DFE and East Bundaberg Creek DFE.*

## Current Flood Hazard Area




## Aerial Photography (Pre-development)

## Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 280

Meters

1:4,085

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

The following changes were
made with Resolution
2/2017

**Operational Works Details:**

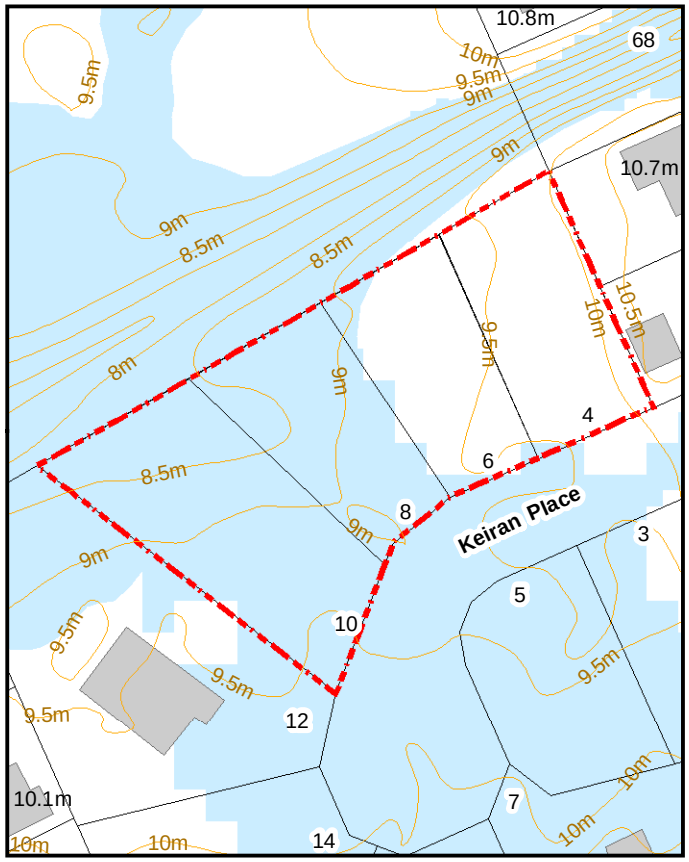
Application Number: *323.2012.34454.1*

Development: *Residential Subdivision - Keiran Place - additional fill on 4 lots.*

**Description:**

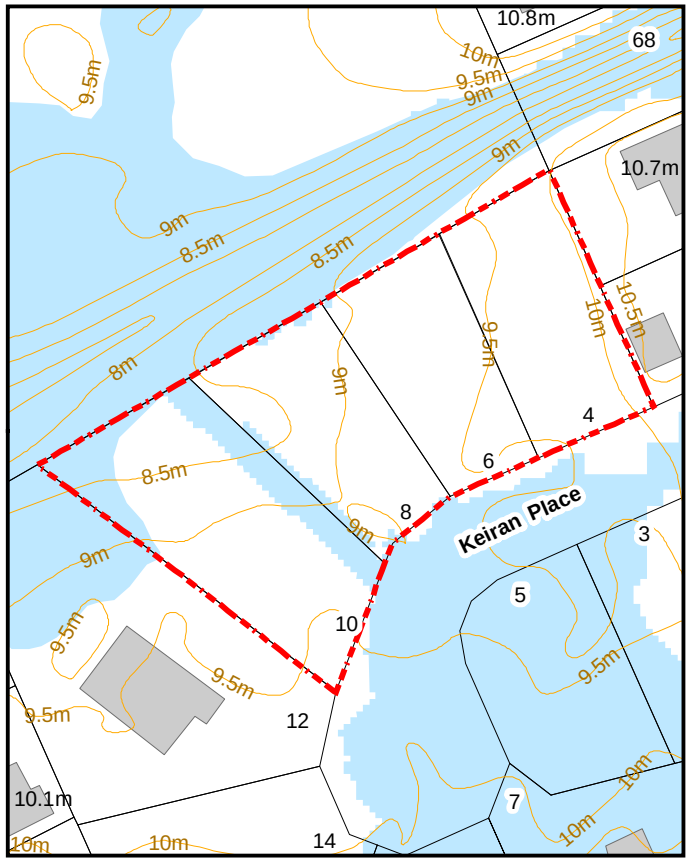
*Affects Burnett River DFE and Bundaberg Creek DFE.*

## Current Flood Hazard Area




## Aerial Photography (2017)

## Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 80

Meters

1:1,203

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Operational Works Details:**

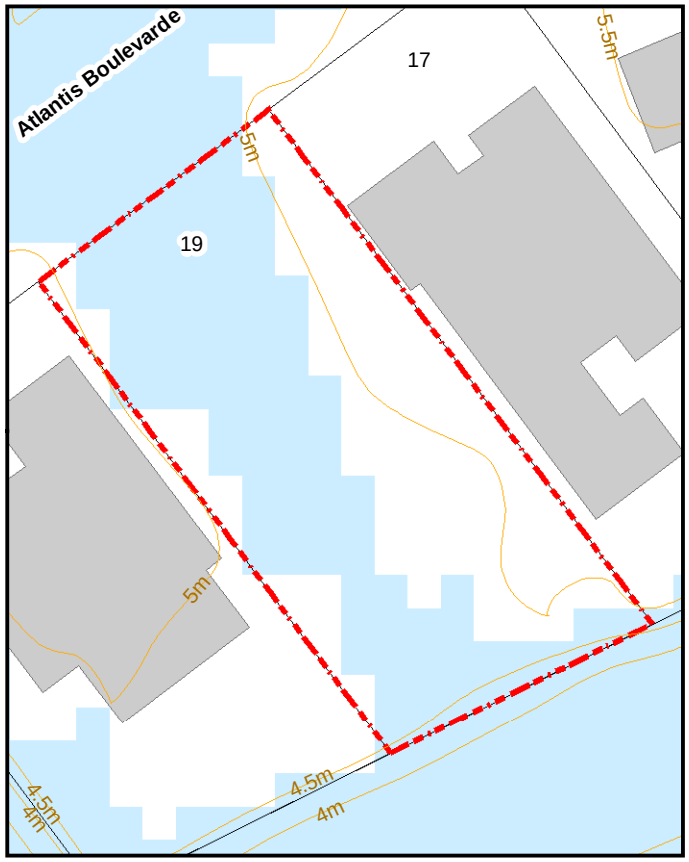
Application Number: *301.2014.72652.1*

Development: *Building Application - 19 Atlantis Blvd - fill associated with building works.*

**Description:**

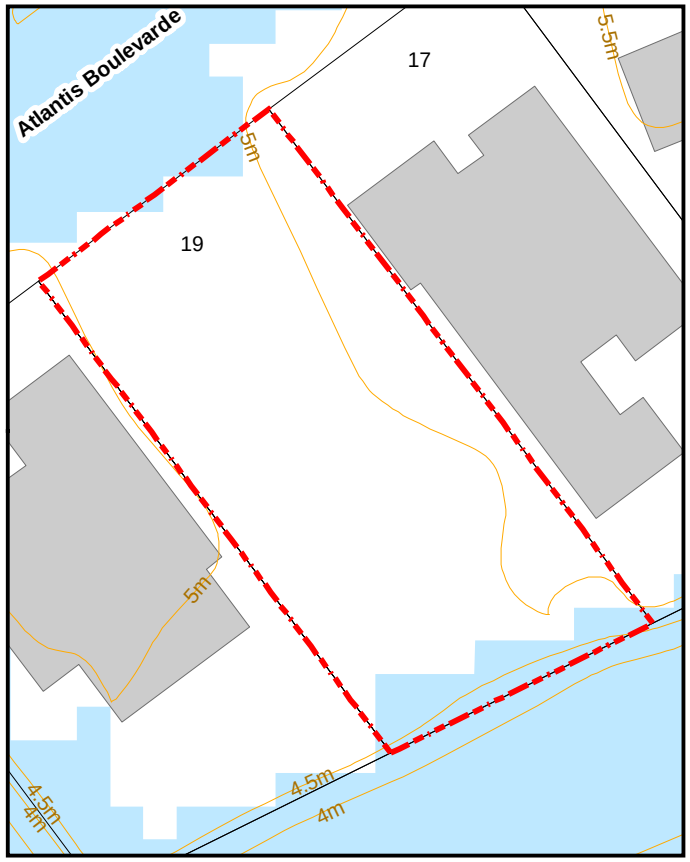
*Affects local flood only*

## Current Flood Hazard Area




## Aerial Photography (2017)

## Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 — 40

Meters

1:571

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

**Operational Works Details:**

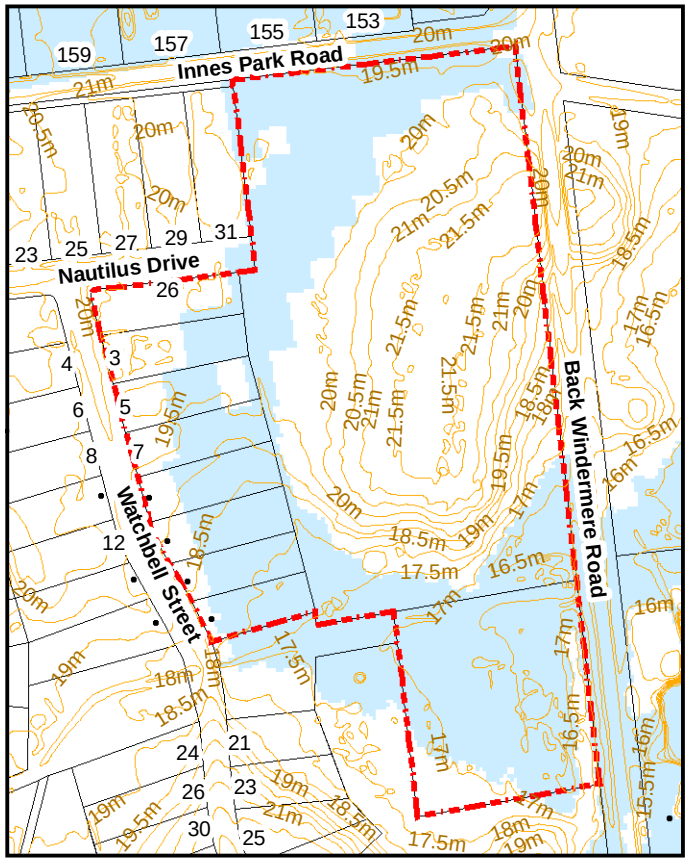
Application Number: *P-0851668-001*

Development: *Residential Subdivision - Pacific Acres Stage 6 - Brijay Holdings Pty Ltd*

**Description:**

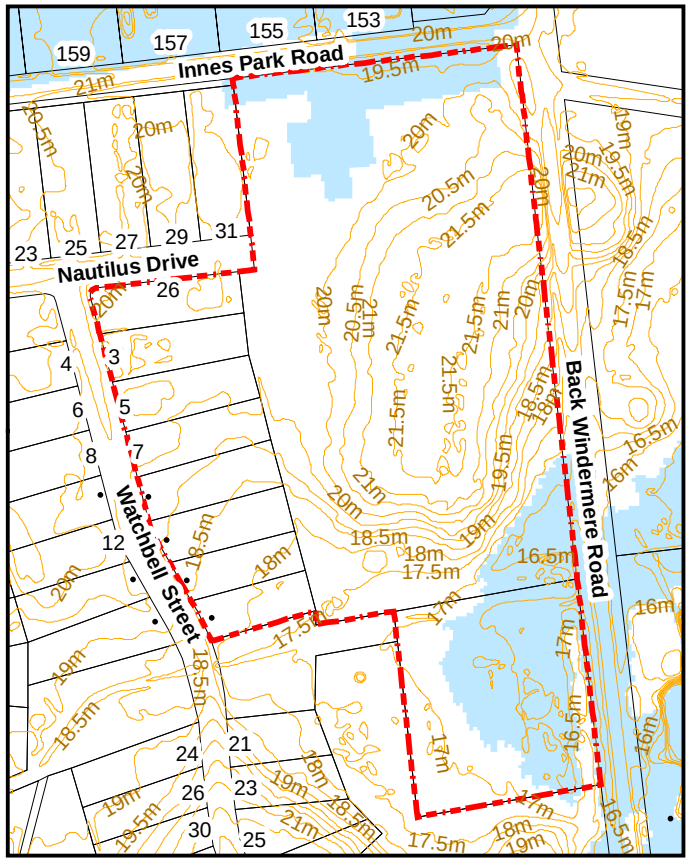
*Affects local flood only*

## Current Flood Hazard Area




## Aerial Photography (2017)

## Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 380

Meters

1:5,487

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

The following changes were
made with Resolution
1/2018

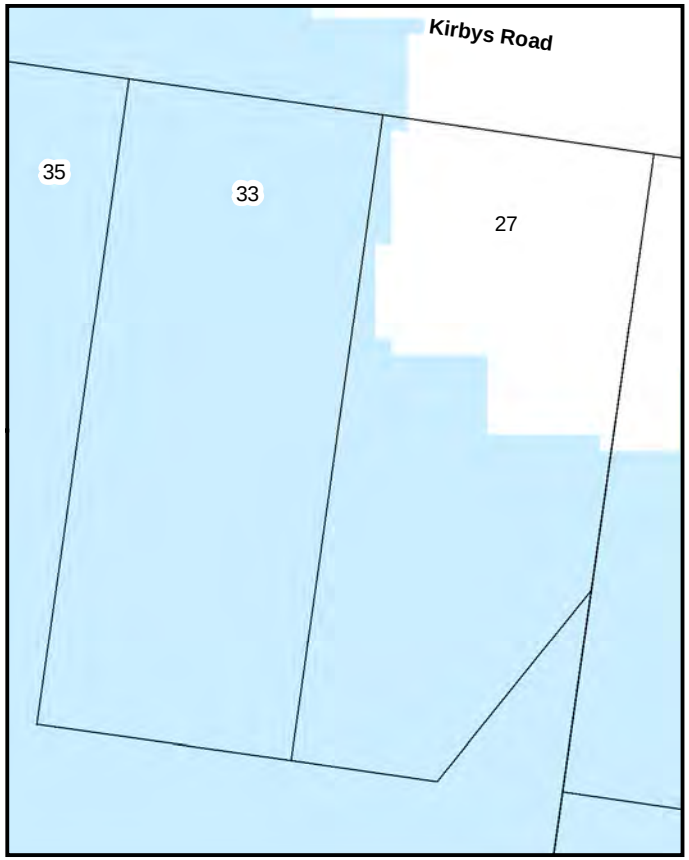
**Proposed Change Details:**

Reason for Change: Operational Works completed in Flood Hazard Area
Council Reference: 321.2015.43354.3

**Description:**

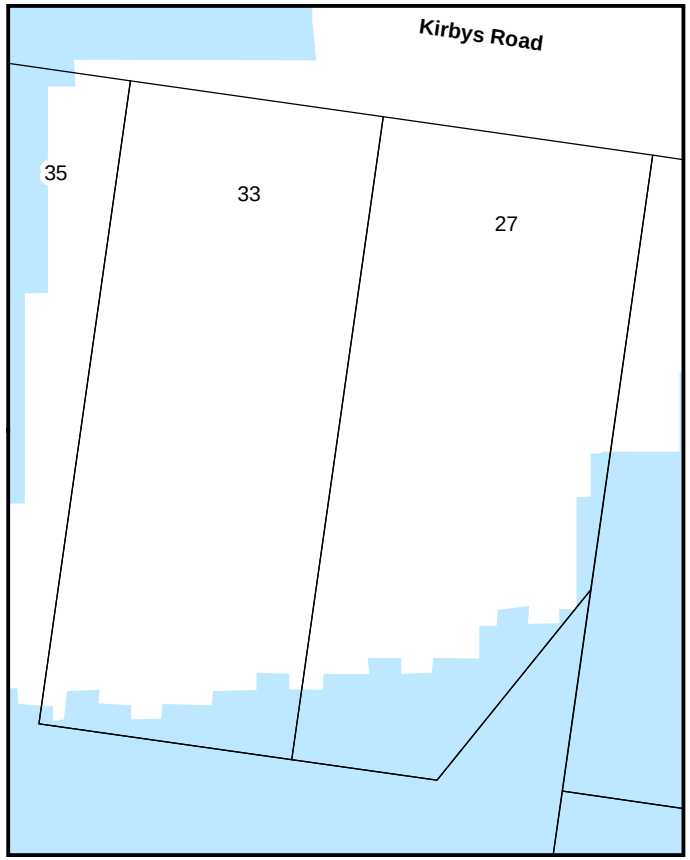
27 Kirbys Road, Kalkie (RJ Bauer & KA Bauer) fill and drainage works associated with development has changed the localised flood characteristics in the vicinity of the development.

**Current Flood Hazard Area**




**Flood Aerial Photography (2013)**

**Proposed Flood Hazard Area**




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 80

Meters

1:1,187

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

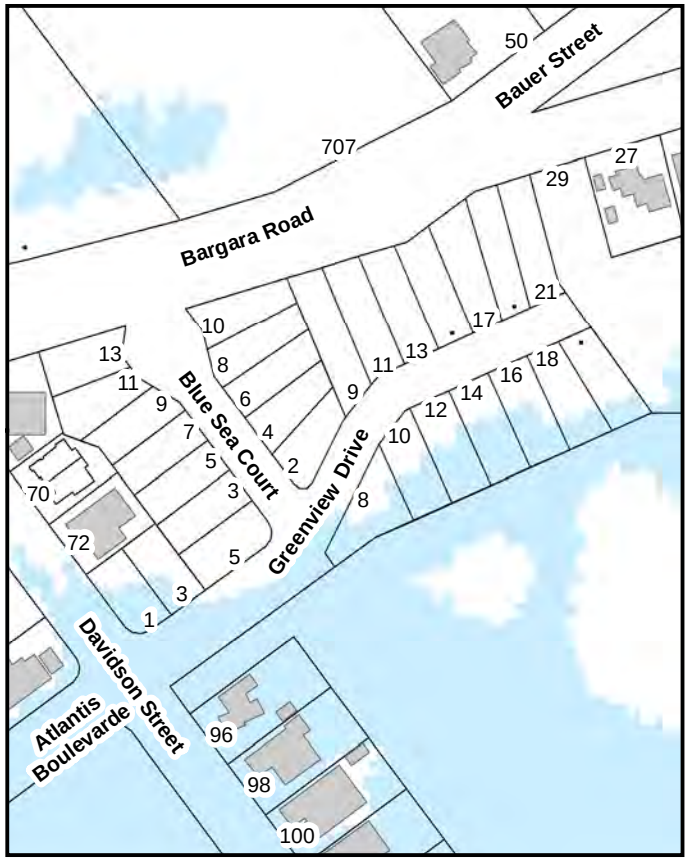
## Proposed Change Details:

Reason for Change: Operational Works completed in Flood Hazard Area
Council Reference: 321.2014.41451.2

## Description:

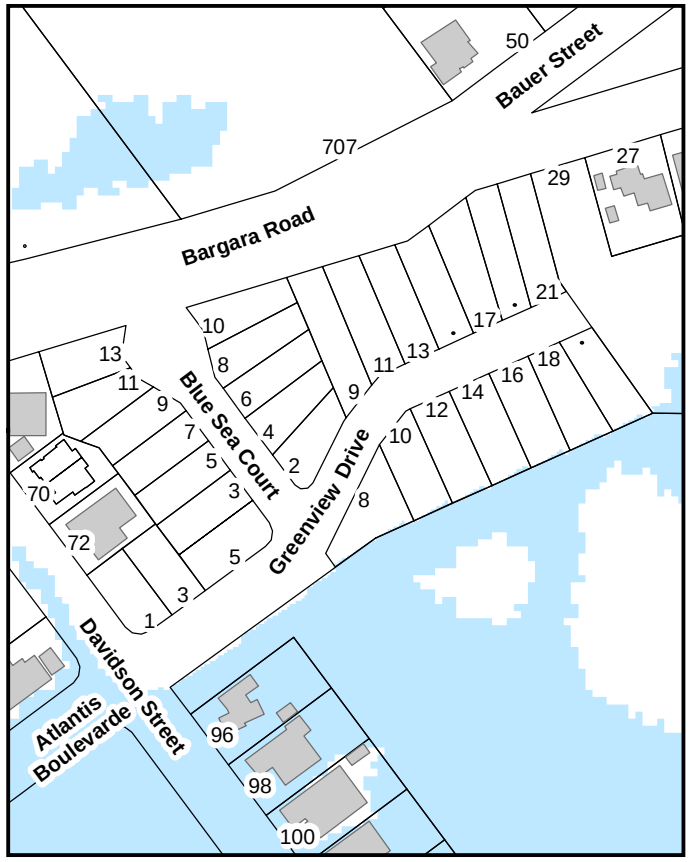
694 Bargara Road, Bargara (Hazenberg Holdings Pty Ltd) fill and drainage works associated with development has changed the localised flood characteristics in the vicinity of the development.

### Current Flood Hazard Area




### Aerial Photography (2017)

### Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 180

Meters

1:2,642

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

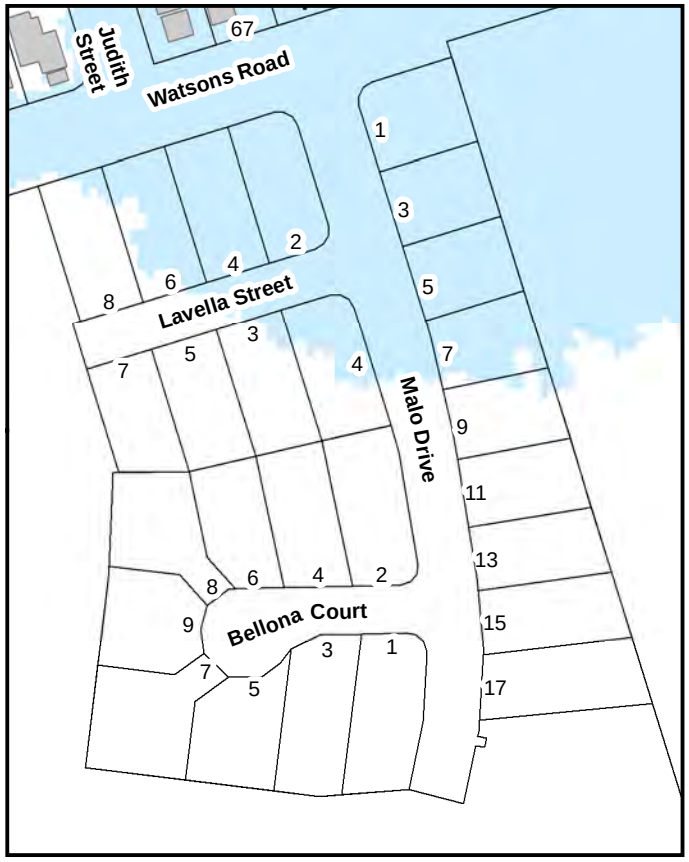
## Proposed Change Details:

Reason for Change: Operational Works completed in Flood Hazard Area
Council Reference: 526.2018.50.1

## Description:

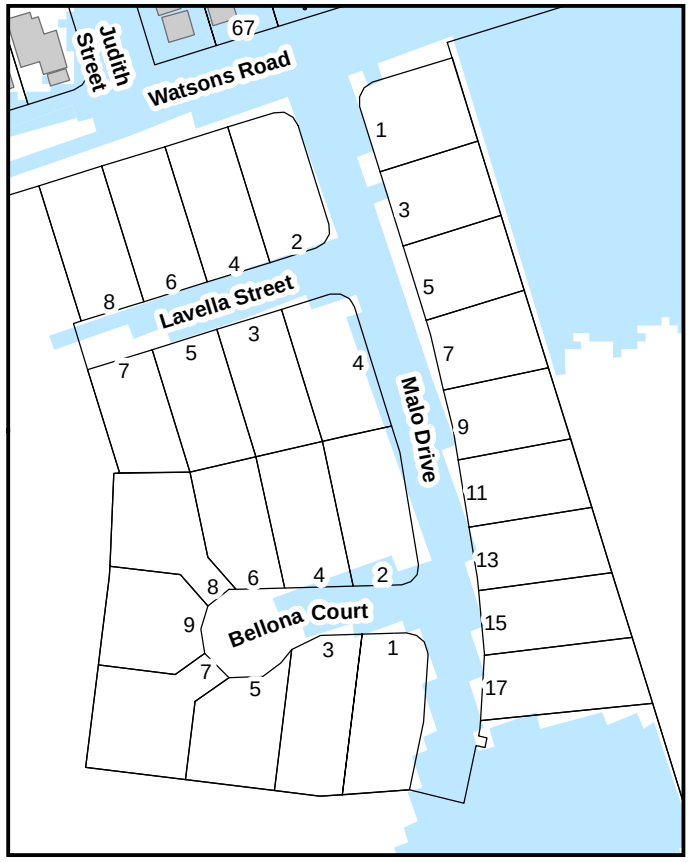
70 Watsons Road, Bargara (Offida Pty Ltd) fill and drainage works associated with development has changed the localised flood characteristics in the vicinity of the development.

### Current Flood Hazard Area




### Aerial Photography (2017)

### Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 160

Meters

1:2,354

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

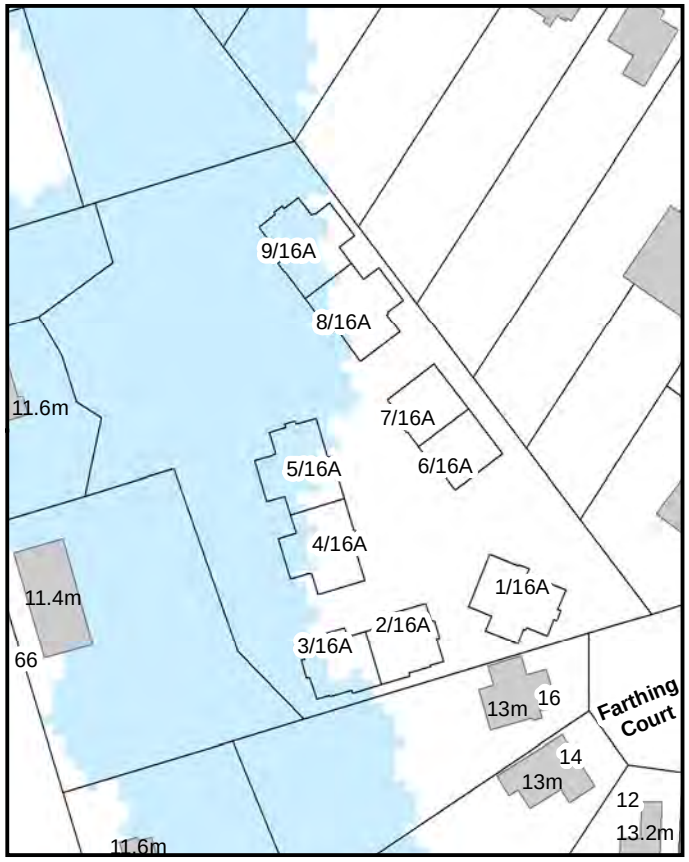
## Proposed Change Details:

Reason for Change: Operational Works completed in Flood Hazard Area
Council Reference: 322.2011.33397.1

## Description:

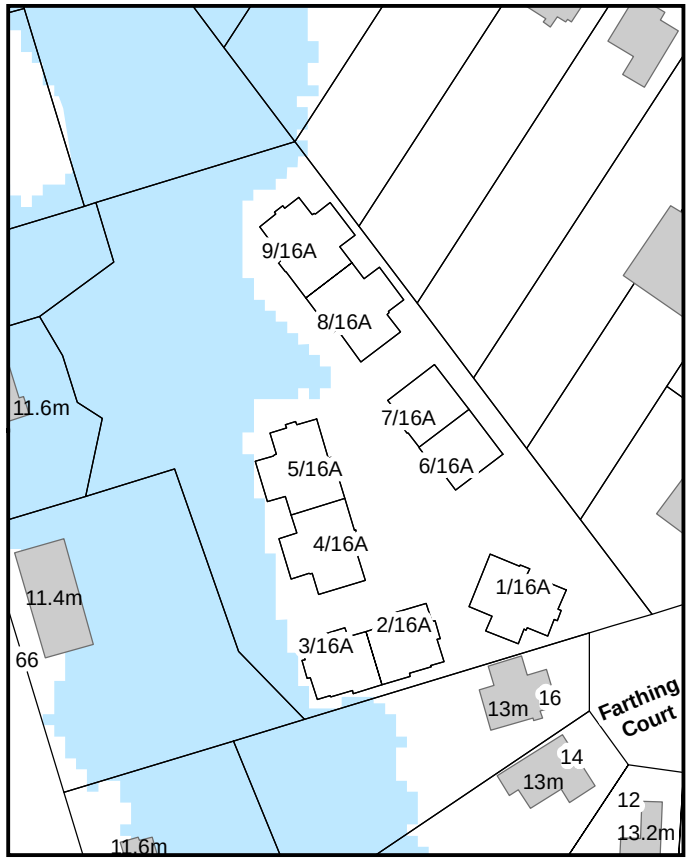
16A Farthing Court, Kepnock (Diret Investments Pty Ltd) fill and drainage works associated with development has changed the localised and river flood characteristics on the developed property. Current owner requested that the flood hazard area be updated.

### Current Flood Hazard Area




### Flood Aerial Photography (2013)

### Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 — 90

Meters

1:1,374

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

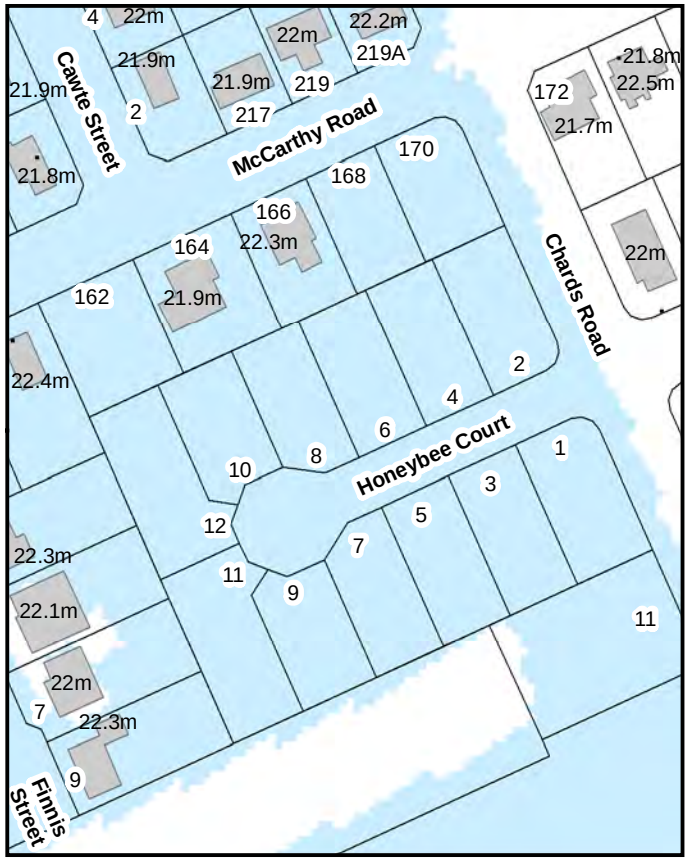
## Proposed Change Details:

Reason for Change: Operational Works completed in Flood Hazard Area
Council Reference: 321.2016.46689.1

## Description:

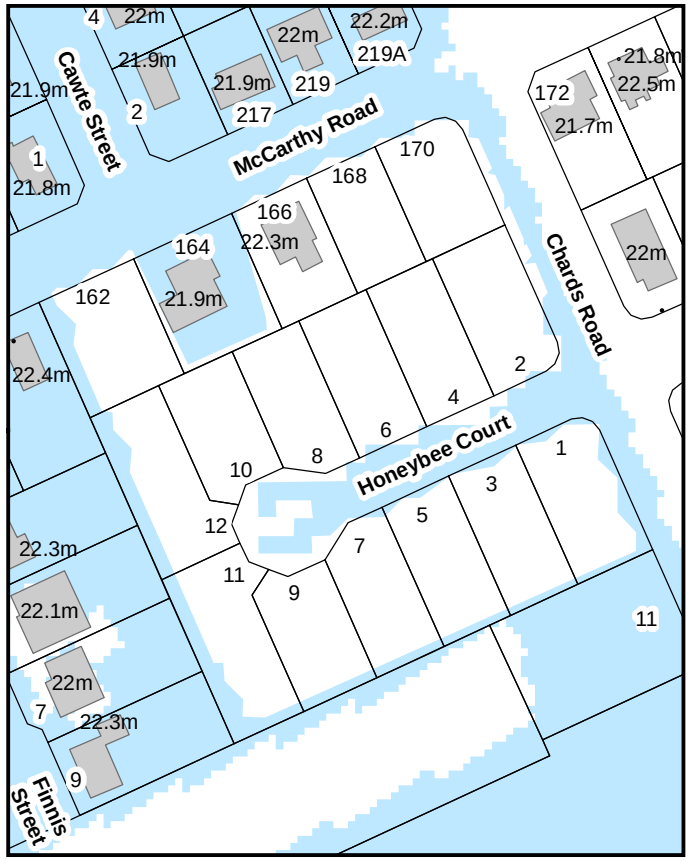
164 & 166 McCarthy Road, Avenell Heights (JRZ Developments Pty Ltd) fill and drainage works associated with development has changed the localised flood characteristics in the vicinity of the development.

### Current Flood Hazard Area




### Flood Aerial Photography (2013)

### Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Building Footprint (Floor Level)
- Operational Works in FHA
- Flood Mitigation Area
- Flood Hazard Area

N

0 150

Meters

1:2,106

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

The following changes were
made with Resolution
1/2019

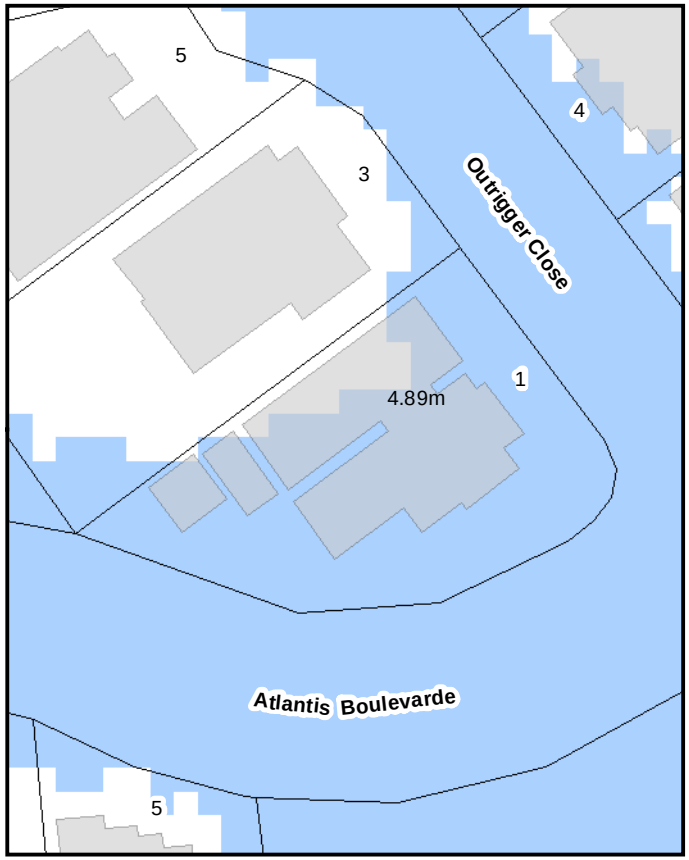
**Proposed Change Details:**

Reason for Change: Council upgrade of Beach Milieu Drainage System
Council Reference: ID09.70 BM

**Description:**

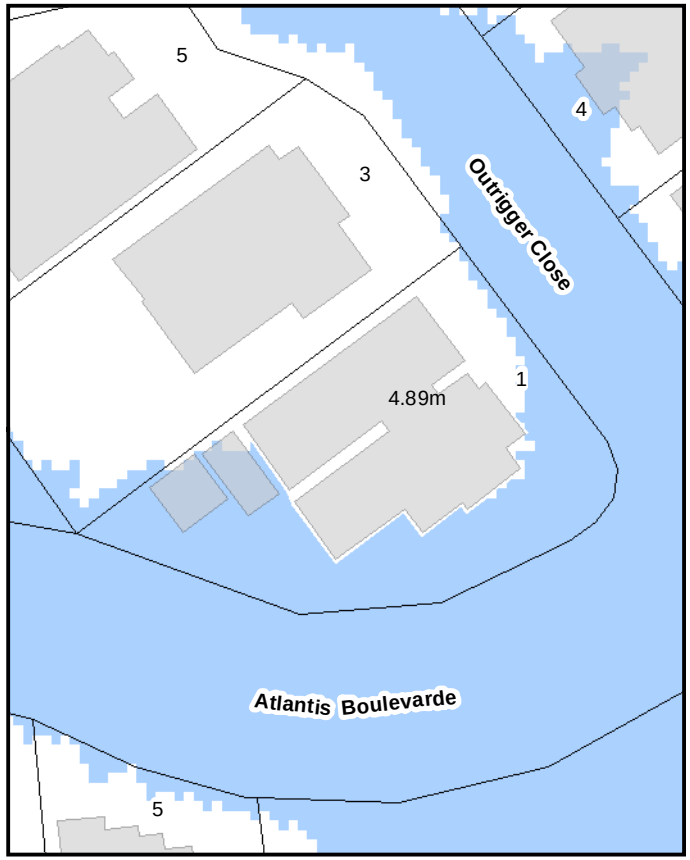
Remove dwelling house at 1 Outrigger Cl from Flood Hazard Area. Drainage works have changed the localised flood characteristics in the vicinity of this property.

**Current Flood Hazard Area**




**Aerial Photography (2018)**

**Proposed Flood Hazard Area**




**Legend**

- Contours (0.5m)
- Operational Works in FHA
- Flood Mitigation Area
- Building Footprint (Floor Level)
- Flood Hazard Area

N

0 50

Meters

1:800

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

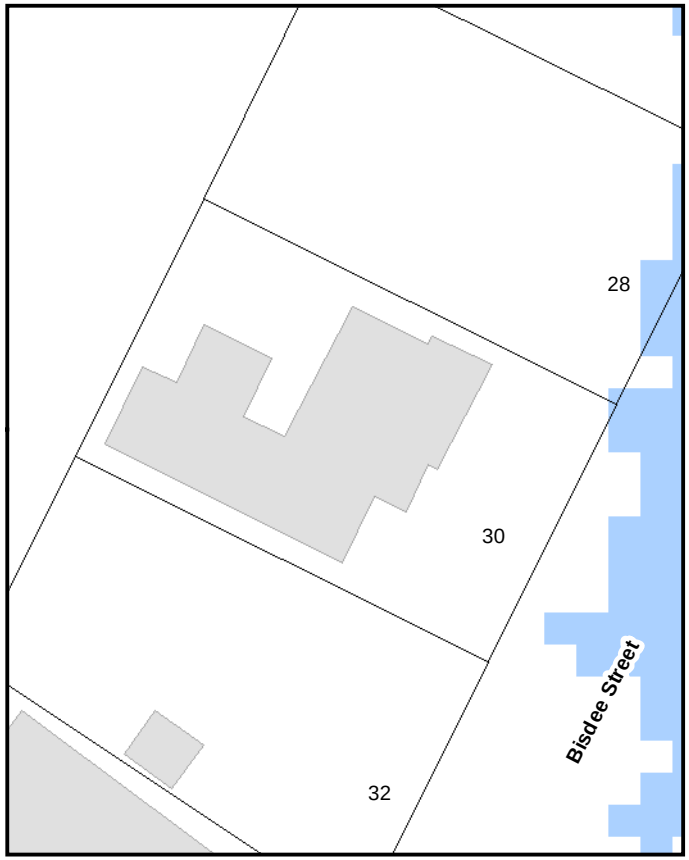
**Proposed Change Details:**

Reason for Change: Ground height is greater than modelled water level
Council Reference: A4675339

**Description:**

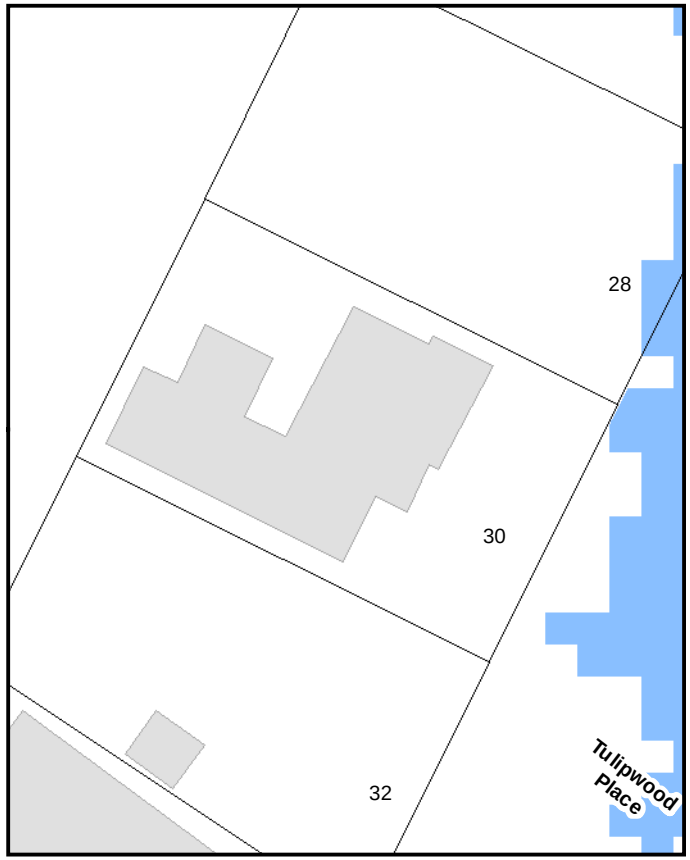
Remove property at 30 Bisdee Street Coral Cove from the Flood Hazard Area. At the front of the property the ground level is 9.19m AHD which is above the modelled flood water level of 9.03m AHD, therefore, the property should not be in the Flood Hazard Area.

**Current Flood Hazard Area**




**Aerial Photography (2018)**

**Proposed Flood Hazard Area**




**Legend**

- Contours (0.5m)
- Operational Works in FHA
- Flood Mitigation Area
- Building Footprint (Floor Level)
- Flood Hazard Area

N

0 40

Meters

1:591

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

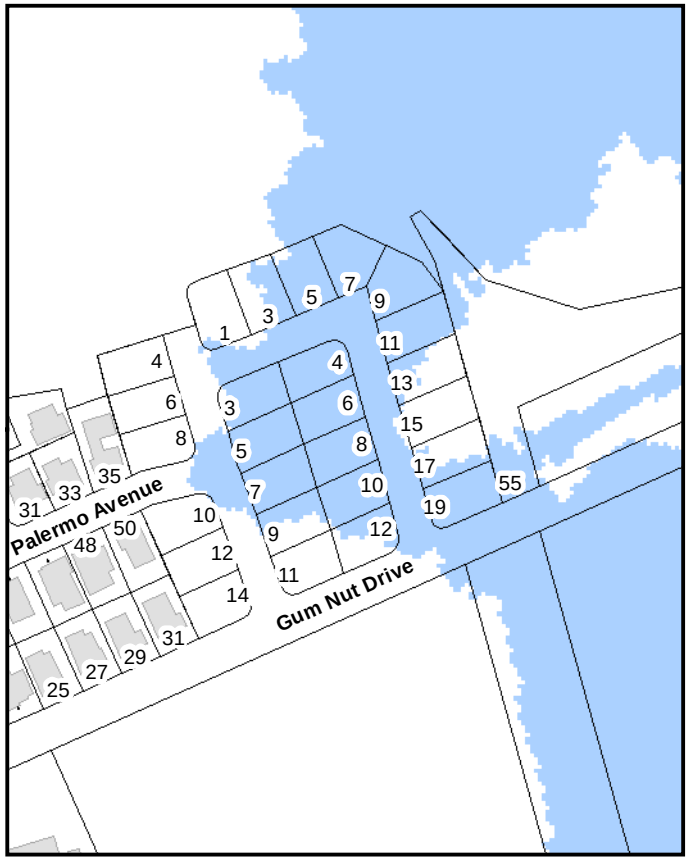
**Proposed Change Details:**

Reason for Change: Operational works has change flooding in the area (Belle Eden Stage 2G)
Council Reference: 523.2017.31.1

**Description:**

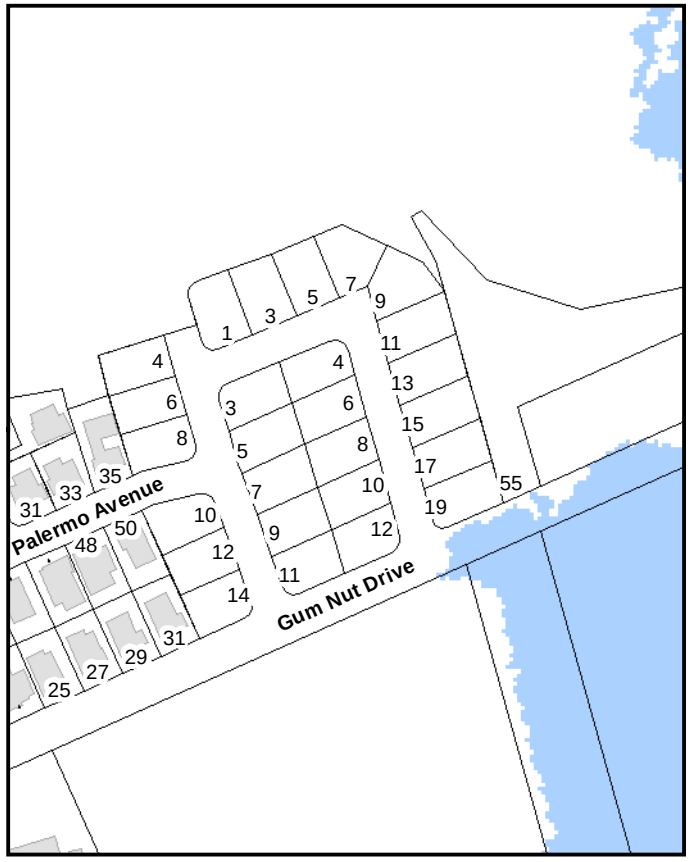
Fill and drainage works associated with 73 Sienna Boulevard, Ashfield (Belle Eden Estate Pty Ltd, development 526.2017.9.1 and operational works 523.2017.31.1) has changed the localised flood characteristics in the vicinity of the development.

**Current Flood Hazard Area**




**Aerial Photography (2018)**

**Proposed Flood Hazard Area**




**Legend**

- Contours (0.5m)
- Operational Works in FHA
- Flood Mitigation Area
- Building Footprint (Floor Level)
- Flood Hazard Area

N

0 260

Meters

1:3,758

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

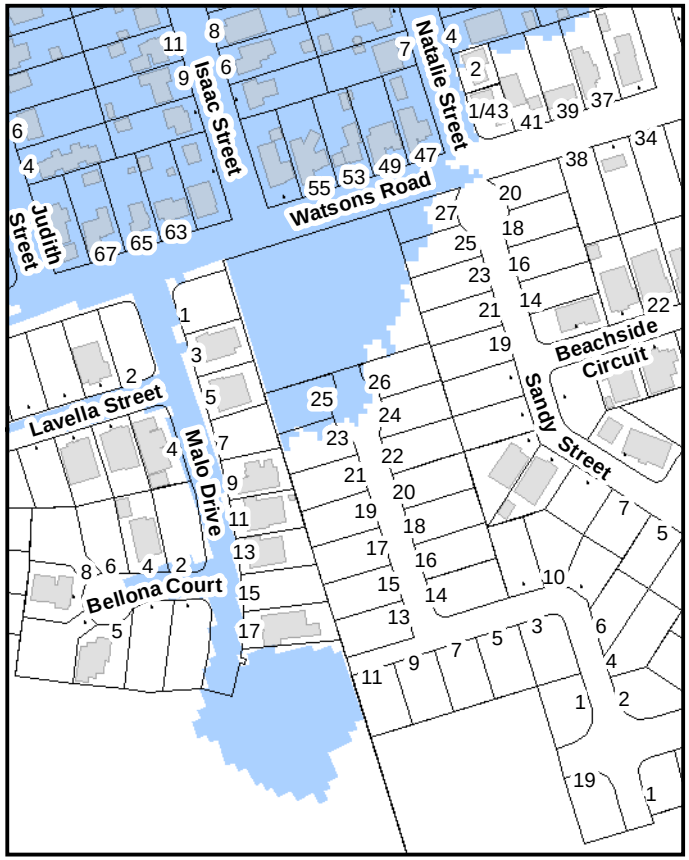
**Proposed Change Details:**

Reason for Change: Operational works has change flooding in the area (Investec Stage 4-6)
Council Reference: 523.2018.54.1

**Description:**

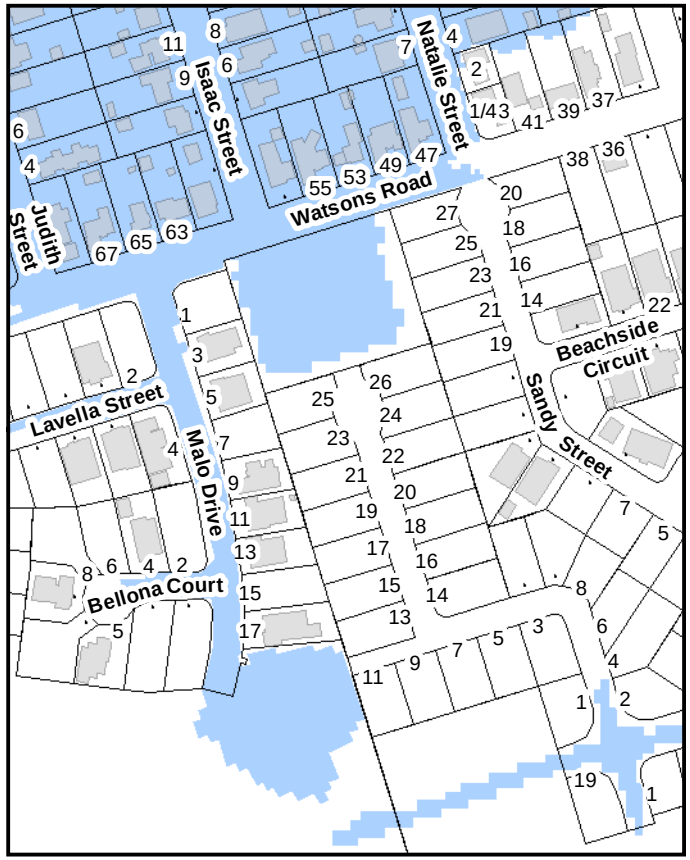
Fill and drainage works associated with Moodies Road, Bargara (Investec Australia Loans Management Pty Ltd, development 526.2018.57.1 and operational works 523.2018.54.1) has changed the localised flood characteristics in the vicinity of the development.

**Current Flood Hazard Area**




**Aerial Photography (2018)**

**Proposed Flood Hazard Area**




**Legend**

- Contours (0.5m)
- Operational Works in FHA
- Flood Mitigation Area
- Building Footprint (Floor Level)
- Flood Hazard Area

N

0 290

Meters

1:4,113

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

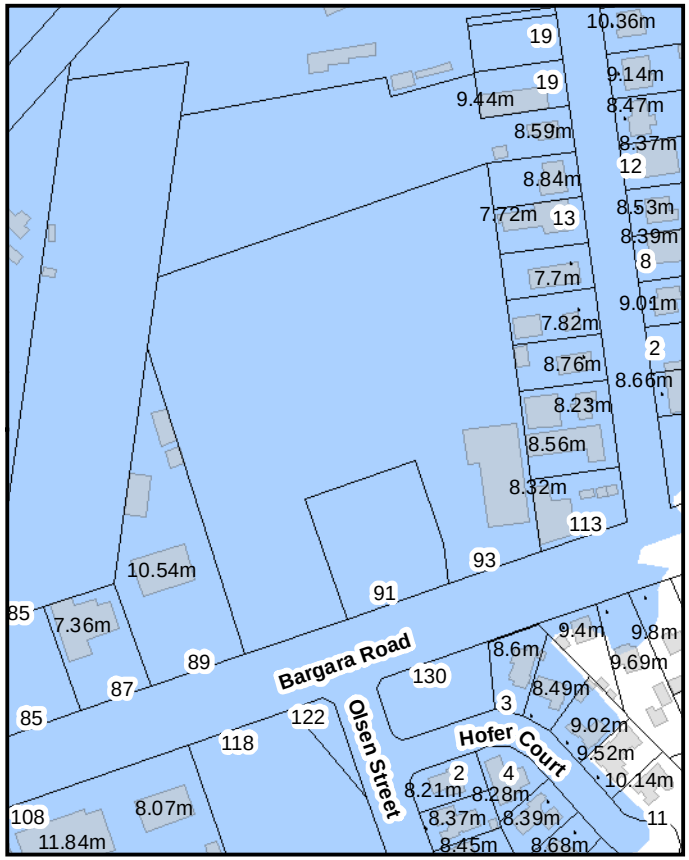
## Proposed Change Details:

Reason for Change: Operational works has change flooding in the area (New KFC)
Council Reference: 523.2019.99.1

## Description:

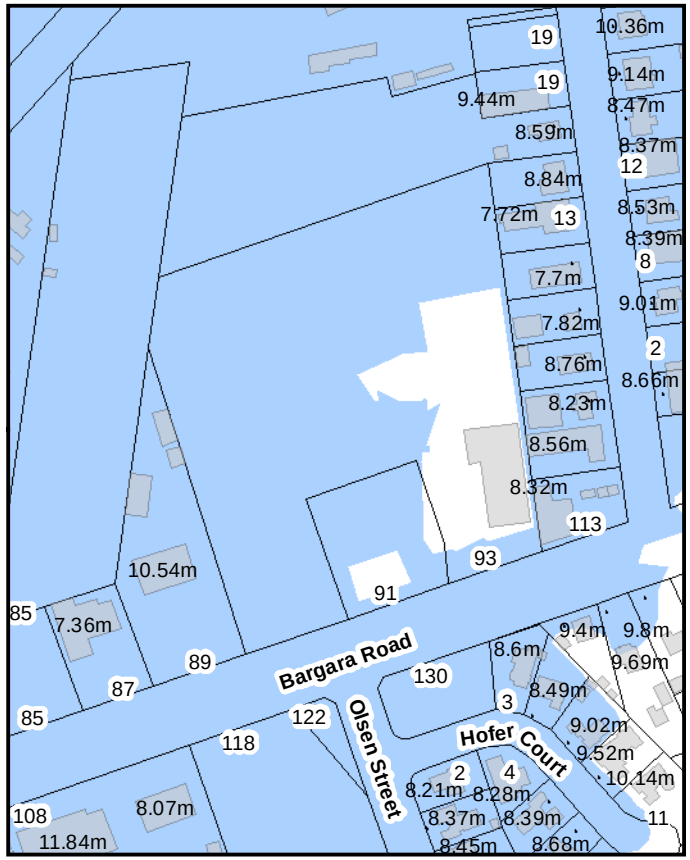
Fill and drainage works associated with 93 Bargara Road, Bundaberg East (RDF Development Pty Ltd, development 525.2018.5.1 and operational works 523.2019.99.1) has changed the river and localised flood characteristics in the vicinity of the development.

### Current Flood Hazard Area




### Aerial Photography (2018)

### Proposed Flood Hazard Area




**Legend**

- Contours (0.5m)
- Operational Works in FHA
- Flood Mitigation Area
- Building Footprint (Floor Level)
- Flood Hazard Area

N

0 240

Meters

1:3,429

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

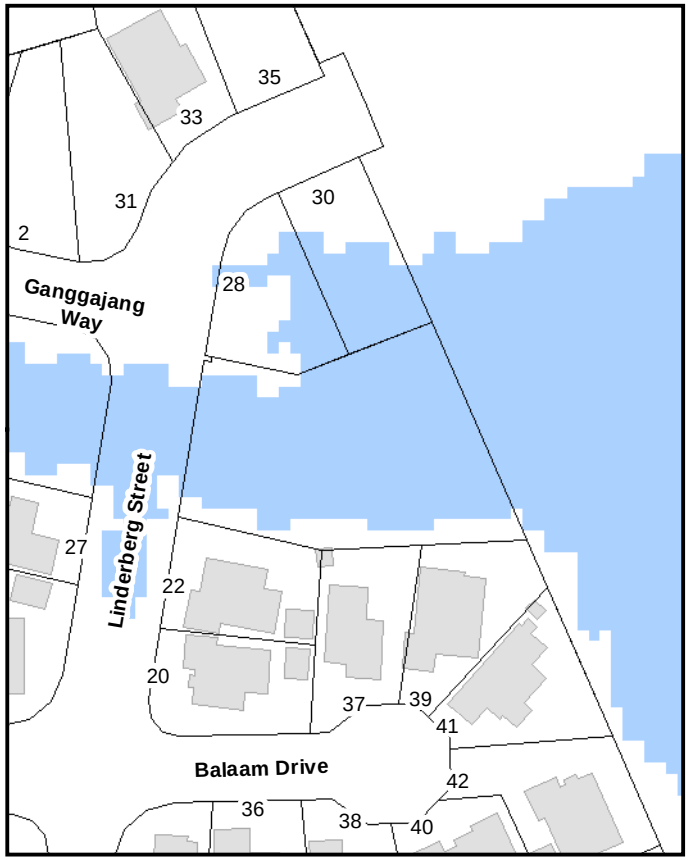
**Proposed Change Details:**

Reason for Change: Operational works has change flooding in the area (Paddington Grove Stage 12)
Council Reference: 523.2018.36.1

**Description:**

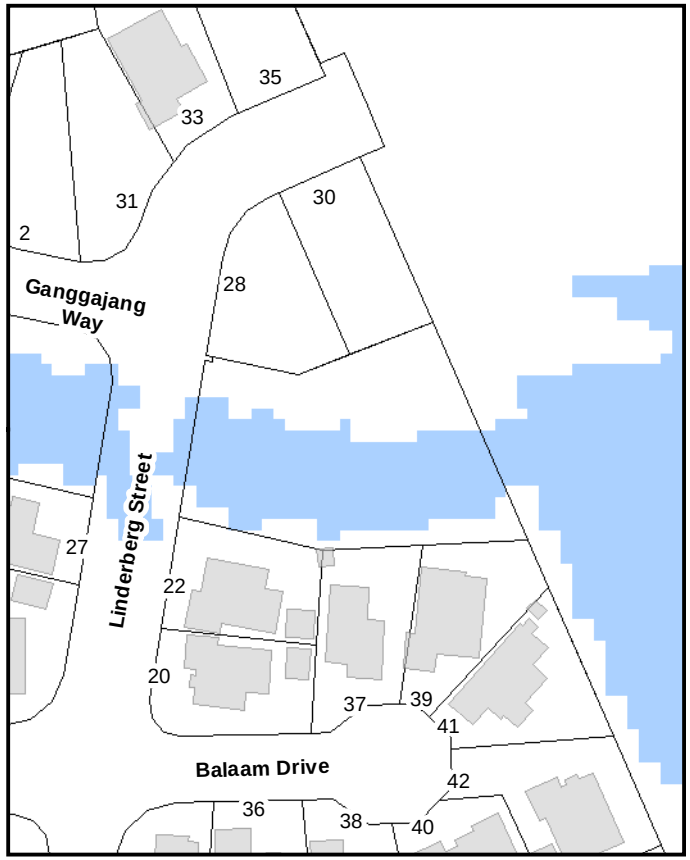
Fill and drainage works associated with Linderberg Street, Kalkie (Multilow Pty Ltd, development 521.2017.17.1 and operational works 523.2018.36.1) has changed the localised flood characteristics in the vicinity of the development.

**Current Flood Hazard Area**




**Aerial Photography (2018)**

**Proposed Flood Hazard Area**




**Legend**

- Contours (0.5m)
- Operational Works in FHA
- Flood Mitigation Area
- Building Footprint (Floor Level)
- Flood Hazard Area

N

0 120

Meters

1:1,712

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

The following changes were
made with Resolution
1/2021

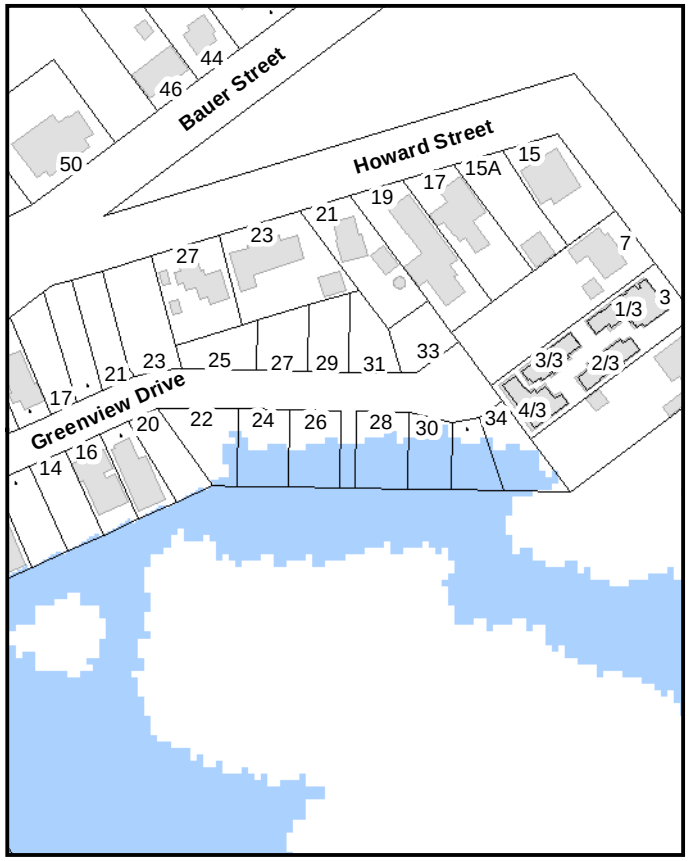
## Proposed Change Details:

Reason for Change: Operational works has change flooding in the area (Tame Development)
Council Reference: 523.2019.137.1

## Description:

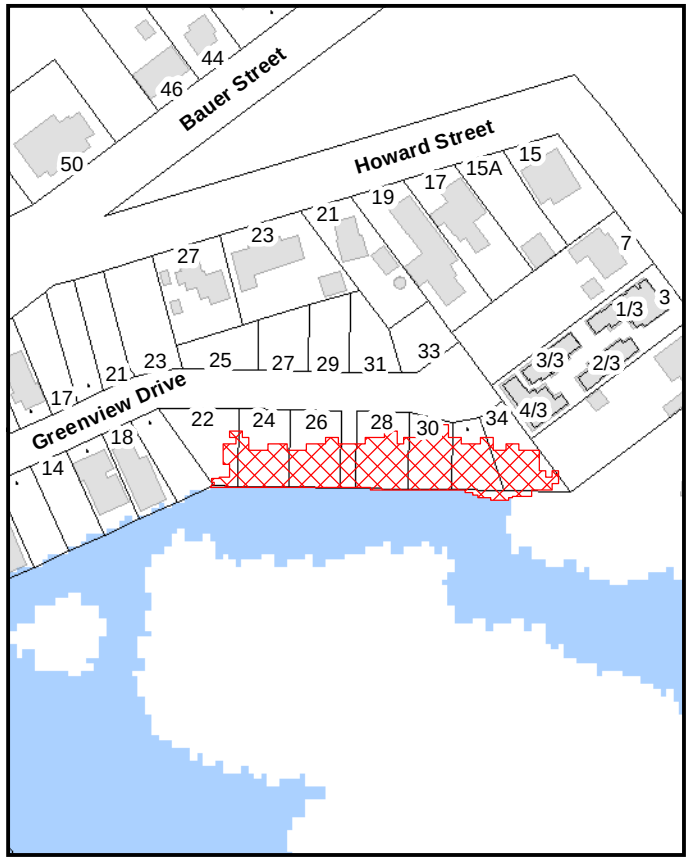
Fill and drainage works associated with Bargara Road, Bargara (Tame development 521.2018.89.1 and operational works 523.2019.137.1) has changed the localised flood characteristics in the vicinity of the development.

### Current Flood Hazard Area




### Aerial Photography (2020)

### Proposed Flood Hazard Area




**Legend**

- Area Added
- Area Removed
- Building Footprint (Floor Level)
- Flood Hazard Area

N

0 — 210

Meters

1:2,932

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

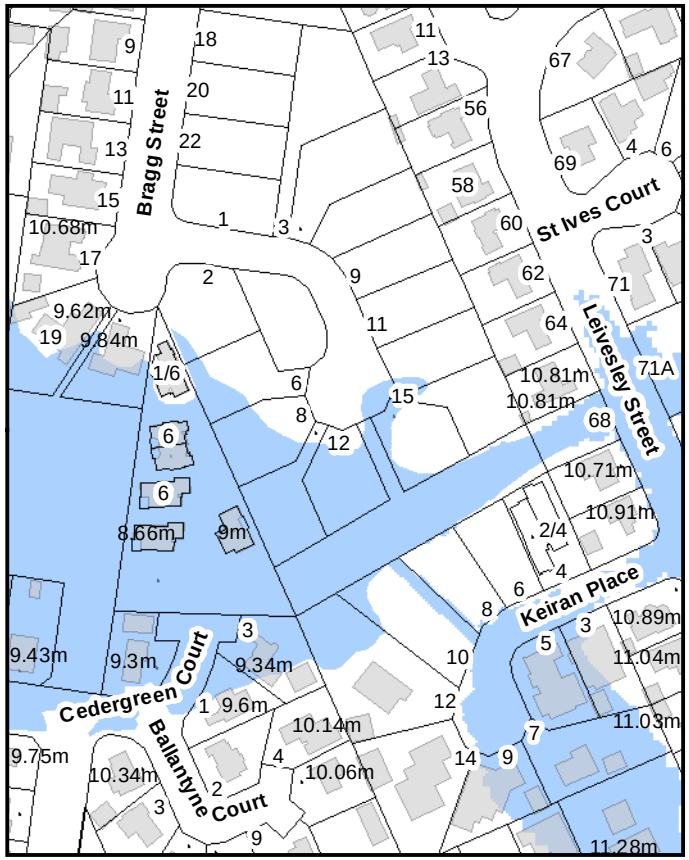
## Proposed Change Details:

Reason for Change: Operational works has change flooding in the area (12 Bragg St Development)
Council Reference: 523.2017.11.1

## Description:

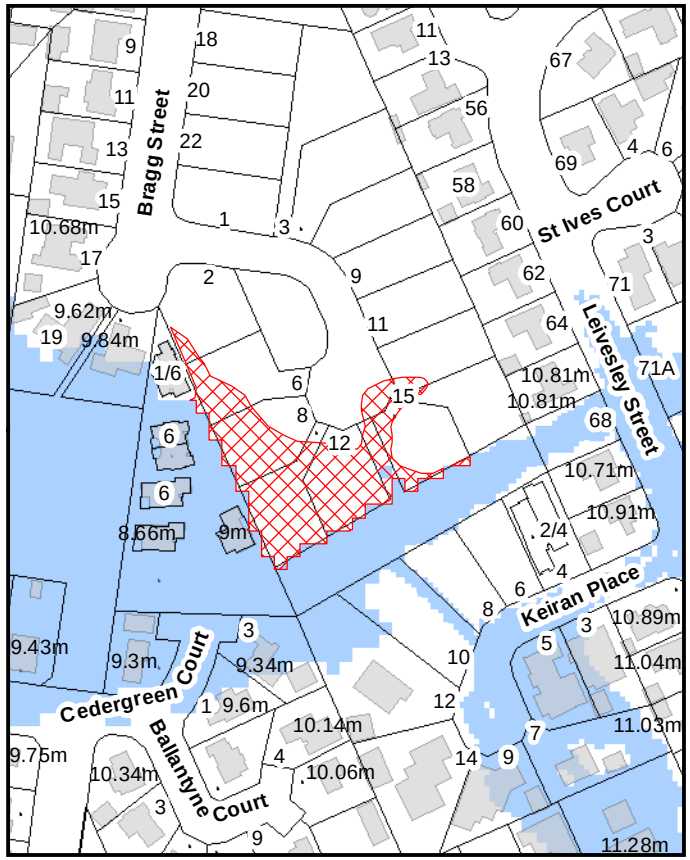
Fill and drainage works associated with 12 Bragg St, Bundaberg East (MTR Development Pty Ltd 321.2016.46365.1 and operational works 523.2017.11.1) has changed the river and localised flood characteristics in the vicinity of the development.

### Current Flood Hazard Area




### Aerial Photography (2020)

### Proposed Flood Hazard Area




**Legend**

- Area Added
- Area Removed
- Building Footprint (Floor Level)
- Flood Hazard Area

N

0 — 210

Meters

1:2,901

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

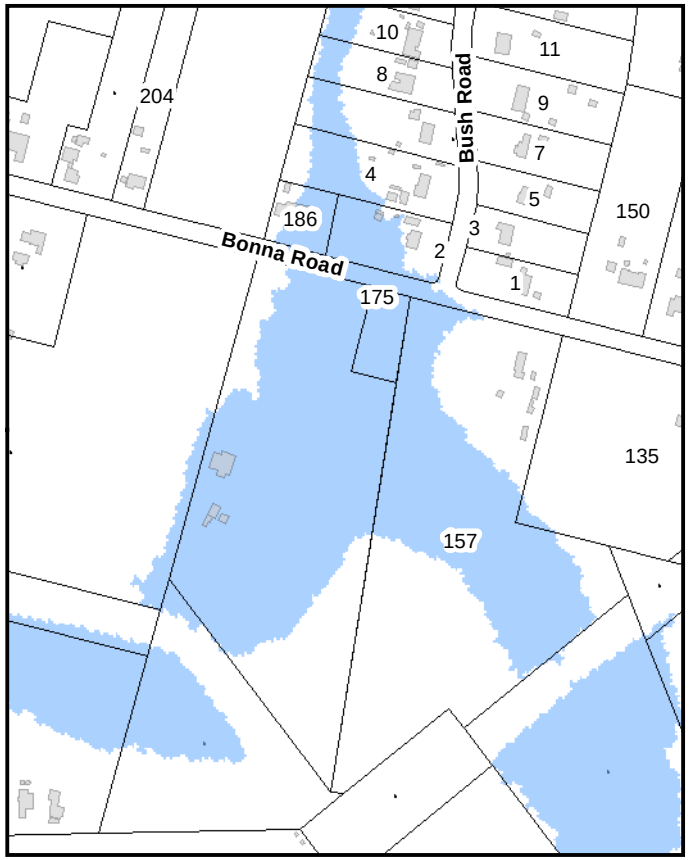
**Proposed Change Details:**

Reason for Change: Operational works has change flooding in the area (185 Bonna Road  Development)
Council Reference: 523.2019.96.1

**Description:**

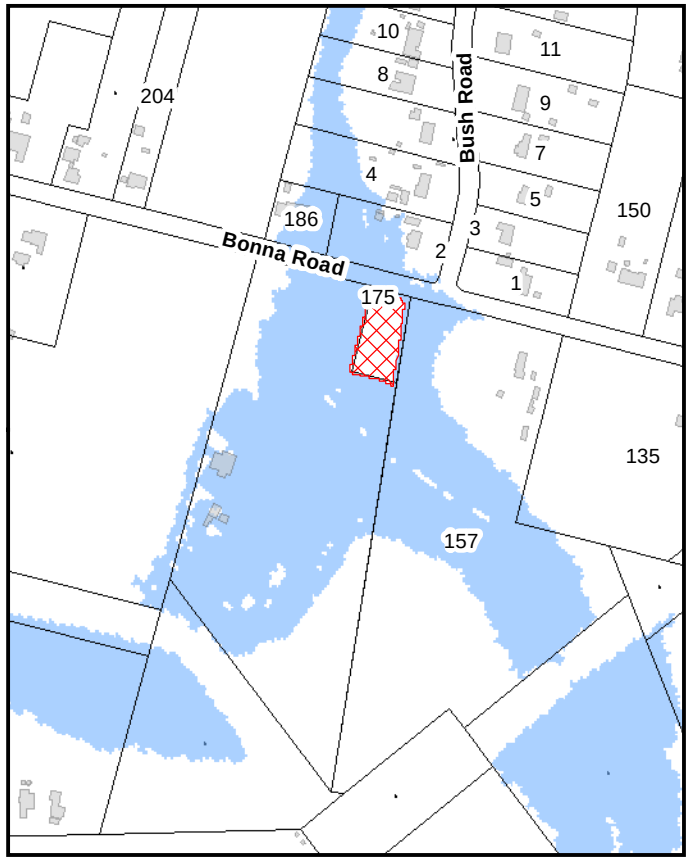
Fill and drainage works associated with 185 Bonna Road Rd, Branyan (521.2017.31.1 and operational works 523.2019.96.1) has changed the localised flood characteristics in the vicinity of the development.

**Current Flood Hazard Area**




**Aerial Photography (2020)**

**Proposed Flood Hazard Area**




**Legend**

- Area Added
- Area Removed
- Building Footprint (Floor Level)
- Flood Hazard Area

N

0 500

Meters

1:7,906

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

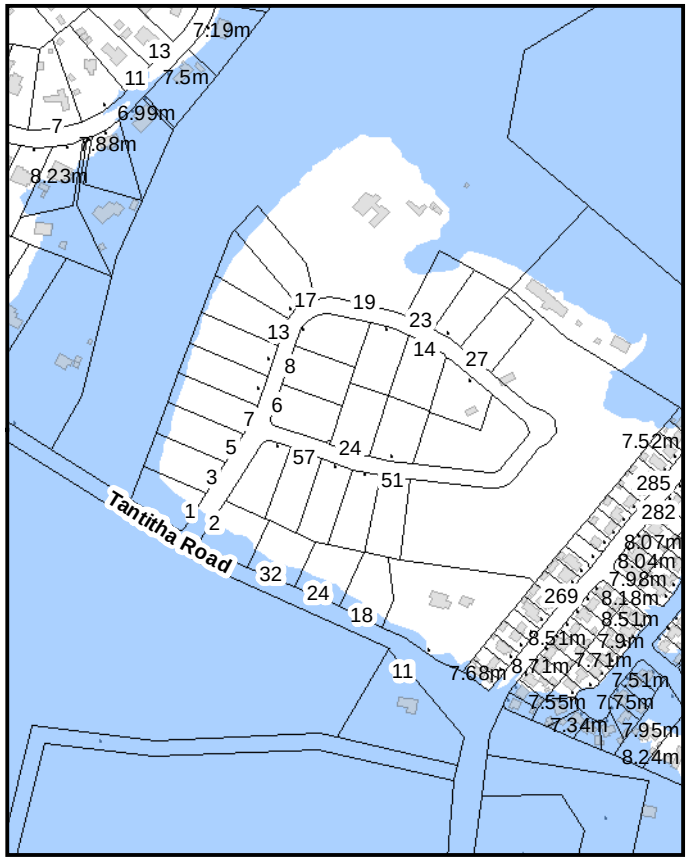
**Proposed Change Details:**

Reason for Change: Operational works has change flooding in the area (Tantitha Rise Development)
Council Reference: 523.2018.43.1

**Description:**

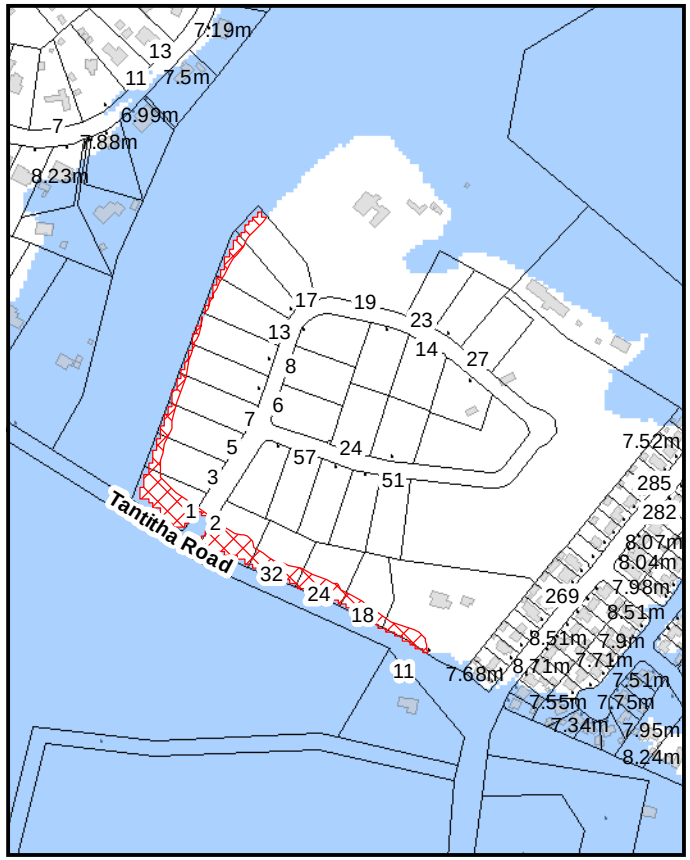
Fill and drainage works associated with 293A Fairymead Rd (Tantitha Rise 321.2014.40478.1 and operational works 523.2018.43.1) has changed the river and localised flood characteristics in the vicinity of the development.

**Current Flood Hazard Area**




**Aerial Photography (2020)**

**Proposed Flood Hazard Area**




**Legend**

- Area Added
- Area Removed
- Building Footprint (Floor Level)
- Flood Hazard Area

N

0 500

Meters

1:9,366

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL

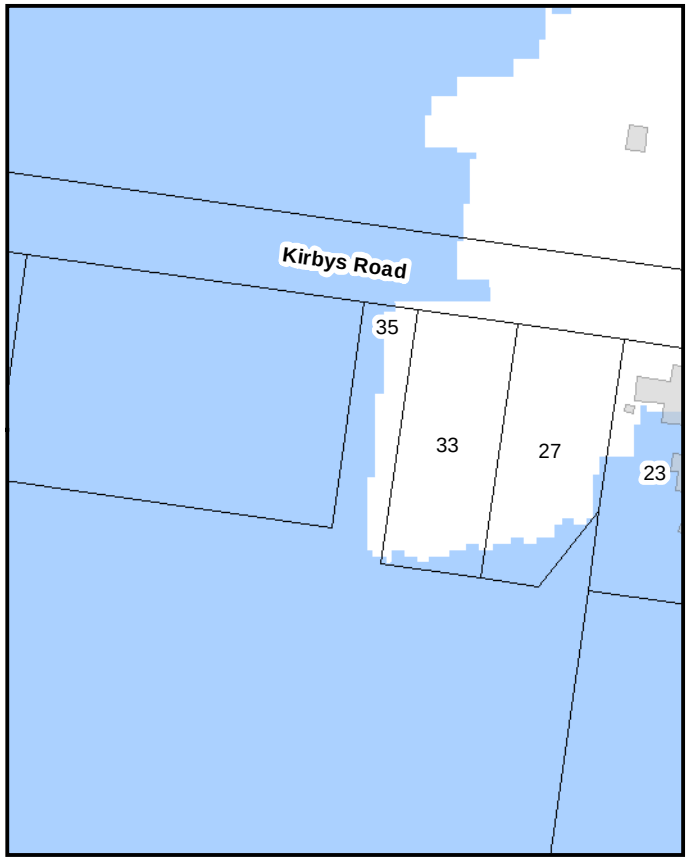
**Proposed Change Details:**

Reason for Change: Operational works has change flooding in the area (Kirbys Road Development)
Council Reference: 323.2015.43354.1

**Description:**

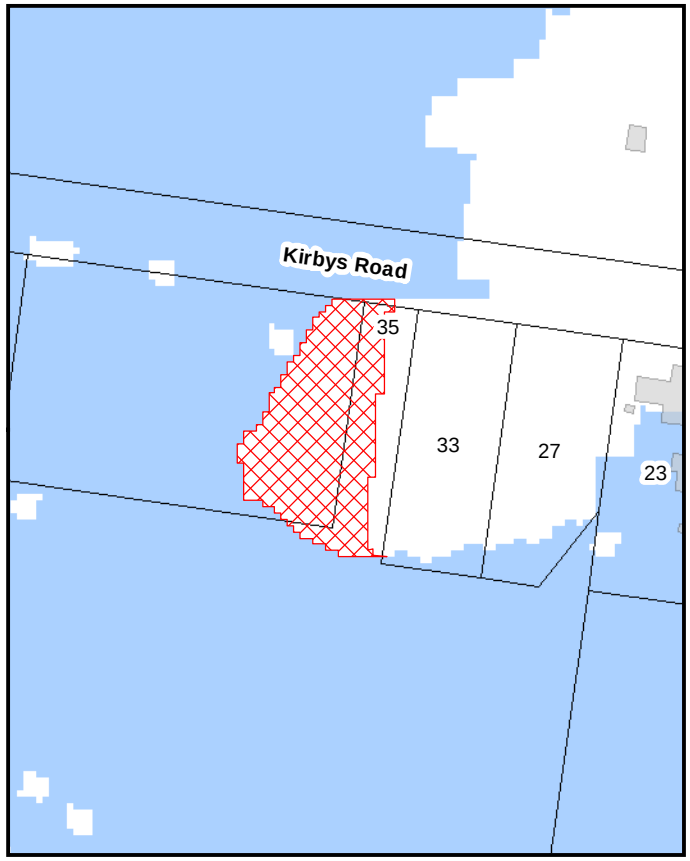
Fill and drainage works associated with Kirbys Rd, Kalkie (521.2021.165.1 and operational works 323.2015.43354.1) has changed the localised flood characteristics in the vicinity of the development.

**Current Flood Hazard Area**




**Aerial Photography (2020)**

**Proposed Flood Hazard Area**




**Legend**

- Area Added
- Area Removed
- Building Footprint (Floor Level)
- Flood Hazard Area

N

0 210

Meters

1:3,003

Co-ordinate System: GDA94 MGA Zone 56

BUNDABERG REGIONAL COUNCIL