REPORT

Phase 4 Land use planning flood provisions

PREPARED FOR
IPSWICH CITY COUNCIL

July 2022

Meridian Urban

WATER TECHNOLOGY

QUALITY STATEMENT

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REVISION SCHEDULE

Rev No.	Date	Description	Prepared by	Checked by	Reviewed by	Approved by
1	9/05/2022	Working Draft Report	UK /KK	KK	SD	SD
2	2/06/2022	Draft Report	KK	KK	SD	SD
3	27/06/2022	Daft Report, incorporating updates from Council received 20/06/2022	KK	KK	SD	SD
4	12/07/2022	Draft Report, incorporating Council comments	KK	KK		SD
5	26/07/2022	Final Report	KK	KK		SD
6	28/07/2022	Appendix B added	KK			KK

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The client acknowledges and agrees that Meridian Urban has not created or contributed to the creation or existence of this hazard and the Client indemnifies Meridian Urban for claims arising out of or resulting from a flood event except to the extent attributable to the negligence of Meridian Urban.

The Client agrees that the Consultant shall have no liability in respect of any damage or loss incurred as a result of flood.

Ipswich City Council

Phase 4 Land use planning flood provisions

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1 Introduction

1.1 Purpose

Meridian Urban, in partnership with Water Technology, have been engaged by Ipswich City Council (Council) to deliver and integrate flood risk assessment outputs from Council's recently completed Ipswich Integrated Catchment Plan (IICP) into the proposed new Ipswich planning scheme.

The project is broken down into five phases, as shown below in **Figure 1**. Phases 1, 2 and 3 were completed in late 2021 and early 2022, and this report, phase 4, builds upon this work.

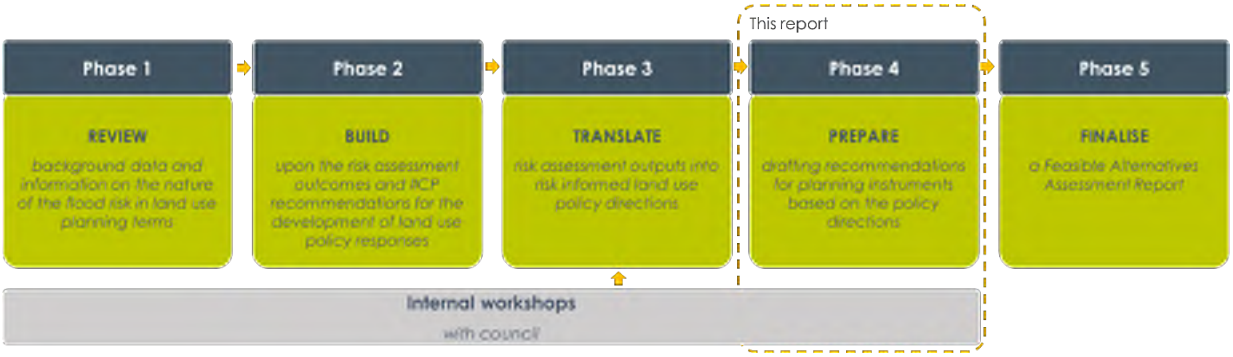


Figure 1 - Overarching project phases

The purpose of this report is to recommend land use planning flood provisions for the new planning scheme based on the policy directions identified within Phases 1 to 3. The Phases 1 to 3 report translated the outcomes from the **Ipswich Integrated Catchment Plan, 2021 (IICP) into local policy responses for their integration into the new planning scheme.**

2 Policy context

This section outlines the local policy context for flood in Ipswich. It is the first step in understanding what the statutory requirements and best practice principles are for managing flood, as well as provide an understanding of the existing planning scheme policy framework for flood.

Figure 2 provides a summary of the policy environment which includes three key areas of consideration being state statutory requirements under the *Planning Act 2016* (Planning Act) to best practice guidance, to the local policies and plans.

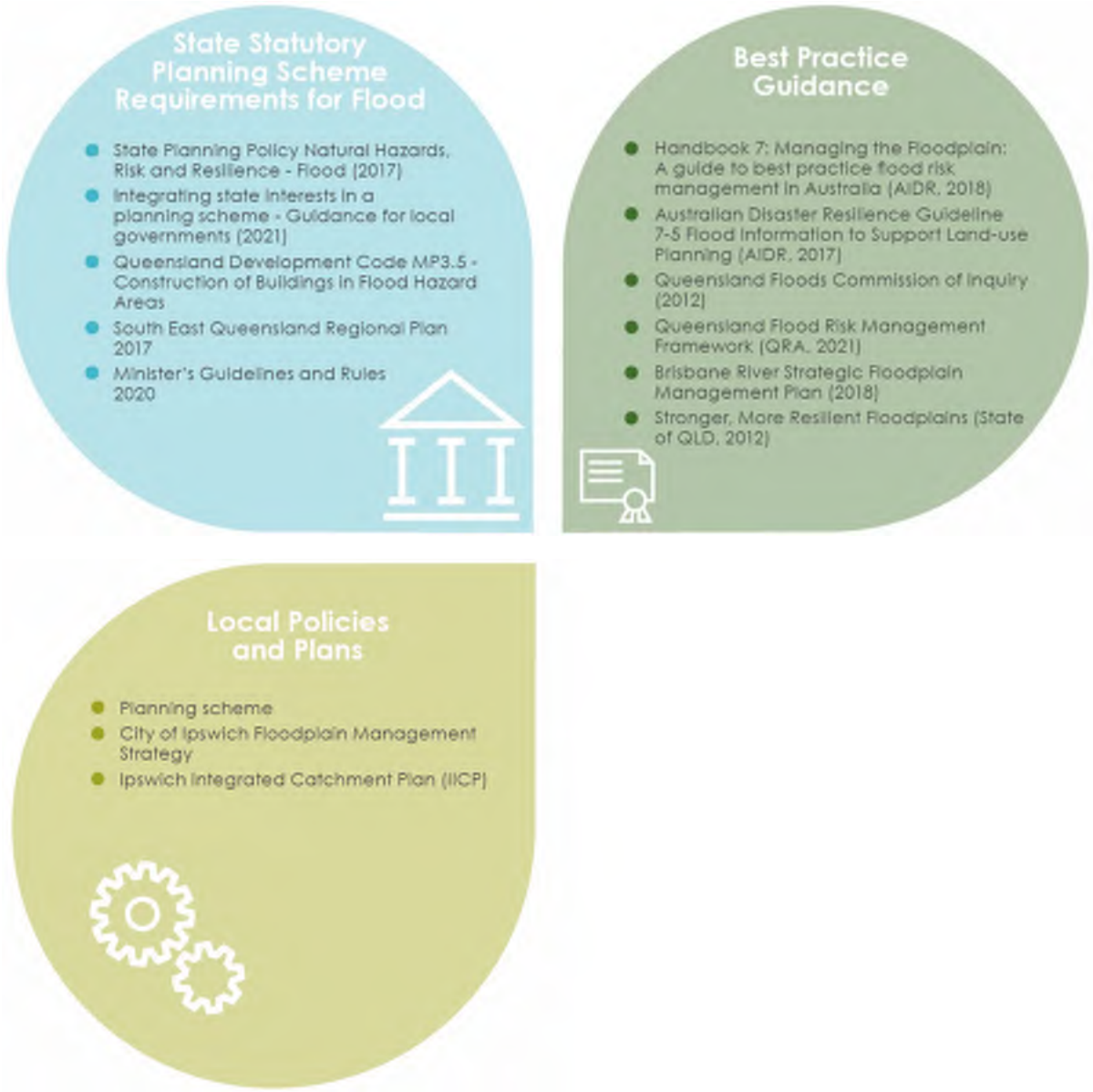


Figure 2 - Flood policy environment for land use planning

2.1 State planning scheme requirements for flood

The Planning Act establishes the framework for achieving ecological sustainable development which includes state planning policies outlined in the Queensland Governments' single State Planning Policy (SPP 2017) document. The SPP 2017 expresses the matters of State interests in land use planning and development. The SPP Integrated Mapping System (SPP IMS) provides the spatial articulation for a number of those interests.

Natural hazards, risk and resilience is identified as a key state interest which seeks that 'the risks associated with natural hazards, including the projected impacts of climate change, are avoided or mitigated to protect people and property and enhance the community's resilience to natural hazards'.

In particular, the SPP requires that:

Table 1 - Relevant State interest policies

State interest policy (summarised)	Relevance to ICC
1 – Natural hazard areas are identified (i.e., mapped)	✓
2 – A fit-for-purpose risk assessment is undertaken	✓
4 – Development avoids natural hazard areas or mitigates risk to an acceptable or tolerable level	✓
5 – Development incorporates a range of risk reduction and resilience measures	✓
6 – Community infrastructure is located and designed to limit risk and maintain functionality	✓

In addition to the content-related state interest policies contained within the SPP 2017, plan-drafting is to align with the guiding principles contained within the SPP. The guiding principles are intended to support the provisions for plan drafting and ensure the planning scheme is outcome focused, integrated, efficient, positive, and accountable.

Upon commencement of the existing Ipswich Planning Scheme in 2004, the planning scheme was identified to have appropriately reflected the former *State Planning Policy 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide* (SPP 1/03).

2.1.1 SPP guidance for local governments

The Queensland Government has prepared the *Integrating state interests in a planning scheme – Guidance for local governments, November 2021 – VS 1.2* (the SPP guideline) to assist local government in the interpretation, integration and advancement of the state interests articulated in the state planning instruments when making or amending their planning scheme.

The SPP guideline:

- is not statutory in its effect and does not constitute mandatory steps or mandatory scop of considerations;
- does not contain new policy;

- illustrates the scope and nature of planning scheme provisions that may contribute to integrating each state interest based on the matters relevant to their local situation and the nature of the planning scheme amendment proposed; and
- will assist state agencies in assessing whether a planning scheme amendment has effectively integrated the state interest and advanced the state interests of the relevant regional plan (to the extent applicable).

The SPP guideline sets out drafting considerations related to flood for the State interest – natural hazards, risk and resilience as set out in **Table 2** below:

Table 2 - SPP 2017 guideline flood considerations for drafting planning scheme provisions

State interest policy	Considerations
Strategic Outcomes *The strategic outcomes provide the planning scheme intent for delivering the state interest. The level of detail contained in the strategic outcomes will be informed by the local government context.*	
4	Do strategic outcomes acknowledge the role in factors such as climate change in the need to respond to natural hazards four current and future development?
4	Do strategic outcomes acknowledge the interrelationship of different parts of the water cycle in the management of flood, such as urban and rural development adopting best practice water catchment planning, using water sensitive design and climate responsive building?
1 & 4	Do strategic outcomes acknowledge the presence of flood hazard areas in the planning scheme area? The response to flood involves avoidance and mitigation, given the extensive urban development and infrastructure investment that has already occurred in the floodplain.
4 & 5	Do strategic outcomes promote a risk-responsive settlement pattern that avoids inappropriate development in flood hazard areas?
4	Do strategic outcomes identify land for future flood hazard mitigation works and protect this land from development where it may prevent the delivery of this function?
4	Where appropriate development may occur in flood hazard areas, do strategic outcomes promote strategies to mitigate risks associated with that development to an acceptable or tolerable level, to protect the safety of people, property and the environment?
5	Do strategic outcomes specifically discourage development in the flood hazard area where this may: 1. Place additional burdens on disaster management capacity, the community and government? 2. Risk disruption to the effective functioning of essential community infrastructure or vulnerable uses during and immediately after a hazard event? 3. Result in the loss of valuable property? 4. Increase the severity of the flood event?
5	Do strategic outcomes support development that is compatible with maintaining the natural functions of the floodplain and the retention of existing riparian vegetation that can mitigate some risks (for example, stream bank erosion) from flooding?
Mapping *Mapping helps users understand and interpret where and how state interest policies apply in the local government area.*	
1	Does planning scheme mapping identify the location of and (where appropriate) refine flood hazard areas in the planning scheme area (and otherwise, identify areas where no flood information is available)? These are mapped in the **SPP IMS**. *Note – The SPP identifies when layers may be locally refined.*

Zones/Overlays/Local Plans *Land should be able to be used for the purpose it is zoned. In allocating a zone to land, or in applying locally specific provisions (such as a zone precinct, overlay or local plan).*	
4	**When updating a settlement pattern or changing a land use intent:** Does the choice of zone/locally specific provisions avoid allocating land for new urban development in areas of unacceptable flood hazard and discourage expansion and intensification of inappropriate urban settlement in existing areas of flood hazard? For example: 1. Identify new urban areas for expansion or intensification in new or existing areas with acceptable or tolerable flood risks and safe evacuation routes for flood events greater than the Probable Maximum Flood (PMF). 2. Limit increases in density relative to the flood risk in existing urban flood hazard areas. 3. Promote more compatible and resilient land uses in flood hazard areas. In areas of intolerable risk where future uses are highly constrained, including land in the Limited development zone may provide transparency regarding the level of hazard.
5	**When updating a settlement pattern or changing a land use intent:** Does the choice of zone/locally specific provisions support anticipated development types that would not be of a form that is likely to result in increases in water-flow velocity or flood levels or increase the potential for damage on the site or to other properties?
4, 5 &6	**Where land is included in a flood hazard area:** Does the choice of zone/locally specific provisions consider the uses envisaged by each zone and whether the risks associated with flood can be mitigated to acceptable or tolerable levels for those uses? The zone and/or locally specific mapping intent may then be adjusted to reflect flood-appropriate land uses / provide guidance on the compatibility of different uses, considering: 1. The flood scenario under which the use will cease to function effectively and the likelihood of such an event. 2. The consequences of and community tolerance to loss of a community service during and immediately after a flood hazard event. 3. Whether the use will place additional burden on government disaster management operations or on recovery capacity. 4. The degree of sensitivity of the use to property loss or damage. For example, intents discourage the following uses from establishing in flood hazard areas. As a minimum these uses should be located outside areas affected by the DFE: 1. Uses catering to vulnerable persons requiring unique evacuation requirements (such as hospitals, education establishments, childcare centres, aged care accommodation, nursing homes, and high-security correctional centres). 2. Community infrastructure that will perform an important role and be required to function during and immediately after a flood hazard event (also consider other uses that may need to perform a role during or after a flood event, for example showgrounds and sports facilities can perform an active role in flood response and recovery, serving as emergency accommodation and recovery staging points). 3. Expansion of the above existing uses in these areas unless evacuation solutions and resilient design can be achieved – refer assessment benchmarks below. 4. Community infrastructure that protects valuable equipment and artefacts (such as museums, libraries, art galleries, archives) – refer assessment benchmarks for mitigation strategies where this is not possible. 5. Hazardous industries and uses that involve the storage of significant amounts of hazardous material. 6. Rural land uses such as intensive animal husbandry and intensive agriculture.

Categories of development and Categories of assessment *Set categories of development and categories of assessment which support the achievement of the spatial outcomes (zones, overlays, local plans).*	
5 & 6	Do the categories of development and categories of assessment reflect the level of risk and vulnerability of the use? For example, are identified vulnerable uses and community infrastructure uses assessable within the flood hazard area? This will enable assessment benchmarks to apply so that impacts can be fully considered.
5	Are aspects of development that may impact on, or be impacted by, flood hazard assessable? For example: Reconfiguring a lot facilitating increases in population within the flood hazard area. Significant earthworks and works involving the redirection of the existing overland flow paths. This will enable assessment benchmarks to apply so that impacts can be fully considered.
5	**Where for development involving the storage of significant amounts of hazardous material in a flood hazard area:** Is development assessable? This will enable assessment benchmarks to apply so that impacts can be fully considered.
Assessment Benchmarks *Prepare assessment benchmarks that deliver the outcomes. Assessment benchmarks measure the extent to which a development achieves the intended outcome, in this case, the intent of the state interest policy.*	
5	**Where in areas of potential flood risk:** Do assessment benchmarks require site-based investigations? For development proposed on land where the potential for flooding is unknown, the assessment benchmarks may require: 1. Information to enable an assessment of whether the subject land is susceptible to flooding. 2. Upon determination that the subject land is susceptible to flooding, more detailed information to allow an assessment of the flood risk. *Note – A planning scheme policy may specify the scope and methodology to be followed in preparing a site-based flood study and risk assessment, in support of a development application for a site in a flood hazard area.*
4 & 5	**Where land is included in low, medium and/or high risk flood hazard areas:** Do assessment benchmarks: 1. Set thresholds such as finished floor levels for development, where appropriate? 2. Contain strategies so development does not affect floodplain behaviour in a way that may increase the number of people at risk to an intolerable level or cause or contribute to increase in the level of risk on surrounding people and property? For example, avoid filling, altering flow-paths or adversely changing flood duration, depth, velocity, hazard or warning time. 3. Contain siting, design and transport infrastructure requirements that: a. Enable people to safely shelter in place (depending on the nature of the risk)? b. Enable the safe self-evacuation of occupants and visitors from the hazard area? c. Provide for effective disaster response and recovery, such as safe and efficient access and operation for emergency services and the supply of essential goods and services? 4. Require the retention or enhancement of riparian corridors and vegetation that provide a protective function during flood events, maintain the natural function of the floodplain and potentially reduce the need for built mitigation infrastructure?

	5. Consider requiring evacuation routes and the provision of LGIP infrastructure as potential mitigation measures? *Note – In addition, local government may seek to alert their community to the Flood Resilient Building Guidance for Queensland Homes non-statutory guidance document that contains considerations for improving the flood resilience of homes.*
5	**Where for development in a flood hazard area involving vulnerable uses and essential community infrastructure that must continue operating during or after a flood event:** Do assessment benchmarks require development to be located above the height of the PMF or other known extreme event to achieve the highest practical level of flood immunity?
6	**Where for development in a flood hazard area involving essential community infrastructure**: Do assessment benchmarks contain siting, design and access standards to achieve the required level of functionality during and immediately after a flooding hazard event?
6	**Where for development in a flood hazard area for community infrastructure that protects valuable equipment and artefacts:** Do assessment benchmarks require this development to be located above the height of the DFE?
6	**Where for development involving the storage of significant amounts of hazardous material in a flood hazard area:** Do assessment benchmarks include design measures so that hazardous materials are not exposed to flood waters and/or are appropriately sealed to avoid the release of hazardous materials as a result of a flood hazard event and evacuation plans to safely remove hazardous materials to alternative sites are in place in the event of a flood?

2.1.2 Planning Regulation considerations

The Planning Act requires that a planning scheme must be consistent with the category of development and category of assessment provided in the Planning Regulation 2017 (Planning Regulation), and the Planning Regulation prevails to the extent of any inconsistency. The Planning Regulation also outlines **development that a planning scheme is prohibited from stating is assessable development** in Schedule 6.

2.1.2.1 Dwelling house, dual occupancy or class 10 buildings

A material change of use for a dwelling house or for a class 10 building or structure (i.e., non-habitable building such as sheds and carports, or structures such as fence, retaining wall, swimming pool) if the use is for a residential purpose in a residential zone is not assessable development, **unless an overlay applies to the premises**, as identified in the local categorising instrument and relevant to assessment of the material change of use (as shown in **Figure 3**).

However, an overlay is not applicable to a material change of use for a dual occupancy if the use is for a residential purpose in a residential zone and either a material change of use involves repairing, renovating, altering or adding to the dual occupancy in a way that does not change the classification for the dual occupancy under the Building Code; or if the dual occupancy is made up of two attached dwellings (the local government for the local government area where the premises are has, by resolution, decided to apply this subsection to the premises).

In sum, the planning scheme can use a flood overlay to make the following development assessable against the overlay code provisions:

- a dwelling house;
- a new dual occupancy development (i.e., not involving repairing, renovating, altering or adding to the dual occupancy in a way that does not change the classification for the dual occupancy under the Building Code); or
- class 10 building or structure.

2.1.2.2 Community residence

The Planning Regulation provides that a local characterising instrument is prohibited from stating a material change of use for a community residence is assessable development in a prescribed zone.

Community residence is defined as the use of premises for residential accommodation, that includes a building or structure associated with the use, for:

(i) no more than—

(A) 6 children, if the accommodation is provided as part of a program or service under the *Youth Justice Act 1992*; or

(B) 6 persons who require assistance or support with daily living needs; and

(ii) no more than 1 support worker.

For a community residence, a prescribed zone means:

- general residential zone, low density residential zone, low-medium density residential zone, medium density residential zone, high density residential zone, character residential zone or tourist accommodation zone;
- centre zone, neighbourhood centre zone, local centre zone, district centre zone, major centre zone or principal centre zone;
- community facilities zone;
- environmental management and conservation zone;
- rural zone;
- rural residential zone; or
- a zone that is of a substantially similar type to the above.

In sum, generally a material change of use for a community residence cannot be assessable development.

2.1.2.3 Other uses of note

The Planning Regulation provides that a local characterising instrument is prohibited from stating a material change of use for cropping that involves forestry for wood production is assessable development if the premises is in a rural zone and the material change of use complies with schedule 13.

Part 2 Material change of use

2 Material change of use for particular buildings or structures

(1) A material change of use of premises for a class 1 or 2 building, if the use is providing support services and temporary accommodation for persons escaping domestic violence.

(2) A material change of use of premises for a dwelling house, if—

(a) the use is for a residential purpose in a residential zone; and

(b) either—

(i) there is no dwelling on the premises; or

(ii) the material change of use involves repairing, renovating, altering or adding to the dwelling house in a way that does not change the classification for the dwelling house under the Building Code; and

(c) either—

(i) no overlay, as identified in the local categorising instrument and relevant to assessment of the material change of use, applies to the premises; or

(ii) only an overlay about bush fire hazards applies to the premises and the premises are less than 2,000m².

(3) A material change of use of premises for a dual occupancy, if—

(a) the use is for a residential purpose in a residential zone; and

(b) either—

(i) the material change of use involves repairing, renovating, altering or adding to the dual occupancy in a way that does not change the classification for the dual occupancy under the Building Code; or

(ii) if the dual occupancy is made up of 2 attached dwellings—the local government for the local government area where the premises are has, by resolution, decided to apply this subsection to the premises.

(4) A material change of use of premises for a class 10 building or structure, if—

(a) the use is for a residential purpose in a residential zone; and

(b) either—

(i) no overlay, as identified in the local categorising instrument and relevant to assessment of the material change of use, applies to the premises; or

(ii) only an overlay about bush fire hazards applies to the premises and the premises are less than 2,000m².

Figure 3 - Extract from Planning Regulation, Schedule 6 Development local categorising instrument is prohibited from stating is assessable development

2.2 Building provisions in planning schemes

The planning system maintains a natural relationship with building provisions. Planning schemes set out whether development can occur in an area whereas building assessment provisions (BAPs) detail how to build. Generally, it is not appropriate to include BAPs in a planning scheme.

The primary BAPs that a planning scheme cannot include are matters covered by the Building Code of Australia (BCA) and parts of the Queensland Development Code (QDC).

Section 8 of the *Planning Act 2016* provides that:

> ***(5) A local planning instrument must not include a provision about building work, to the extent the building work is regulated under the building assessment provisions, unless allowed under the Building Act.***
>
> *(6) To the extent a local planning instrument does not comply with subsection (5), the local planning instrument is of no effect.*

2.2.1 Designation of a natural hazard management area

With regards to flood hazard, a planning scheme may designate **a natural hazard management area (flood) and declare a defined flood level, maximum flow velocity of water, inactive flow or backwater area, freeboard that is more than 300 ml or finished floor level of Class 1 buildings built in all or part of the designated flood area.**

Sections 32 and 33 of the *Building Act 1975* provide the matters a planning scheme may include:

> ***32 Local laws, local planning instruments and local government resolutions that may form part of the building assessment provisions***
>
> *A local government may make or amend—*
>
> *(a)* ***a local planning instrument that designates, for the BCA or QDC, matters prescribed under a regulation****; or*
>
> *Example of a matter that may be prescribed— designated bush fire prone areas for the BCA*
>
> *(b) a provision of a local law or planning scheme or a resolution about an aspect of, or matter related or incidental to, building work prescribed under a regulation; or*
>
> *Examples of aspects that may be prescribed— swimming pool fencing or land liable to flooding*
>
> *(c) alternative provisions under section 33.*
>
> ***33 Alternative provisions to QDC residential design and siting provisions for particular buildings***
>
> *(1) This section applies for work (relevant work) that—*
>
> *(a) is building assessment work or accepted building work; and*
>
> *(b) is for a relevant building or a class 10 building or structure located on the same allotment as a single detached class 1 building.*
>
> ***(2) A planning scheme or PDA instrument may include provisions (alternative provisions) that, for relevant work, are alternative or different to the QDC residential design and siting provisions.***
>
> ***(3) However, a planning scheme or PDA instrument may include alternative provisions only if the provisions are a qualitative statement or quantifiable standard****.*
>
> *(4) If there are alternative provisions for relevant work, the QDC residential design and siting provisions only apply to the extent the alternative provisions do not apply to the work.*
>
> *(5) Alternative provisions cannot be made other than under a planning scheme or PDA instrument.*

(6) In this section—

***PDA instrument** means a relevant development instrument for a priority development area, made under the Economic Development Act 2012.*

***qualitative statement** means a statement about a performance or outcome sought to be achieved when applicable buildings or structures are completed.*

***quantifiable standard** means a standard that achieves a performance or outcome sought under a qualitative statement.*

***relevant building** means a building that is— (a) a single detached class 1 building; or (b) a building of a class and type prescribed by regulation*

Section 8 of the Building Regulation 2021 (Building Regulation) provides:

8 Designation of area liable to flooding

(1) A local government may in a planning scheme, temporary local planning instrument under the Planning Act or by resolution—

(a) designate all or part of its area as a flood hazard area; and

(b) declare the following matters for all or part of the designated flood hazard area—

i. the defined flood level;

ii. the maximum flow velocity of water;

iii. an inactive flow or backwater area;

iv. a freeboard that is more than 300mm;

v. the finished floor level of class 1 buildings built in all or part of the flood hazard area.

(2) The local government must, in designating a flood hazard area, comply with—

(a) a State planning policy; and

(b) if a temporary State planning policy is in effect when the designation is made—the temporary State planning policy to the extent it applies in relation to the designation.

(3) If the local government makes a designation or declaration under subsection (1), the local government must state in the planning scheme, temporary local planning instrument under the Planning Act or resolution, that the designation or declaration is made under this section.

Note— QDC part 3.5 applies to the carrying out of particular building work carried out wholly or partly within a flood hazard area and a defined flood level is declared by a local government for the area.

(4) The local government must keep a register of—

(a) each flood hazard area designated by the local government; and

(b) the date each area was designated as a flood hazard area.

Note— For public access to the register see the Planning Act, section 264 and the Planning Regulation 2017, schedule 22.

(5) In this section—

***defined flood level** means the level to which it is reasonably expected flood waters may rise.*

***finished floor level** means the level of the uppermost surface of a finished floor not including any floor covering.*

Examples of a floor covering— carpet, tiles

freeboard *means a height above the defined flood level that takes account of matters that may cause flood waters to rise above the defined flood level.*

Examples of matters that may cause a flood level to rise above the defined flood level— wave action, localised hydraulic behaviour

inactive flow or backwater area *means all or part of a flood hazard area where the maximum flow velocity of water is not likely to be greater than 1.5m/s.*

maximum flow velocity of water*, for all or part of a designated flood hazard area, means a flow velocity of water reasonably expected to be the maximum flow velocity of water for all or part of the area.*

State planning policy *means a State planning policy under the Planning Act, other than a temporary State planning policy.*

temporary State planning policy *see the Planning Act, section 12.*

2.2.2 Building matters a planning scheme cannot include

A planning scheme cannot include mandatory parts in the current parts of the Queensland Development Code, which includes **Mandatory Part 3.5 – Construction of buildings in flood hazard areas (MP3.5)**. For MP3.5 to be considered, the planning scheme must designate all or part of its LGA a flood hazard area and include a statement that a designation / declaration has been made under the Building Regulation.

MP3.5 of the QDC regulates the design and construction of buildings in designated flood hazard areas to ensure they resist flotation, collapse or significant permanent movement resulting from actions during the 'defined flood event', including the design and location of utilities and customer dedicated substations and protection from backflow from sanitary drains. MP3.5 only applies to the extent the building work is carried out wholly or partly within a flood hazard area for new buildings and additions to, and a defined flood level is declared by a local government for the area (**Table 3**).

The purpose of MP3.5 is to ensure:

(a) particular buildings located in flood hazard areas—

i. resist flotation, collapse or significant permanent movement caused by flood water; and

ii. safeguard occupants and other people against illness or injury caused by flood water affecting buildings; and

iii. are protected from backflow; and

iv. have utilities that are protected from the effects of flood water; and

(b) that a customer dedicated substation is designed or located so its ability to function effectively is not affected by flood water.

MP3.5 applies to lawful building work in accordance with the following table:

Table 1 – Application of MP 3.5

Application	Performance Requirements			
	P1	P2	P3	P4
Construction of a new *class* 1 or a *class* 4 part of a *building*	✓	✓	✓	
Construction of a new class 2, 3, 9a or 9c *building*	✓	✓	✓	✓
Relocation of a *class* 1 *building*	✓	✓	✓	
Additions to a *class* 1 *building* where the additions constitute 50% or more of the *floor area* of the existing *building*	✓	✓	✓	
Additions to a *class* 2, 3, 9a or 9c *building*, or a *class* 4 part of a *building*	✓	✓		✓
Construction of a new *class* 5, 6, 7, 8 or 9b *building*		✓	✓	✓

*Any plumbing or drainage work mentioned in this Part is plumbing or drainage work under the *Plumbing and Drainage Act 2002* and is subject to the requirements under that Act.

Source: MP3.5 Construction of buildings in flood hazard areas

Amongst other matters, it is noted that MP3.5 does not apply to a building located, or proposed to be located, on a lot that is subject to:

- significant mudslide or significant landslide cause by rainfall or runoff, where it would be reasonable to expect that the mudslide or landslide would affect the part of the lot where the building is, or is proposed to be, located; or
- storm surge.

For the purposes of the table above, the following groups of buildings by their function and use are provided:

- **Class 1 buildings** – houses or dwellings of a domestic or residential nature:
  - Class 1a – a single dwelling being a detached house or one of a group of attached dwellings being a town house etc
  - Class 1b – is a boarding house, guest house or hostel that has a floor area less than 300m2
- **Class 2 buildings** – Apartment buildings – residential buildings containing two or more sole-occupancy units which may also be single storey attached dwellings where the is a common space
- **Class 3 buildings** – a residential building (other than a class 1 or 2 building) which is a common place of long term or transient living such as a boarding house, hostel, backpackers accommodation, residential part of a hotel, motel, school or detention centre, or could also include dormitory style accommodation, or q workers' quarters for shearers or fruit pickers. Class 3 buildings may also be "care-type" facilities such as accommodation buildings for children, the elderly, or people with a disability, and which are not considered to be Class 9 buildings
- **Class 4 buildings** – part of a building that is a dwelling or residence within a non-residential building (Class 5 to 9), such as a caretaker's residence in a hospital
- **Class 5 buildings** – office buildings for professional and/or commercial purposes (excluding Class 6 to 9), such as offices for government agencies, accountants, or lawyers
- **Class 6 buildings** – shops, restaurants and cafes where there is the sale of goods or the supply of services direct to the public
- **Class 7 buildings** – buildings including carparks, warehouses or storage buildings:
  - Class 7a – carparks

- Class 7b – warehouses, storage buildings or buildings for the display of goods (or produce) that is for wholesale

- **Class 8 buildings** – factories where buildings are used for production, assembling, altering, repairing, finishing, packing, or cleaning or goods or produce i.e., mechanics workshop, abattoir, laboratory
- **Class 9 buildings** – public buildings:
  - Class 9a – healthcare buildings such as hospitals and day surgery clinics
  - Class 9b – buildings where people assemble for social, political, theatrical, religious or civic purposes e.g., churches, schools, universities, sports facilities, night clubs
  - Class 9c – aged care facilities
- **Class 10 buildings or structures** – non habitable buildings or structures:
  - Class 10a – non-habitable buildings including sheds, carports, and private garages
  - Class 10b – structures such as fence, mast, antenna, retaining wall, swimming pool
  - Class 10c – private bushfire shelter associated within, but not attached to, a class 1a building

Table 3 - Modified excerpt from MP3.5

QDC, MP3.5 – Construction of building in flood hazard areas		Applicable building class/es	How a planning scheme can deal with this provision
PERFORMANCE REQUIREMENT	**ACCEPTABLE SOLUTION**		May not be modified, but planning scheme 'triggers' application
Design and construction of buildings			
P1 **A building must be designed, constructed, connected and anchored so that, in the event of a flood up to the DFL, it—** **(a) resists flotation, collapse or significant permanent movement, resulting from—** **(i) hydrostatic action; and** **(ii) hydrodynamic action; and** **(iii) erosion and scouring; and** **(iv) wind; and** **(v) any other action; and** **(b) safeguards occupants and other people against illness and injury caused by flood water affecting the building.**	A1 The building complies with sections 2.3, 2.5 - 2.8 and section 2.10 of the national flood standard, and— (a) if the building is a class 1 building and the local government has declared, under section 13 of the Building Regulation 2006, the finished floor level for a class 1 building—the finished floor level of the building complies with the level declared; or (b) otherwise—the finished floor level of the building complies with section 2.4 of the national flood standard. *Note— Where A1 does not apply (refer to the provision in this part with the heading 'Limitations'), an alternative solution will be required in order to ensure it complies with P1. To formulate an alternative solution, the services of a competent person may be required.*	Construction of a new: Class 1 – Residential Class 4 – Residential part Class 2 or 3 – Residential Class 9a or 9c – Health care / aged care Relocation of a Class 1 – Residential building Additions to a Class 1 – Residential building (50% or more) Additions to a: Class 2 or 3 – Residential Class 4 – Residential part Class 9a or 9c – Health care / aged care	
Design and location of utilities			
P2 **Utilities associated with a building, other than an electrical meter for a class 1 building, must be designed or located to reduce the effects of flood water on the utilities in the event of a flood up to the DFL.**	A2 (1) Utilities associated with a class 1 building, other than an electrical meter for the building, are located above— (a) if the local government has declared, under section 13 of the Building Regulation, the finished floor level for a class 1 building—the level declared; or (b) otherwise—the flood hazard level. (2) Utilities associated with a building other than a class 1 building are located above the flood hazard level. *Note— Electrical installations may be installed by a person only if the person is a licensed electrician. Electrical meters must be installed in accordance with electrical entity requirements.*	Construction of a new: Class 1 – Residential Class 4 – Residential part Class 2 or 3 – Residential Class 9a or 9c – Health care / aged care Relocation of a Class 1 – Residential building Additions to a Class 1 – Residential building (50% or more) Additions to a: Class 2 or 3 – Residential Class 4 – Residential part Class 9a or 9c – Health care / aged care Construction of a new: Class 5 – Business Class 6 – Commercial Class 7 – Industry Class 8 – Industry Class 9b – Public buildings where people assemble i.e., churches, schools	

Protection from backflow from sanitary drains			
P3 **A building with a sanitary drain must be protected from backflow so that in the event of a flood up to the DFL the effects of flood water on the building are reduced.**	A3 (1) A building with a sanitary drain is protected from backflow by a reflux valve fitted between the building and— (a) if the building has an onsite sewerage facility—the on-site sewerage facility; or (b) otherwise—the connection point. (2) Also, a reflux valve fitted under subsection (1) is accessible for maintenance in accordance with AS3500.2:2003, section 4.5. *Note— A reflux valve may be fitted by a person only if the person is licensed to fit the valve under the Plumbing and Drainage Act 2002*	Construction of a new: Class 1 – Residential Class 4 – Residential part Class 2 or 3 – Residential Class 9a or 9c – Health care / aged care Relocation of a Class 1 – Residential building Additions to a Class 1 – Residential building (50% or more) Construction of a new: Class 5 – Business Class 6 – Commercial Class 7 – Industry Class 8 – Industry Class 9b – Public buildings where people assemble i.e., churches, schools	
Design and location of customer dedicated substations			
P4 **A customer dedicated substation located in a building must be designed or located so its ability to function effectively is not affected by a flood event up to the DFL. Note— Under section 59(2)(a) of the Electricity Regulation 2006, an entity may require the owner of premises to provide space on the premises for a substation.**	A4 A customer dedicated substation located in a building is located above the DFL.	Construction of a new: Class 2 or 3 – Residential Class 9a or 9c – Health care / aged care Additions to a: Class 2 or 3 – Residential Class 4 – Residential part Class 9a or 9c – Health care / aged care Construction of a new: Class 5 – Business Class 6 – Commercial Class 7 – Industry Class 8 – Industry Class 9b – Public buildings where people assemble i.e., churches, schools	

Table 4 provides how the building provisions should be addressed in a planning scheme.

Table 4 - Addressing building provisions within a planning scheme

How to address building provisions
(a) Determine whether the planning scheme seeks to designate all or part of the local government area as a designated flood hazard area for the Building Regulation for the purpose of triggering MP3.5
(b) If so: i. Ensure these areas do not include areas subject to storm-tide inundation (unless also within a flood hazard area) Note – If the planning scheme mapping contains areas in both a storm-tide inundation area and a flood hazard area the flood triggers of MP3.5 will not apply to land in the identified storm-tide inundation area ii. Ensure the BAPs triggered to address flood hazard do not address storm tide inundation iii. Clearly state that the designation is made under section 8 of the Building Regulation iv. Maintain a register of all designated flood hazard areas and when each designation was made
(c) If the planning scheme declare a defined flood level or requirements, ensure the following precise terms are used: i. the defined flood level (DFL) – declaring of a defined flood level is necessary to trigger MP3.5 to apply ii. the maximum flow velocity of water iii. an inactive flow or backwater area iv. a freeboard that is more than 300mm v. the finished floor level of class 1 buildings built in all or part of the flood hazard area
(d) Clearly identify up-front in the planning scheme that BAPs are included and include notes as necessary to alert users to the implications of this e.g.: ***Editor's note – The flood hazard area defined by this planning scheme is taken to be the flood hazard area pursuant to section 8 of the Building Regulation 2021. Building work in a designated flood hazard area must meet the requirements of the relevant building assessment provisions under the Building Act 1975. 3. Designating land as a transport noise corridor for the QDC Refer to section 3.15 of Integrating building work in planning schemes – Guidance for local governments***

2.2.3 National Construction Code

The National Construction Code (NCC) comprises the Building Code of Australia (BCA), Volume One and Two; and the Plumbing Code of Australia (PCA), as Volume Three. It is a performance-based code which sets out the requirements for the construction of buildings including plumbing and drainage. The NCC has two different mandatory requirements:

1. **Performance requirements** – which outline certain criteria which must be met, being the minimum level that buildings, building elements and plumbing and drainage must meet; and
2. **General requirements** – which cover other aspects of applying the NCC including its interpretation, reference documents, the acceptance of design and construction (including related evidence of suitability / documentation) and the classification of buildings within the NCC.

With regards to buildings in flood areas, the NCC includes the following performance requirements:

Volume One Amendment 1, Section B Structure, Part B1 Structural Provisions

Performance Requirements

Qld BP1.4 Building work in designated flood hazard areas is regulated by the Building Act 1975 and the Queensland Development Code 3.5 - Construction of buildings in flood hazard areas.

Volume Two Amendment 1, Section 2 Performance Provisions, Part 2.1 Structure

Objective

O2.1 The Objective is to—

(a) safeguard people from injury caused by structural failure; and

(b) safeguard people from loss of amenity caused by structural behaviour; and

(c) protect other property from physical damage caused by structural failure; and

(d) safeguard people from injury that may be caused by failure of, or impact with, glazing.

Performance Requirements

P2.1.2 Buildings in flood areas provides that:

(a) A building in a flood hazard area must be designed and constructed, to the degree necessary, to resist flotation, collapse or significant permanent movement resulting from the action of hydrostatic, hydrodynamic, erosion and scour, wind and other actions during the defined flood event.

(b) The actions and requirements to be considered to satisfy (a) include but are not limited to—

i. flood actions; and

ii. elevation requirements; and

iii. foundation and footing requirements; and

iv. requirements for enclosures below the flood hazard level; and

v. requirements for structural connections; and

vi. material requirements; and

vii. requirements for utilities; and

viii. requirements for occupant egress.

P2.1.2 only applies to a Class 1 building.

P2.1.2 does not apply in Queensland.

Note: Building work in designated flood hazard areas is regulated by the Building Act 1975 and Development Code 3.5 - Construction of buildings in flood hazard areas.

It is noted that the NCC performance requirements BP1.4 and P2.1.2 do not apply in Queensland, with building work in designated flood hazard areas regulated under the Building Act and MP3.5.

ABCB Standard: Construction of buildings in flood hazard areas, 2012.3 (the Standard) provides the national standards for the design and construction of certain new buildings in flood hazard areas. The Standard provides additional requirements for buildings in flood hazard areas consistent with the objectives of the NCC, which primarily aim to protect the lives of occupants of those buildings in events up to and include the DFE. The Standard does not apply to parts of flood hazard areas which are also subject to:

- mudslide or landslide during periods of rainfall or runoff; or
- storm surge or coastal wave action.

Table 5 provides the standards at the national level as they align with in the BAPs set at the State level and then the relationship with the planning scheme.

Table 5 - Consideration of building assessment provisions within a planning scheme

National Construction Code	National Standard basic design requirements	Building Act / Regulation	MP3.5	Considerations for planning scheme provisions
P2.1.2 Buildings in flood areas (a) **A building in a flood hazard area must be designed and constructed, to the degree necessary, to resist flotation, collapse or significant permanent movement resulting from the action of hydrostatic, hydrodynamic, erosion and scour, wind and other actions during the defined flood event.** (b) **The actions and requirements to be considered to satisfy (a) include but are not limited to—** *i.* ***flood actions; and*** *ii.* ***elevation requirements; and*** *iii.* ***foundation and footing requirements; and*** *iv.* ***requirements for enclosures below the flood hazard level; and*** *v.* ***requirements for structural connections; and*** *vi.* ***material requirements; and*** *vii.* ***requirements for utilities; and*** *viii.* ***requirements for occupant egress.***	**2.3 Flood actions** General (a) Values of flood actions for use in design must be established that are appropriate for the type of structure or structural element, its intended use and exposure to flood action. (b) The flood actions must include, but not limited to, the following as appropriate: hydrostatic actions, hydrodynamic actions, debris actions, wave actions, erosion and scour. (c) The flood actions must be based on the DFE. **2.4 Floor height requirements** Unless otherwise specified by the appropriate authority- (a) the finished floor level of habitable rooms must be above the FHL; and (b) the finished floor level of enclosed non-habitable rooms must be no more than 1.0 m below the DFL. *Note: The structural provisions of this Standard are based on the DFL being a maximum of 1.0 m above the finished floor level of enclosed rooms. Therefore, if the appropriate authority permits more than 1.0 m, additional structural analysis should be undertaken.* **2.5 Footing system requirements** The footing system of a structure must provide the required support to prevent flotation, collapse or significant permanent movement resulting from the flood actions specified in Section 2.3. Requirements related to geotechnical considerations, footing system depth, piers, posts, columns and piles, use of fill and use of slabs are included. **2.6 Requirements for enclosures below the flood hazard level (FHL)** (a) Any enclosure below the FHL must have openings to allow for automatic	**8 Designation of area liable to flooding** (1) A local government may in a planning scheme, temporary local planning instrument under the Planning Act or by resolution— (a) designate all or part of its area as a flood hazard area; and (b) declare the following matters for all or part of the designated flood hazard area— i. the defined flood level; ii. the maximum flow velocity of water; iii. an inactive flow or backwater area; iv. a freeboard that is more than 300mm; v. the finished floor level of class 1 buildings built in all or part of the flood hazard area. (2) The local government must, in designating a flood hazard area, comply with— (a) a State planning policy; and (b) if a temporary State planning policy is in effect when the designation is made—the temporary State planning policy to the extent it applies in relation to the designation. (3) If the local government makes a designation or declaration under subsection (1), the local government must state in the planning scheme, temporary local planning instrument under the Planning Act or resolution, that the designation or declaration is made under this section. Note— QDC part 3.5 applies to the carrying out of particular building work carried out wholly or partly within a flood hazard area and a defined flood level is declared by a local government for the area. (4) The local government must keep a register of— (a) each flood hazard area designated by the local government; and (b) the date each area was designated as a flood hazard area.	**Design and construction of buildings** **Performance requirement** P1A building must be designed, constructed, connected and anchored so that, in the event of a flood up to the DFL, it— (a) resists flotation, collapse or significant permanent movement, resulting from— (i) hydrostatic action; and (ii) hydrodynamic action; and (iii) erosion and scouring; and (iv) wind; and (v) any other action; and (b) safeguards occupants and other people against illness and injury caused by flood water affecting the building. **Acceptable Solution** A1 The building complies with **sections 2.3, 2.5 - 2.8 and section 2.10 of the national flood standard**, and— (a) if the building is a class 1 building and the local government has declared, under section 13 of the Building Regulation 2006, the finished floor level for a class 1 building—the finished floor level of the building complies with the level declared; or (b) otherwise—the finished floor level of the building complies with **section 2.4 of the national flood standard.** *Note— Where A1 does not apply (refer to the provision in this part with the heading 'Limitations'), an alternative solution will be required in order to ensure it complies with P1. To formulate an alternative solution, the services of a competent person may be required.*	Ensure there is a clear statement in the planning scheme that a flood hazard area has been declared to instigate the application of MP3.5. Ensure that the flood hazard area excludes overland flow paths. A natural hazard risk assessment for storm tide inundation and erosion prone areas was undertaken to inform the new Ipswich planning scheme. It was found that the dominant source of inundation hazard was from riverine flooding. Therefore, it recommended that storm tide inundation risk is not considered significant to evoke a dedicated land use planning response and should not be mapped within the planning scheme. Ensure that the planning scheme declares the finished floor level of a building (for both residential and non-residential uses) with a freeboard that is more than 300mm. The Building Act / Regulation and MP3.5 (P1) regulates the structural design and construction of a building in flood hazard areas in relation to resisting flotation, collapse or permanent movement from the hydrostatic and hydrodynamic actions, erosion and scouring, wind and any other motion. With regards to the built form and design of a building and the protection and preservation of the streetscape amenity, reference should be made to the enclosure of buildings below the flood planning level and the need to use resilient building materials.

	entry and exit of floodwater for all floods up to the FHL. (b) The openings must meet the following criteria- (i) doors and windows must not be counted as openings but openings can be installed in doors and windows; and (ii) there must be a minimum of two openings on different sides of each enclosed area; and (iii) the total net area of all openings must be at least 1% of the enclosed area; and (iv) openings must permit a 75 mm sphere to pass through; and (v) any opening covers must not impede the flow of water.			The planning scheme includes requirements related to ensuring the evacuation of occupants / workforce during a flood emergency. As part of this, reference should be made in the planning scheme to ensuring that egress from buildings in accordance with Clause 2.10 of the National Standard basic design requirements is provided. Whilst MP3.5 provides A1 (as an acceptable solution only) which references compliance with Clause 2.10 for Class 1-4 and 9a and 9c buildings, a note should be included in the planning scheme which requires compliance with Clause 2.10 more broadly. P1 of MP3.5 does not apply to the construction of a new Class 5 – Business, Class 6 – Commercial, Class 7 – Industry, Class 8 – Industry or Class 9b – Public buildings where people assemble i.e., churches, schools buildings. Reference to the NCC standards should therefore be made in the planning scheme more broadly, related to Clauses 2.5 Footing system requirements, 2.6 Requirements for enclosures below the flood hazard level (FHL), 2.7 Requirements for structural attachments, 2.8 Material requirements, 2.10 Requirements for egress of the National Standard basic design requirements, as required.
	2.7 Requirements for structural attachments (a) Erosion control structures that are attached to the foundation or superstructure of the building must be structurally adequate and not reduce the structural capacity of the building during the DFE. (b) Decks, patios, stairways, ramps and the like below the FHL that are attached to the building must be structurally adequate and not reduce the structural capacity of the building during the DFE.			
	2.8 Material requirements (a) Materials used for structural purposes and located below the FHL must be capable of resisting damage, deterioration, corrosion or decay taking into account the likely time the material would be in contact with flood water and the likely time it would take for the material to subsequently dry out. (b) For the purposes of (a), materials used for structural purposes include loadbearing columns, bracing members, structural connections, fasteners, wall framing members and the like.			
	2.10 Requirements for egress Egress from a balcony, verandah, deck, door, window or the like must be available to allow a person in the building to be rescued by emergency services personnel,			

	if rescue during a flood event up to the DFE is required.			
	2.9 Requirements for utilities General (a) Utilities and related equipment, other than an electrical meter for the building, must not be placed below the FHL unless they have been designed specifically to cope with flood water inundation. Note: The location of electrical meters is regulated by the electrical authority. (b) Buried systems must be placed at a depth sufficient to prevent damage due to scour and erosion during the DFE. (c) Exposed systems must be designed to withstand the flood related actions (buoyancy, flow, debris and wave).		**Design and location of utilities** **Performance requirement** P2 Utilities associated with a building, other than an electrical meter for a class 1 building, must be designed or located to reduce the effects of flood water on the utilities in the event of a flood up to the DFL. **Acceptable solution** A2 (1) Utilities associated with a class 1 building, other than an electrical meter for the building, are located above— (a) if the local government has declared, under section 13 of the Building Regulation, the finished floor level for a class 1 building—the level declared; or (b) otherwise—the flood hazard level. (2) Utilities associated with a building other than a class 1 building are located above the flood hazard level. *Note— Electrical installations may be installed by a person only if the person is a licensed electrician. Electrical meters must be installed in accordance with electrical entity requirements.* **Protection from backflow from sanitary drains** **Performance outcome** P3 A building with a sanitary drain must be protected from backflow so that in the event of a flood up to the DFL the effects of flood water on the building are reduced. **Acceptable solution** A3 (1) A building with a sanitary drain is protected from backflow by a reflux valve fitted between the building and— (a) if the building has an onsite sewerage facility—the on-site sewerage facility; or (b) otherwise—the connection point. (2) Also, a reflux valve fitted under subsection (1) is accessible for maintenance in accordance with AS3500.2:2003, section 4.5. *Note— A reflux valve may be fitted by a person only if the person is licensed to fit the valve under the Plumbing and Drainage Act 2002* ***Design and location of customer dedicated substations*** **Performance outcome** P4 A customer dedicated substation located in a building must be designed or located so	This is about building-related utilities - switchboards etc. Reference to 'utilities' in the planning scheme should refer to utilities infrastructure in the likes of RALs e.g., underground electrical networks, standalone substations, etc.

			its ability to function effectively is not affected by a flood event up to the DFL. Note— Under section 59(2)(a) of the Electricity Regulation 2006, an entity may require the owner of premises to provide space on the premises for a substation. **Acceptable solution** A4 A customer dedicated substation located in a building is located above the DFL.	

2.3 Existing flood planning scheme provisions

The existing Ipswich planning scheme includes riverine flood and catchment flow provisions in its Development Constraints Overlays code for Flooding and Urban Catchment Flow Paths (Flood code).

The application of the Flood code is triggered where land is affected by the Development Constraints Overlay (Map OV5 Flooding and Urban Stormwater Flow Path Area) which was prepared in accordance with SPP 1/03. Map OV5 shows four key areas which are summarised below in **Figure 2**: Adopted Flood Regulation Line, I in 20 development line, urban catchment flow paths, and indicative and subject to further detailed assessment.

Generally, different provisions are included for residential uses, and commercial, industrial and other non-residential uses. Different provisions apply for these uses when land is situated below the 1 in 20 development line or when situated between the 1 in 20 development line and the adopted flood regulation line.

Of further note, the existing Flood code includes a specific provision for:

- **community infrastructure** requiring the use to be able to function effectively during and immediately after a flood hazard event;
- **uses that accommodate or otherwise cater for the aged, infirm or other at risk or mobility impaired people** such as hospitals and nursing homes which are not to be located below the adopted flood regulation line or within an urban catchment flow path;
- **basements** below the adopted flood regulation line or within an urban catchment flow path, which are to be waterproofed, with walls and floors impermeable to the passage of water, basement entry points and services to be located above the adopted flood level or incorporate effective barriers (i.e., flood gates) and the backup power source is to be provided and located above the adopted flood level where the basement relies on a pumping solution to manage floodwater ingress or for dewatering after a flood; and
- development that includes an **undercroft**, which ensures that the building and site design allows floodwaters and flood debris to pass predominantly unimpeded under the structure, is stabilised, resistant to scour, and designed to drain freely.

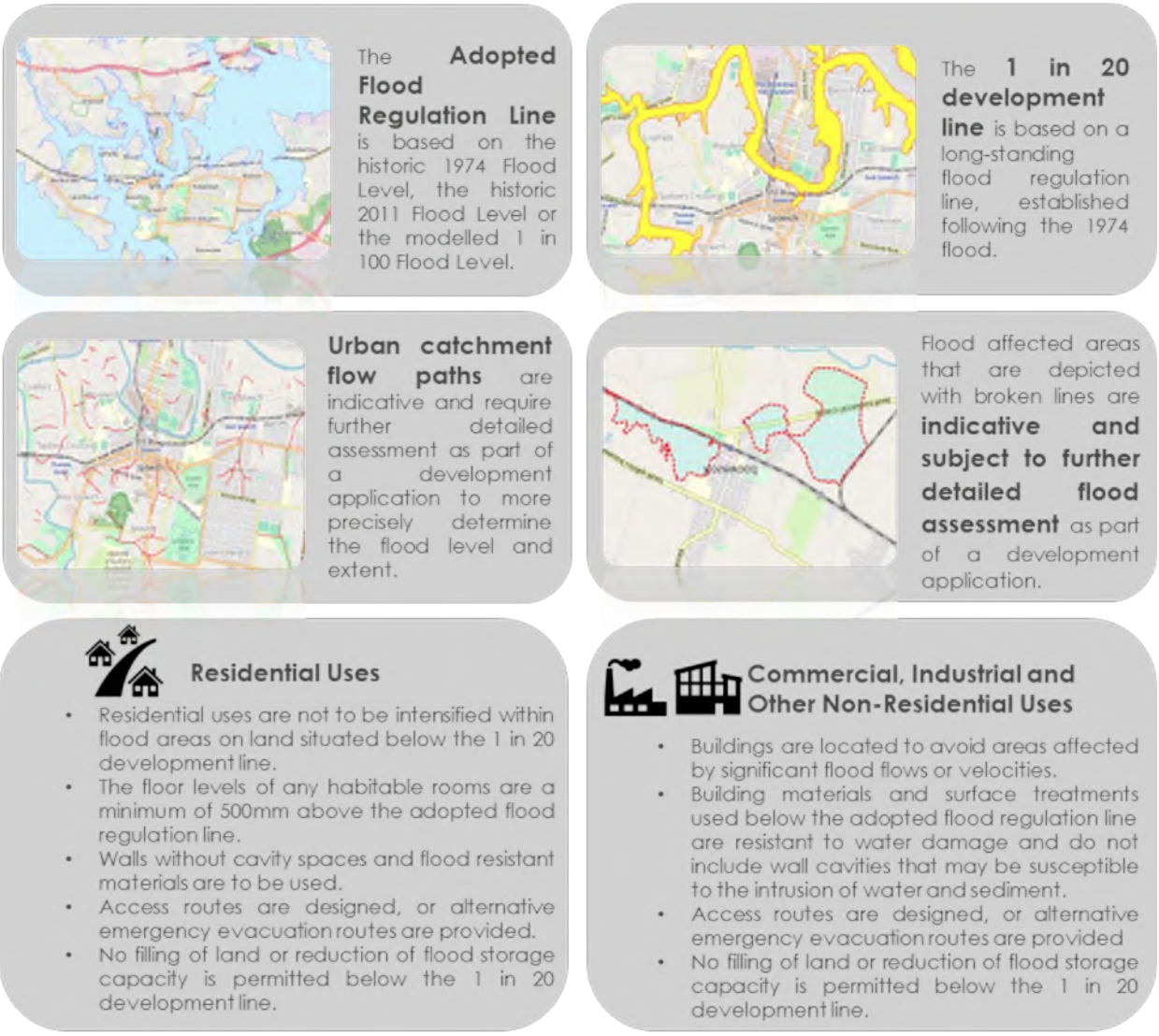


Figure 4 - Key flooding provision in Ipswich Planning Scheme

2.3.1 Levels of assessment

The Development Constraints Overlays code also includes the tables of assessment categories (i.e., code assessable, self assessable or exempt) which apply to all development constraints – there is not a separate table of assessment specific to the flood hazard. The tables of assessment categories identify specific land uses as code assessable, self assessable or exempt. With regards to flooding specifically, the following land uses are code assessable:

- **Carpark**, where land affected by the 1 in 20 development line of adopted flood regulation line constraints overlays or the urban catchment flow paths development constraint overlay (Map OV5);
- **Plant nursery (wholesale)**, where land affected by the urban catchment flow paths development constraint overlay (Map OV5);
- **Single residential**; or
- **All,** except uses otherwise identified in the table (i.e., agriculture, animal husbandry, forestry, home based business, minor utility, night court, park, which are identified as exempt).

Reconfiguration a lot is also code assessable, as well as earthworks (not associated with a material change use), where land is affected by the 1 in 20 development line of adopted flood regulation line constraints overlays or the urban catchment flow paths development constraint overlay (Map OV5).

Building works not associated with a material change of use are code assessable where:

- erecting a **Class 10 building (outbuilding)** within an urban catchment flow path;
- **building underneath an existing dwelling** situated below the adopted flood regulation line or within an urban catchment flow path;
- **an auxiliary unit** situated below the adopted flood regulation line or within an urban catchment flow path; or
- **any other building work** on land subject to the Flood code, except where erecting a Class 10 building (outbuilding) on site which is not within an urban catchment flow path.

2.3.2 Division 16 – Planning Scheme Building Matters Code

The existing Ipswich planning scheme includes Division 16 – Planning Scheme Building Matters Code which sets out the specific outcomes which seek to ensure that:

- buildings are sited, designed and constructed in a manner which does not cause nuisance or disturbance to the occupiers or users of nearby land;
- the visual character and amenity of the site and the nearby area is not adversely affected; and
- buildings are compatible with the physical characteristics of the site and its surrounds.

Acceptable / probable solutions are provided which refer to the relevant matters included within the Queensland Development Code, related to the:

- design and siting of buildings and structures
- on-site car parking; and
- outdoor living space.

No specific reference is made to designating a natural hazard management area to instigate the application of MP3.5.

2.3.3 Amendment history for flood

Since the commencement of the existing Ipswich planning scheme, several temporary local planning instruments and an amendment to the planning scheme related to flood hazard have been made including:

- **Temporary Local Planning Instrument 01/2011** adopted the Flood Regulation Line comprising the outer limit of the 1 in 100 Flood Line, the historic 1974 Flood Line and the 2011 Flood Line; updated Development Constraint Overlay Code provisions; and Special Opportunity Areas to encourage the transition from residential uses to low impact non-residential uses in selected areas to improve flood resilience.
- **Temporary Local Planning Instrument 01/2012** incorporated minor changes related to flood hazard tolerance, minor alterations to permitted earthworks and updates to

improve the Adopted Flood Regulation Line. The mapping updates incorporated revised 1974 flood data based on current topographical information and updated 2011 flood data. The TLPI instrument was prepared to provide improved flood regulation based on a revised Flood Regulation Line and associated provisions for new development and earthworks within flood affected areas. The provisions provided an interim precautionary approach pending the implementation of the recommendations from the Queensland Floods Commission of Inquiry, the SPP review and the finalisation of the Brisbane River Catchment Flood Study.

- **Temporary Local Planning Instrument 01/2013** generally retained the same provisions that were included in TLPI 01/2012. Minor amendments were included to recognise the introduction of MP3.5 Construction of buildings in flood hazard areas as a mandatory component in the Queensland Development Code (QDC) and to facilitate the extension of the TLPI duration where legislative changes make an extension possible beyond the current 12 months.
- **Major Amendment 02/2013**, this major amendment involved the more comprehensive review of the current flood provisions (including the provisions in TLPI 01/2013) and incorporate new catchment and drainage information. The amendment included the removal of the 1 in 100 Flood Line and inclusion of the Adopted Flood Regulation Line; replacement of the heading Urban Stormwater Flow Path Areas with Urban Catchment Flow Paths; updates to the Adopted Flood Regulation Line, 1 in 20 development line and urban catchment flow paths in particular locations; and changes to 'back-zone' unoccupied land below the 1 in 20 development line. This process involved public notification.

2.4 Ipswich Integrated Catchment Plan (IICP) land use planning recommendations

The following table provides a summary of the land use planning (LUP) recommendations from the IICP that were considered in identifying the planning policy pathways and planning directions in Phases 1 to 3. Identified are those LUP recommendations that will be addressed as part of drafting instructions for the new planning scheme detailed in this report.

Table 6 - IICP LUP recommendations to be considered for drafting the flood provisions in the new planning scheme

	LUP IICP recommendation	Considered
LUP1	Apply a consistent methodology to the identification of hazard categories for the purposes of the draft new flood hazard overlay	To be addressed
LUP2	Extend any development controls for residential uses to the HR4 category to include the 1 in 500 year H3 hazard category	To be addressed
LUP4	Develop and include a city-wide overland flow path assessment to allow risk-based assessment of this type of flood risk	Inclusion of controls related to overland flow path to be addressed in
LUP5	Avoid any intensification of development in areas mapped in HR1(c) and HR1(b)	✓
LUP6	Continue the existing requirements in the current planning scheme that promote built form and resilient building materials as an acceptable mitigation response such as building on stilts, or with wet / dry proofing on ground floor, but may consider revising	To be addressed

	trigger areas based on lower risk areas such as HR2a, HR3a, HR4 and HR5	
LUP7	Include requirements for easements in greenfield areas up to the Defined Flood Event (DFE)	To be addressed
LUP8	Include requirements for a Flood Risk and Emergency Plan (FEMP) for non-residential uses in locations where TTI is <6 hours and where DFI is >36 hours	To be addressed
LUP9	Include requirements for responses such as FEMPs linked to new development in locations subject to flood islands	To be addressed
LUP10	Include development control measures that may be applied to the development assessment process of vulnerable uses below the Probable Maximum Flood (PMF)	To be addressed
LUP11	Provide a definition of vulnerable uses in the new Ipswich Planning Scheme	To be addressed
LUP12	Avoid vulnerable uses and non-intensification of residential uses in locations where TTI is <6 hours and DFI is >36 hours, or locations subject to flood islands. In areas of low hazard built form and resilient building materials should be considered as an acceptable mitigation response	✓
Consider the following changes in draft planning scheme:		
LUP13	Request a Flood Risk Assessment	To be addressed
LUP14	Adding a provision for commercial, industrial and other non-residential uses to avoid increasing the concentration of people in areas in HR1(c) and HR1(b)	To be addressed
LUP15	For residential uses removing provision relating to a flood depth of no more than 800mm	To be addressed
LUP16	Minimum clearance for the construction of basements and undercrofts	To be addressed
LUP18	Preserve pockets of flood storage in the catchment to avoid future flood risk impacts in areas where HR categories and flood levels may increase as a result of filling or due to development activity	To be addressed
LUP19	Continue provisions that maintain flood storage capacity and do not create impacts on sites upstream or downstream– this is normally a request to provide hydraulic and hydrology report demonstrating compliance	To be addressed

3 Consideration of climate change

The SPP 2017 recognises that mitigating and adapting to climate change is an important consideration for planning at all levels, and that all State interests should be applied and considered in the context of a changing climate to support Queensland's people, economy and the environment. With specific regards to flood hazard, the SPP State interest statement for the State interest *Natural hazards, risk and resilience* is:

> ***The risks associated with natural hazards, including the projected impacts of climate change, are avoided or mitigated to protect people and property and enhance the community's resilience to natural hazards.***

As part of the integration of the integration of the flood risk assessment outputs from Council's recently completed Ipswich Integrated Catchment Plan (IICP) into the proposed new Ipswich planning scheme, Water Technology undertook a flood height assessment. The purpose of the flood height assessment was to undertake an analysis of the flood planning levels with a particular focus on the expected difference between the current Adopted Flood Regulation Line (ARFL) level and the modelled 1% Annual Exceedance Probability (AEP) with climate change flood level.

The flood height assessment shows the difference between the AFRL and the 1% AEP with climate change for each of the LAFs where the AFRL is greater than the 1% with climate change by:

- 0 metres to 0.5 metres;
- 0.5 metres to 1 metre;
- 1 metre to 2.5 metres;
- 2.5 metres to 5 metres;
- 5 metres to 7.5 metres;
- 7.5 metres to 10 metres; and
- greater than 10 metres.

It also identifies where the 1% AEP with climate change is higher than the AFRL flood extent.

In response to the outcomes of the flood height assessment, it is recommended that a proposed defined flood level of 1% AEP at 2100 is identified within the new Ipswich planning scheme as the defined flood event, which takes into account climate change.

Appendix B provides the Report Addendum – Ipswich City Council Flood Height Assessment, dated 7 July 2022.

4 Planning scheme proposed flood provisions

Local planning instruments include the range of planning schemes and other associated instruments prepared and administered by local government. This includes planning schemes, temporary local planning instruments and planning scheme policies.

Council's key requirements for Phase 4 include the following elements of the planning scheme that will require revision / drafting:

- administrative provisions;
- building work regulated under the planning scheme (section 1.6);
- Strategic Framework elements and place visions;
- tables of assessment;
- Flood risk and overland flow overlay code and map;
- other relevant codes (including landscaping code, earthworks code, or reconfiguring a lot code).

4.1 Administrative provisions

The State provides definitions for intolerable, tolerable and acceptable risk in the context of all natural hazards, which should be contemplated within the administrative definitions of the new planning scheme.

Table 7 - Risk definitions as per the SPP 2017

Risk benchmark	Definition as per SPP 2017
Acceptable	A risk that, following an understanding of the likelihood and consequences, is sufficiently low to require no new treatments or actions to reduce risk of the natural hazard further. Individuals and society can live with this risk without feeling the necessity to reduce the risk any further.
Tolerable, subject to treatment	A risk that, following an understanding of the likelihood and consequences, is low enough to allow the exposure to the natural hazard to continue, and at the same time high enough to require new treatments or actions to reduce risk. Society can live with this risk but believes that as much as is reasonably practical should be done to reduce the risks further.
Intolerable	A risk that, following an understanding of the likelihood and consequences, is so high that it requires actions to avoid or reduce the risk. Individuals and society will not accept this risk, and measures are to be put in place to reduce the risk to at least a tolerable level.

With regards to the SPP guidance for flood hazard, it identifies certain land uses that should be discouraged from establishing in flood hazard areas, noting that as a minimum the following uses should be located outside areas affected by the DFE:

- **uses catering to vulnerable persons requiring unique evacuation requirements** (such as hospitals, education establishments, childcare centres, aged care accommodation, nursing homes, and high-security correctional centres);
- **community infrastructure** that will perform an important role and be required to function during and immediately after a flood hazard event (also consider other uses

that may need to perform a role during or after a flood event, for example showgrounds and sports facilities can perform an active role in flood response and recovery, serving as emergency accommodation and recovery staging points);

- **expansion of the above existing uses** in these areas unless evacuation solutions and resilient design can be achieved – refer assessment benchmarks below;
- **community infrastructure that protects valuable equipment and artefacts** (such as museums, libraries, art galleries, archives) – refer assessment benchmarks for mitigation strategies where this is not possible; and
- **rural land uses** such as intensive animal husbandry and intensive agriculture.

The State also provides example assessment benchmarks in support of the bushfire State interest, which incorporates a list of vulnerable uses, critical infrastructure uses for essential services and uses involving hazardous materials storage, manufacture and use.

It is considered that a uniform approach to the definition of such uses will reduce confusion and work to streamline the efficiency of the new planning scheme. In this regard, consideration across multiple hazards informs the following recommendation in relation to the identification of land uses which constitute 'vulnerable uses' as they pertain to natural hazards:

Table 8 - Recommended vulnerable use, community infrastructure and hazardous activity definitions for all natural hazards for embedding in the Administrative Definitions of the new Planning Scheme

Group	Uses
Hazard vulnerable uses	Childcare centre, Community care centre, Detention facility, Hotel, Nature-based tourism, Rooming accommodation, Relocatable home park, Residential care facility, Resort complex, Retirement facility, Short term accommodation uses and Tourist park
Community infrastructure for essential services	Educational establishment, Emergency services, Facilities utilised as an evacuation or recovery facility in addition to their normal function, Hospital, Major electricity infrastructure, Telecommunications facility, Utility installation
Hazardous materials in the context of natural hazards	Medium and High Impact and Special Industry where involving hazardous materials and chemicals that are present in the quantities identified in Schedule 15 of the Work Health and Safety Regulation, schedule 15, or that would constitute the use being a hazardous chemical facility

The following other flood related administrative definitions can also be contemplated for inclusion within the planning scheme's definitions, or alternatively in a planning scheme policy:

Table 9 - Recommended flood related administrative definitions for consideration

Definition	SPP	SPP guidance	Existing Ipswich planning scheme	Recommended definition for new planning scheme
Annual exceedance probability (AEP)	Nil	The annual exceedance probability (AEP) is the likelihood of the occurrence of a flood or event of a given size or larger in any one year, usually expressed as a percentage. For example, if an event has an AEP of 1 per cent, it means that there is a 1 per cent risk (i.e., a likelihood of 1 in 100) of this event occurring in any one year. A 1 per cent AEP event should not be interpreted as only occurring once in 100 years.	"Annual Exceedance Probability (AEP)" means the likelihood of occurrence of a flood of given size or larger occurring in any one year.	Annual Exceedance Probability (AEP) means the likelihood of occurrence of a flood of given size or larger occurring in any one year.
Defined flood event (DFE)	Nil	A defined flood event (DFE) is the flood event adopted by a local government for the management of development in a particular locality.		A Flood Height Assessment (see Appendix A) which considered the difference between the current Adopted Flood Regulation Line (AFRL) and the modelled 1% AEP with climate change flood level was undertaken. This analysis informed the identification of a defined flood level of 1% AEP at 2100 as the recommended DFE. The defined flood event (DFE) that has been adopted by Council for the management of development in the Ipswich local government area is the 1% AEP at 2100 flood event.
Defined flood level (DFL)	Nil	The defined flood level (DFL) is defined in the Queensland Development Code (QDC) MP3.5 – Construction of buildings in flood hazard areas as the expected flood level declared by a local government under the Building Regulation, section 8, or a flood level that has been used by a local government for assessment purposes of a development application for that lot. (Managing the floodplain, chapter 14 'Terminology')	*"Adopted Flood Level" means the flood level which has been selected as the basis for planning purposes within the City, which unless otherwise specifically stated is based on the flood event depicted by the Adopted Flood Regulation Line and the flood level depicted by an Urban Catchment Flow Path.* *"Adopted Flood Regulation Line" means the flood line as depicted on the Flood and Urban Catchment Flow Paths Overlay Map (OV5).*	The defined flood level means the flood level which has been selected as the basis for planning purposes within the City, which unless otherwise specifically stated is the level associated with the defined flood event, which is the 1% AEP at 2100 flood event.
Flood hazard area	Flood hazard area means an area that is: (a) identified by a local government in a local planning instrument as a flood hazard area, based on a localised flood study that is prepared by a Registered Professional Engineer of Queensland; or (b) if a local government has not identified flood hazard areas in a local planning instrument in accordance with (a) above, shown on the SPP IMS as a flood hazard area. Note: Flood hazard areas referred to in (a) above are to be identified to align with the climate change factors for increased rainfall intensity in the Australian Rainfall and Runoff (AR&R) projections. The flood hazard areas shown on the SPP IMS are the Level 1 – Queensland Floodplain Assessment Overlay (QFAO) and do not include climate change projections.		Nil	The flood hazard area is the area that is shown on Map OV12.
Floodplain	Nil	A floodplain is an area of land that is subject to inundation by floods up to and including the probable maximum flood event – i.e., 'flood-prone land'. (Managing the floodplain, chapter 14 'Terminology')	Nil	A floodplain is an area of land that is subject to inundation by floods up to and including the probable maximum flood event.
Flood planning level (FPL)	Nil	The flood planning level (FPL) is a combination of the DFL, derived from significant historical flood events or floods of specific annual exceedance probabilities (AEPs), and freeboard levels selected for floodplain management purposes, as determined in management	Nil	The flood planning level (FPL) is a combination of the DFL, derived from significant historical flood events or floods of AEPs, and freeboard levels selected for floodplain management purposes, as determined in

		studies and incorporated in management plans. (Managing the floodplain, chapter 14 'Terminology')		management studies and incorporated for planning purposes within the City.
Freeboard	Nil	Freeboard is defined in the QDC MP3.5 as a height above the DFL that takes account of matters that may cause flood waters to rise above the DFL.	Nil	Freeboard is defined in the QDC MP3.5 as a height above the DFL that takes account of matters that may cause flood waters to rise above the DFL.
Probable maximum flood (PMF)	Nil	A probable maximum flood (PMF) is the largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation and, where applicable, snow melt, coupled with the worst flood-producing catchment conditions. It is not physically or economically possible to provide complete protection against this event. The PMF defines the extent of flood-prone land – the floodplain. The extent, nature and potential consequences of flooding associated with a range of events rarer than the flood used for designing mitigation works and controlling development, up to and including the PMF event, should be addressed in a floodplain risk management study. (Managing the floodplain, chapter 14 'Terminology')	Nil	A probable maximum flood (PMF) is the largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation with the worst flood-producing catchment conditions. It is not physically or economically possible to provide complete protection against this event. The PMF defines the extent of flood-prone land – the floodplain. The extent, nature and potential consequences of flooding associated with a range of events rarer than the flood used for designing mitigation works and controlling development, up to and including the PMF event, should be addressed in a floodplain risk management study.
Vulnerable Uses	The SPP does not include a definition for vulnerable uses. SPP Glossary: Sensitive land uses see the Planning Regulation 2017: ***sensitive land use*** means— (a) caretaker's accommodation; or (b) a childcare centre; or (c) a community care centre; or (d) a community residence; or (e) a detention facility; or (f) a dual occupancy; or (g) a dwelling house; or (h) a dwelling unit; or (i) an educational establishment; or (j) a health care service; or (k) a hospital; or (l) a hotel, to the extent the hotel provides accommodation for tourist (m) a multiple dwelling; or (n) a relocatable home park; or (o) a residential care facility; or (p) a resort complex; or (q) a retirement facility; or (r) rooming accommodation; or (s) rural workers' accommodation; or (t) short-term accommodation; or (u) a tourist park; or (v) workforce accommodation.	Where land is included in a flood hazard area consider if the choice of zone/locally specific provisions consider the uses envisaged by each zone and whether the risks associated with flood can be mitigated to acceptable or tolerable levels for those uses. For example, intents discourage the following uses from establishing in flood hazard areas. As a minimum these uses should be located outside areas affected by the DFE: • **Uses catering to vulnerable persons requiring unique evacuation requirements** (such as hospitals, education establishments, childcare centres, aged care accommodation, nursing homes, and high-security correctional centres). • **Community infrastructure** that will perform an important role and be required to function during and immediately after a flood hazard event (also consider other uses that may need to perform a role during or after a flood event, for example showgrounds and sports facilities can perform an active role in flood response and recovery, serving as emergency accommodation and recovery staging points). • **Expansion of the above existing uses** in these areas unless evacuation solutions and resilient design can be achieved – refer assessment benchmarks below. • **Community infrastructure that protects valuable equipment and artefacts** (such as museums, libraries, art galleries, archives) – refer assessment benchmarks for mitigation strategies where this is not possible. • **Rural land uses** such as intensive animal husbandry and intensive agriculture.	"Vulnerable Development" means— (a) uses and activities such as licensed premises (including taverns, hotels, entertainment venues, licensed clubs, off premises bottle shops and nightclubs), large entertainment and recreational venues, large institutional uses (e.g., tertiary campuses, hospitals), schools, car parks (50 spaces and greater), public toilets, telephone booths and Automatic Teller Machines; or (b) any use or activity in a 'vulnerable area' which generates people movement or use at times when there are less than normal business hour levels of formal or informal surveillance; or (c) any use operating at night-time (after 9.00 p.m.) or over a 24 hour period (e.g., Automatic Teller Machines, service stations, institutions or tertiary educational facilities, or public transport interchanges); or (d) any large scale project considered to have wide ranging safety implication	Hazard vulnerable uses include Childcare centre, Community care centre, Detention facility, Rooming accommodation, Residential care facility, Retirement facility, Short term accommodation uses, Nature-based tourism, Relocatable home parks, Resort complexes and Tourist parks.

4.2 Section 1.6 Building work regulated under the planning scheme

A planning scheme cannot include mandatory parts in the current parts of the Queensland Development Code, which includes **MP3.5**. For MP3.5 to be considered, the planning scheme must designate all or part of its LGA a flood hazard area and include a statement that a designation / declaration has been made under the Building Regulation.

The following provides the draft Section 1.6 provisions as they relate to flood hazard based on the Queensland Planning Provisions template and as updated:

1. Section 17(b) of the Planning Regulation identifies that a local planning instrument must not be inconsistent with the effect of the building assessment provisions stated in the *Building Act 1975*.

2. The building assessment provisions are listed in section 30 of the *Building Act 1975*.

Note—The building assessment provisions are stated in section 30 of the *Building Act 1975* and are assessment benchmarks for the carrying out of building assessment work or building work that is accepted development subject to any requirements (see also section 31 of the *Building Act 1975*).

3. This planning scheme, through Part 5, regulates building work in accordance with sections 32 and 33 of *the Building Act 1975*.

Note—The *Building Act 1975* permits planning schemes to:

- regulate, for the Building Code of Australia (BCA) or the Queensland Development Code (QDC), matters prescribed under a regulation under the Building Act 1975 (section 32). These include variations to provisions contained in parts MP1.1, MP1.2 and MP1.3 of the QDC such as heights of buildings related to obstruction and overshadowing, siting and design of buildings to provide visual privacy and adequate sight lines, on-site parking and outdoor living spaces. It may also regulate other matters, such as designating land liable to flooding, designating land as bushfire prone areas and transport noise corridors.
- deal with an aspect of, or matter related or incidental to building work prescribed under a regulation under section 32 of the *Building Act 1975*;
- specify alternative boundary clearances and site cover provisions for Class 1 and 10 structures under section 33 of the *Building Act 1975*.

Refer to Schedule 9 of the Planning Regulation to determine assessable development, the type of assessment and any referrals applying to the building work.

4. The building assessment provisions and designations in the planning scheme are contained in Table 1.6.1.

Table 1.6.1 Designations and Building assessment provisions in the planning scheme for the purpose for the *Building Act 1975*

Description of designation and Building assessment provisions	**Planning Scheme Part**	***Building Act 1975* (BA), *Building Regulation 2021* (BR) or Queensland Development Code (QDC) Reference**
Flood hazard In accordance with section 8(3) of the Building Regulation 2021, the following designation is made under section 8 of the Building Regulation 2021 for the flood hazard area in the Ipswich Planning Scheme. Building work in a designated flood hazard area must meet the requirements of the relevant building assessment provisions under the *Building Act 1975*.		

Designated flood hazard area for Queensland Development Code MP3.5 In accordance with section 8(4) of the Building Regulation 2021, the Flood hazard area was designated on <insert date>.	Land identified in the following flood risk categories shown on the Flood Risk Overlay Map OV12 is designated as the Designated flood hazard area: i. Extreme risk area; ii. High risk area; iii. Medium risk area; iv. Low risk area; v. Very low risk area (PMF); vi. Priority Evacuation Areas; and vii. Flood Resilient Precincts.	Section 32(a) BA and section 8 BR; and QDC MP3.5 – Construction of buildings in flood hazard areas
Declaration within the flood hazard area of the defined flood level (DFL)	Table <insert table reference> Administrative Definitions "defined flood level' and Section 8.10.2 Purpose and Overall Outcomes and Table 8,10.3.4 – Minimum flood immunity standards	Section 32(b) BA and section 8(1)(b)(i) BR; and QDC MP3.5 – Construction of buildings in flood hazard areas
Declaration within the flood hazard area of a freeboard that is more than 300mm	Section 8.10.2 Purpose and Overall Outcomes and Table 8.10.3.4 – Minimum flood immunity standards	Section 32(b) BA and section 8(1)(b)(iv) BR; and QDC MP3.5 – Construction of buildings in flood hazard areas
Declaration within the flood hazard area of a finished floor level of class 1 buildings built in all or part of the flood hazard area	Section 8.10.2 Purpose and Overall Outcomes and Table 8.10.3.4 – Minimum flood immunity standards	Section 32(b) BA and section 8(1)(b)(v) BR; and QDC MP3.5 – Construction of buildings in flood hazard areas

Note—A decision in relation to building work that is assessable development under the planning scheme can only be issued as a preliminary approval. See section 83(b) of the *Building Act 1975*.

Note—In a development application, the applicant may request preliminary approval for building work. The decision on that development application can also be taken to be a referral agency's response under section 56 of the Planning Act, for building work assessable against the *Building Act 1975*. The decision notice must state this.

4.3 Strategic Framework

The strategic framework of the planning scheme sets the policy positions for development. It is not an assessment benchmark unless development is impact assessable. The strategic framework should set up the first principles for development in natural hazard areas from which the balance of the planning scheme parts will be derived. The principal messages that the framework should convey in addition to the SPP content include:

- the policy position towards natural hazards in the context of the hazards and exposure for this community;
- the policy position for development in areas of intolerable risk and other risk levels
- any place based or zone differences to policy positions;
- the relationship between various planning elements and constraints; and
- clear articulation of the local prioritisation of same.

In May to July 2019, Council released and consulted on the State of Proposals (including the draft Strategic Framework and maps) for its new planning scheme. The draft Strategic framework includes the following vision statements relating to flood mitigation policies:

(21) Waterways are rehabilitated and protected, providing a high standard of water quality, habitat and fauna connectivity and recreational outcomes while at the same time reducing the impact of major storm and flood events.

(25) Innovative solutions for mitigating climate variability and increasing community resilience to floods, droughts and bushfires are implemented.

The aspirations in the Vision Statement that directly relate to land use planning are addressed in this draft Strategic Framework through setting a proposed development framework that avoids the inappropriate development of land that is subject to constraints from natural hazards such as flooding, and separates and manages the impacts between incompatible uses and from the impacts associated with the operations of facilities and infrastructure (which are further outlined in section 3.4 Development Constraints).

Section 3.4, Development Constraints, address impacts associated with natural hazards including flooding and stormwater, bushfire, and steep slopes and unstable land. The section acknowledges that climate change is expected to lead to sea level rise and increase the frequency and severity of extreme weather events including rainfall and temperatures and the related hazards and risks associated with natural events such as flooding and bushfire. The occurrence and distribution of the constraints within the Ipswich Local Government Area influences how the city will be developed, with land use designations in the planning scheme having been determined having regard to the impacts from, and risks associated with the constraints.

Subsection 3.4.4 on natural hazards, states that the detrimental impacts of natural events are effectively managed through:

(a) the planning scheme establishing a framework based on the hazard and the risks associated with the hazard and in accordance with the approach required by the State Planning Policy;

(b) zoning of land and the planning intent for land being compatible with the hazard and associated level of risk; and

(c) reducing the risk of harm to persons or property from natural hazards through:

(i) **reducing the likelihood or effects** of a hazard;

(ii) **development being located and designed to include mitigation measures** that reduce the inherent risk from the hazard to a tolerable or acceptable level;

(iii) **adequate evacuation routes and emergency service access** being available in a natural hazard event; and

(iv) **critical infrastructure and sensitive and vulnerable uses** requiring the highest level of immunity from natural hazard events being:

(A) located outside of the areas of the natural hazard wherever practicable or in areas of lower likelihood and risk; and

(B) located and designed to remain functional during and immediately after the natural hazard event.

Section 3.4.4.3 includes the following specific strategies for flooding and major urban stormwater flowpaths:

(1) The Bremer and Brisbane Rivers, their major creek tributaries and other watercourses and flow paths periodically flood with associated risks to the safety of people and damage to properties.

(2) The location and historic settlement pattern of Ipswich has led to:

(a) urban development being located in areas at risk of flooding; and

(b) existing development commitments and associated land use expectations.

(3) The level of risk from flooding based on a range of flood events (likelihoods) has been determined having regard to flood studies and floodplain management studies and plans including:

(a) Brisbane River Catchment Flood Study;

(b) Brisbane River Catchment Strategic Floodplain Management Plan;

(c) Ipswich Rivers Flood Studies Update [being finalised]; and

(d) other local flood studies.

(4) ***Overlay Map 10 – Flooding and Major Urban Catchment Flow Paths*** *shows the extent and risk from flooding based on a fit-for-purpose risk framework (refer to Note 6) through delineating the:*

(a) indicative extent of the Brisbane River and Bremer River floodplains based on a modelled Probable Maximum Flood (ranging between a 1 in 90,000 and 1 in 100,000 Annual Exceedance Probability);

(b) the extent and levels of risk category as:

(i) High Flood Risk (Major Flood Conveyance) for the rivers and creeks (major watercourses);

(ii) Moderate Flood Risk (Major Flood Storage) for the rivers and creeks (major water courses); and

(iii) Low to Extremely Low Flood Risk (Balance Floodplain) from flooding from the Brisbane River and Bremer River;

(c) Defined Flood Event (horizontal extent) and the Defined Flood Level (vertical height) for rivers and creeks (1 in 100 Annual Exceedance Probability with Climate Change Factor) which has a corresponding spatial extent to the Moderate Flood Risk Category;

(d) Special Flood Resilient Precincts; and

(e) Major Urban Catchment Flow Paths.

(5) Flooding hazard and associated risks are to be managed by:

(a) the ***zoning of land aligning the development intent with the level of risk*** *whilst also recognising existing land uses, approvals and commitments;*

(b) where located within the Defined Flood Event and the risk is categorised as ***High (Major Conveyance)*** *all development including filling is to be avoided unless for:*

(i) recreation and open space uses or parking where not involving permanent structures that are designed to ensure there is no adverse impact on hydraulic characteristics;

(ii) non-residential development on land where there is a development commitment through the zoning of the land or a development approval and which is designed to mitigate the

impacts on the development from flooding as far as is practicable and to ensure there are no adverse impacts on hydraulic characteristics; and

(iii) other works to reduce the flood hazard and risk and that rehabilitate the river or waterway corridor and improve drainage function and hydraulic characteristics;

(c) where located within the Defined Flood Event and the risk is categorised as ***Moderate (Major Flood Storage)****:*

(i) the intensification of residential uses, including the creation of new residential lots, is avoided unless within an identified Special Flood Resilient Precinct where there is adequate warning time before flooding to allow for evacuation that is designed and constructed to mitigate the risk to a tolerable or acceptable level by:

(A) enabling the self-evacuation of residents and visitors via established evacuation routes external to the site;

(B) the finished floor level of all habitable floor space being above the Defined Flood Level and the additional required freeboard;

(C) maintaining existing flood storage, not impeding flood flows into the site and enabling flood waters to recede from the site;

(D) incorporating flood resilient design and construction methods for building and structures located below the Defined Flood Level;

(E) locating flood sensitive services, connections, utilities (including point of connection), plant and equipment (such as electrical switch-boards, data servers or lift machinery) above the Defined Flood Level and the additional required freeboard or provide protection to prevent water inundation;

(ii) the development of ***new sensitive and vulnerable uses*** *are avoided and the expansion of established uses are designed to mitigate the impacts of flooding as far as is practicable;*

(iii) ***critical infrastructure*** *is avoided, or where this is not possible, is designed and sited to mitigate the risks and impacts of flooding as far as is practicable;*

(iv) ***non-residential uses*** *reducing the hazard and mitigating risks to the development through siting and design to a tolerable or acceptable level and with uses that would cause significant environmental harm in the event of a flood, for example by requiring the storage of large quantities of hazardous materials, to be avoided; and*

(v) ***filling being avoided*** *unless undertaken as balanced cut and filling (i.e. no importation of fill) and there being no worsening of hydraulic flows or reduction in overall flood storage capacity; and (d) the areas of the river floodplains not located within the Defined Flood Event (and High or Moderate Flood Risk Categories) being identified as Low to Extremely Low Flood Risk (Balance Floodplain) and as being acceptable for all development except new highly sensitive and vulnerable uses and critical infrastructure that is required to operate during and immediately after a flood event, for example hospitals, emergency services facilities and depots and evacuation centres, which should be developed where practicable outside the floodplain; and*

(e) development mitigating the impacts and risks from flooding in ***major urban stormwater flow paths*** *to a tolerable or acceptable level through siting and design measures and avoid worsening of flooding or drainage impacts on nearby land.*

(6) The further intensification of residential uses does not include the development of a Single Residential use on an existing zoned residential lot or rural lot that has a dwelling entitlement.

4.3.1 Draft Strategic Framework

Explanatory Note

Relevant parts of the Draft Strategic Framework provided in the *Statement of Proposals [including the Draft Strategic Framework] – Draft Ipswich Planning Scheme 2019* have been reviewed and revised to include outcomes from the Flood Risk Assessment and Planning Scheme Alignment project.

Proposed updates are identified in red.

3 DRAFT STRATEGIC FRAMEWORK

3.2.1 Vision Statement

(21) Waterways are rehabilitated and protected, providing a high standard of water quality, habitat and fauna connectivity and recreational outcomes while at the same time reducing the impact of major storm and flood events.

(25) Innovative solutions for mitigating climate variability and increasing community resilience to floods, droughts and bushfires are implemented.

3.4 Development Constraints

3.4.4 Natural Hazards

(1) Natural hazards present significant risks to the safety of people, damage to property and are a significant economic cost, including a recurring cost where events happen repeatedly.

(2) The detrimental impacts of natural events are effectively managed through:

(a) the planning scheme establishing a framework based on the hazard and the risks associated with the hazard and in accordance with the approach required by the State Planning Policy;

(b) zoning of land and the planning intent for land being compatible with the hazard and associated level of risk; and

(c) reducing the risk of harm to persons or property from natural hazards through:

(i) reducing the likelihood or effects of a hazard;

(ii) development being located and designed to include mitigation measures that reduce the inherent risk from the hazard to a tolerable or acceptable level;

(iii) adequate evacuation routes and emergency service access being available in a natural hazard event; and

(iv) critical infrastructure and sensitive and vulnerable uses requiring the highest level of immunity from natural hazard events being:

(A) located outside of the areas of the natural hazard wherever practicable or in areas of lower likelihood and risk; and

(B) located and designed to remain functional during and immediately after the natural hazard event.

3.4.4.3 Flooding and Major Urban Stormwater Flowpaths

(1) The Bremer and Brisbane Rivers, their major creek tributaries and other watercourses and flow paths periodically flood with associated risks to the safety of people and damage to properties.

(2) The location and historic settlement pattern of Ipswich has led to:

(a) urban development being located in areas at risk of flooding; and

(b) existing development commitments and associated land use expectations.

(3) The level of risk from flooding based on a range of flood events (likelihoods) has been determined having regard to flood studies and floodplain management studies and plans including:

(a) Brisbane River Catchment Flood Study;

(b) Brisbane River Catchment Strategic Floodplain Management Plan;

(c) Ipswich Rivers Flood Studies Update;

(d) Ipswich Integrated Catchment Plan – Strategy and Action Plan; and

(e) other local flood studies.

(4) Overlay Map 12 – Flood risk and overland flow shows the extent and risk from flooding based on a fit-for-purpose risk framework (refer to Note 6) through delineating the:

(a) indicative extent of the Brisbane River and Bremer River floodplains based on a modelled Probable Maximum Flood (ranging between a 1 in 90,000 and 1 in 100,000 Annual Exceedance Probability);

(b) the extent and levels of risk category as:

(i) Extreme to High Flood Risk (Major Flood Conveyance) for the rivers and creeks (major watercourses)

(ii) Medium Flood Risk (Major Flood Storage) for the rivers and creeks (major water courses);

(iii) Low Flood Risk (Built Form Response) from flooding from the rivers and creeks; and

(iv) Very Low Flood Risk (Balance Floodplain) from flooding from the Brisbane River and Bremer River;

(c) Defined Flood Event (horizontal extent) and the Defined Flood Level (vertical height) for rivers and creeks (1 in 100 Annual Exceedance Probability with Climate Change Factor) which has a corresponding spatial extent to the Medium to Extreme Flood Risk Category;

(d) Special Flood Resilient Precincts;

(e) Priority Evacuation Areas; and

(f) Major Urban Catchment Flow Paths.

(5) Flooding hazard and associated risks are to be managed by:

(a) the zoning of land aligning the development intent with the level of risk whilst also recognising existing land uses, approvals and commitments;

(b) where located within the Defined Flood Event and the risk is categorised as High to Extreme (Major Conveyance) all development including filling is to be avoided unless for:

(i) recreation and open space uses or parking where not involving permanent structures that are designed to ensure there is no adverse impact on hydraulic characteristics;

(ii) non-residential development on land where there is a development commitment through the zoning of the land a development approval and which is designed to mitigate the impacts on the development from flooding as far as is practicable and to ensure there are no adverse impacts on hydraulic characteristics;

(iii) non-residential development within an identified Special Flood Resilient Precinct that is designed and constructed to mitigate the risk to a tolerable or acceptable level by:

(A) enabling the self-evacuation of occupants and visitors via established evacuation routes external to the site;

(B) the finished floor level of all floor space being above the Defined Flood Level and the additional required freeboard;

(C) maintaining existing flood storage, not impeding flood flows into the site and enabling flood waters to recede from the site;

(D) incorporating flood resilient design and construction methods for building and structures located below the Defined Flood Level;

(E) locating flood sensitive services, connections, utilities (including point of connection), plant and equipment (such as electrical switch-boards, data servers or lift machinery) above the Defined Flood Level and the additional required freeboard or provide protection to prevent water inundation; and

(iv) other works to reduce the flood hazard and risk and that rehabilitate the river or waterway corridor and improve drainage function and hydraulic characteristics;

(c) where located within the Defined Flood Event and the risk is categorised as Medium (Major Flood Storage):

(i) the intensification of residential uses, including the creation of new residential lots, is avoided unless within an identified Special Flood Resilient Precinct where there is adequate warning time before flooding to allow for evacuation that is designed and constructed to mitigate the risk to a tolerable or acceptable level by:

(A) enabling the self-evacuation of residents and visitors via established evacuation routes external to the site;

(B) the finished floor level of all habitable floor space being above the Defined Flood Level and the additional required freeboard;

(C) maintaining existing flood storage, not impeding flood flows into the site and enabling flood waters to recede from the site;

(D) incorporating flood resilient design and construction methods for building and structures located below the Defined Flood Level;

(E) locating flood sensitive services, connections, utilities (including point of connection), plant and equipment (such as electrical switch-boards, data servers

or lift machinery) above the Defined Flood Level and the additional required freeboard or provide protection to prevent water inundation;

(ii) the development of new sensitive and vulnerable uses are avoided and the expansion of established uses are designed to mitigate the impacts of flooding as far as is practicable;

(iii) critical infrastructure is avoided, or where this is not possible, is designed and sited to mitigate the risks and impacts of flooding as far as is practicable;

(iv) non-residential uses reducing the hazard and mitigating risks to the development through siting and design to a tolerable or acceptable level and with uses that would cause significant environmental harm in the event of a flood, for example by requiring the storage of large quantities of hazardous materials, to be avoided; and

(v) filling being avoided unless undertaken as balanced cut and filling (i.e. no importation of fill) and there being no worsening of hydraulic flows or reduction in overall flood storage capacity; and

(d) the areas of the river floodplains not located within the Defined Flood Event (and Medium to Extreme Flood Risk Categories) being identified as Very Low to Low Flood Risk (Balance Floodplain) and as being acceptable for all development except new highly sensitive and vulnerable uses and critical infrastructure that is required to operate during and immediately after a flood event, for example hospitals, emergency services facilities and depots and evacuation centres, which should be developed where practicable outside the floodplain; and

(e) development mitigating the impacts and risks from flooding in major urban stormwater flow paths to a tolerable or acceptable level through siting and design measures and avoid worsening of flooding or drainage impacts on nearby land.

(6) The further intensification of residential uses does not include the development of a Single Residential use on an existing zoned residential lot or rural lot that has a dwelling entitlement.

Note 6: Risk Framework for Managing Development in the Floodplain

Following publication of the findings and recommendations of the Queensland Floods Commission of Inquiry, the state government in collaboration with Ipswich City Council, Brisbane City Council, Somerset Regional Council, Lockyer Valley Regional Council and other stakeholders undertook the Brisbane River Catchment Flood Study (Flood Study) and subsequently prepared the Brisbane River Catchment Strategic Floodplain Management Plan (SFMP). This work is collectively referred to as the Brisbane River Catchment Flood Studies (BRCFS).

Further information regarding the Brisbane River Catchment Flood Studies is available from the state government's website at www.qra.qld.gov.au/our-work-resilience-building-flood-resilience/brisbaneriver-catchment-flood-studies.

An important aspect of managing flood risk is that no two floods are the same even when the overall chance or likelihood of events of a similar size occurring is the same. The term Annual Exceedance Probability (AEP) has been used to describe the probability (chance or likelihood) of a flood of a nominated size occurring in any year. To account for the variation in flooding that can occur, the Brisbane River Catchment Flood Study produced the most comprehensive flood modelling of its kind undertaken in Australia to produce modelling for 11 flood events

ranging from highly likely flood events (1 in 10 AEP) through to extremely unlikely flood events (1 in 100,000 AEP).

The Brisbane River SFMP analysed and assessed the combinations of the likelihood of these different sized floods occurring and the levels of hazard based on velocity and depth to identify a series of risk categories, referred to as Potential Hydraulic Risk (PHR). These categories provide a strategic understanding of flooding in the Brisbane River and the lower and middle reaches of the Bremer River (the upper reaches of the Bremer River were not included in the BRCFS and the SFMP) and provide an initial (raw) risk identification.

Five (5) categories of PHR are used to describe the most severe flood risk (PHR1) to the least severe (PHR5). The SFMP considers that at the catchment assessment level and based on the 'raw' risk that:

the most frequent and severe floods are those characterised by deep and fast flowing water (Conveyance Areas) and generally correlate with risk categories PHR1 and PHR2;

risk categories PHR3 and PHR4 generally have a major storage function within the floodplain; and

risk category PHR5 is used to define the lowest potential for flood risk, with the outer extent that corresponds with the 1 in 100,000 AEP used to identify the theoretical extent of a floodplain.

Producing modelling and outputs across the large area of the Brisbane River catchment meant that a 30 metre modelling grid and 15 metre output grid were used. This represents a limitation to the scale at which the information can be applied without further refinement, for example to be able to apply it at the individual property level. Consequently, additional flood modelling (referred to as the Ipswich Rivers Flood Study Update (IRFSU)) has been undertaken that both refines the modelling from the BRCFS as well as expanding the modelling to cover the parts of the Bremer River and other watercourses not covered (with the exception of Blacksnake Creek that does not form part of the Bremer River catchment with the existing flood study used to inform Overlay map 10) and which will produce results at a smaller grid. The preliminary outputs from the IRFSU and other local flood studies have been further refined (to 'smooth' the modelled lines) to provide an improved representation of the flood and risk extents at the individual lot level. Upon completion of the IRFSU the final modelling and outputs will be provided and accordingly, it should be noted that the flood extents and areas of risk shown in Overlay Map 10 will be subject to further refinement.

The Ipswich Integrated Catchment Plan (IICP), which is a non-statutory integrated floodplain management document, has been prepared following the regionally consistent approach established in the SFMP for catchments of the Bremer River, Brisbane River and the local creeks within the bounds of the Ipswich.

Using the best available information on the impacts of different likelihoods of flooding across the Ipswich Local Government Area taking into account the latest understanding of the regional impacts from the Brisbane River Catchment Flood Studies, Brisbane River SFMP, IRFSU (which includes the Brisbane and Bremer River systems) and the individual flood studies for the local creek catchments, a full understanding of the flood behaviour has been developed.

The IICP was informed by the Ipswich Integrated Catchment Plan – Technical Evidence Report (TER). It assessed and characterised the nature of flood risk across the Ipswich LGA, including a consideration of the Hydraulic risk (HR) which mapped the flood likelihood by Annual Exceedance Probability (AEP) and flood hazard category based on depths and velocities of floodwaters. The IICP adopts the Brisbane River Strategic Floodplain Management Plan five HR

categories, but refines the matrix by introducing subcategories based on the hazard level across 10 categories of relative HR:

AEP	LOW HAZARD	MODERATE HAZARD			HIGH HAZARD	
PMF	HR5	HR5	HR5	HR5	HR5	HR5
1 in 2,000	HR5	HR5	HR4	HR4	HR4	HR4
1 in 500	HR5	HR4	HR4	HR3(b)	HR3(c)	HR3(c)
1 in 100	HR4	HR4	HR3(b)	HR2(b)	HR2(c)	HR2(c)
1 in 50	HR4	HR3(b)	HR2(b)	HR2(b)	HR1(c)	HR1(c)
1 in 20	HR3(a)	HR2(b)	HR2(b)	HR1(b)	HR1(c)	HR1(c)
1 in 10	HR2(a)	HR1(b)	HR1(b)	HR1(b)	HR1(c)	HR1(c)

Table 3 Revised HR Matrix for use in the IICP

The HR categories adopted in the IICP, have been used in preparing Overlay Map 12 and categorised as follows:

Risk description	Rationale	Risk profile	Hydraulic risk category
Extreme risk	Frequent flooding Conveyance area Buildings vulnerable to failure and unsafe for vehicles and people	Intolerable	HR1(c) HR1(b)
High risk	Unlikely and rare flooding New flow conveyance paths create dangerous conditions Buildings vulnerable to failure	Tolerable	HR2(c) HR2(b)
Medium risk	Generally unsafe for vehicles and people Areas still effected by frequent and likely flood events	Tolerable	HR3(c) HR3(b)
Low risk	Generally safe infrequent and likely flood events High hazard associated with unlikely and rare events	Acceptable	HR2(a) HR3(a) HR4
Very low risk	Balance of floodplain Area potentially affected by extremely rare flooding that may not require mitigation	Acceptable	HR5

Flood Resilient Precincts have also been identified in Overlay Map 10. Land in these precincts is located within or in proximity to higher order centres and major public transport nodes and can be where higher density residential development would be consistent with achieving appropriate land use outcomes and having regard to the flood risk, evacuation routes and potential to mitigate the risk to a tolerable level through flood resilient design. Flood resilient design, construction and materials can minimise damage caused by flood waters and significantly reduce the time to recover after a flood. Examples include the use of sealable basements, the mix of uses (for example non-residential uses such as car parking, retail or

commercial uses on the ground and lower floors with residential units above) and the use of water resistant materials and non-cavity walls. In particular, the mid to high rise development form sought in these precincts provides the opportunity to achieve a flood resilient design response whilst providing a safe vehicular evacuation route.

The combination of Overlay Map 10 and the policy approach outlined in section 3.4.3(5) and (6) provides a strategic policy framework as part of the initial and baseline flood risk assessment and is a precautionary policy approach that is the first step in a risk management framework for development in the floodplain. The approach accords with the requirements of the State Planning Policy and aligns with the Brisbane River Catchment Strategic Floodplain Management Plan by:

identifying risks based on an assessment of a range of modelled flood events (ranging from a frequent 1 in 2 Annual Exceedance Probability to extremely unlikely (the Probable Maximum Flood generally defined as the 1 in 100,000 Annual Exceedance Probability) rather than a single defined flood event, such as a "1 in 100";

identifying risk categorisation being defined having regard to and aligning with the potential hydraulic risk methodology in the Brisbane River Catchment Strategic Floodplain Management Plan;

modelling the Defined Flood Event and Level incorporating a climate change factor aligned with the Intergovernmental Panel on Climate Change's 'Representative Concentration Pathway' (RCP) 8.5 (a sea level rise of 0.8 metres and a 20% increase in rainfall intensity for the year 2090);

providing an initial determination of the acceptability of development through the designation of land uses (without mitigation) having regard to the development intent of the designations (zoning) and existing development commitments; and

providing a framework to assess possible mitigation options and determination of the acceptability, tolerability and intolerability of land uses and development (including the ability of different uses and development to appropriately mitigate the risks including through built form response) through local fit-for-purpose flood risk assessments relative to a comprehensive understanding of flood risk and capacity for emergency management, such as evacuation routes.

4.4 Categories of development and assessment

The levels of assessment indicate the need for or the ease of compliance with regulatory provisions. They also dictate the provisions which are used as assessment benchmarks and the ability for the public to be consulted or appeal. The extent to which the regulatory provisions can be applied without intervention are a primary consideration for assigning assessment levels. Low levels of assessment indicate a low-risk proposal where benchmarks can be applied and complied with relatively simply without the need for individual assessment. Higher levels of assessment indicate the need for alternative solutions and assessment manger review, or the need for public consultation.

Development proposals with greater risk should have higher levels of assessment along with proposals of community interest.

The *Planning Regulation 2017* prescribes levels of assessment or defines whether an activity is indeed development. Section 16 of the regulation prohibits local government from making some development assessable as listed in Schedule 6. Schedule 6 is paraphrased as not allowing dwelling houses or dual occupancies to be made assessable development where it is a residential

use in a residential zone unless an overlay applies. Thus, these forms of development should be carefully considered, as one of the most likely forms of development for the overlay. Appropriate levels of assessment are needed to capture even low risk proposals where an arresting or mitigation response is needed.

Further, the levels of assessment for the overlay can convey messages of suitable land uses which are foreseen in a risk area or locality. The tables of assessment can attribute an assessment level by hazard, risk or land use.

Code assessment is used for tolerable and intolerable risk areas where mitigation is codified. While impact assessment may be triggered for inappropriate land uses.

Thresholds can also be used to trigger levels of assessment. For example, reconstruction of a dwelling house in a rural zone might have an assessment level of Accepted Development Subject to Requirements (ADSR), while increasing the footprint by more than 50m^2 may trigger code assessment. It is important in these instances that the assessment level uplift is warranted, and further benchmarks apply.

The SPP guidance requires the consideration of whether the categories of assessment reflect the level of risk and vulnerability of the uses. In particular, it notes that the impacts of vulnerable uses, reconfiguring a lot which facilitates the increases in population, significant earthworks which involve the redirection of existing overland flow paths and development that involves the storage of significant amounts of hazardous material in a flood hazard area are fully considered.

Impact assessment does not have to be used. Where policy is clearly articulated and codes are strongly worded, impact assessment in natural hazards does not value add to the assessment process.

The current Ipswich planning scheme identified either exempt or code assessment for uses subject to the Flood code (Map OV5).

A separate table of assessment relating to the Flood risk and overland flow overlay is proposed to be provided in the new planning scheme. This is distinct from the existing Ipswich planning scheme which provides combined tables of assessment categories for the Development Constraints Overlays.

Table 10 below provides an overview of the existing levels of assessment as compared to the proposed levels of assessment for the new planning scheme, for land affected by flood hazard. In general, the same levels of assessment for particular development identified within the existing Ipswich planning scheme are proposed under the new planning scheme.

Table 10 - Comparison of existing and proposed levels of assessment

Existing development categories	Existing levels of assessment	Proposed levels of assessment
Material change of use for a: (a) Dwelling house; or (b) Dual occupancy. *Note – The definition for a dual occupancy is proposed to include a secondary dwelling for the new Ipswich planning scheme.*	Assessable development – code	Accepted development subject to requirements, where located within a very low to low flood risk category Assessable development – code, where located within a medium to extreme flood risk category *Note – A material change of use for a dwelling house or for a class*

		10 building or structure if the use is for a residential purpose in a residential zone is not assessable development, ***unless an overlay applies to the premises****, as identified in the local categorising instrument and relevant to assessment of the material change of use.* *Residential development located within a very low to low flood risk category provides alignment with the policy position of the Planning Regulation commensurate with the level of risk and land use planning pathways determined in the Phases 1 to 3 Report.*
Material change of use for a: (a) Community residence.	Accepted development subject to requirements *Note – The Planning Regulation provides that a local categorising instrument is prohibited from stating a material change of use for a community residence is assessable development in a prescribed zone.*	Community residence – Accepted development subject to requirements Note – Whist the Planning Regulation provides that a planning scheme cannot state a community residence is assessable *development, it does not prevent requirements being included e.g.,* ***RO1 Community Residences are not located in areas of high and very high flood risk as shown on the overlay.*** *With no AO. The fact that they cannot be bumped to Code can be foreshadowed in the preamble rules of Part 5. i.e., the Regulation overrides and no application can be accepted.*
Material change of use for a: (a) Childcare centre; (b) Community care centre; (c) Detention facility; (d) Rooming accommodation; (e) Residential care facility; (f) Retirement facility; (g) Short term accommodation uses; (h) Nature-based tourism; (i) Relocatable home parks; (j) Resort complexes; or (k) Tourist parks.	Assessable development – code	Assessable development – code assessment

Material change of use for a: (a) Educational establishment; (b) Emergency services; (c) Hospital; (d) Major electricity infrastructure; (e) Telecommunications facility; or (f) Utility installation.	Assessable development – code	Assessable development – code
Material change of use for a: (a) Medium impact industry; (b) High impact industry; or (c) Special industry.	Assessable development – code	Assessable development – code
Material change of use for a: (a) Carpark.	Assessable development – code	Assessable development – code
Material change of use for a: (a) Plant nursery (wholesale).	Assessable development – code	Assessable development – code
Material change of use for a: (a) Agriculture; (b) Animal husbandry; (c) Forestry; (d) Home based business; (e) Minor utility; (f) Night court; or (g) Park.	Accepted development subject to requirements	Accepted development
Any other material change of use	Assessable development – code	Assessable development – code
Reconfiguring a lot	Assessable development – code	Assessable development – code
Building work not associated with a material change of use where: (a) erecting a Class 10 building (outbuilding) within an urban catchment flow path; (b) building underneath an existing dwelling situated below the adopted flood regulation line or within an urban catchment flow path; (c) an auxiliary unit situated below the adopted flood regulation line or within an urban catchment flow path; or	Assessable development – code	**Building work not associated with a material change of use:** Accepted development subject to requirements, where located within a very low to medium flood risk category Otherwise, assessable development – code *Note – A material change of use for a dwelling house or for a class 10 building or structure if the use is for a residential purpose in a residential zone is not assessable development, **unless an overlay applies to the premises**, as identified in the local categorising instrument and*

(d) any other building work on land subject to the Flood code, except where erecting a Class 10 building (outbuilding) on site which is not within an urban catchment flow path.		*relevant to assessment of the material change of use.*
Earthworks (not associated with a material change use), where land affected by the 1 in 20 development line or adopted flood regulation line or the urban catchment flow paths.	Assessable development – code	**Operational work not associated with a material change of use:** Accepted development subject to requirements, where located within a very low to low flood risk category Otherwise, assessable development – code

4.4.1 Draft table of assessment for flood

Table x.x.x – Table of assessment for overlays

Development	Categories of development and assessment	Requirements for accepted development and assessment benchmarks for assessable development
Flood hazard overlay (medium, high, extreme flood risk areas) Note – to avoid any doubt, the terms extreme, high and medium flood hazard risk are areas shown on Map OV12.		
Material change of use for: (a) Dual occupancy; or (b) Dwelling house.	Assessable development – code	Flood risk and overland flow code
Material change of use for a: (a) Community residence	Accepted development subject to requirements	Flood risk and overland flow code
Material change of use for a: (a) Childcare centre; or (b) Community care centre; or (c) Detention facility; or (d) Rooming accommodation; or (e) Residential care facility; or (f) Retirement facility; or (g) Short term accommodation uses; or (h) Nature-based tourism; or (i) Relocatable home parks; or (j) Resort complexes; or (k) Tourist parks.	Assessable development – code	Flood risk and overland flow code
Material change of use for a: (a) Educational establishment; or (b) Emergency services; or (c) Hospital; or (d) Major electricity infrastructure; or (e) Telecommunications facility; or (f) Utility installation.	Assessable development – code	Flood risk and overland flow code
Material change of use for a: (a) Medium impact industry; or (b) High impact industry; or (c) Special industry.	Assessable development – code	Flood risk and overland flow code

Material change of use for a: (a) Animal husbandry; or (b) Cropping; or (c) Home-based business; or (d) Park; or (e) Permanent plantation.	Accepted development	
Any other material change of use	Assessable development – code	Flood risk and overland flow code
Reconfiguring a lot	Assessable development – code	Flood risk and overland flow code
Building work not associated with a material change of use.	Accepted development subject to requirements, where located within a medium flood risk category Otherwise, assessable development – code	Flood risk and overland flow code
Operationl work not associated with a material change of use	Assessable development – code	Flood risk and overland flow code
Flood hazard overlay (very low and low flood risk areas) Note – to avoid any doubt, the terms low and very low flood risk are areas shown on Map OV12.		
Material change of use for: (a) Dwelling house; or (b) Dual occupancy.	Accepted development subject to requirements	Flood risk and overland flow code
Material change of use for a: (a) Community residence	Accepted development subject to requirements	Flood risk and overland flow code
Material change of use for a: (a) Childcare centre; or (b) Community care centre; or (c) Detention facility; or (d) Rooming accommodation; or (e) Residential care facility; or (f) Retirement facility; or (g) Short term accommodation uses; or (h) Nature-based tourism; or (i) Relocatable home parks; or (j) Resort complexes; or (k) Tourist parks.	Assessable development – code	Flood risk and overland flow code
Material change of use for a: (a) Educational establishment; or (b) Emergency services; or (c) Hospital; or (d) Major electricity infrastructure; or (e) Telecommunications facility; or (f) Utility installation.	Assessable development – code	Flood risk and overland flow code
Material change of use for a: (a) Medium impact industry; or (b) High impact industry; or (c) Special industry.	Assessable development – code	Flood risk and overland flow code
Material change of use for a: (a) Animal husbandry; or (b) Cropping; or (c) Home-based business; or (d) Park; or (e) Permanent plantation.	Accepted development	
Any other material change of use	Assessable development – code	Flood risk and overland flow code
Reconfiguring a lot	Assessable development – code	Flood risk and overland flow code

Building work not associated with a material change of use y.	Accepted development subject to requirements	Flood risk and overland flow code
Operational work not associated within a material change of use	Accepted development subject to requirements	Flood risk and overland flow code

4.5 Flood risk and overland flow overlay code

The purpose of an overlay is to address State and local government interests by identifying areas that have:

- **a sensitivity to the effects of development;**
- **a constraint on land or development outcomes;**
- the presence of valuable features; and/or
- opportunities for development.

Overlays can alter the level of assessment for proposed land uses and will take precedence over zone provisions in the hierarchy of assessment benchmarks in accordance with the draft planning scheme.

The flood hazard overlay deals with areas of land identified as a flood hazard area, as defined in the SPP and may include areas of land affected by flooding and inundation or overland flow paths.

As per the State guidance, it should apply at a minimum, to development that:

- increases the number of people living and working in the natural hazard area;
- involves vulnerable uses where evacuating people may be difficult;
- involves essential community infrastructure that must continue operating during or after an event;
- involves uses where valuable equipment or artefacts must be protected; or
- involves the manufacture or storage of hazardous materials in bulk.

The introductory matter of an overlay code has two parts: Application, which reflects the extent to which the overlay applies spatially; and the purpose and overall outcomes. When drafting the code:

- the assessment benchmarks should not conflict with the outcomes included in the Strategic Framework or other planning scheme elements;
- the overall outcomes should reflect and enable the delivery of the outcomes included in the Strategic Framework;
- performance outcomes and acceptable outcomes are used, where appropriate; or
- illustrative material (tables, diagrams, figures) may be used in the code to support or explain the assessment benchmarks.

The code may be separated into two tables, including:

- one for assessment benchmarks for accepted development subject to requirements; and

- one for assessable development.

In addition, it is anticipated that within these tables the code provisions will be stepped out into key themes (i.e., building floor levels, hazard vulnerable uses and essential community infrastructure, resilient design, access and evacuation, storage and conveyance, environmental functions and storage of hazardous materials, etc.,) and may also be separated by hazard risk category type where differing benchmarks apply.

Table 11 provides a summary of the key policy considerations for preparing the draft assessment benchmarks for the flood overlay code:

Table 11 - Flood risk overlay code policy considerations

Themes	SPP guidance	SFMP LUP guidance	IICP recommendations	Phases 1 to 3 report planning directions	Existing Ipswich planning scheme	Proposed recommendations for draft Flood risk overlay code
Residential uses	**When updating a settlement pattern or changing a land use intent**, does the choice of zone/locally specific provisions avoid allocating land for new urban development in areas of unacceptable flood hazard and discourage expansion and intensification of inappropriate urban settlement in existing areas of flood hazard? • For example: Identify new urban areas for expansion or intensification in new or existing areas with acceptable or tolerable flood risks and safe evacuation routes for flood events greater than the Probable Maximum Flood (PMF). • Limit increases in density relative to the flood risk in existing urban flood hazard areas. • Promote more compatible and resilient land uses in flood hazard areas. In areas of intolerable risk where future uses are highly constrained, including land in the Limited development zone may provide transparency regarding the level of hazard. In addition, local government may seek to alert their community to the Flood Resilient Building Guidance for Queensland Homes non-statutory guidance document that contains considerations for improving the flood resilience of homes.	For expansion (or greenfield) areas, the establishment of new residential and accommodation uses **should not occur in the HR1 or HR2 Potential Hydraulic Risk categories**. The intensification or expansion of existing residential and accommodation uses **should not occur in the HR1 and HR2 Potential Hydraulic Risk categories** or where the relative time to inundation is **less than 12 hours** and development does not support preservation of life on-site. The establishment of new residential and accommodation uses or expansion of existing development in the HR3 or HR4 Potential Hydraulic Risk categories **may be tolerable subject to certain requirements**, including mitigation to an extent where development achieves an acceptable level of risk and is higher than or outside the 1 in 100 AEP + freeboard.	**LUP 2** – Extend any development controls for residential uses to the HR4 category to include the 1 in 500 year H3 hazard category. **LUP5** – Avoid any intensification of development in areas mapped in HR1c and HR1b. **LUP12** – Avoid vulnerable uses and non-intensification of residential uses in locations where TTI is <6 hours and DFI is >36 hours, or locations subject to flood islands. In areas of low hazard built form and resilient building materials should be considered as an acceptable mitigation response **LUP15** – For residential uses removing provision relating to a flood depth of no more than 800mm.	Restrict further intensification of development in extreme and high risk areas through zoning Provide a Finished Floor Level / Flood Planning Level for residential uses Require the use of flood resilient building materials and built form for development in the floodplain Require site specific emergency response mitigations such as a FEMP for development in the medium and high density residential zones and centre zones where increased residential development is planned.	The Flood code includes provisions focused on built form outcomes for residential uses on land situated: • below the 1 in 20 development line • between the 1 in 20 development line and the adopted flood regulation line; and • within urban catchment flood paths. The key flood mitigation provisions on the design and layout of residential developments require: • the floor levels of any habitable rooms of a proposed building are a minimum of 500mm above the adopted flood regulation line; • vehicle parking and other low intensive, non-habitable uses are located at ground level • the areas below habitable rooms are to be left open; • may be used for the parking of vehicles or the storage of large items; may be screened for security purposes using timber battens; • may use timber batten gates such that the gates do not impede flood flows; and • building materials and surface treatments used below the Adopted Flood Regulation Line are resistant to water damage and do not include wall cavities that may be susceptible to the intrusion of water and sediment. In terms of site earthworks, where a floodplain management plan does not exist for the catchment, no filling of land or reduction of flood storage capacity is permitted below the 1 in 20 development line or on land below the adopted flood regulation line.	Residential uses do not occur on the part of land within the high to extreme flood risk area. Include the following existing provisions as accepted development subject to requirements: • the floor levels of any habitable rooms of a proposed building are a minimum of 300mm above the defined floor level; **Dry flood proofing** • the areas below the flood planning level that are not enclosed: o are left open so as not to impede flood flows; o may be used for the parking of vehicles or the storage of large items that are readily able to be moved in the event of a flood; o may be screened for security purposes, using timber battens where such screening does not impede flood flows; and o may use timber batten gates such that the gates do not impede flood flows, avoiding the use of solid fill gates, roll-a-doors or tilt doors; **Wet flood-proofing** • any enclosure of areas below the flood planning level does not consist of habitable rooms; • openings are provided to allow for automatic entry and exit of floodwater up to the defined flood level; • non-structural materials used below the defined flood level are flood resistant; • walls without cavity spaces and flood resistant materials are used to minimise the need for replacement and repair and to

Themes	SPP guidance	SFMP LUP guidance	IICP recommendations	Phases 1 to 3 report planning directions	Existing Ipswich planning scheme	Proposed recommendations for draft Flood risk overlay code
					The clearing of native vegetation within the stream banks is avoided.	provide for ease of cleaning in the event of a flood.
Commercial, industrial uses and other non-residential uses	Where land is included in a flood hazard area consider if the choice of zone/locally specific provisions consider the uses envisaged by each zone and whether the risks associated with flood can be mitigated to acceptable or tolerable levels for those uses. The zone and/or locally specific mapping intent may then be adjusted to reflect flood-appropriate land uses / provide guidance on the compatibility of different uses, considering: The flood scenario under which the use will cease to function effectively and the likelihood of such an event. The consequences of and community tolerance to loss of a community service during and immediately after a flood hazard event. Whether the use will place additional burden on government disaster management operations or on recovery capacity. The degree of sensitivity of the use to property loss or damage. For example, intents discourage the following uses from establishing in flood hazard areas. As a minimum, hazardous industries and uses that involve the storage of significant amounts of hazardous material should be located outside areas affected by the DFE. Where for development involving the storage of significant amounts of hazardous material in a flood hazard area should be assessable. This will enable assessment benchmarks to apply so that impacts can be fully considered. Where for development involving the storage of significant amounts of hazardous material in a flood	For expansion (or greenfield) areas, the establishment of new commercial and industrial development **should not occur in the HR1 and HR2 Potential Hydraulic Risk categories.** The intensification or material expansion of existing commercial and industrial uses should not occur in the HR1 and HR2 Potential Hydraulic Risk categories or where Relative Time to Inundation is less than **12 hours**. The establishment of new commercial or industrial uses or expansion of existing development in the HR3 or HR4 Potential Hydraulic Risk categories may be potentially tolerable subject to certain requirements, including mitigation to an extent where development achieves an acceptable level of risk and is located above the 1 in 100 AEP. Ancillary activities associated with commercial and industrial uses which are more resilient to flooding impacts such as carparking, buffer areas etc. may be located in areas with a lower flood immunity than the primary uses. Hazardous uses or the storage of hazardous materials occur in areas outside the floodplain (defined by the extent of the 1 in 100,000 AEP) or occur within facilities that should be designed to ensure hazardous materials are not released to flood waters during any flood event and where relative time to inundation is greater than 24 hours.	**LUP8** – Include requirements for a Flood Risk and Emergency Plan (FEMP) for non-residential uses in locations where TTI is <6 hours and where DFI is >36 hours. **LUP14** – Adding a provision for commercial, industrial and other non-residential uses to avoid increasing the concentration of people in areas in HR1c and HR1b.	Restrict further intensification of development in high risk areas through zoning Any development in a flood hazard area is subject to code assessment Provide a Finished Floor Level / Flood Planning Level for industrial uses Require the use of flood resilient building materials and built form for development in the floodplain No storage of chemicals and hazardous material in the floodplain	Commercial and industrial uses are code assessable. The key flood mitigation provisions on the design and layout of buildings for commercial, industrial and other non-residential developments require: • vehicle parking, or other low intensive, or non-habitable uses at ground level; retail, commercial and work areas above the parking areas, to increase flood immunity; and expensive plant, equipment and stock in the area of the site or building with the greatest flood immunity; • building materials and surface treatments used below the adopted flood regulation line are resistant to water damage and do not include wall cavities that may be susceptible to the intrusion of water and sediment; • electrical switchboards, main data servers and the like are positioned to maximise flood immunity; • the concentration of people in flood affected areas, particularly within areas affected by significant flood flows (i.e., one metre or more in depth), is avoided unless it can be demonstrated that the overall use is appropriate (e.g., sporting fields) and where there is likely to be adequate warning and vehicular access to a safe evacuation route in the event of a flood. In terms of earthworks, where a floodplain management plan does not exist for the catchment no filling of land or reduction of flood storage capacity is permitted:	Include a requirement for a finished floor level for commercial, industrial and non-residential uses. For development for an extension to an existing building, or where below the defined floor level, including a requirement for development to: • not create a sudden change in flow distributions, flood level or velocity that could result in increased flood hazard to the surrounding area; • maintains a functional and attractive relationship with the adjacent street frontage; • provides ground level engagement and activation where in centre zones and other urban environments where an active frontage is desired; • avoids the need to rebuild structures and replace materials after a flood event up to and including the flood planning level; and • ensures any portion of a permitted structure below the flood planning level is constructed of flood compatible (flood damage resistant) materials. Include a requirement for the design and layout of buildings to provide for wiring, power outlets and switches, conduits, heating and air conditioning to be above the flood planning level and to have a backup power source.

Themes	SPP guidance	SFMP LUP guidance	IICP recommendations	Phases 1 to 3 report planning directions	Existing Ipswich planning scheme	Proposed recommendations for draft Flood risk overlay code
	hazard area; consider if the assessment benchmarks include design measures so that hazardous materials are not exposed to flood waters and/or are appropriately sealed to avoid the release of hazardous materials as a result of a flood hazard event and evacuation plans to safely remove hazardous materials to alternative sites are in place in the event of a flood.				• below the 1 in 20 development line; • on land below the adopted flood regulation line; • unless an assessment, undertaken by a suitably qualified consultant, demonstrates that the reforming of the land does not negatively impact on the overall hydrology, hydraulics and flood capacity of the waterway, does not result in the reduction of flood storage capacity on the site and does not significantly impact on the ecological values of the riparian corridor.	
Vulnerable uses and community infrastructure	Where land is included in a flood hazard area consider if the choice of zone/locally specific provisions consider the uses envisaged by each zone and whether the risks associated with flood can be mitigated to acceptable or tolerable levels for those uses. For example, intents discourage the following uses from establishing in flood hazard areas. As a minimum these uses should be located outside areas affected by the DFE: • **Uses catering to vulnerable persons requiring unique evacuation requirements** (such as hospitals, education establishments, childcare centres, aged care accommodation, nursing homes, and high-security correctional centres). • **Community infrastructure** that will perform an important role and be required to function during and immediately after a flood hazard event (also consider other uses that may need to perform a role during or after a flood event, for example showgrounds and sports facilities can perform an active role in flood response and recovery, serving as emergency	Vulnerable uses are: • Intolerable for HR1, HR2, and HR3; • Tolerable (subject to requirements to treat and manage risk to an acceptable level) for HR4; • Acceptable for HR5.	**LUP10** – Include development control measures that may be applied to the development assessment process of vulnerable uses below the Probable Maximum Flood (PMF). **LUP11** – Provide a definition of vulnerable uses in the new Ipswich Planning Scheme. **LUP12** – Avoid vulnerable uses and non-intensification of residential uses in locations where TTI is <6 hours and DFI is >36 hours, or locations subject to flood islands. In areas of low hazard built form and resilient building materials should be considered as an acceptable mitigation response.	No vulnerable uses on land affected by flood.	A specific provision is included for Community infrastructure requiring the use to be able to function effectively during and immediately after flood hazard events. A probable solution is that key elements of community infrastructure are sited and designed to achieve the levels of flood immunity as set out in the SPP and associated guidelines. A specific provision is also included for uses that accommodate or otherwise cater for the aged, infirm or other at risk or mobility impaired people such as hospitals and nursing homes are not located below the adopted flood regulation line or within an urban catchment flow path.	Include a specific requirement for hazard vulnerable uses not to be located in medium to extreme flood risk areas. The following administrative definitions are proposed: • **hazard vulnerable uses**, means: Childcare centre, Community care centre, Detention facility, Educational establishment, Hospital, Rooming accommodation, Residential care facility, Retirement facility, Short term accommodation uses, Nature-based tourism, Relocatable home parks, Resort complexes and Tourist parks. • **community infrastructure** for essential services, means: Educational establishment, Emergency services, Hospital, Major electricity infrastructure, Telecommunications facility, Utility installation. • **hazardous materials** in the context of natural hazards means: Medium and High Impact and Special Industry where involving hazardous materials and chemicals that are present in the quantities identified in the Work Health and Safety Regulation, schedule 15, or that

Themes	SPP guidance	SFMP LUP guidance	IICP recommendations	Phases 1 to 3 report planning directions	Existing Ipswich planning scheme	Proposed recommendations for draft Flood risk overlay code
	accommodation and recovery staging points). • **Expansion of the above existing uses** in these areas unless evacuation solutions and resilient design can be achieved – refer assessment benchmarks below. • Community infrastructure that protects **valuable equipment and artefacts** (such as museums, libraries, art galleries, archives) – refer assessment benchmarks for mitigation strategies where this is not possible. • **Rural land uses** such as intensive animal husbandry and intensive agriculture. Consider if the categories of development and categories of assessment reflect the level of risk and vulnerability of the use. For example, if vulnerable uses and community infrastructure uses are identified as assessable within the flood hazard area. **Where for development in a flood hazard area involving vulnerable uses and essential community infrastructure that must continue operating during or after a flood event**, consider if the assessment benchmarks require development to be located above the height of the PMF or other known extreme event to achieve the highest practical level of flood immunity. **Where for development in a flood hazard area involving essential community infrastructure**, consider if the assessment benchmarks contain siting, design and access standards to achieve the required level of functionality during and immediately after a flooding hazard event. **Where for development in a flood hazard area for community infrastructure that protects valuable equipment and artefacts**, consider if the assessment					would constitute the use being a hazardous chemical facility. Include a specific requirement for community infrastructure to ensure that it remains functional to serve community needs during and after a flood event.

Themes	SPP guidance	SFMP LUP guidance	IICP recommendations	Phases 1 to 3 report planning directions	Existing Ipswich planning scheme	Proposed recommendations for draft Flood risk overlay code
	benchmarks require this development to be located above the height of the DFE.					
Hazardous or noxious materials	**Where for development involving the storage of significant amounts of hazardous material in a flood hazard area**, consider if the assessment benchmarks include design measures so that hazardous materials are not exposed to flood waters and/or are appropriately sealed to avoid the release of hazardous materials as a result of a flood hazard event and evacuation plans to safely remove hazardous materials to alternative sites are in place in the event of a flood.	Nil	Nil	Nil	Materials or chemicals manufactured or stored on site: are located as far as practicable on the highest part of the site and designed to prevent the intrusion of floodwaters • are readily able to be moved in a flood event; • are not hazardous or noxious or comprise materials that may cause a deleterious effect on the environment if discharged in a flood event; • are contained in order to minimise movement in times of flood.	Include a specific requirement for ensuring the storage and handling of hazardous materials and chemicals in the floodplain avoids or minimises the risk of contamination to the environment and public safety. To provide measurability to this provision – link it to the nature of particular land uses including uses such as Medium impact industry, High impact industry and Special industry, together with referencing the Work Health and Safety regulation which identifies specific hazardous chemicals and their qualities.
Filling / earthworks	Consider if the aspects of development that may impact on, or be impacted by, flood hazard are assessable. For example, significant earthworks and works involving the redirection of the existing overland flow paths. This will enable assessment benchmarks to apply so that impacts can be fully considered. Where land is included in low, medium and/or high risk flood hazard areas consider if the assessment benchmarks contain strategies so development does not affect floodplain behaviour in a way that may increase the number of people at risk to an intolerable level or cause or contribute to increase in the level of risk on surrounding people and property. For example, avoid filling, altering flow-paths or adversely changing flood duration, depth, velocity, hazard or warning time. Also consider if the assessment benchmark require the retention or enhancement of riparian corridors and vegetation that provide a protective function during flood events, maintain the	HR 1 and 2 risk categories are particularly sensitive to filling – resulting in flood impacts elsewhere in the floodplain, and implications for cumulative impact downstream.	**LUP7** – Include requirements for easements in greenfield areas up to the Defined Flood Event (DFE). **LUP18** – Preserve pockets of flood storage in the catchment to avoid future flood risk impacts in areas where HR categories and flood levels may increase as a result of filling or due to development activity. **LUP19** – Continue provisions that maintain flood storage capacity and do not create impacts on sites upstream or downstream– this is normally a request to provide hydraulic and hydrology report demonstrating compliance.	Preserve flood storage. Ensure new development has regard to the possible cumulative impacts of storage loss.	Earthworks not associated with a material change of use is code assessable if land is affected by the 1 in 20 development line or adopted flood regulation line constraints overlay. The Earthworks code on flooding and drainage specifies the following outcomes: • all earthworks are to comply with any applicable development criteria set out in an approved floodplain management plan; • where a floodplain management plan does not exist for the catchment, no earthworks (including filling) is permitted on land below the adopted flood regulation line, unless: o the land is located above the 1 in 20 development line; o an assessment, undertaken by a suitably qualified consultant, demonstrates that the reforming of the land does not negatively impact on the overall hydrology, hydraulics and flood capacity of the	Include a requirement for managing earthworks in the floodplain to ensure that flood conveyance functions are maintained in high to extreme flood risk areas and that there is no net loss of flood storage on land in a medium flood risk area. Include a specific requirement for development in a greenfield area to protect flood conveyance by providing an easement or reserve over the area of the premises up to the Defined Flood Level (including freeboard).

Themes	SPP guidance	SFMP LUP guidance	IICP recommendations	Phases 1 to 3 report planning directions	Existing Ipswich planning scheme	Proposed recommendations for draft Flood risk overlay code
	natural function of the floodplain and potentially reduce the need for built mitigation infrastructure.				waterway, and does not result in the reduction of flood storage capacity on the site, and does not significantly impact on the ecological values of the riparian corridor.	
Built form and freeboard	Where land is included in low, medium and/or high risk flood hazard areas consider if the assessment benchmarks set thresholds such as finished floor levels for development, where appropriate. Where for development in a flood hazard area for community infrastructure that protects valuable equipment and artefacts, consider if the assessment benchmarks require this development to be located above the height of the DFE.	The SFMP TER provides an options framework to determine an appropriate freeboard for use in setting defined flood levels / finished floor levels. The most significant factors that contribute to variable flood levels across the floodplain include: (1) the sensitivity or uncertainty of changes in flood behaviour as a result of increased catchment inflows, rainfall and sea level rise. This factor also considers how significantly the depth changes between similar AEP events (e.g., between 1 in 50 and 1 in 100 AEPs), with a greater differential (e.g. >1m) indicating higher flood sensitivity; and (2) the sensitivity of the proposed development to flooding and the impact of property damage. This can be expressed for each land use activity group (e.g., residential, commercial, industrial etc.), or for specific uses (e.g., community use, health care service, relocatable home park etc.). The appropriate freeboard applied depends on the combination of development sensitivity and flood behaviour sensitivity/uncertainty in the floodplain. This aligns with a more risk-based approach in recognising that different areas of the floodplain will have higher or lower levels of uncertainty. Table 9-1 Freeboard options assessment framework Flood behaviour sensitivity / uncertainty: Low / High Development sensitivity: Low — Minimal (minimum 300mm) / Moderate (300 – 500mm); High — Moderate (300 – 500mm) / Maximal (at least 500mm)	**LUP 6** – Continue the existing requirements in the current planning scheme that promote built form and resilient building materials as an acceptable mitigation response such as building on stilts, or with wet / dry proofing on ground floor, but may consider revising trigger areas based on lower risk areas such as HR2a, HR3a, HR4 and HR5. **LUP12** – Avoid vulnerable uses and non-intensification of residential uses in locations where TTI is <6 hours and DFI is >36 hours, or locations subject to flood islands. In areas of low hazard built form and resilient building materials should be considered as an acceptable mitigation response **LUP16** – Minimum clearance for the construction of basements and undercrofts.	Provide a Finished Floor Level / Flood Planning Level for residential / commercial and other non residential uses. Require the use of flood resilient building materials and built form for development in the floodplain.	Specific built form requirements are included for residential development (detailed above) and commercial, industrial and other non-residential development (detailed above). Specific provisions are included for basements and undercrofts. Basements below the adopted flood regulation line or within an urban catchment flow path are to be waterproof, with walls and floors impermeable to the passage of water. All basement entry points and services are to be located where practicable above the adopted flood level or incorporate effective barriers (i.e., flood gates) to prevent inundation. A backup power source is to be provided and located above the adopted flood level where the basement relies on a pumping solution to manage floodwater ingress or for dewatering after a flood. Development that includes an undercroft ensures that the building and site design allows floodwaters and flood debris to pass predominantly unimpeded under the structure. The design of the undercroft does not increase flood hazard. The undercroft area is stabilised, resistant to scour, and designed to drain freely.	Carry in the existing design and built form requirements for residential and commercial, industrial and non-residential development, basements and undercroft areas, as amended to ensure they do not offend the BAPs.

Themes	SPP guidance	SFMP LUP guidance	IICP recommendations	Phases 1 to 3 report planning directions	Existing Ipswich planning scheme	Proposed recommendations for draft Flood risk overlay code
Site based assessments	**Consider if area of potential flood risk requires assessment benchmarks for site-based investigations**. For development proposed on land where the potential for flooding is unknown, the assessment benchmarks may require: • Information to enable an assessment of whether the subject land is susceptible to flooding. • Upon determination that the subject land is susceptible to flooding, more detailed information to allow an assessment of the flood risk. A planning scheme policy may specify the scope and methodology to be followed in preparing a site-based flood study and risk assessment, in support of a development application for a site in a flood hazard area.	The guidance includes a Flood risk factors decision support tool with a focus on relative time to inundation as a key factor in determining land use suitability for certain uses. The core issues is addressing whether all occupants can be evacuated to a safe location within the available warning time (including along the evacuation route). This will require both consideration at strategic land use planning stage (for allocation of zones) and at site-based development assessment stage.	**LUP9 –** Include requirements for responses such as FEMPs linked to new development in locations subject to flood islands. **LUP13** – Request a Flood Risk Assessment.	Require site specific emergency response mitigations such as a FEMP for development in the medium density residential zone and major centre zone. Require site specific emergency response mitigations such as a FEMP for development subject to high / medium hazard risk and/or priority evacuation areas. For commercial, sport and recreation and other non-residential uses in high risk areas, require site specific emergency response mitigations such as a FEMP. Require site specific emergency response mitigations such as a FEMP for vulnerable uses within the floodplain.		Include a link to the PSP and reference to the preparation of any site-based assessments, including a Flood Emergency Management Plan where required within the Flood risk overlay provisions.
Evacuation / access	Where land is included in low, medium and/or high risk flood hazard areas consider if the assessment benchmarks contain siting, design and transport infrastructure requirements that: • Enable people to safely shelter in place (depending on the nature of the risk). • Enable the safe self-evacuation of occupants and visitors from the hazard area. • Provide for effective disaster response and recovery, such as safe and efficient access and operation for emergency services and the supply of essential goods and services. Also consider if the assessment benchmarks need to require evacuation routes and the provision of LGIP infrastructure as potential mitigation measures.					Include a requirement for development to be designed to ensure personal safety at all times, ensuring that access and egress avoids isolation. Further, ensure the intensification of development in priority evacuation areas and low flood islands is avoided.
Other – Reconfiguring a lot code				Restrict further intensification of development in high risk areas through zoning.	The Reconfiguring a lot code provides the following flood mitigation provisions for minor, moderate and major subdivisions	Include a requirement that the reconfiguration of land to create additional lots or the realignment of boundaries of existing lots

Themes	SPP guidance	SFMP LUP guidance	IICP recommendations	Phases 1 to 3 report planning directions	Existing Ipswich planning scheme	Proposed recommendations for draft Flood risk overlay code
					focusing on the lot layout and design outcome for urban residential lots: • for residential lots, other than homestead or township lots, a drainage system is provided so that no part of the driveway is below the adopted flood level; • for homestead or township lots no part of the driveway is below the adopted flood level; • all cottage lots, courtyard lots, traditional lots, hillside lots and dual occupancy lots are located outside the adopted flood regulation line and urban catchment flow paths • for Homestead or township lots, an area which is suitable for a building platform comprising at least 600m² of each lot is to be located outside the adopted flood regulation line and urban catchment flow paths. Also, an additional area is to be available on each lot that is suitable to treat and dispose of effluent on-site in compliance with the *Plumbing and Drainage Act 2002* and the Queensland Plumbing and Wastewater Code; • all multiple residential lots, commercial lots, mixed business and industry lots and industrial lots are located above the adopted flood level for the respective zone or sub area. For minor and moderate rural subdivisions: • for rural lots, other than rural living lots, a drainage system is provided so that no part of the driveway is below the adopted flood level; • for rural living lots no part of the driveway is below the adopted flood level; • a flood free dwelling site is located above the adopted flood level to provide protection	ensures that lots have a suitable area of land above the flood planning level to accommodate the intended use.

Themes	SPP guidance	SFMP LUP guidance	IICP recommendations	Phases 1 to 3 report planning directions	Existing Ipswich planning scheme	Proposed recommendations for draft Flood risk overlay code
					of property in accordance with the accepted level of risk; • each proposed lot is to contain an area which is suitable for a building platform comprising at least 2000m² and located outside the adopted flood regulation line and urban catchment flow paths. Also, an additional area is to be available on each lot that is suitable to treat and dispose of effluent on-site in compliance with the *Plumbing and Drainage Act 2002* and the Queensland Plumbing and Wastewater Code.	

4.5.1 Draft overlay code

8.10 Flood Risk and Overland Flow Overlay Code

8.10.1 Application

(1) This code applies to:

a. land subject to the Flood Risk Overlay shown on Map OV12 and identified in the following categories:

(i) Extreme risk area;

(ii) High risk area;

(iii) Medium risk area;

(iv) Low risk area;

(v) Very low risk area (PMF);

(vi) Priority Evacuation Areas; and

(vii) Flood Resilient Precincts; and

b. accepted development subject to requirements and assessable development for which the Flood Risk and Overland Flow Overlay Code is identified in the 'Assessment Benchmarks and Required Outcomes' column in Table 5.9.10 — Flood Risk and Overland Flow Overlay.

(2) When using this code, reference should be made to Section 5.3.2 — Determining the category of development and category of assessment and, where applicable, Section 5.3.3 — Determining the requirements for accepted development and assessment benchmarks and other matters for assessable development located in Part 5 —Tables of assessment.

(3) When using this code:

a. Table 8.10.3.1 applies to accepted development subject to requirements;

b. Table 8.10.3.2 applies to assessable development on land subject to the Flood Risk Overlay shown on Map OV12, other than assessable development on land in a Flood Resilient Precinct; and

c. Table 8.10.3.3 applies to assessable development on land subject to a Flood Resilient Precinct shown on Map OV12.

8.10.2 Purpose and Overall Outcomes

Note—for the purposes of section 8 of the Building Regulation 2021:

(b) the Flood Risk Overlay area is designated as the designated flood hazard area shown on Map OV12 for land in the following flood risk categories:

i. Extreme risk area

ii. High risk area;

iii. Medium risk area;

iv. Low risk area;

v. Very low risk area (PMF);

vi. Priority Evacuation Areas; and

vii. Flood Resilient Precincts;

(c) the defined flood level is the level associated with the defined flood event, which is the 1% AEP at 2100 – unless otherwise stated for specific uses;

(d) for residential uses, a freeboard of 300mm is selected; and

(e) for commercial, industrial and other non residential uses (excluding Hazard vulnerable uses or Community infrastructure), a freeboard of 300mm is selected.

(f) the finished floor level of Class 1 buildings is the defined flood level plus 300mm.

(1) The purpose of the Flood Risk and Overland Flow Overlay Code is to provide for development that protects people and property and provides for risk responsive design and appropriate development outcomes which are aligned to the flood risk profile of the site and land use vulnerability and overall settlement pattern.

(2) The purpose of this code will be achieved through the following overall outcomes:

a. development is compatible with the nature of the flood risk. Where development is not compatible with the nature of the flood risk, there is an overriding need for the development and no other site is suitable and reasonably available for the proposal, and the development:

(i) can minimise as far as practical the adverse impacts from the flood risk to a tolerable and acceptable level;

(ii) does not result in unacceptable risk to the safety of people, protection of public infrastructure and protection of private property; and

(iii) the development does not place additional burdens on disaster management capacity;

b. the intensification of land through a reconfiguration of a lot to create additional lots or realignment of boundaries of existing lots, or the exposure of residential or non-residential activities is avoided in extreme and high flood risk areas;

c. the risk from flood hazard is managed for the full range of flood events to ensure exposure of people and property to unacceptable risk is avoided;

d. infrastructure and new buildings mitigate the flood risk through its location, siting, design, construction and operation whilst maintaining a consistent form and scale expected of the place;

e. the city's disaster management response capacity, including emergency services access during a flood emergency is not unduly burdened;

f. efficient self-evacuation and access for evacuation resources including emergency services during flood events is provided, or plans for the impact of isolation or hindered evacuation during flooding are made;

g. increase in residential exposure is avoided in areas of:

(i) medium to extreme flood risk; or

(ii) high evacuation risk;

h. essential community infrastructure remains functional during and immediately after flood events;

i. emergency management plans respond to the number and capacity of future users of the development so they may safely participate in self-managed emergency measures such as evacuation;

j. essential building services or services essential for the development are designed, located and operated to minimise the flood risk to people, minimise damage to property and disruption to building function, and minimise re-establishment time after a flood event;

k. hazardous materials manufactured, handled or stored in bulk do not adversely impact on public safety and the environment as a result of the impacts of floodwater;

l. development maintains flood storage and the hydraulic function of conveyance and does not, directly or cumulatively, cause or increase adverse impacts on other properties or land within the floodplain from flooding;

m. infrastructure mitigates the impacts of hydraulic hazard due to predictable future changes in rainfall intensity and risk of flooding; and

n. development prioritises in order, the safety of people, protection of public infrastructure and protection of private property, in the management of the economic, social and environmental impacts of flooding.

8.10.3 Specific Benchmarks for Assessment

Table 8.10.3.1 – Benchmarks for Accepted Development Subject to Requirements

1 Flood Risk Compatibility	RO1.1 Development does not occur on the part of land that is: a. subject to the medium to extreme flood risk category shown on Map OV12; or b. located in a priority evacuation area shown on Map OV12; or c. located on, or over an Overland flow path area shown on Map OV12.
	RO1.2 Building work not associated with a material change of use does not occur on the part of the land that is subject to high to extreme flood risk category shown on Map OV12, where: a. erecting a Class 10 building (outbuilding); or b. involving the enclosure of a ground floor storey of an existing dwelling or dual occupancy.
2 Building Floor Levels	RO2.1 Finished floor levels of all habitable rooms are at or above the flood planning level. Note—A property specific flood risk report can be accessed through ipswich.qld.gov.au
3 Earthworks	RO3.1 Development is limited to rehabilitation works.
	RO3.2 There is no change to existing natural ground level.
	RO3.3 The clearing of native vegetation within a watercourse or designated wetland is avoided. Note—Strategic Valuable Features Map 2 (SVFM2) - Watercourses and Designated Wetlands provides mapped extents of watercourses and designated wetlands.
4 Resilient Built Form – dry flood-proofing	RO4.1 The areas below the flood planning level that are not enclosed: a. are to be left open so as not to impede flood flows; b. may be used for the parking of vehicles or the storage of large items that are readily able to be moved in the event of a flood; c. may be screened for security purposes, using timber battens where such screening does not impede flood flows; and d. may use timber batten gates such that the gates do not impede flood flows, avoiding the use of solid fill gates, roll-a-doors or tilt doors.
5 Enclosure below the DFE – wet flood-proofing	RO5.1 Any enclosure of areas below the flood planning level does not consist of habitable rooms.
	RO5.2 Any enclosure of areas below the flood planning level does not exceed: a. 1.0 metre of depth above the finished floor level; or b. 1.5 metres/second maximum flow velocity; or

	c. a H3 flood hazard classification in any known event.
	RO5.3 Openings are provided to allow for automatic entry and exit of floodwater up to the defined flood level. Note—Buildings are to be designed in compliance with Clause 2.6 of the ABCB Handbook: Construction of Buildings in Flood Hazard Areas. The Queensland Development Code Mandatory Requirements 3.5 – Construction of buildings in flood hazard areas, provides Acceptable solution 1 which requires compliance with Clause 2.6 of the ABCB Handbook: Construction of Buildings in Flood Hazard Areas for class 1-4 and Class 9a and 9c buildings.
	RO5.4 Non-structural materials used below the defined flood level must be capable of resisting damage, deterioration, decay taking into account the likely time the material would be in contact with flood water and the likely time it would take for the material to subsequently dry out. Note—Deemed to satisfy wet-proofing contained within Clause 2.8 of the ABCB Handbook: Construction of Buildings in Flood Hazard Areas achieves this requirement.
	RO5.5 Walls without cavity spaces and flood resistant materials are used to minimise the need for replacement and repair and to provide for ease of cleaning in the event of a flood. Note—Buildings are to be designed in compliance with Clause 2.8 of the ABCB Handbook: Construction of Buildings in Flood Hazard Areas. The Queensland Development Code Mandatory Requirements 3.5 – Construction of buildings in flood hazard areas provides Acceptable solution 1 which requires compliance with Clause 2.8 of the ABCB Handbook: Construction of Buildings in Flood Hazard Areas for class 1-4 and Class 9a and 9c buildings.
6 **Carparking**	RO6.1 Parking spaces associated with non-residential development are located outside the high to extreme flood risk category shown on Map OV12.

Table 8.10.3.2 – Benchmarks for Assessable Development

1 **Flood Risk Compatibility**	
PO1 Development for an accommodation activity (other than a hazard vulnerable uses) is avoided on the part of the land subject to the high to extreme flood risk category shown on Map OV12.	AO1.1 No accepted outcome provided.
PO2 All buildings and structures within the very low to medium flood risk category shown on Map OV12 are located and designed to: a. avoid an intolerable level of flood risk; and b. mitigate the risk to people and property from the flood hazard to an acceptable or tolerable level. Note—Compliance with this performance outcome will be achieved through a Flood Risk Assessment prepared by a suitably qualified and experienced engineer.	AO2.1 Finished floor levels for: a. all habitable rooms are at or above the flood planning level; and b. commercial, industrial and other non-residential development are at or above the flood planning level. Note: A property specific flood risk report can be accessed through ipswich.ald.gov.au.
	AO2.2 Any enclosure of areas below the flood planning level do not consist of habitable rooms.
PO3 The reconfiguration of land to create additional lots or realignment of boundaries of existing lots is avoided on land within the high to extreme flood risk categories shown on Map OV12.	AO3.1 No accepted outcome provided.

2 **Hazard Vulnerable Uses and Community Infrastructure**	
PO4 Development for a Hazard vulnerable use is avoided in the medium to extreme flood risk categories shown on Map OV12.	AO4.1 No accepted outcome provided.
PO5 Development for, or the expansion of, a Hazard vulnerable use is compatible with the level of risk associated with the natural hazard.	AO5.1 Development is located outside the PMF. OR
	AO5.2 Where unable to locate outside the PMF, development for, or expansion of, a Hazard vulnerable use, the following is demonstrated: a. the development does not place additional burdens on disaster management capacity; b. the development complies with the minimum flood immunity standards relative to the use shown in Table 8.10.3.4, or an appropriate finished floor level has been selected considering events rarer than the 1% AEP at 2100 through a Flood Risk Assessment prepared by a suitably qualified engineer; c. the development will not create a sudden change in flow distributions, flood level or velocity that could result in increased flood hazard to the surrounding area; d. that permanent, fail-safe, maintenance-free measures are incorporated in the development to ensure the timely, orderly and safe evacuation of people during a range of floods including rarer than the 1% AEP event is possible; and e. ensure the safe evacuation of the premises in accordance with a site-specific Flood Emergency Management Plan. Note—Compliance with this acceptable outcome will be achieved through a Flood Risk Assessment prepared by a suitably qualified and experienced engineer. Note—A Flood Emergency management Plan must be prepared by a suitably qualified and experienced person in accordance with PSPXX.
	AO5.2 Any portion of a permitted structure below the Flood Planning Level (or finished floor level determined in AO13.1(c) above) must be constructed of materials capable of resisting damage, deterioration, decay taking into account the likely time the material would be in contact with flood water and the likely time it would take for the material to subsequently dry out. Note—Deemed to satisfy wet-proofing contained within Clause 2.8 of the ABCB Handbook: Construction of Buildings in Flood Hazard Areas achieves this requirement.
	AO5.3 Any permitted structure (including foundations and support), must include information from a suitably qualified engineer confirming that the structure can withstand the likely conditions experienced during the

	PMF (or other relevant design event determined in AO13.1(c) above without suffering structural failure.
PO6 Development for community infrastructure and essential services: a. remains functional to serve community needs during and immediately after the defined flood event; b. is designed, sited and operated to avoid adverse impacts on the community or the environment due to the impacts of flood inundation on infrastructure, facilities or access and egress routes; c. retains essential site access during the defined flood event; d. is able to remain functional even when other infrastructure or services may be compromised in the defined flood event; and e. the development complies with the minimum flood immunity standards relative to the use shown in Table 8.10.3.4, or an appropriate finished floor level has been selected considering events rarer than the 1% AEP at 2100. Note—Compliance with this performance outcome will be achieved through a Flood Risk Assessment prepared by a suitably qualified and experienced engineer.	AO6.1 No accepted outcome provided.
PO7 Development for a Community use is compatible with the level of risk associated with the natural hazard and complies with the minimum flood immunity standards relative to the use shown in Table 8.10.3.4. Note—A Flood Risk Assessment prepared by a suitably qualified and experienced engineer in accordance with PSPXX will need to be prepared to demonstrate compliance with this performance outcome.	AO7.1 No accepted outcome provided.
3 **Resilient Design**	
PO8 Where development is for an extension to an existing building or for new development that can be classed as infill development and the development is at or below the flood planning level, the design and built form of development: a. must not create a sudden change in flow distributions, flood level or velocity that could result in increased flood hazard to the surrounding area b. maintains a functional and attractive relationship with the adjacent street frontage; c. provides ground level engagement and activation where in centre zones and other urban environments where an active frontage is desired; d. avoids the need to rebuild structures and replace materials after a flood event up to and including the flood planning level; and	AO8.1 The areas below the flood planning level within a high to extreme flood risk category shown on Map OV12 are not to be enclosed and: a. are to be left open so as not to impede flood flows; b. may be used for the parking of vehicles or the storage of large items that are readily able to be moved in the event of a flood; c. may be screened for security purposes, where such screening does not impede flood flows; and d. may use gates such that the gates do not impede flood flows, avoiding the use of solid fill gates, roll-a-doors or tilt doors. AO8.2 Development for commercial, industrial and other non-residential uses that includes an undercroft ensures that the building and site design allows floodwaters and flood debris to pass predominantly unimpeded under the structure and:

e. ensures any portion of a permitted structure below the flood planning level is constructed of flood compatible (flood damage resistant) materials. Note—This is particularly relevant for commercial uses in centres with a strong 'town-centre' pedestrian realm that also may be affected by flood, or for character areas to maintain an attractive presentation to the street. Note—Compliance with this performance outcome will be achieved through a Flood Risk Assessment prepared by a suitably qualified and experienced engineer.	a. the design of the undercroft does not increase flood risk; b. the predevelopment flood risk profile is not varied as a result of development; c. the undercroft area is stabilised, resistant to erosion and scour, and designed to drain freely in accordance with Clause 2.3 of the ABCB Handbook: Construction of Buildings in Flood Hazard Areas; d. may be screened for security purposes where such screening does not impede flood flows; and e. may use gates that do not impede flood flows, avoiding the use of solid fill gates, roll-a-doors or tilt doors. Note—Compliance with this performance outcome will be achieved through a Flood Risk Assessment prepared by a suitably qualified and experienced engineer. Note—The Queensland Development Code Mandatory Requirements 3.5 – Construction of buildings in flood hazard areas, provides residential design and sitting provisions in accordance with Clause 2.3 of the ABCB Handbook: Construction of Buildings in Flood Hazard Areas, which apply to residential development within the designated flood hazard area under this planning scheme.
	AO8.3 Any enclosure of areas below the flood planning level only occurs within a very low to medium flood risk category shown on Map OV12 and does not exceed: a. 1.0 metre of depth above the finished floor level; or b. 1.5 metres/second maximum flow velocity; or c. a H3 flood hazard classification in any known event.
	AO8.4 Openings are provided to allow for automatic entry and exit of floodwater up to the defined flood level. Note—Buildings are to be designed in compliance with Clause 2.6 of the ABCB Handbook: Construction of Buildings in Flood Hazard Areas. The Queensland Development Code Mandatory Requirements 3.5 – Construction of buildings in flood hazard areas, provides Acceptable solution 1 which requires compliance with Clause 2.6 of the ABCB Handbook: Construction of Buildings in Flood Hazard Areas only for class 1-4 and Class 9a and 9c buildings. This accepted outcome applies to all development.
	AO8.5 Non-structural materials used below the defined flood level must be capable of resisting damage, deterioration, decay taking into account the likely time the material would be in contact with flood water and the likely time it would take for the material to subsequently dry out. Note—Deemed to satisfy wet-proofing contained within Clause 2.8 of the ABCB Handbook: Construction of Buildings in Flood Hazard Areas achieves this requirement.
	RO8.6 Walls without cavity spaces and flood resistant materials are used to minimise the need for replacement and repair and to provide for ease of cleaning in the event of a flood. Note—Buildings are to be designed in compliance with Clause 2.8 of the ABCB Handbook: Construction of Buildings in Flood Hazard Areas. The Queensland Development Code Mandatory

	Requirements 3.5 – Construction of buildings in flood hazard areas provides Acceptable solution 1 which requires compliance with Clause 2.8 of the ABCB Handbook: Construction of Buildings in Flood Hazard Areas only for class 1-4 and Class 9a and 9c buildings. This accepted outcome applies to all development.
PO9 Development is resilient to flood events by ensuring the design and layout of buildings accounts for the potential risks of flooding. Note—Compliance with this performance outcome will be achieved through a Flood Risk Assessment prepared by a suitably qualified and experienced engineer.	AO9.1 As far as practicable, the layout of commercial uses provides for retail, office and service areas above carparking areas to increase flood immunity. AO9.2 As far as practicable, the design and layout of buildings provide for: a. the incoming power supply, including all metering equipment to be located above the flood planning level; b. all wiring, power outlets and switches to be above the flood planning level; c. all conduits located below the flood planning level installed so that they will be self-draining; d. heating and air conditioning systems to be above the flood planning level; and e. a backup power source to be provided and located above the flood planning level where the basement relies on a pumping solution to manage floodwater ingress, or for dewatering after a flood.
PO10 Underground parking is designed to prevent the intrusion of flood waters.	AO10.1 Underground parking is located on land in the very low to medium flood risk category shown on Map OV12 and is designed to: a. be waterproof, with walls and floors impermeable to the passage of water; b. all basement entry points and services are located a minimum height of 300mm above the defined flood level and incorporate a bund or similar barrier to prevent flood inundation (i.e., flood gates); and c. a backup power source is located above the flood planning level where the basement relies on a pumping solution to manage flood inundation or for dewatering after a flood.
4 **Siting, Access and Isolation**	
PO11 The concentration of people in areas that may be at risk of isolation is avoided unless it can be demonstrated that: a. the development and residual risk is tolerable for all flood risk factors that affect the site; b. permanent, fail-safe, maintenance-free measures are incorporated in the development to ensure the timely, orderly and safe evacuation of people during a range of floods including the 1% AEP at 2100 is possible; and	AO11.1 Development does not provide for further intensification of residential uses or net gain in population or increase the number of people likely to need evacuation within: (a) a priority evacuation area shown on Map OV12; or (b) on land that is identified as a flood island. Note—Refer to PSPXX to determine whether the land is subject to a low flood island.

c. ensure safe evacuation of the premises in accordance with a site-specific Flood Emergency Management Plan. Note—A Flood Emergency Management Plan must be prepared by a suitably qualified and experienced person in accordance with PSPXX.	
PO12 Development for or associated with reconfiguring a lot to create new lots, or reconfigure the boundary of existing lots, has a suitable area of land above the flood planning level to accommodate the intended use. Note—Outbuildings and recreational structures do not need to be accommodated in the area available above the flood planning level.	AO12.1 No accepted outcome provided.
PO13 Development siting and layout responds to the flood risk and maintains personal safety at all times, such that the access and egress avoids isolation in a flood event and does not impede evacuation.	AO13.1 Development is located and designed to ensure personal safety at all times from risk of isolation from flood events up to and including the defined flood event by ensuring that access and egress is subject to no more than a low degree of flood hazard in accordance with Table 8.10.3.5.
	AO13.2 Access routes are designed for self-evacuation or alternative emergency evacuation routes are provided so that in a flood event occupants can safely escape by vehicle to a safe and secure area.
5 **Flood Storage and Conveyance**	
PO14 Development for filling or excavation does not directly, indirectly or cumulatively cause any material increase in flood risk or hydraulic hazard outside the site, including: a. loss of flood storage; or b. loss of or changes to flow paths; or c. an increase in water flow velocity or level; or d. reduction in flood warning times; or e. an increase in potential erosion, scour or flood damage on the premise or on other premises, public land, watercourses, roads or infrastructure. Note—Compliance with this performance outcome will be achieved through a Flood Risk Assessment prepared by a suitably qualified and experienced engineer.	AO14.1 No filling or excavation occurs on land within the high to extreme flood risk categories shown on Map OV12.
	AO14.2 Development maintains the flood storage capacity of the premises up to the defined flood level. Note—The preferred method is for balance cut and fill earthworks to be used to maintain the capacity of on-site flood storage. Note—A Flood Risk Assessment prepared by a suitably qualified and experienced engineer in accordance with PSPXX may need to be prepared to demonstrate compliance with this acceptable outcome.
	AO14.3 Development in a greenfield area protects a flood conveyance area by providing an easement or reserve over the area of the premises up to the area of the flood planning level.
PO15.1 Development within the overland flow path: a. maintains the conveyance function of flood waters to allow flow and debris to pass predominately unimpeded through the site; b. does not concentrate, intensify or divert floodwater onto upstream, downstream or adjacent properties; and	AO15.1 Development is not located within an identified overland flow path shown on Map OVX. OR
	AO5.2 Development provides an open undercroft area below the food planning level from natural ground level for the site.

c. will not result in a material increase in flood levels or flood hazard on upstream, downstream or adjacent properties to ensure no change in the hydraulic risk profile. Note—Compliance with this performance outcome will be achieved through a Flood Risk Assessment prepared by a suitably qualified and experienced engineer.	Note—Any Development Application for a permitted structure (including foundations and support), must include information from a Registered Professional Engineer Queensland that certifies the development confirming that the structure can withstand the likely conditions without suffering significant damage.
	AO15.3 Development which creates a new overland flow path or significantly modifies an existing overland flow path via earthworks does not materially worsen hydraulic hazard or the hydraulic risk profile on the site, or downstream receiving sites, from existing conditions. Note—Compliance with this acceptable outcome will be achieved through a Flood Risk Assessment prepared by a suitably qualified and experienced engineer.
	AO15.4 Development protects the conveyance of flood hazard area by providing an easement over the: a. 2% AEP flood extent for overland flow flooding; or b. 1% AEP at 2100 flood extent for waterway flooding. Note—Mapped overland flow and waterway corridor flooding may intersect, in such instances (b) will prevail.
6 **Environmental Values**	
PO16 Development occurs in a way that maintains or enhances the protective function of landforms, vegetation and natural processes in managing the effects of flooding.	AO16.1 The clearing of native vegetation within a watercourse or designated wetland is avoided. Note—OV provides mapped extents of watercourses and designated wetlands.
PO16 Flood mitigation measures required to meet other assessment benchmarks in this code do not create significant impacts on environmental values on the premises or on other premises or land within the floodplain.	AO16.1 No accepted outcome provided.
PO17.2 (Hold for any additional requirements for environmental health	
7 **Storage and Handling of Hazardous Materials**	
PO18 Development involving the storage and handling of hazardous materials avoids or minimises the risk of contamination to the environment and public health and safety, by: a. locating hazardous or noxious materials or chemicals and their manufacturing equipment as far as practicable on the highest part of the site, and within areas designed to prevent the intrusion of floodwaters; or	AO18.1 Development for Medium impact industry, High impact industry and Special industry that involves hazardous materials and chemicals that are present in the quantities identified in the Schedule 15 of the Work Health and Safety Regulation, or that would constitute the use being a Hazardous chemical facility ensures that hazardous materials or chemicals are not located or stored on land in the high to extreme flood risk category on Map OV12.
b. ensuring hazardous or noxious materials are readily able to be moved in a flood event; or	AO18.2 Development for Medium impact industry, High impact industry and Special industry that involves hazardous materials and chemicals that are present in the

c. where not hazardous or noxious, do not comprise materials that may cause a deleterious effect on the environment if discharged in a flood event; and d. in all cases, where capable of creating a safety hazard by being shifted by flood waters, are contained in order to minimise movement in times of flood.	quantities identified in the Schedule 15 of the Work Health and Safety Regulation, or that would constitute the use being a Hazardous chemical facility ensures that hazardous materials or chemicals are located and stored at a minimum above the flood planning level. AO18.3 Within the very low to medium flood risk category shown on Map OV12, structures used for the manufacture or storage of hazardous materials or chemicals in the quantities identified in the Schedule 15 of the Work Health and Safety Regulation are designed to prevent the intrusion of flood waters up to at least a 0.2% AEP flood event.

Table 8.10.3.3 – Benchmarks for Assessable Development

1 **Special Flood Resilient Precincts**	
PO1 Development on land located within a Special Flood Resilient Precinct is compatible with the risk and must: a. ensure design and built form mitigate the potential risks of flooding considering events rarer than the defined flood event; and b. mitigate flood damage to buildings and the contents of buildings up to the flood planning level; and c. achieve an acceptable level of flood immunity for the uses that complies with the minimum flood immunity standards relative to the use shown in Table 8.10.3.4, or an appropriate finished floor level has been selected considering events rarer than the defined flood event; d. avoid disruption to residents, business or site operations and recovery time due to a defined flood event; e. avoid the need to rebuild structures after a flood event up to and including the flood planning level; f. construct any portion of a permitted structure below the flood planning level of materials capable of resisting damage, deterioration, decay taking into account the likely time the material would be in contact with flood water and the likely time it would take for the material to subsequently dry out. Note—Compliance with this performance outcome will be achieved through a Flood Risk Assessment prepared by a suitably qualified and experienced engineer. Note—For PO1(f) above, deemed to satisfy wet-proofing contained within Clause 2.8 of the ABCB Handbook: Construction of Buildings in Flood Hazard Areas achieves this requirement.	AO1.1 No accepted outcome provided.
PO2 Development is located and designed to ensure personal safety at all times from the risk of isolation from flood events by:	AO2.1 No accepted outcome provided.

a. achieving access and egress to a flood resilient access road during flood events up to and including the defined flood event by ensuring that access and egress is subject to no more than a low degree of flood hazard in accordance with Table 8.10.3.5.; or b. where access or egress to a flood-resilient access road cannot be achieved, providing safe egress from a balcony, verandah, deck, door, window or the like to allow a person in the building to be rescued by emergency services personnel, if rescue during a flood event up to the defined flood level is required, or comfortable and adequately provisioned shelter-in-place[1] measures to accommodate the likely population of the development during a flood event and allow egress options for emergency evacuation; and c. a suitable Flood Emergency Management Plan is in place in accordance with PSPXX. Note—A Flood Emergency Management Plan must be prepared by a suitably qualified and experienced person in accordance with PSPXX.	

[1] **shelter-in-place** means the act of occupying a place of refuge during a flood emergency.

PO3 Development of a use which requires an interface with the public realm of the street and public spaces or is identified on land that requires an active frontage as shown on Map OV4, ensures that the design and built form of the development: a. accounts for the potential risks of flooding to people, property and infrastructure; b. utilises high quality urban design treatments that do not impede flood flow; c. activates the public realm along a road, active transport and pedestrian route or public space; d. maintains a functional and attractive relationship with the adjacent street or public space; e. provides informal surveillance opportunities and improves the passive safety of the area; and f. for commercial or other non-residential building or structure, is designed in accordance with the ABCB Handbook: Construction of Buildings in Flood Hazard Areas. Note—This is particularly relevant for commercial uses in centres or along key transport corridors with a strong pedestrian realm that also may be affected by flood, or for residential uses to maintain an attractive presentation to the street.	AO3.1 No accepted outcome provided.
PO4 Development with underground or undercroft areas containing essential electrical services is suitably located and designed to ensure public safety and minimise flood recovery and economic consequences of damage during flood events.	AO4.1 Where underground or undercroft areas contain essential electrical services: a. a waterproof structure, with walls and floors impermeable to the passage of water; b. all services are located at or above the flood planning level; and c. a backup power source is located above the flood planning level where the basement relies on a pumping solution to manage flood inundation or for dewatering after a flood.
PO5 Development with underground or undercroft car parking is designed to prevent the intrusion of flood waters to the car parking area.	AO5.1 Underground or undercroft car parking is designed to: a. be waterproof, with walls and floors impermeable to the passage of water; b. a backup power source is located above the flood planning level where the basement relies on a pumping solution to manage flood inundation or for dewatering after a flood; and c. for underground parking, all entry points and services are located a minimum height of 300mm above the defined flood level and incorporate a bund or similar barrier to prevent flood inundation (i.e., flood gates). OR
	AO5.2 Underground or undercroft car parking is designed to experience no more than a medium degree of flood hazard inundation in accordance with Table 8.10.3.5.

Table 8.10.3.4 – Minimum flood immunity standards

Land use	Risk compatibility and Designated flood level and minimum declared freeboard
Residential uses	
Accommodation activities (other than Hazard vulnerable uses)	1% AEP at 2100 + 300mm freeboard.
Hazard vulnerable uses	
Childcare centre, Community care centre, Detention facility, Residential care facility, Retirement facility	Not located within high or extreme flood risk categories 0.2% AEP at 2100 + 300mm freeboard.
Rooming accommodation, Short term accommodation uses, Nature-based tourism, Relocatable home parks, Resort complexes, Tourist parks	Not located within high or extreme flood risk categories 1% AEP at 2100 + 300mm freeboard.
Community infrastructure and essential services	
Educational establishment	0.5% AEP at 2100 + 300mm freeboard.
Emergency services facility (including police facilities), Hospitals and associated institutions, Facilities utilised as an evacuation or recovery facility in addition to their normal function (e.g., sporting facility, community centre, meeting hall)	0.2% AEP + 300mm freeboard.
Major electricity infrastructure, Telecommunications facility, Utility installation e.g., water cycle management infrastructure (water treatment plant), waste management facilities, storage and works depots	0.2% AEP + 300mm freeboard.
Transport infrastructure	
Transport infrastructure as defined by the Regulation	No specific recommended flood level, however it is ensured 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.
Facilities with potential for property loss	
Community use including art gallery, museum, library, and any other similar community / cultural facility use	1% AEP at 2100 + 300mm freeboard.
Other uses	
Any other use	1% AEP at 2100 + 300mm freeboard.

Table 8.10.3.5 – Hazard evacuation route requirements

Criteria	Degree of Flood Hazard	
	Low	Medium
Wading ability	If necessary children and the elderly could wade (generally, safe wading velocity depth product is less than 0.25)	Fit adults can wade (generally, safe wading velocity depth product is less than 0.4)
Evacuation distances	<200 metres	200-400 metres
Maximum flood depths	<0.3 metres	<0.6 metres
Maximum flood velocity	<0.4 meters per second	<0.8 metres
Typical means of egress	Sedan	Sedan early, but 4WD or trucks later
Timing Note—The category cannot be implemented until evacuation times have been established in the Counter Disaster Plan (flooding).	Ample for flood forecasting. Warning and evacuation routes remain passable for twice as long as evacuation time	Evacuation routes remain trafficable for 1.5 times as long as the evacuation time

4.5.2 Overlay map

The Flood risk and overland flow overlay code provides assessment benchmarks commensurate with the flood risk compatibility and built form and design responses for development.

This includes specific provisions for various land uses including residential accommodation, hazard vulnerable uses and essential community infrastructure, and commercial, industrial and other non-residential uses etc., where specific uses require a specific response given the nature of the land use and its risk tolerability.

A risk-based Flood overlay map (which indicates the degrees of risk i.e., none, acceptable, tolerable or intolerable) provides for the spatial application of the Flood risk and overland flow overlay code. It creates a 'footprint' that will help determine the appropriate land use response in certain areas relative to the risk, spatially identifying the locations relative to the overlay code assessment benchmarks which provide circumstances where:

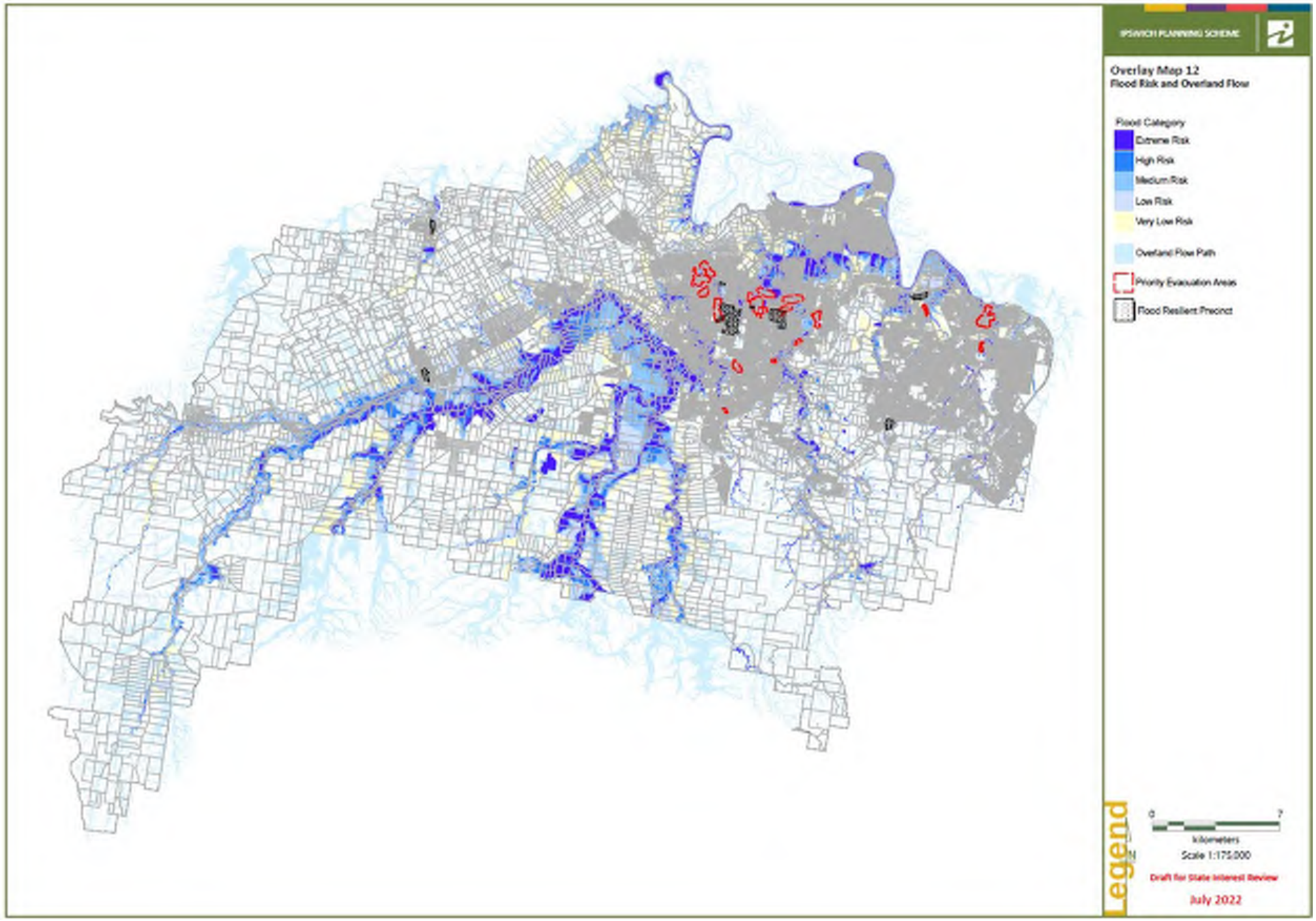
- development can occur subject to some prescriptive controls such the finished floor level of all habitable floor space being above the DFL and the additional required freeboard;
- development may be able to occur subject to demonstrating that there is adequate warning time for the safe self-evacuation of occupants and visitors to occur via identified evacuation routes; or
- development should not occur.

The IICP categorises the hydraulic risk categories against five (5) risk descriptions based on their risk profile as shown in **Table 12** below. These risk descriptions have informed the development of a risk-based Flood overlay map based on the hydraulic risk categories (as updated):

Table 12 - Description of risk tolerability

Risk description for Flood overlay map	Rationale	Risk profile	Relevant hydraulic risk category
Extreme risk	• Frequent flooding • Conveyance area • Buildings vulnerable to failure and unsafe for vehicles and people	Intolerable	HR1(c) HR1(b)
High risk	• Unlikely and rare flooding • New flow conveyance paths create dangerous conditions • Buildings vulnerable to failure	Tolerable	HR2(c) HR2(b)
Medium risk	• Generally unsafe for vehicles and people • Areas still effected by frequent and likely flood events	Tolerable	HR3(c) HR3(b)
Low risk	• Generally safe infrequent and likely flood events • High hazard associated with unlikely and rare events	Acceptable	HR2(a) HR3(a) HR4
Very low risk	• Balance of floodplain • Area potentially affected by extremely rare flooding that may not require mitigation	Acceptable	HR5
	•		

The following map provides the proposed overlay map:



4.6 Planning Scheme Policies

Planning Scheme Policies (PSPs) are found in the schedules of a planning scheme. These detail matters common across a range of codes, land uses or circumstances. They are generally fairly detailed and insertion into the codes would make the codes unwieldy.

They should be similar in nature to the SPP guidance material in providing guidance on how to comply with a benchmark in preparation or supporting assessment and reports. PSPs may also set technical standards and guidelines, and additional supporting maps.

Preparation of a PSP for flood is recommended to support the application of the Flood risk and overland flow overlay code, and it should include:

- additional technical flood mapping and information that informed the development of the flood overlay map; and
- requirements for site based assessments including a Flood Risk Assessment and Flood Emergency Management Plan.

5 Local Area Framework drafting narratives

This section provides the drafting instructions for the Local Area Frameworks, commensurate with the proposed local flood hazard risk land use policy response for each area provided in the Phases 1 to 3 report.

Table 11 provides a summary of the planning policy pathways and planning directions provided in Phases 1 to 3 that will be addressed as part of drafting instructions for the new planning scheme detailed in this report:

Table 13 - Level of land use planning response by Local Area Framework

	Very high
	High
	Moderate
	Low

Local Area Frameworks	Policy pathway	Phases 1 to 3 report planning directions	Planning scheme response				Other mechanisms
			Avoid development in high flood risk	Change to existing zoning required	Local area code provisions required	Overlay	
Area 1 – Goodna Gailes and Camira (part)	Transition	Transition commercial development further up the hill and back zone areas identified for further expansion to the south toward Alice Street subject to high flood hazard risk Back zone low and medium density residential areas subject to extreme / high flood hazard risk No intensification of the existing large lot residential and low density residential zones Investigate emergency voluntary house purchase of residential properties on the northern side of the Ipswich Motorway and also properties that are on the southern side of the Motorway where influenced by Woogaroo Creek		✓	✓	✓	✓
Area 2 – Carole Park	Mitigate	Recognition of the low flood hazard and requirement for a built form response for any remaining lots				✓	
Area 3 – Camira (part)	Arrest (large lot residential) / Mitigate	No further intensification of large lot residential and areas subject to extreme / high flood hazard risk Consider use of split zones for properties adjacent to the creek subject to extreme / high flood risk Consider use of Limited Development Zone or alternative zone for residential properties wholly included on land subject to extreme / high flood hazard risk Encourage new dwellings / extensions, and structures to be located on the parts of a property not affected by extreme flood hazard risk Built form response required for residential areas subject to low flood hazard risk	✓	✓	✓	✓	
Area 4 – Springfield Estate and Augustine Heights (part)	Avoid	Avoid development in the floodplain Include requirements for easements in greenfield areas up to the Defined Flood Event (DFE)	✓		✓		
Area 5 – Bellbird Park, Redbank Plains, Augustine Heights (part)	Mitigate	New expansion areas should avoid land affected by high flood hazard risk Consider a Special Flood Resilient Precinct for land around Six Mile Creek and Mount Juillerat Drive			✓	✓	
Area 6 – Redbank and Collingwood Park	Mitigate	Large areas of low flood hazard inundation extend across the industrial area which requires a built form response Flood inundation to the area on the northern side of the Ipswich Motorway is depth driven and requires a consideration of options around the commercial centre and train station Consider a Special Flood Resilient Precinct for areas that are proximal to the train station Residential development to avoid high flood risk in urban expansion areas and mitigate in areas subject to low flood hazard risk	✓		✓	✓	
Area 7 – Swanbank, New Chum, Redbank Plains (part)	Mitigate	Built form response required for industrial development Development to avoid high flood hazard risk areas	✓		✓	✓	
Area 8 – Riverview	Transition (industry) / Arrest (residential)	Consideration for a transition strategy for industrial areas subject to high flood hazard risk Consider existing allowances or commitments in land subject to Bremer Business Park preliminary approval No further intensification of residential areas subject to high flood hazard risk Built form response required for residential and industrial areas subject to low flood risk Consideration of low intensive, no short term, no vulnerable land uses commensurate with level of flood risk required for Salvation Army owned land	✓	✓	✓	✓	
Area 9 – Bundamba, Blackstone,	Transition (large lot residential) / Arrest	Consideration for a transition strategy for large lot residential areas subject to extreme / high flood hazard risk and investigation of emergency voluntary house purchase No further intensification of areas subject to extreme / high flood hazard risk	✓	✓	✓	✓	✓

Local Area Frameworks	Policy pathway	Phases 1 to 3 report planning directions	Planning scheme response				Other mechanisms
			Avoid development in high flood risk	Change to existing zoning required	Local area code provisions required	Overlay	
Ebbw Vale and Dinmore		Preserve flood storage No vulnerable uses on land affected by flood hazard					
Area 10 – Karalee, Barella Point, Chuwar	Arrest	Consider an infrastructure mitigation response for the area to improve access and egress during a flood event No further intensification of development on land subject to flood hazard risk Consider use of split zones for properties adjacent to the creek No new development in extreme / high flood hazard risk areas adjacent to the Brisbane and Bremer Rivers and investigation of emergency voluntary house purchase No vulnerable uses on land affected by flood hazard	✓	✓	✓	✓	✓
Area 11 – North Ipswich, Tivoli, North Tivoli and Moores Pocket	Arrest (Moores Pocket) / Mitigate (Flood Resilient Precincts / industrial area)	Expand the buffer areas to include land subject to very high flood hazard risk and built form response for low flood hazard risk areas Ensure existing allowances and commitments are acknowledged for land subject o the Riverlink preliminary approval Use of Flood Resilient Precincts to enable development in North Ipswich (exclude areas subject to extreme flood hazard risk) No further intensification of residential areas in Moores Pocket	✓	✓	✓	✓	
Area 12 – Brassall	Arrest	No further intensification of development in areas subject to flood hazard risk Consider use of Limited Development Zone or alternative zone for residential properties wholly included on land subject to extreme / high flood hazard risk	✓	✓	✓	✓	
Area 13 – Ipswich, West Ipswich, Sadliers Crossing, Coalfalls and Woodend	Mitigate (Flood Resilient Precincts)	Use Special Flood Resilient Precincts in key locations (i.e., Marsden Parade) to enable development whilst requiring additional controls to mitigate flood risk No intensification of development in extreme / high flood hazard risk areas outside Special Flood Resilient Precincts Prioritise areas not subject to extreme / high flood hazard risk for further intensification of development	✓		✓	✓	
Area 14 – Basin Pocket, North Booval, Booval, Silkstone and East Ipswich	Arrest (North Booval) / Mitigate (Flood Resilient Precincts)	No intensification of residential development in North Booval and investigation of emergency voluntary house purchase Consider use of Flood Resilient Precincts (i.e., Grammar school site and proposed Blackhall Street high density precinct / southern side of railway) to enable development and improve resilience			✓	✓	✓
Area 15 – Raceview, Flinders View, Ipswich (part)	Transition (area under overland flow path) / Arrest (industrial area and residential area)	Arrest further intensification of industrial development in extreme / high flood hazard risk areas and promote non-building intensive industrial uses (i.e., rural industries) Arrest further intensification of residential development in flood hazard risk areas Transition land subject to overland flow and frequent flood hazard with a short time to inundation to an open space corridor to improve the areas resilience		✓	✓	✓	
Area 16 – Churchill	Transition / Mitigate	Consider a transition strategy for undeveloped industrial sites and to the north of the golf course where there is undeveloped or existing residential structures along Lobb Street No further intensification of residential areas subject to extreme / high flood hazard risk and investigation of potential for emergency voluntary house purchase Prioritise residential intensification to areas of low flood hazard risk with a built form response	✓	✓	✓	✓	✓
Area 17 – Yamanto, Churchill (part)	Transition / Mitigate	Prioritise further commercial, industrial and residential intensification on unconstrained land and areas affected by low flood hazard risk Consider a transition strategy for the pocket of residential properties located around Midland Street Review and align the buffer and recreation areas with high flood hazard risk areas	✓	✓	✓	✓	
Area 18 – Ripley Valley	Avoid	Avoid development in the floodplain Include requirements for easements in greenfield areas up to the Defined Flood Event (DFE)	✓		✓		
Area 19 – Purga, Goolman and Peak Crossing	Avoid	Maintain as a sustainable rural area Locate housing and structures on unconstrained land or land impacted by low risk flood hazard Locate eco and other tourism uses on unconstrained land Allow rural uses commensurate with the flood hazard risk			✓	✓	
Area 20 – Amberley	Avoid	Avoid development in the floodplain Built form response for development in low flood hazard risk areas No storage of chemicals and hazardous material in the floodplain	✓			✓	
Area 21 – One Mile, Leichardt, Walkaraka (part)	Transition / Arrest	No further intensification of development in extreme / high flood hazard risk areas Consider a transition strategy for development in very high flood hazard risk areas	✓	✓	✓	✓	
Area 22 – Karrabin (part), Blacksoil (part)	Avoid (rural) / Transition (industrial)	No further industrial intensification in extreme / high flood risk areas Maintain as a rural area and locate housing and structures on unconstrained land Allow rural uses commensurate with the flood hazard risk	✓		✓	✓	

Local Area Frameworks	Policy pathway	Phases 1 to 3 report planning directions	Planning scheme response				Other mechanisms
			Avoid development in high flood risk	Change to existing zoning required	Local area code provisions required	Overlay	
Area 23 – Pine Mountain, Muirlea, Blacksoil (part), Haigslea (part), Ironbark	Avoid	Maintain as a rural area No further subdivision on lots in the floodplain Locate housing and structures on unconstrained land or land impacted by low risk flood hazard	✓		✓	✓	
Area 24 – Walloon, Thagoona, Haigslea (part) and Mount Marrow	Avoid (rural areas) / Mitigate (urban investigation)	Maintain rural areas and avoid development in the floodplain Ensure a consideration of existing preliminary approvals in the area Consider regional mitigation response for the urban investigation area	✓		✓		
Area 25 – Marburg	Transition (highly constrained land) / Mitigate (commercial)	No intensification of the rural living lots within the floodplain Consider low intensity rural uses and Flood Resilient Precinct to maintain commercial function Consideration of a transition strategy for highly constrained lots (flood / salinity etc.) Maintain rural land as a rural area and locate housing and structures on unconstrained land No vulnerable and new tourism related uses should be located in the floodplain	✓	✓	✓	✓	
Area 26 – Rosewood	Avoid (rural areas) / Mitigate (urban investigation / town centre)	Maintain rural areas and avoid development in the floodplain Consider regional mitigation response for the urban investigation area Consider a Flood Resilient Precinct for the town centre to promote primacy Consider extent of the development footprint on land at the end of William and Edward Streets south of the school	✓		✓	✓	
Area 27 – Ebenezer, Willowbank, Jeebropilly, Mount Forbes, Mutdapilly	Avoid	Avoid development in the floodplain No storage of chemicals and hazardous material in the floodplain	✓		✓	✓	
Area 28 – Tallegalla, Woolshed and The Bluff	Avoid	Maintain as a sustainable rural area Locate housing and structures on unconstrained land or land impacted by low flood hazard risk Locate eco and other tourism uses on unconstrained land Allow rural uses commensurate with the flood hazard risk	✓		✓	✓	
Area 29 – Ashwell, Lanefield, Calvert and Grandchester	Avoid (rural areas) / Mitigate (commercial)	Maintain as a sustainable rural area Locate housing and structures on unconstrained land or land impacted by low flood hazard risk Locate eco and other tourism uses on unconstrained land Allow rural uses commensurate with the flood risk	✓		✓	✓	
Area 30 – Mount Mort, Lower Mount Walker and Mount Walker West	Avoid	Maintain as a sustainable rural area Locate housing and structures on unconstrained land or land impacted by low risk flood hazard Locate eco and other tourism uses on unconstrained land Allow rural uses commensurate with the flood risk	✓		✓	✓	

Local Framework – Area 1 Goodna, Gailes and Camira (part)

Local Area Context

Inclusive, Connected and Safe

Flooding is the most significant development constraint which requires careful consideration for development affecting nearly all of the area located north of the Ipswich Motorway, the area south and east of the Goodna major centre on land adjoining the lower reaches of Woogaroo Creek, Goodna Creek and along the drainage depression located between Mill and Alice Streets. It also affects residential properties along Woogaroo and Sandy Creek. Flow paths are mostly incised and therefore flood risk is often depth driven. A priority evacuation area centred around Bertha Street has been identified.

Purpose and Overall Outcomes

Goodna Gailes area generally

Development is intended to respond to the limitations of growth in the area and in consideration of constraints owning to:

i. the dual sources of flooding impacting the area with backwater flooding from the Brisbane River which is depth driven averaging 6.4 metres in the lower areas and creek flooding in the upper areas. Woogaroo Creek averages a depth of 1.5 metres;
ii. limited development zones identified in heavily impacted flood areas to the north of the Ipswich Motorway as well as parts of the major centre to minimise the impact to people and property by imposing limits for new development. Residential and commercial intensification in these locations should be avoided;
iii. the continuation of Low Density Residential and Large Lot Residential occurs in areas identified as a priority evacuation area and where there are flood islands to minimise further residential exposure to flood risk.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 2 Carole Park

Local Area Context

Inclusive, Connected and Safe

Flooding is a development constraint which requires consideration for development. Large areas of low flood risk with flood depths that are generally low are mapped affecting properties adjacent to Anthony Street and Boundary Road and east of Cobalt Street, the area south and east of the Mica Steet on land adjoining the drainage corridor south of Sandy Creek and along Sandy Creek partially affecting Comira State School. Development of any remaining lots in the area should respond to the low flood risk through a built form response.

Purpose and Overall Outcomes

Carole Park area generally

d. Development is intended to have a consideration of constraints owning to:

i. low hazard flood inundation from Sandy Creek and exposure to of flash flooding, with development responding to the flood risk through resilient built form.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 3 Camira (part)

Local Area Context

Inclusive, Connected and Safe

Flooding is a development constraint which requires careful consideration for development, affecting large lot residential properties adjoining the Woogaroo Creek to the north west of the area. There is also lower hazard inundation from Sandy Creek affecting residential properties adjoining the watercourse including the properties west of Ishmael Road south to Old Logan Road. The area is exposed to flash flooding (less than 6 hours time to inundation) with inundation durations of less than 24 hours.

Purpose and Overall Outcomes

Camira area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owning to:
   i. flooding, ensuring further intensification of properties adjacent to Woogaroo Creek and Sandy Creek is avoided to minimise further residential exposure to extreme flood risk.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 4 Springfield Estate and Augustine Heights (part)

Local Area Context

Inclusive, Connected and Safe

Flooding is a development constraint occurring along Woogaroo Creek and Opossum Creek. There are also major urban catchment flowpaths. Whilst much of the development in the area is located outside of the floodplain, Springfield Central is subject to very low flood risk that breaks out across the floodplain.

Purpose and Overall Outcomes

Springfield Estate and Augustine Heights (part) area generally

d. Development is intended to have a careful consideration of constraints owning to:
   i. flooding being driven primarily by Woogaroo Creek and Opossum Creek and contained to the land immediately adjoining the waterways with very short time to inundation and

short duration of inundation associated with flashy catchments. Development should continue to avoid the floodplain.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 5 Bellbird Park, Redbank Plains and Augustine Heights (part)

Local Area Context

Inclusive, Connected and Safe

Flooding of Woogaroo Creek, Six Mile Creek and Goodna Creek is a development constraint which requires consideration for development. The School Road local centre and medium residential density areas are impacted by wider flood inundation from Six Mile Creek, which has been modified by the development in the catchment. There are also some residential areas in the northeast of the area potentially at risk of inundation in the 1% AEP flood event. The area is exposed to flash flooding (less than 6 hours time to inundation) with inundation durations of less than 24 hours.

Purpose and Overall Outcomes

Bellbird Park, Redbank Plains and Augustine Heights (part) generally

d. Development is intended to have a careful consideration of constraints owning to:
   i. flood inundation which is generally constrained to areas immediately adjoining the watercourse of Woogaroo Creek, Six Mile Creek and Goodna Creek;
   ii. major urban catchment flow paths such as Happy Jack Gully;
   iii. any further structural mitigation is limited due to the extent of development with development mitigating any flood risk through resilient built form.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 6 Redbank and Collingwood Park

Local Area Context

Inclusive, Connected and Safe

Flooding is a development constraint which requires careful consideration for development. It affects access to and around Redbank by depth driven inundation limiting developable land in proximity to the train station. There is also a priority evacuation area identified along Namatjira Drive which comprises of residential properties exposed to short time to inundation.

Purpose and Overall Outcomes

Redbank and Collingwood Park area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owning to:
   i. flood inundation of the Brisbane River, Six Mile and Goodna Creeks and major urban catchment flow paths;
   ii. flood inundation to the northern side of the Ipswich Motorway including land that is to be developed as a Special Flood Resilient Precinct owing to its strategic location in close proximity to the commercial centre and train station;
   iii. the continuation of Low Density Residential occurs in areas identified as a priority evacuation area to minimise further residential exposure to flood risk.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 7 Swanbank, New Chum and Redbank Plains (part)

Local Area Context

Inclusive, Connected and Safe

Flooding is a development constraint which requires consideration for development. Flood risk is drive by creek flooding in the upper Bundamba Creek catchment and Six Mile Creek, with short time to inundation and duration associated with flash flooding. A number of large lots are exposed to high flood risk to the south of the area and a series of ponds and weirs near the Asphalt mine in Swanbank. There is also a large low flood island at the railway turning loop near Patrick Street.

Purpose and Overall Outcomes

Swanbank, New Chum and Redbank Plains (part) area generally

d. Development is intended to have a careful consideration of constraints owning to:
   ii. flood inundation of Bundamba Creek, Oaky Creek and Six Mile Creek with development avoiding land subject to high to extreme flood risk.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 8 Riverview

Local Area Context

Inclusive, Connected and Safe

Flooding is the most significant development constraint which requires careful consideration for development. The regional business areas to the north of the area are exposed to high hazard

floodwaters and residential lots to the south of the Ipswich Motorway are exposed to flood risk as backwater traverses up Six Mile Creek. Inundation is associated with riverine flooding subject to long durations of greater than 72 hours and a time to inundation of greater than 12 hours in the flood fringe.

Purpose and Overall Outcomes

Riverview area generally

e. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owning to:
   i. the location of the area near the confluence of the Brisbane and Bremer Rivers and being bound by Six Mile Creek to the south and east;
   ii. preserving flood storage and avoiding filling in conveyance areas;
   iii. environmental management zones are identified in heavily impacted flood areas identified to the north of the area which minimise the impact to people and property. Industrial development in these locations should be avoided;
   iv. providing for low intensive land uses commensurate with the flood risk on land identified as special opportunity. Hazard vulnerable land uses are to be avoided on this land, including short term accommodation to minimise exposure of a transient population to high hazard flood waters;
   v. the further intensification of low density residential development is avoided in areas subject to high to extreme flood risk to minimise further residential exposure to high hazard flood waters.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 9 Bundamba, Blackstone, Ebbw Vale and Dinmore

Local Area Context

Inclusive, Connected and Safe

Flooding is the most significant development constraint which requires careful consideration for development. Riverine flooding from the Bremer River is the dominant flood source north of Brisbane Road where existing large lots and rural residential properties are exposed to long duration of inundation and short time to inundation of under 6 hours. A pocket of high and medium density residential properties is also exposed to medium to high flood risk plus time to inundation of under 6 hours around Bergin Hills Road, which has very low flood immunity and is therefore identified as a priority evacuation area.

Purpose and Overall Outcomes

Bundamba, Blackstone, Ebbw Vale and Dinmore area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owning to:
   i. flood inundation in the lower areas is due to backwater flooding from the Bremer River. In the upper areas, creek flooding from Bundamba Creek is the dominant flood source with high velocities;
   ii. major flow paths through established areas;
   iii. preserving flood storage and avoiding filling in conveyance areas;

iv. limited development zones are identified in heavily impacted flood areas to the north of Brisbane Road where there are existing large lots and rural residential properties which are exposed to high hazard flood waters;
v. the further intensification of infill development in the area is avoided on land subject to high to extreme flood risk proximal to Bundamba Creek to minimise further exposure of people and property to high hazard flood waters;
vi. the further intensification of residential uses or net gain in population is avoided within a priority evacuation area or land identified as a flood island.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 10 Karalee, Barellan Point and Chuwar

Local Area Context

Inclusive, Connected and Safe

Flooding is the most significant development constraint which requires careful consideration for development. Flooding affects the western, northern, eastern and southern parts of the area with:

- Sandy Creek impacting the development of additional greenfield areas of Chuwar;
- the Brisbane River impacting the development of additional greenfield areas of Karalee in the east;
- flooding affecting properties at the northern, eastern and southern edges of the area which are susceptible to and at risk of isolation during significant flood events.

Inundation impacts access and egress into the area. Colleges Crossing Bridge has very low immunity and hinders self-evacuation to the north and sections of the Warrego Highway have low flood immunity impacted by multiple types of flooding. High ground is best accessed to the west towards Brassall; however one section of the Warrego Highway only has 1 in 20 AEP immunity impeding access. Junction Road in general provides a major thoroughfare and access for the majority of the population into the area, however some sections become inundated by either local or backwater flooding.

Purpose and Overall Outcomes

Karalee, Barellan Point and Chuwar area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owning to:
   i. areas of high flood islands, high to extreme flood risk and significant durations of flooding from the Brisbane and Bremer Rivers;
   ii. environmental management zones are identified on land adjacent to the Bremer and Brisbane River waterways where there are residential properties which are exposed to high hazard flood waters;
   iii. limited development zones are identified in heavily impacted flood areas proximal to the Bremer and Brisbane Rivers to minimise the impact to people and property by imposing limits for new development. Residential intensification in these locations should be avoided;
   iv. the further intensification of infill development on land subject to flood risk or identified as a high flood island in the area is avoided given the access and egress into area is constrained.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 11 North Ipswich, Tivoli, North Tivoli and Moores Pocket

Local Area Context

Inclusive, Connected and Safe

Flooding is the most significant development constraint which requires careful consideration for development. Flooding affects:

- North Ipswich which is bounded by the Bremer River on three sides and therefore dominated by riverine flooding (averaging 7.2 metres depth);
- much of North Tivoli which is exposed to inundation associated with backwater from the Bremer River breaking out across the floodplain and localised creek flooding from Sandy Creek with flood depth remaining extreme averaging 3.7 metres;
- large lot and low density residential properties proximal to the Bremer River in Moores Pocket significantly affected by flood inundation. Moores Pocket is also identified as a priority evacuation area and impacted by short time to inundation being less than 6 hours.

Purpose and Overall Outcomes

North Ipswich, Tivoli, North Tivoli, and Moores Pocket area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owning to:
   i. flooding of the Bremer River, Tivoli and Sandy Creeks, and major urban catchment flow paths which is depth driven;
   ii. further developing the principal centre frame and High Density Residential development on land outside the high to extreme flood risk areas within North Ipswich as a Special Flood Resilient Precinct to enable development and mitigate the flood risk, owing to its strategic location given its proximity to the Ipswich City Centre, Riverlink Shopping Centre and Ipswich railway station (regional public transport interchange);
   iii. the extent of the industry investigation area in North Tivoli avoids land subject to high to extreme flood risk;
   iv. environmental management zones are identified on the parts of land adjacent to the Bremer River waterway in Moores Pocket where there are large lot residential properties which are exposed to high hazard flood waters;
   v. the further intensification of residential uses or net gain in population is avoided within a priority evacuation area.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 12 Brassall

Local Area Context

Inclusive, Connected and Safe

Flooding of the Bremer River and associated Mihi Creek and Ironpot Creek and major urban catchment flow paths is the most significant development constraint which requires careful consideration for development. Riverine flood depths average 5.5 meters and creek flood depth average 0.8 metres. The majority of properties at risk are generally described in three categories:

- those properties bordering the Bremer River that experience progressive inundation as the river breaches its banks;
- those properties in the upper reaches of Mihi Creek that are exposed to localised creek flooding; and
- the areas below Fernvale / Pine Mountain Road that are impacted by deep backwater flooding in a riverine event.

Flooding also affects a number schools in the area, which are particularly at risk requiring priority evacuation.

Purpose and Overall Outcomes

Brassall area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owning to:
   i. flooding of the Bremer River and associated Mihi Creek and Ironpot Creek and major urban catchment flow paths;
   ii. environmental management zones are identified on the parts of land adjacent to the riverine and creek waterway where residential properties are exposed to high hazard flood waters;
   iii. the continuation of Low Density Residential and Large Lot Residential occurs in areas identified as priority evacuation areas and where there are flood islands to minimise further residential exposure to flood risk.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 13 Ipswich, West Ipswich, Sadliers Crossing, Coalfalls and Woodend

Local Area Context

Inclusive, Connected and Safe

Flooding is the most significant development constraint which requires careful consideration for development. Ipswich Central is surrounded on three sides by the Bremer River which has flood depths averaging 7.4 metres. A priority evacuation area is identified between Woodend Road, Darling Street and the Bremer River on land within the CBD and character housing areas.

Purpose and Overall Outcomes

Ipswich, West Ipswich, Sadliers Crossing, Coalfalls and Woodend area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owning to:

i. flooding of the Bremer River and Deebing Creek, and major urban catchment flow paths;
ii. developing land within the Ipswich City Centre as a Special Flood Resilient Precinct to enable development and mitigate the flood risk given its significance as a principal regional activity centre and regional economic cluster and the location of Marsden Parade to the Ipswich railway station.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 14 Basin Pocket, North Booval, Booval, Silkstone and East Ipswich

Local Area Context

Inclusive, Connected and Safe

Flooding is the most significant development constraint which requires careful consideration for development. Riverine flooding overtops the banks of the Bremer River and Bundamba Creek which inundate the area adjoining the waterways to a significant depth (averaging 7.3 to 8 metres along the main flow paths) with limited time to inundation. There are low flood islands, priority evacuation areas and deep inundation of existing residential areas north of Brisbane Road along the Bremer River and one low flood island on the western side of Bundamba Creek. There is one high flood island on the southern side of Brisbane Road over Walsh and Lusltania streets in Newtown.

Purpose and Overall Outcomes

Basin Pocket, North Booval, Booval, Silkstone and East Ipswich area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owning to:
   i. the Bremer River bordering the area to the north and Bundamba Creek to the south and east with a number of low flood islands and deep inundation affected existing residential areas;
   ii. Medium Density Residential is considered on land to be developed in Flood Resilient Precincts to improve the resilience of the area through resilient built form and site specific emergency response mitigation to improve the residual risk;
   iii. limited development zones are identified in heavily impacted flood areas in North Booval which minimise the impact to people and property by imposing limits for new development. Residential intensification in these locations should be avoided;
   iv. the continuation of Low Density Residential and Large Lot Residential occurs in areas identified as a priority evacuation area and where there are flood islands to minimise further residential exposure to flood risk. Residential intensification in these locations should be avoided.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 15 Raceview, Flinders View and Ipswich (part)

Local Area Context

Inclusive, Connected and Safe

Flooding is a development constraint which requires careful consideration for development. This area experiences impacts from riverine and creek flooding, and major urban catchment flow paths extending across the residential area. Special opportunity and residential low density properties are subject to a combination of urban drainage and Bundamba Creek backflow. Whilst the hydraulic risk is low, this flood hazard is frequent and has a very short time to inundation. The local business and industry area experiences high to extreme flood risk from the Bremer River and Deebing Creek.

Purpose and Overall Outcomes

Raceview, Flinders View and Ipswich (part) area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owning to:
   i. flooding of the Bremer River and Deebing, Bundamba, Small and Reedy Creeks and major urban catchment flow paths;
   ii. limit further intensification of residential development in the floodplain and transition land subject to an overland flow path and frequent flood hazard with a short time to inundation to an open space corridor to improve the areas flood resilience;
   iii. the further intensification of industrial land is avoided in areas subject to high to extreme flood risk, and low intensive industrial land uses commensurate with the flood risk considered.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 16 Churchill

Local Area Context

Inclusive, Connected and Safe

Flooding is the most significant development constraint which requires careful consideration for development. The area is significantly impacted by flooding. The average flood depths are extremely deep, with riverine flood sources averaging 7.3 to 8.0 metres deep. Creek flooding is also extreme with average flood depth of 4.3 metres.

Whilst the majority of residential properties are elevated above the mapped flood risk areas, a number of residential properties are identified within the 1% AEP flood inundation area. There is short time to inundation and high hazard floodwater associated with riverine backwater causing high risk to properties near Lupton Street and Warwick Road. University accommodation on Warwick Road is exposed to deep flooding. Industrial properties along Lobb Street are significantly affected by extreme flood risk, with Lobb Street rising up out of floodwaters toward the south. Both Warwick Road and Lobb Street toward the south are identified as key evacuation routes.

Purpose and Overall Outcomes

Churchill area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owning to:
   i. flooding of the Bremer River and Deebing Creek, and major urban catchment flow paths. There is difficult topography in association with the riparian zone of the Bremer River;
   ii. environmental management zones are identified in heavily impacted industrial areas along Lobb Street, which minimise the impact to people and property of high hazard flood waters by imposing limits for new development. Industrial intensification in these locations should be avoided;
   iii. the continuation of Low Density Residential occurs in areas subject to high to extreme flood risk to minimise further residential exposure to flood risk. Residential intensification in these locations should be avoided.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 17 Yamanto, Churchill (part)

Local Area Context

Inclusive, Connected and Safe

Flooding is the most significant development constraint which requires careful consideration for development. The area exposed to flood inundation to the west, north and east from a variety of sources including Purga and Warril Creek on the west, Bremer River on the north and Deebing Creek on the east. Flooding affects rural and industrial lands across the northern extent of the area which are flood constrained (high to extreme flood hazard risk).

Purpose and Overall Outcomes

Yamanto, Churchill (part) area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owning to:
   i. Flooding of the Bremer River, Deebing, Warrill and Purga Creeks, and major urban catchment flow paths;
   ii. any further intensification of land that is flood constrained should be avoided;
   iii. the continuation of Low Density Residential occurs in the pocket of residential properties around Midland Street / Suffield Drive to minimise further residential exposure to flood risk. Residential intensification in this locations should be avoided.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 18 Ripley Valley

Local Area Context

Inclusive, Connected and Safe

Flooding is a development constraint which requires consideration for development with flooding of Bundamba, Deebing, Six Mile and Woogaroo Creeks and major urban catchment flow paths, particularly in South Ripley. A number of lots north of Ripley Road are identified as being subject to extreme flood risk. Time to inundation is less than 6 hours and duration of inundation less than 24 hours, which is indicative of flash flooding. A number of low and high flood islands extend along Bundamba Creek and across the area.

Purpose and Overall Outcomes

Ripley Valley area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owing to:
   i. flooding of Bundamba, Deebing, Six Mile and Woogaroo Creeks which is indicative of flash flooding, and major urban catchment flow paths. Flood islands are extensively located along Bundamba Creek;
   ii. development in the floodplain should be avoided to minimise further residential exposure to flood risk.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 19 Purga, Goolman, Peak Crossing

Local Area Context

Inclusive, Connected and Safe

Flooding is a development constraint which requires consideration for development with the area bordered by the Bremer River to the west and extensive areas of flooding along Warrill Creek and Purga Creek and their tributary watercourses.

Purpose and Overall Outcomes

Purga, Goolman and Peak Crossing area generally:

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owing to:
   i. extensive areas of flooding along Warrill Creek and Purga Creek and their tributary;
   ii. conserving areas impacted by the floodplain as agricultural land;
   iii. ensuring housing and structures that support rural activities are located on unconstrained land, or land impacted by low flood risk;
   iv. ensuring the development of eco and other tourism uses are located on unconstrained land.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 20 Amberley

Local Area Context

Inclusive, Connected and Safe

Flooding is a development constraint which requires consideration for development with widespread inundation associated with riverine flooding from the Bremer River and overland flows in the areas surrounding Warrill Creek and Purga Creek.

Purpose and Overall Outcomes

Amberley area generally

d. Development is intended to have a consideration of constraints owning to:
   i. the flood behaviour being reflective of regional flooding (deep and slow) with risk multipliers relatively moderate in nature (time to inundation is generally greater than 6 hours, duration of inundation is up to 72 hours);
   ii. any further development for defence and national security requirements including for associated industries should avoid the floodplain.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 21 One Mile, Leichhardt, Wulkuraka (part)

Local Area Context

Inclusive, Connected and Safe

Flooding is a significant development constraint which requires careful consideration for development. The area is surrounded by the Bremer River which, when in flood, impacts residential properties in One Mile. These properties are afforded a time to inundation of generally greater than 12 hours. Residential properties in the lower sections of Chubb Street are exposed to flood risk and duration of inundation. Chubb Street here has low flood immunity of approximately 1 in 10 AEP. Old Toowoomba Road is also constrained at the Bremer River crossings of Three Mile Bridge and One Mile Bridge, the latter having a flood immunity of 1 in 10 AEP. Areas of light and medium impact industry, significant sport and recreation facilities and environmental areas are framed by a reach of the Bremer River.

Purpose and Overall Outcomes

One Mile, Leichhardt and Wulkuraka (part) area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owning to:
   i. extensive flood inundation from the Bremer River breaking out across the floodplain;

ii. preserving flood storage and avoiding filling in conveyance areas;
iii. environmental management zones are identified on land adjacent to the Bremer River waterway where there are properties exposed to extreme flood risk;
iv. the continuation of Low Density Residential and Large Lot Residential occurs in areas subject to flood risk, particularly around the lower sections of Chubb Street to minimise further residential exposure to flood risk. Residential intensification in these locations should be avoided.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 22 Karrabin (part), Blacksoil (part)

Local Area Context

Inclusive, Connected and Safe

Flooding is a development constraint which requires consideration for development with flooding contained to the area adjoining the Bremer River on industrial lots and adjoining Ironpot Creek on rural lots.

Purpose and Overall Outcomes

Karrabin (part) and Blacksoil (part) area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owing to:
   i. riverine flooding from the Bremer River, and creek flooding and overland flows in the areas surrounding Campbells Gully, Spresser Gully and Ironpot Creek;
   ii. environmental management zones are identified on land adjacent to the Bremer River waterway where there are properties exposed to extreme flood risk;
   iii. conserving areas impacted by the floodplain as rural land;
   iv. ensuring housing and structures are located on unconstrained land or land impacted by low flood risk.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 23 Pine Mountain, Muirlea, Blacksoil (part), Haigslea (part), Ironbark

Local Area Context

Inclusive, Connected and Safe

Flooding is a development constraint which requires consideration for development with the area bordered on the east by the Brisbane River and the north by Sandy Creek. Flood behaviour is driven by riverine flooding with time to inundation generally greater than 12 hours and duration of inundation

greater than 72 hours. A low flood island is identified in the north of the area near McMullen Road and to the south of the area near Riverside Drive, as well as four small high flood islands across the area.

Purpose and Overall Outcomes

Pine Mountain, Muirlea, Blacksoil (part), Haigslea (part) and Ironbark area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owing to:
   i. riverine flooding affecting the northern and eastern areas along the Brisbane River and creek flooding affecting the northern areas of Pine Mountain;
   v. rural areas continue to be maintained as rural living areas where impacted by the floodplain, with housing and structures located on unconstrained land or land impacted by low flood risk;
   vi. ensuring the development of eco and other tourism uses are located on unconstrained land.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 24 Walloon, Thagoona , Haigslea (part) and Mount Marow

Local Area Context

Inclusive, Connected and Safe

Flooding is a significant development constraint which requires careful consideration for development. Walloon, Thagoona and Haigslea are located to the north of the Bremer River. Local catchments pose flash flooding risk to residential properties throughout the local area. The nature of localised flooding is a series of breakouts across the floodplain with large areas of low risk flood hazard. Isolation caused by flood islands is recognised as a risk. There are high hazard flowpaths and longer duration floods associated with riverine flooding south of Rosewood-Thagoona Road across rural paddocks.

Purpose and Overall Outcomes

Walloon, Thagoona, Haigslea (part) and Mount Morrow area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owning to:
   i. flooding of the Bremer River, Guilfoyles Gully, Campbells Gully and O'Shea Gully, and dispersed overland sheet flows throughout Thagoona and to the south and west of Walloon during significant rain events;
   ii. ensuring structure planning of the Urban Investigation Area integrates a regional approach with improved transport infrastructure and emergency response, and resilient built form;
   iii. maintain rural areas and avoid development in the floodplain.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 25 Marburg

Local Area Context

Inclusive, Connected and Safe

Flooding is a significant development constraint which requires careful consideration for development. Flood risk is associated with creek flooding from Black Snake Creek which flows through the centre of the local area(partially mitigated by the Marburg Detention Basin). A secondary flow path has been identified to the east. Time to inundation is under 6 hours associated with flash flooding and duration is under 24 hours.

Purpose and Overall Outcomes

Marburg area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owning to:
   i. the township being constrained due to flooding of Black Snake Creek and limitations set by the need for on-site sewerage treatment;
   ii. low intensity rural uses are considered on land to be developed in a Flood Resilient Precinct to promote the economic primacy of the township and improve resilience through built form to improve the residual risk;
   iii. outside the township where there are opportunities for rural living on lots of a minimum of six hectares, new development avoids land within the floodplain;
   i. ensuring housing and structures that support rural activities are located on unconstrained land, or land impacted by low flood risk;
   ii. ensuring the development of eco and other tourism uses are located on unconstrained land.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 26 Rosewood

Local Area Context

Inclusive, Connected and Safe

Flooding is a significant development constraint which requires careful consideration for development. Rosewood is located to the north of the Bremer River. The local catchment poses flash flooding risk to residential properties throughout the local area. The nature of localised flooding is a series of breakouts across the floodplain with large areas of low risk flood hazard. Isolation caused by flood islands is recognised as a risk. There are high hazard flowpaths and longer duration floods associated with riverine flooding south of Rosewood-Thagoona Road across rural paddocks.

Purpose and Overall Outcomes

Rosewood area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owning to:
   i. extensive creek and river flooding along Western Creek and the Bremer River, and major urban catchment flow paths including the 'town drain' which runs through Rosewood town;
   ii. land within the town centre is developed in a Flood Resilient Precinct to promote its economic primacy and improve resilience through built form to improve the residual risk;
   iii. ensuring structure planning of the Urban Investigation Area integrates a regional approach with improved transport infrastructure and emergency response, and resilient built form;
   iv. maintain rural areas and avoid development in the floodplain.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 27 Ebenezer, Willowbank, Jeebropilly, Mount Forbes, Mutdapilly

Local Area Context

Inclusive, Connected and Safe

Flooding is a development constraint which requires consideration for development with flooding of the Bremer River, Warrill and Ebenezer Creeks and major urban catchment flow paths. Unidentified stormwater overland flow paths may also occur as a result of altered hydrology owing to the significant landform modifications associated with mining activities. At risk properties are large rural paddocks exposed to high hazard floodwaters. The Ebenezer regional industrial area is exposed to riverine flooding which is largely contained to the immediate area adjoining the Bremer River.

Purpose and Overall Outcomes

Ebenezer, Willowbank, Jeebropilly, Mount Forbes and Mutdapilly area generally

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owning to:
   i. flood inundation of the Bremer River, Warrill and Ebenezer Creeks and major urban catchment flow paths;
   ii. avoiding development on land subject to high to extreme flood risk;
   iii. ensuring the storage and handling of hazardous materials and chemicals is avoided in the floodplain.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 28 Tallegalla, Woolshed, and The Bluff

Local Area Context

Inclusive, Connected and Safe

Flooding is a development constraint which requires consideration for development. The area is largely rural in the upper catchments of Plain Creek, Black Snake and Woolshed Creek. The flood risk is contained to rural paddocks adjoining the creek waterways. Black Snake Creek also contains relatively high levels of microbes and the catchment contains high levels of salinity, with Black Snake Creek forming part of a tributary that flows into the Brisbane River above the Mount Crosby Water Treatment Plant intake.

Purpose and Overall Outcomes

Tallegalla, Woolshed, and The Bluff area generally:

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owing to:
   i. flooding of Plain Creek, Black Snake Creek and Woolshed Creek, and areas of land to the south of The Bluff;
   ii. maintaining the area as a sustainable rural area with areas impacted by the floodplain conserved as agricultural land;
   iii. ensuring housing and structures that support rural activities are located on unconstrained land, or land impacted by low flood risk;
   iv. ensuring the development of eco and other tourism uses are located on unconstrained land.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 29 Ashwell, Lanefield, Calvert and Grandchester

Local Area Context

Inclusive, Connected and Safe

Flooding is a development constraint which requires consideration for development with the area is located in the upper Western Creek and Franklin Vale Creek (Bremer River) catchment. Inundation is generally constrained to areas immediately adjoining the waterway. The northern arm is exposed to flash flooding (less than 6 hours time to inundation) whilst the southern tributary along main watercourse has a relatively longer lead time.

Purpose and Overall Outcomes

Ashwell, Lanefield, Calvert and Grandchester area generally:

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owing to:
   i. flooding of Western, Franklin Vale, Woolshed and Plain Creeks, and dispersed overland sheet flows in areas to the south of the Little Liverpool Range between Mount Grandchester and The Bluff during significant rain events;
   ii. maintaining the area as a sustainable rural area with areas impacted by the floodplain conserved as agricultural land;
   iii. ensuring housing and structures that support rural activities are located on unconstrained land, or land impacted by low flood risk;
   iv. ensuring the development of eco and other tourism uses are located on unconstrained land.

Specific Benchmarks for Assessment

Nil proposed.

Local Framework – Area 30 Mount Mort, Lower Mount Walker and Mount Walker West

Local Area Context

Inclusive, Connected and Safe

Flooding is a development constraint which requires consideration for development with Riverine flooding from the Bremer River in Lower Mount Walker, and flooding of creeks including Western Creek, Franklin Vale Creek and Spring Creek. The area is largely rural with a steep narrow catchment rising up to the south. The flood risk is contained to rural paddocks adjoining the upper Bremer watercourse.

Purpose and Overall Outcomes

Mount Mort, Lower Mount Walker and Mount Walker West area generally:

d. Development is intended to respond to the limitations of growth in the area and in consideration of constraints owing to:
   i. riverine flooding from the Bremer River in Lower Mount Walker, and flooding of creeks including Western Creek, Franklin Vale Creek and Spring Creek;
   i. maintaining the area as a sustainable rural area with areas impacted by the floodplain conserved as agricultural land;
   ii. ensuring housing and structures that support rural activities are located on unconstrained land, or land impacted by low flood risk;
   iii. ensuring the development of eco and other tourism uses are located on unconstrained land.

Specific Benchmarks for Assessment

Nil proposed.

6 Implementation of IICP land use planning recommendations

The following table provides the land use planning recommendations from the IICP that were considered in identifying the planning policy pathways and planning directions under Phases 1 to 3, and those that have been addressed as part of the proposed planning scheme provisions for the new planning scheme as part of this report:

Table 14 - What IICP LUP recommendations have been addressed

	Definitions
	Overlay code
	Overlay map
	Local Area Framework narratives
	Rezoning and density reduction consideration

	LUP IICP recommendation	Phases 1 to 3 Report	Phase 4 Report
LUP1	Apply a consistent methodology to the identification of hazard categories for the purposes of the draft new flood hazard overlay		
LUP2	Extend any development controls for residential uses to the HR4 category to include the 1 in 500 year H3 hazard category		
LUP4	Develop and include a city-wide overland flow path assessment to allow risk-based assessment of this type of flood risk	Out of scope	
LUP5	Avoid any intensification of development in areas mapped in HR1c and HR1b	✓	
LUP6	Continue the existing requirements in the current planning scheme that promote built form and resilient building materials as an acceptable mitigation response such as building on stilts, or with wet / dry proofing on ground floor, but may consider revising trigger areas based on lower risk areas such as HR2a, HR3a, HR4 and HR5		
LUP7	Include requirements for easements in greenfield areas up to the Defined Flood Event (DFE)		
LUP8	Include requirements for a Flood Risk and Emergency Plan (FEMP) for non-residential uses		

	in locations where TTI is <6 hours and where DFI is >36 hours		
LUP9	Include requirements for responses such as FEMPs linked to new development in locations subject to flood islands		
LUP10	Include development control measures that may be applied to the development assessment process of vulnerable uses below the Probable Maximum Flood (PMF)		
LUP11	Provide a definition of vulnerable uses in the new Ipswich Planning Scheme		
LUP12	Avoid vulnerable uses and non-intensification of residential uses in locations where TTI is <6 hours and DFI is >36 hours, or locations subject to flood islands. In areas of low hazard built form and resilient building materials should be considered as an acceptable mitigation response	✓	
Consider the following changes in draft planning scheme:			
LUP13	Request a Flood Risk Assessment		
LUP14	Adding a provision for commercial, industrial and other non-residential uses to avoid increasing the concentration of people in areas in HR1c and HR1b		
LUP15	For residential uses removing provision relating to a flood depth of no more than 800mm		
LUP16	Minimum clearance for the construction of basements and undercrofts		
LUP18	Preserve pockets of flood storage in the catchment to avoid future flood risk impacts in areas where HR categories and flood levels may increase as a result of filling or due to development activity	✓	
LUP19	Continue provisions that maintain flood storage capacity and do not create impacts on sites upstream or downstream– this is normally a request to provide hydraulic and hydrology report demonstrating compliance		

APPENDICES

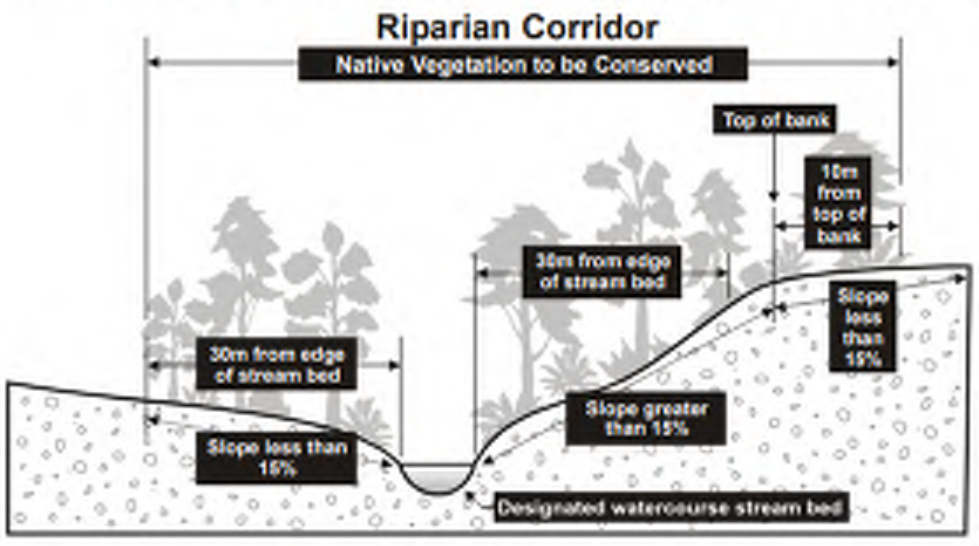
Meridian Urban

Appendix A - Flood provisions in Ipswich Planning Scheme 2006

Use	Existing ICC Planning Scheme
Part 3 - Desired Environmental Outcomes	
ALL	Part 3 – Desired Environment Outcomes and Performance Indicators 3.1 Desired Environmental Outcomes (3) The desired environmental outcomes for the Local Government area are as follows— (i) the adverse effects from natural and other hazards, including flooding, land subsidence, bush fires, ordnance explosions and aircraft operations, are minimised;
Part 4 – Urban Areas	
Residential	Council's residential zoning (i.e., Large Lot Residential Zone, Residential Low Density Zone, Residential Medium Density Zone and Character Areas/Housing Zone) codes include a note advising that some of the land is affected by development constraints, particularly flooding and to refer to the overlay maps and Part 11 to determine whether a proposal is affected by an overlay.
Commercial	Council's commercial zoning (i.e., Local Retail and Commercial Zone, Local Business and Industry Zone, Local Business and Industry Investigation Zone, Local Business and Industry Buffer Zone) codes include a note advising that some of the land is affected by development constraints, particularly flooding and to refer to the overlay maps and Part 11 to determine whether a proposal is affected by an overlay. The provisions for North Tivoli sub-area in the Local Business and Industry Zone notes that the area is constrained by flooding and requires that the "Business Mix" outcomes support uses which "are compatible with flood plain of the Bremer River and Sandy Creek, including provision for a riparian open space corridor".
Industrial	Council's commercial zoning (i.e., Local Business and Industry Zone, Local Business and Industry Investigation Zone, Local Business and Industry Buffer Zone) codes include a note advising that some of the land is affected by development constraints, particularly flooding and to refer to the overlay maps and Part 11 to determine whether a proposal is affected by an overlay.
Part 5 – City Centre	
Commercial	Council's City Centre zone include a note advising that some of the land is affected by development constraints, particularly flooding and to refer to the overlay maps and Part 11 to determine whether a proposal is affected by an overlay.
Part 6 – Regional Business and Industry Zone	
Commercial and Industry	(2) The overall outcomes sought for the Regional Business and Industry Investigation Zone are the following— Land Use Mix (a) Uses and works within the Regional Business and Industry Investigation Zone provide regional business enterprise and industry employment opportunities subject to resolution of applicable constraints such as potential amenity impacts on nearby residential areas, mining, flooding and availability of services. In addition, the code includes a number of notations about flooding as a development constraint and a note advising that some of the land is affected by development constraints, particularly flooding and to refer to the overlay maps and Part 11 to determine whether a proposal is affected by an overlay
Parts 7 – Amberley Area	
Amberley Air Base and Aviation Zone	7.10 (2)(b) Uses and works within the Business Park Investigation Area occur within a comprehensive planning framework that— (vii) incorporates flood immunity levels, relative to the details of the type of use proposed;
Part 8 – Rosewood Area	
Residential	Residential Low Density Zone assessment criteria 8.24 Effects of Development – General (1) (b) Buildings on stumps/piers are provided in preference to slab on ground construction, particularly in areas which are subject to flooding/drainage issues and past undermining and which contain significant vegetation. 8.25 Effects of Development within Sub Areas (2)Greenfield Areas (a) Specific Outcomes (iii) Future residential and other urban uses and works are developed to ensure minimisation of the impact of undermining activities and flooding and drainage issues. Division 9- Urban Investigation Zone 8.33 Effects of Development – General (2) (c) Buildings on stumps/piers are provided in preference to slab on ground construction, particularly in areas which are subject to flooding/drainage issues and past undermining or which contain significant vegetation. South West Urban Investigation Area – Note 8.34B — (3) The land in this Sub Area is constrained by significant flooding and drainage issues, with evidence suggesting that a portion of the south-western corner of the site lies below the 1974 flood line, making it unsuitable for residential uses and works. & (4) Any proposals will be required to undertake extensive flooding and drainage investigations to ensure that all residential uses and works are above the adopted flood level and incorporate appropriate drainage. South West Urban Investigation Area – Probable Solutions – for sub-section (a) (b) Residential uses and works are situated above the adopted flood level. Southern Urban Investigation Area – Probable Solutions – for sub-section (a) (b) Residential uses and works are situated above the adopted flood level. South East Urban Investigation Area – Note 8.34D - (3) Evidence suggests that a portion of the land is below the 1974 flood level, and that the majority of the land is subject to ponding during periods of high rainfall. & (8) Approval of uses and works are subject to detailed investigation and resolution of flooding and drainage issues. South East Urban Investigation Area – Probable Solutions – for sub-section (a) (e) Residential uses and works are situated above the adopted flood level.
Commercial	Town Centre Zone assessment criteria in the Rosewood Area include a note advising that some of the land is affected by development constraints, particularly flooding and to refer to the overlay maps and Part 11 to determine whether a proposal is affected by an overlay.
Industrial	Sub Area SU61 – Cabanda/Rosewood Rail Line Transport Link/Tourist Attraction – (a) Uses and Works are designed and located such that— any buildings will not be significantly affected by flooding and stormwater damage;
Part 9 – Township Areas	
Residential	Sub Area TR1 – land at William and James Streets, Marburg, Queen and George Streets, Marburg, Lawrence and Edward Streets, Marburg – (1) Specific Outcomes (b) Residential Uses are sited on the land to take into account the location of any development constraints, particularly flooding and drainage. Sub Area TCH1 – land at Pollock Street, Harrisville, Queen Street, Harrisville and off Post Office Lane, Harrisville – Note9.15B (1) These ten (10) parcels of existing lots, many of which are below the adopted flood level, are held in common ownership by various land owners. (2) It is intended that the grouping of lots (shown on Figure 9.2) be treated as one lot only for the purpose of using the land for residential purposes.

	Sub Area TCH1 – land at Pollock Street, Harrisville, Queen Street, Harrisville and off Post Office Lane, Harrisville – (1) Specific Outcomes (b) Residential Uses are sited on the land to take into account the location of any development constraints, particularly flooding and drainage.
Commercial	Township Business Zone assessment criteria in the Township Area include a note advising that some of the land is affected by development constraints, particularly flooding and to refer to the overlay maps and Part 11 to determine whether a proposal is affected by an overlay.
Vulnerable	Special Use Zone assessment criteria in the Township Area – (4) Sub Area SU70 – Park, Recreation and Community Uses – Specific Outcomes (b) Uses and works on the land— (iii) are able to withstand flooding impacts. & (e) Future activities are compatible with the area's flooding and drainage problems and have minimal building requirements. & (f) Residential uses are discouraged owing to the flooding and drainage impacts. Special Use Zone assessment criteria in the Township Area – Sub Area SU72 – Highway Oriented Uses, Business Uses, Service Trades Uses, Recreation and Community Uses (6) Specific Outcomes (a) Future activities are compatible with the area's flooding and drainage problems. (b) For the flood affected areas this may include open parkland, recreation uses, community uses or other land extensive, low key activities that are able to withstand flooding impacts and which have no building requirements. (c) For the flood free land or land where the effect of flooding can be mitigated, uses may include— (i) low key business and commercial uses which support the town's main street; (ii) community uses; (iii) low impact service trade activities which expand upon the Marburg Town Business Zone; (iv) highway related uses (e.g. motel, service station, fast food, etc) taking advantage of the site's exposure to the highway. (d) Future uses— (i) resolve drainage and flooding issues; (ii) provide safe access which does not adversely affect the operations of the Warrego Highway; (iii) do not adversely affect the amenity of nearby residential areas; and (iv) provide controlled signage. (e) Residential uses are discouraged owing to the flooding, drainage and noise impacts.
Industry	Special Use Zone assessment criteria in the Township Area – Sub Area SU73 – Highway Oriented Uses, Business Uses, Service Trades Uses and Light Engineering/Metal Fabrication Works (7) Specific Outcomes (b) Future uses— (i) resolve drainage and flooding issues. (c) Residential uses are discouraged owing to the flooding, drainage and noise impacts.
Part 10 – Rural Areas	
ALL	Council's rural areas zoning (i.e., rural A to E & Special uses zone) codes include a note advising that some of the land is affected by development constraints, particularly flooding and to refer to the overlay maps and Part 11 to determine whether a proposal is affected by an overlay.
Part 11 – Overlays	
General	Part 11 – Overlays – Div 4 –Development Constraints Overlays 11.4.7 Flooding and urban catchment flow paths (1) The provisions of this section apply to land identified on Map OV5 as being— (a) below the 1 in 20 development line; or (b) below the adopted flood regulation line; or (c) within urban catchment flow paths. (2) The adopted flood regulation line is based on the historic 1974 Flood Level, the historic 2011 Flood Level or the modelled 1 in 100 Flood Level. (3) Flood affected areas are depicted in two ways on the overlay maps— (a) unbroken lines – representing 'known' constraints as determined by a technical report, or study or an actual flood event; and (b) broken lines – indicative and subject to further detailed assessment as part of a development application. (4) The 1 in 20 development line is based on a long standing flood regulation line, established following the 1974 flood, that applied to the former Ipswich City Council area prior to its amalgamation with the former Moreton Shire. (5) Urban catchment flow paths are indicative and require further detailed assessment as part of a development application to more precisely determine the flood level and extent. (6) In some cases, further information will need to submitted to the local government, such as a flood assessment, for consideration as part of the development assessment process. (7) Further information on the requirements for a flood assessment are contained in Planning Scheme Policy 2—Information Local Government May Request and Implementation Guideline No. 24 – Stormwater Management.
Residential	(1) Specific Outcomes (a) Land Situated Below the 1 in 20 Development Line – Residential Uses (i) There is no further intensification of residential uses within flood affected areas on land situated below the 1 in 20 development line, including the provision of an auxiliary unit. (ii) Unless otherwise determined by Council, the floor levels of any habitable rooms of a proposed building are a minimum of 500mm above the adopted flood regulation line, whilst having regard to the visual amenity and streetscape impacts on nearby dwellings, associated with the raising of floor levels and the resulting height of buildings. (iii) As far as practicable— (A) The design and layout of residential buildings provides for— (I) vehicle parking and other low intensive, non habitable uses at ground level (e.g., temporary storage of readily removable items); and (II) habitable rooms above, to increase flood immunity. (B) The areas below habitable rooms— (I) are to be left open so as not to impede flood flows; and (II) may be used for the parking of vehicles or the storage of large items that are readily able to be moved in the event of a flood; and (III) may be screened for security purposes using timber battens where such screening does not impede flood flows; and (IV)may use timber batten gates such that the gates do not impede flood flows, with the use of solid fill gates, roll-a-doors or tilt doors to be avoided (C) Building materials and surface treatments used below the adopted flood regulation line (other than materials used for structural purposes) are resistant to water damage and do not include wall cavities that may be susceptible to the intrusion of water and sediment. (D) Buildings and other structures are sited on the highest part of the site to increase flood immunity. (E) Electrical switchboards, main data servers and the like are positioned to maximise flood immunity. (F) Electrical and data installations below the adopted flood regulation line are designed and constructed to withstand submergence in flood water. (iv) Access routes are designed or alternative emergency evacuation routes are provided so that in a flood event occupants can escape by vehicle to a safe and secure area. (v) The development does not increase the flood hazard (e.g., by way of increased depth, duration or velocity of flood waters or a reduction in warning times) for other properties. (vi) All earthworks are to comply with any applicable development criteria set out in an approved floodplain management plan. (vii) Where a floodplain management plan does not exist for the catchment, no filling of land or reduction of flood storage capacity is permitted below the 1 in 20 development line. (viii) The clearing of native vegetation within the stream banks is avoided. (c) Land Situated Between the 1 in 20 Development Line and the Adopted Flood Regulation Line – Residential Uses (i) There is no further intensification of residential uses within flood affected areas on land situated below the adopted flood regulation line, including the development of dual occupancies, multiple residential uses, institutional residential uses, temporary accommodation uses and the reconfiguration of land to create additional lots.

	(ii) Engineering solutions that provide flood immunity to a minimum of 500mm above the adopted flood regulation line for habitable rooms and do not negatively impact on the overall hydrology, hydraulics and flood capacity of the waterway may be considered to facilitate residential intensification where the land— (A) is contained within areas zoned for medium and high density housing or for mixed use / centre development where involving residential uses, including the Character Housing Mixed Density, Residential Medium Density, Residential High Density, Ipswich City Centre and Major Centre Zones; and (B) is located near the edge of the adopted flood regulation line; and (C) has a flood depth of generally no more than 800mm over the site based on the adopted flood regulation line level; and (D) has direct vehicular access to a flood free evacuation route. (iii) Special dispensation may be obtained to erect an auxiliary unit or a second dwelling to house family members on land situated between the 1 in 20 development line and the adopted flood regulation line based on the extent of flood immunity achieved. (iv) Unless otherwise determined by Council, the floor levels of any habitable rooms of a proposed building are a minimum of 500mm above the adopted flood regulation line, whilst having regard to the visual amenity and streetscape impacts on nearby dwellings, associated with the raising of floor levels and the resulting height of buildings. (v) As far as practicable— (A) The design and layout of residential buildings provides for— (I) vehicle parking and other low intensive, non habitable uses at ground level (e.g., temporary storage of readily removable items); and (II) habitable rooms above, to increase flood immunity. (B) The areas below habitable rooms— (I) are to be left open so as not to impede flood flows; and (II) may be used for the parking of vehicles or the storage of large items that are readily able to be moved in the event of a flood; and (III) may be screened for security purposes using timber battens where such screening does not impede flood flows; and (IV)may use timber batten gates such that the gates do not impede flood flows, with the use of solid fill gates, roll-a-doors or tilt doors to be avoided. (C) Building materials and surface treatments used below the adopted flood regulation line (other than materials used for structural purposes) are resistant to water damage and do not include wall cavities that may be susceptible to the intrusion of water and sediment. (D) Buildings and other structures are sited on the highest part of the site to increase flood immunity. (E) Electrical switchboards, main data servers and the like are positioned to maximise flood immunity. (F) Electrical and data installations below the adopted flood regulation line are designed and constructed to withstand submergence in flood water. (vi) Access routes are designed or alternative emergency evacuation routes are provided so that in a flood event occupants can escape by vehicle to a safe and secure area. (vii) The development does not increase the flood hazard (e.g. by way of increased depth, duration or velocity of flood waters or a reduction in warning times) for other properties. (viii) The clearing of native vegetation within the stream banks is avoided. (ix) All earthworks are to comply with any applicable development criteria set out in an approved floodplain management plan. (x) Where a floodplain management plan does not exist for the catchment, no earthworks (including filling) is permitted on land below the adopted flood regulation line, unless: (A) the land is located above the 1 in 20 development line; and (B) an assessment, undertaken by a suitably qualified consultant, demonstrates that the reforming of the land does not negatively impact on the overall hydrology, hydraulics and flood capacity of the waterway, does not result in the reduction of flood storage capacity on the site and does not significantly impact on the ecological values of the riparian corridor.
Commercial	(b) Land Situated Below the 1 in 20 Development Line – Commercial, Industrial and Other Non Residential Uses (i) As far as practicable— (A) The design and layout of buildings provides for— (I) vehicle parking, or other low intensive, or non habitable uses at ground level; and (II) retail, commercial and work areas above the parking areas, to increase flood immunity; and (III) expensive plant, equipment and stock in the area of the site or building with the greatest flood immunity. (B) Building materials and surface treatments used below the adopted flood regulation line (other than materials used for structural purposes) are resistant to water damage and do not include wall cavities that may be susceptible to the intrusion of water and sediment. (C) Electrical switchboards, main data servers and the like are positioned to maximise flood immunity. (D) Electrical and data installations below the adopted flood regulation line are designed and constructed to withstand submergence in flood water. (ii) Access routes are designed or alternative emergency evacuation routes are provided so that in a flood event occupants can escape by vehicle to a safe and secure area. (iii) The concentration of people in flood affected areas, particularly within areas affected by significant flood flows (i.e., one metre or more in depth), is avoided unless it can be demonstrated that the overall use is appropriate (e.g. sporting fields) and where there is likely to be adequate warning and vehicular access to a safe evacuation route in the event of a flood. (iv) As far as practicable, buildings are located to avoid areas affected by significant flood flows or velocities. (v) Materials or chemicals manufactured or stored onsite— (A) where hazardous or noxious materials or chemicals, inclusive of their manufacturing equipment, are located as far as practicable on the highest part of the site and designed to prevent the intrusion of floodwaters; and (B) are those that are readily able to be moved in a flood event; and (C) are not hazardous or noxious, or comprise materials that may cause a deleterious effect on the environment if discharged in a flood event; and (D) where capable of creating a safety hazard by being shifted by flood waters, are contained in order to minimise movement in times of flood. (vi) The development does not increase the flood hazard (e.g. by way of increased depth, duration or velocity of flood waters or a reduction in warning times) for other properties. (vii) All earthworks are to comply with any applicable development criteria set out in an approved floodplain management plan. (viii) Where a floodplain management plan does not exist for the catchment, no filling of land or reduction of flood storage capacity is permitted below the 1 in 20 development line. (ix) The clearing of native vegetation within the stream banks is avoided.
Industrial	(d) Land Situated Between the 1 in 20 Development Line and the Adopted Flood Regulation Line – Commercial, Industrial and Other Non Residential Uses (i) As far as practicable— (A) The design and layout of buildings provides for— (I) vehicle parking, or other low intensive, or non habitable uses at ground level; and (II) retail, commercial and work areas above the parking areas, to increase flood immunity; and (III) expensive plant, equipment and stock in the area of the site or building with the greatest flood immunity. (B) Building materials and surface treatments used below the adopted flood regulation line (other than materials used for structural purposes) are resistant to water damage and do not include wall cavities that may be susceptible to the intrusion of water and sediment. (C) Buildings and other structures are sited on the highest part of the site to increase flood immunity. (D) Electrical switchboards, main data servers and the like are positioned to maximise flood immunity. (E) Electrical and data installations below the adopted flood regulation line are designed and constructed to withstand submergence in flood water. (ii) Access routes are designed or alternative emergency evacuation routes are provided so that in a flood event occupants can escape by vehicle to a safe and secure area. (iii) As far as practicable, buildings are located to avoid areas affected by significant flood flows or velocities. (iv) Materials or chemicals manufactured or stored onsite— (A) where hazardous or noxious materials or chemicals, inclusive of their manufacturing equipment, are located as far as practicable on the highest part of the site and designed to prevent the intrusion of floodwaters; and (B) are those that are readily able to be moved in a flood event; and (C) are not hazardous or noxious, or comprise materials that may cause a deleterious effect on the environment if discharged in a flood event; and (D) where capable of creating a safety hazard by being shifted by flood waters, are contained in order to minimise movement in times of flood. (v) The development does not increase the flood hazard (e.g. by way of increased depth, duration or velocity of flood waters or a reduction in warning times) for other properties.

	(vi) The clearing of native vegetation within the stream banks is avoided. (vii) All earthworks are to comply with any applicable development criteria set out in an approved floodplain management plan. (viii) Where a floodplain management plan does not exist for the catchment, no earthworks (including filling) is permitted on land below the adopted flood regulation line, unless: (A) the land is located above the 1 in 20 development line; and (B) an assessment, undertaken by a suitably qualified consultant, demonstrates that the reforming of the land does not negatively impact on the overall hydrology, hydraulics and flood capacity of the waterway, does not result in the reduction of flood storage capacity on the site and does not significantly impact on the ecological values of the riparian corridor.
OTHER	(g) Community Infrastructure (i) Key elements of community infrastructure are able to function effectively during and immediately after flood hazard events. (h) Community Safety (i) Uses that accommodate or otherwise cater for the aged, infirm or other at risk or mobility impaired people such as hospitals and nursing homes are not located below the adopted flood regulation line or within an urban catchment flow path. (i) Basements (i) Basements below the adopted flood regulation line or within an urban catchment flow path are to be waterproof, with walls and floors impermeable to the passage of water. (ii) All basement entry points and services are to be located where practicable above the adopted flood level or incorporate effective barriers (ie flood gates) to prevent inundation. (iii) A backup power source is to be provided and located above the adopted flood level where the basement relies on a pumping solution to manage floodwater ingress or for dewatering after a flood. (j) Undercrofts (i) Development that includes an undercroft ensures that the building and site design allows floodwaters and flood debris to pass predominantly unimpeded under the structure. (ii) The design of the undercroft does not increase flood hazard. (iii) The undercroft area is stabilised, resistant to scour, and designed to drain freely.
Probable Solutions	Probable Solutions (a) Electrical Installations (i) As far as practicable, the design and layout of buildings provides— (A) the incoming power supply, including all metering equipment above the adopted flood level; and (B) all wiring, power outlets and switches above the adopted flood level; and (C) all conduits located below the adopted flood level are installed so that they will be self-draining; and (D) heating and air conditioning systems above the adopted flood level. (b) Evacuation Routes (i) At least one road access will remain passable for the performance of emergency evacuations at a level of no more than 300mm below the adopted flood level. (c) Earthworks (i) Earthworks do not negatively affect urban catchment flow path and flood conveyance characteristics or reduce flood storage capacity through the importation of fill to the site, or any alteration to a watercourse or floodway. (d) Clearing of Vegetation (i) Clearing of vegetation does not involve the removal of native vegetation from land within a Designated Watercourse or land within 30m of a Designated Watercourse or within 10 metres of the top of the bank of a Designated Watercourse where the slope of the bank exceeds 15% (refer Figure 11.4.12). (e) Community Infrastructure (i) Key elements of community infrastructure are sited and designed to achieve the levels of flood immunity as set out in the State Planning Policy and associated Guidelines for Natural Disaster Mitigation. **Figure 11.4.12: Defining Extent of Riparian Corridor for Protection of Native Vegetation** 
Part 12 - Assessment Criteria for Development for a Stated Purpose or of a Stated Type	
All	Division 5 – Reconfiguring a Lot Code Table 12.5.1 - Specific Outcomes and Probable Solutions for Minor Subdivisions Lot Layout and Design – Specific Outcome (1) Lots (including hatchet lots) have the appropriate area and dimensions to— (f) overcome site constraints (e.g., undermining, flooding, drainage, bushfire risk, buffers to incompatible land uses etc.) Probable Solution – Hatchet Lots (3)(i) For residential lots, other than homestead or township lots, a drainage system is provided so that no part of the driveway is below the adopted flood level. & (j) For homestead or township lots no part of the driveway is below the adopted flood level. Note 6 - Where unavoidable, for commercial or industrial lots, a drainage system is provided so that no part of the driveway is below the adopted flood level. Probable Solution – Public Open Space (5) In those lot reconfigurations adjoining a river or creek system where it is proposed that linear or waterside parkland be secured— (c) the extent of the parkland correlates with the adopted flood level or is a minimum width of 30 metres (measured from the banks of the watercourse) or as much in addition to the 30 metres to achieve at least a 10 metre width with slopes less than 1 in 20 (5%) to enable construction of a walking/bicycle path and to facilitate maintenance; Stormwater Drainage - Specific Outcome - (8) All lots are located above the adopted flood level to provide protection of property in accordance with the accepted level of risk. Stormwater Drainage – Probable Solutions - (8) (a) All Cottage Lots, Courtyard Lots, Traditional Lots, Hillside Lots and Dual Occupancy Lots are located outside the adopted flood regulation line and urban catchment flow paths. (b) For Homestead or Township Lots, an area which is suitable for a building platform comprising at least 600m² of each lot is to be located outside the adopted flood regulation line and urban catchment flow paths. Also, an additional area is to be available on each lot that is suitable to treat and dispose of effluent on-site in compliance with the Plumbing and Drainage Act 2002 and the Queensland Plumbing and Wastewater Code. (c) All multiple residential lots, commercial lots, mixed business and industry lots and industrial lots are located above the adopted flood level for the respective zone or Sub Area. Note 12 - (1) Those areas of residential lots below the adopted flood level for the applicable zone or Sub Area which are affected by a 'significant flood flow' are to be subject to a drainage easement. Table 12.5.2: Specific Outcomes and Probable Solutions for Moderate and Major Subdivisions Lot Layout and Design – Specific Outcome (2) Lots (including hatchet lots) have the appropriate layout, area and dimensions to— (f) overcome site constraints (e.g., undermining, flooding, drainage, bushfire risk, buffers to incompatible land uses etc.

	Probable Solution – Hatchet Lots (4) (i) For residential lots, other than homestead or township lots, a drainage system is provided so that no part of the driveway is below the adopted flood level. (j) For homestead or township lots no part of the driveway is below the adopted flood level. Note 7 - Where unavoidable, for commercial or industrial lots, a drainage system is provided so that no part of the driveway is below the adopted flood level. Probable Solution – Public Open Space (26) (v) for linear or waterside parkland— (B) the extent of the parkland correlates with the adopted flood level or is a minimum width of 30 metres (measured from the banks of the watercourse) or as much in addition to the 30 metres to achieve at least a 10 metre width with slopes less than 1 in 20 (5%) to enable construction of a walking/bicycle path and to facilitate maintenance Stormwater Drainage - Specific Outcome - (28) The major stormwater drainage system— (c) is to maximise community benefit through the retention of natural streams and vegetation wherever practicable, the incorporation of parks and other less flood-sensitive land uses into the drainage corridor and the placement of detention basins for amenity and function. (29) All lots are located above the adopted flood level to provide protection of property in accordance with the accepted level of risk. Stormwater Drainage – Probable Solutions - (29) (a) All Cottage Lots, Courtyard Lots, Traditional Lots, Hillside Lots and Dual Occupancy Lots are located outside the adopted flood regulation line and urban catchment flow paths. (b) For Homestead or Township Lots, an area which is suitable for a building platform comprising at least 600m² of each lot is to be located outside the adopted flood regulation line and urban catchment flow paths. Also, an additional area is to be available on each lot that is suitable to treat and dispose of effluent on-site in compliance with the Plumbing and Drainage Act 2002 and the Queensland Plumbing and Wastewater Code. (c) All multiple residential lots, commercial lots, mixed business and industry lots and industrial lots are located above the adopted flood level for the respective zone or Sub Area. Note 38 - (1) Those areas of residential lots below the adopted flood level for the applicable zone or Sub Area which are affected by a 'significant flood flow' are to be subject to a drainage easement. Table 12.5.3: Specific Outcomes and Probable Solutions for Minor Rural Subdivisions Lot Layout and Design (1) Lots (including hatchet lots) have the appropriate area and dimensions to— (e) overcome site constraints (e.g. undermining, flooding, drainage, bushfire risk, buffers to incompatible land uses etc.); Probable Solution – Hatchet Lots – (3) (i) For rural lots, other than rural living lots, a drainage system is provided so that no part of the driveway is below the adopted flood level. (j) For rural living lots no part of the driveway is below the adopted flood level. Stormwater Drainage - Specific Outcome –(9) A flood free dwelling site is located above the adopted flood level to provide protection of property in accordance with the accepted level of risk. Stormwater Drainage – Probable Solutions - (9) Each proposed lot is to contain an area which is suitable for a building platform comprising at least 2000m² and located outside the adopted flood regulation line and urban catchment flow paths. Also, an additional area is to be available on each lot that is suitable to treat and dispose of effluent on-site in compliance with the Plumbing and Drainage Act 2002 and the Queensland Plumbing and Wastewater Code. Table 12.5.4: Specific Outcomes and Probable Solutions for Moderate Rural Subdivisions Lot Layout and Design – Specific Outcome (1) Lots (including hatchet lots) have the appropriate layout, area and dimensions to— (e) overcome site constraints (e.g., undermining, flooding, drainage, bushfire risk, buffers to incompatible land uses etc. Probable Solution – Hatchet Lots – (3) (i) For rural lots, other than rural living lots, a drainage system is provided so that no part of the driveway is below the adopted flood level. (j) For rural living lots no part of the driveway is below the adopted flood level. Stormwater Drainage - Specific Outcome – (18) A flood free dwelling site is located above the adopted flood level to provide protection of property in accordance with the accepted level of risk. Stormwater Drainage – Probable Solutions - (18) Each proposed lot is to contain an area which is suitable for a building platform comprising at least 2000m² and located outside the adopted flood regulation line and urban catchment flow paths. Also, an additional area is to be available on each lot that is suitable to treat and dispose of effluent on-site in compliance with the Plumbing and Drainage Act 2002 and the Queensland Plumbing and Wastewater Code. Appendix H – Land dedications for public parks **Table 1: Flood Level Parameters for Integration with Linear and Waterside Parks** Citywide = Level 1, District = Level 2 and Local = Level 3.
Residential	Division 6—Residential Code 12.6.4 Residential Uses and Works – Effects of Development – General Provisions (12) Site Suitability and Amenity – Specific Outcomes - (d) Habitable rooms in dwellings are situated above the adopted flood level.
Commercial and Industrial	Division 7—Commercial and Industrial Code 12.7.4 Effects of Development – General Commercial and Industrial Provisions - Hazards and Risks (5) Specific Outcomes (c) Where there is potential for stored material to escape and pollute nearby waters— (ii) outdoor storage areas are located above the adopted flood level; and (iii) on-site stormwater detention ponds are used to provide sediment and litter traps as a means of containing accidental spillages and preventing them from entering drainage systems.
ALL	Division 9—Parking Code Drainage (36) Specific Outcomes (a) All stormwater drainage from paved and impervious areas is collected within the site and piped to a nominated legal point of discharge. (b) Particular attention is given to the flow path of stormwater resulting from a storm equivalent to the 1% AEP + climate change. (37) Probable Solutions – for sub-section (36) (a) All stormwater drainage design is in accordance with the requirements of the Institute of Engineers, Australia, 1987: "Australian Rainfall and Runoff: A Guide to Flood Estimation", Volume 1, for a two year return period. (b) Where the internal driveway drains towards the street, a grated catch drain is installed immediately inside the property boundary.
Community /Vulnerable	Division 12—Community Use Code 12.12.3 Overall Outcomes for the Community Use Code (2) (a) Community uses— (iv) where possible, avoid areas prone to flooding, bushfires or landslip.

Recreational Setting	Level	Flood Level Criteria
Sportsgrounds and Courts	Headquarter Sports	Not recommended below 1 in 100 Average Recurrence Interval (ARI).
	Citywide and Local	All fields above 1 in 20 Average Recurrence Interval (ARI), multi-purpose courts (unfenced) above 1 in 50 Average Recurrence Interval (ARI), all buildings, playground areas or fenced multi-purpose courts above 1 in 100 years Average Recurrence Interval (ARI).
Recreation Parks	Citywide	All buildings and playground areas above 1 in 100 years Average Recurrence Interval (ARI).
	District	All buildings and playground areas above 1 in 100 years Average Recurrence Interval (ARI).
	Local	All buildings and playground areas above 1 in 100 years Average Recurrence Interval (ARI).

	Natural Disasters (15) Specific Outcomes Key elements of community infrastructure, including emergency services, hospitals, nursing homes, child care facilities and stores of valuable records or items of historic and cultural significance (e.g., galleries, museums, libraries and archives)— (a) avoid areas prone to flooding, bushfires and landslip (see Part 11); and (b) are able to function effectively during and immediately after natural hazard events. Natural Disasters (16) Probable Solution – for sub-section (15) Key elements of community infrastructure are sited and designed to avoid areas prone to flooding, bushfires and landslip as set out in the State Planning Policy and associated Guidelines for Natural Disaster Mitigation.
Definitions	Schedule 1 – Dictionary "Adopted Flood Level" means the flood level which has been selected as the basis for planning purposes within the City, which unless otherwise specifically stated is based on the flood event depicted by the Adopted Flood Regulation Line and the flood level depicted by an Urban Catchment Flow Path. "Adopted Flood Regulation Line" means the flood line as depicted on the Flood and Urban Catchment Flow Paths Overlay Map (OV5). "Annual Exceedance Probability (AEP)" means the likelihood of occurrence of a flood of given size or larger occurring in any one year. "Average Recurrence Interval (ARI)" (1) "Average Recurrence Interval (ARI)" is a statistical estimate of the probability of a flood of a given size occurring, e.g., 1 in 100 equates to an annual exceedance probability of 1%. (2) The ARI of a flood event does not predict when a flood of that size will occur next. "Climate Change" means a 20% increase in rainfall intensity for flood modelling purposes consistent with the Inland Flood Study (2010). "Significant Flood Flow" means inundation of land by water which is one (1) metre or more in depth. "Urban Catchment Flow Path" means the flood line as depicted on the Flood and Urban Catchment Flow Paths Overlay Map (OV5)
	"Vulnerable Development" means— (a) uses and activities such as licensed premises (including taverns, hotels, entertainment venues, licensed clubs, off premises bottle shops and nightclubs), large entertainment and recreational venues, large institutional uses (e.g., tertiary campuses, hospitals), schools, car parks (50 spaces and greater), public toilets, telephone booths and Automatic Teller Machines; or (b) any use or activity in a 'vulnerable area' which generates people movement or use at times when there are less than normal business hour levels of formal or informal surveillance; or (c) any use operating at night-time (after 9.00 p.m.) or over a 24 hour period (e.g., Automatic Teller Machines, service stations, institutions or tertiary educational facilities, or public transport interchanges); or (d) any large scale project considered to have wide ranging safety implications, such as major shopping centres.

Appendix B - Flood height assessment

WATER TECHNOLOGY
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Report

Ipswich City Council Flood Height Assessment

Ipswich City Council

28 July 2022

Document Status

Version	Doc type	Reviewed by	Approved by	Date issued
01	Report	RWS	RWS	28 July 2022

Project Details

Project Name	Ipswich City Council Flood Height Assessment
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1 OVERVIEW AND METHODOLOGY

1.1 Introduction

This addendum to the Fit For Purpose Risk Assessment is for purposes of providing Ipswich City Council (Council) a city wide analysis of flood planning levels with a particular focus on the expected differences between the Adopted Flood Regulation Line (ARFL) level and the modelled 1% Annual Exceedance Probability (AEP) with climate change flood level. This Flood Height Assessment provides Council context for the potential amendment to flood planning level policy settings within the Ipswich City Council Planning Scheme.

1.2 Base data

This Flood Height Assessment analyses Council's corporate dataset that was developed for the AFRL with the 1% AEP plus climate change flood height across all creek and riverine catchments within the Ipswich Local Government Area (LGA).

1.2.1 AFRL Dataset

The Adopted Flood Regulation Line (AFRL) dataset supports land use planning development assessment particularly for the assessment of flood heights and forms the base dataset for property level flood certificates. The dataset is an amalgamation of 3 different flood grids including some interpolated extents:

- 1974 historic flood extent
- 2011 historic flood extent
- Q100 flood model
- Ground level information is based on the 2014 Digital Terrain Modelling (i.e. not latest 2019 LIDAR) but is available against all affected parcels.

The AFRL dataset provided by Council (19 April 2022) contains the following information for over 97,000 properties in the Ipswich LGA:

- Lot Plan number
- Street address
- Historic and modelled flood analysis (True / False)
  - 1974 Affected
  - 2011 Affected
  - Q20 Affected
  - Q100 Affected
  - AFRL Affected
- Minimum and maximum ground levels (mAHD)
- Flood level data:
  - 1974 flood level (mAHD)
  - 2011 flood level (mAHD)
  - Q20 flood level (mAHD)
  - Q100 flood level (mAHD)

1.2.2 1% AEP plus climate change flood level

The methodology adopted for climate change is in accordance with the Inland Flooding Study report (DNRM, 2010). This correlates with Australian Rainfall and Runoff (AR&R) 1987 methodologies which infers for every degree of global warming apply a 5% increase in rainfall intensity within the models.

This is also considered to align with the Intergovernmental Panel on Climate Change's 'Representative Concentration Pathway' (RCP) 8.5 which assumes a sea level rise of 0.8 metres and a 20% increase in rainfall intensity for the year 2090.

The following 1%AEP climate change grids were used in the analysis:

- IRFSU 1% AEPCC
- Brisbane River 1 % AEPCC
- Bundamba Creek 1%AEPCC
- Sandy Creek 1%AEPCC
- Western Creek 1%AEPCC
- Warrill Creek 1%AEPCC
- Goodna Creek 1%AEPCC
- Walloon 1%AEPCC
- Black Snake Creek 1%AEPCC
- Rosewood / Thagoona 1%AEPCC
- Tallegalla 1%AEPCC
- Purga Creek 1%AEPCC
- Woogaroo Creek 1%AEPCC
- Six Mile Creek1%AEPCC
- Frankin Vale Creek1%AEPCC
- Deebing Creek 1%AEPCC; and
- Mihi Creek1%AEPCC

The grids were combined to create a "MAX MAX" of 1%AEP climate change flood heights. I.e. where regional riverine flooding is dominant, the maximum surface was taken in preference to the local creek flood height.

Peak flood level difference mapping shown between the1% AEP plus climate change and the 1% AEP flood event is provided in the Ipswich Integrated Catchment Plan (IICP).

1.3 Assumptions and limitations

- The data was used as supplied, no modelling was undertaken for this project.
- This flood height assessment does not seek to replicate the work undertaken in the IICP, but analyse the adopted flood planning levels on a property by property scale. It is therefore noted that there could be significant variations of flood level across large rural lots and the ARFL will assign one flood planning level (1974, 2011 or existing Q100 flood model). When mapping the quantum of difference between the ARFL and the 1%AEP plus climate change therefore, there might be significant difference

2 RESULTS

2.1 Difference mapping

The flood height assessment maps show the difference between the AFRL and 1% AEP climate change for each of the Local Area Frameworks across the LGA. The results present the height difference as:

- AFRL greater than 1 %AEP climate change by:
  - 0m to 0.5m
  - 0.5m to 1m
  - 1m to 2.5m
  - 2.5m to 5m
  - 5 to 7.5m
  - 7.5m to 10m
  - Greater than 10m

Where the 1% AEP climate change level is higher than the AFRL the flood extent is mapped as blue. For example as shown in Figure 2-1, in Mount Mort, Lower Mount Walker and Mount Walker West there are some properties where the AFRL is between 0.5m and 1m higher than the 1% AEP climate change level.

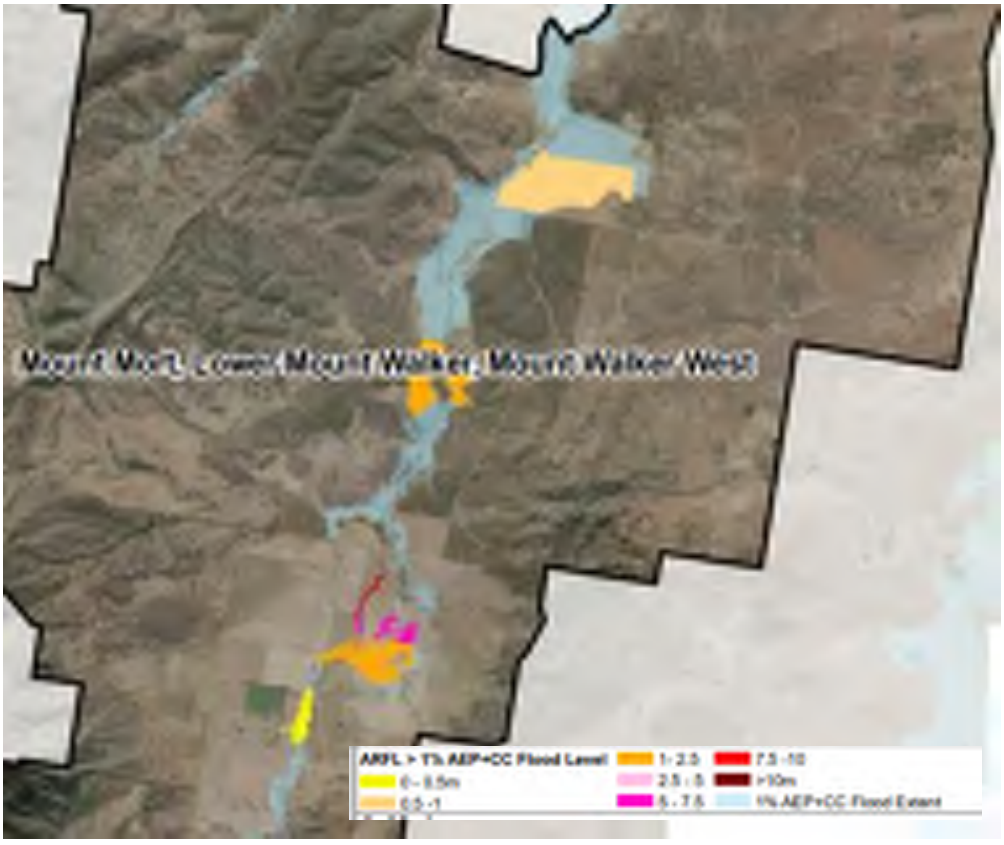

Figure 2-1 AFRL and climate change difference map excerpt in Mount Mort, Lower Mount Walker and Mount Walker West

2.2 Discrepancy

In the Local Area Framework of Goodna, Gailes and Camira (part), there is an anomaly in the difference mapping picked in the review process.

In the suburb of Gailes, in the Tiemens Street locality south of the motorway as shown in Figure 2-2, the ARFL is between 1 and 5 metres higher than the 1%AEP climate change.

This area is mapped in the Goodna Creek local model, however it would appear that Brisbane River flood model did not include the culvert structure under the motorway and subsequently, the low-lying area immediately south of the motorway have not been included in the results.

Interrogation of the elevation data in the area reveal the ground levels are comparative to the north of the motorway, where flooding has been mapped. It is therefore assumed that floodwaters via backflow through the culvert and stormwater system would occur causing inundation.

- Historic flood data in the AFRL dataset shows the level of the 1974 flood event was 18.4m AHD in this area
- The Brisbane River flood modelled 1%AEPCC to the north of the motorway has a flood height of 18.7m AHD.
- The Goodna Creek local flood model 1%AEPCC has a flood height of approx.15.3m AHD.

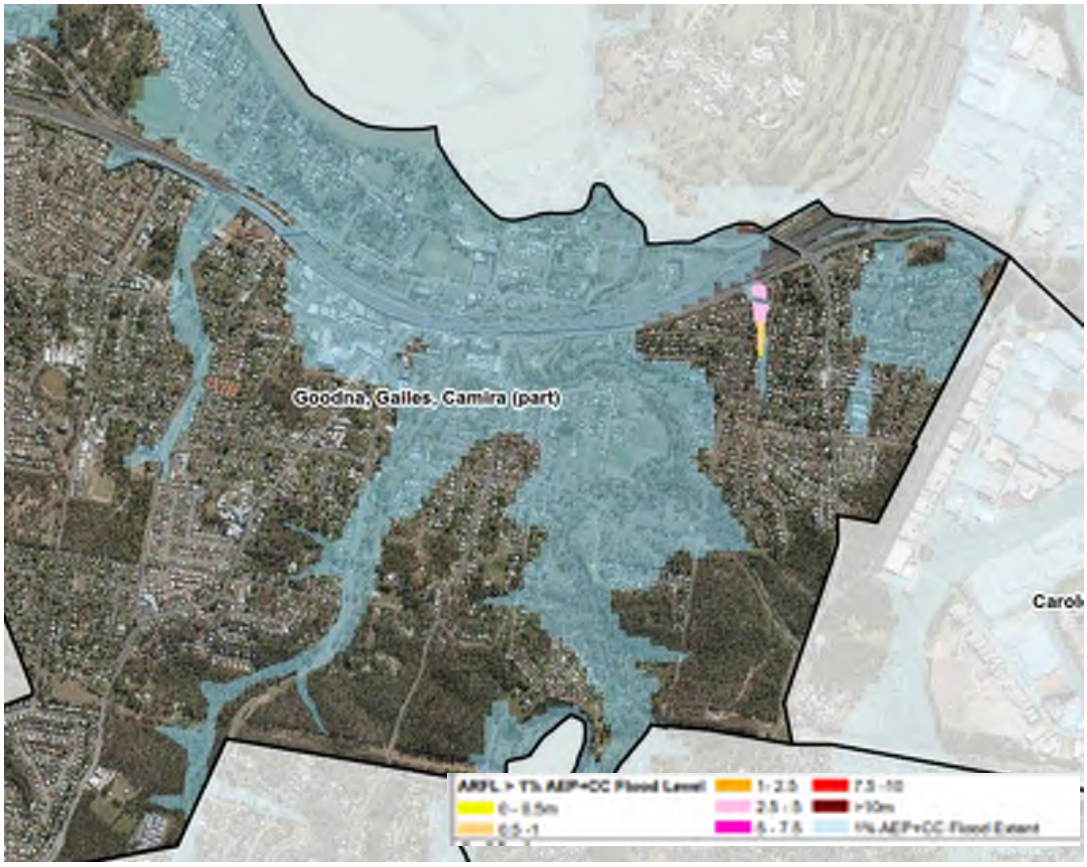

Figure 2-2 AFRL and climate change difference map excerpt in Goodna, Gailes, Camira (part)

3 SUMMARY

Council has undertaken an assessment of the Adopted Flood Regulation Line (AFRL) flood levels and 1% AEP climate change flood level across the LGA to inform discussions regarding the policy setting for a defined flood event and to inform flood planning levels within the Ipswich City Council Planning Scheme.

The difference mapping for 30 Local Area Frameworks is presented in Appendix A of this Report Addendum.

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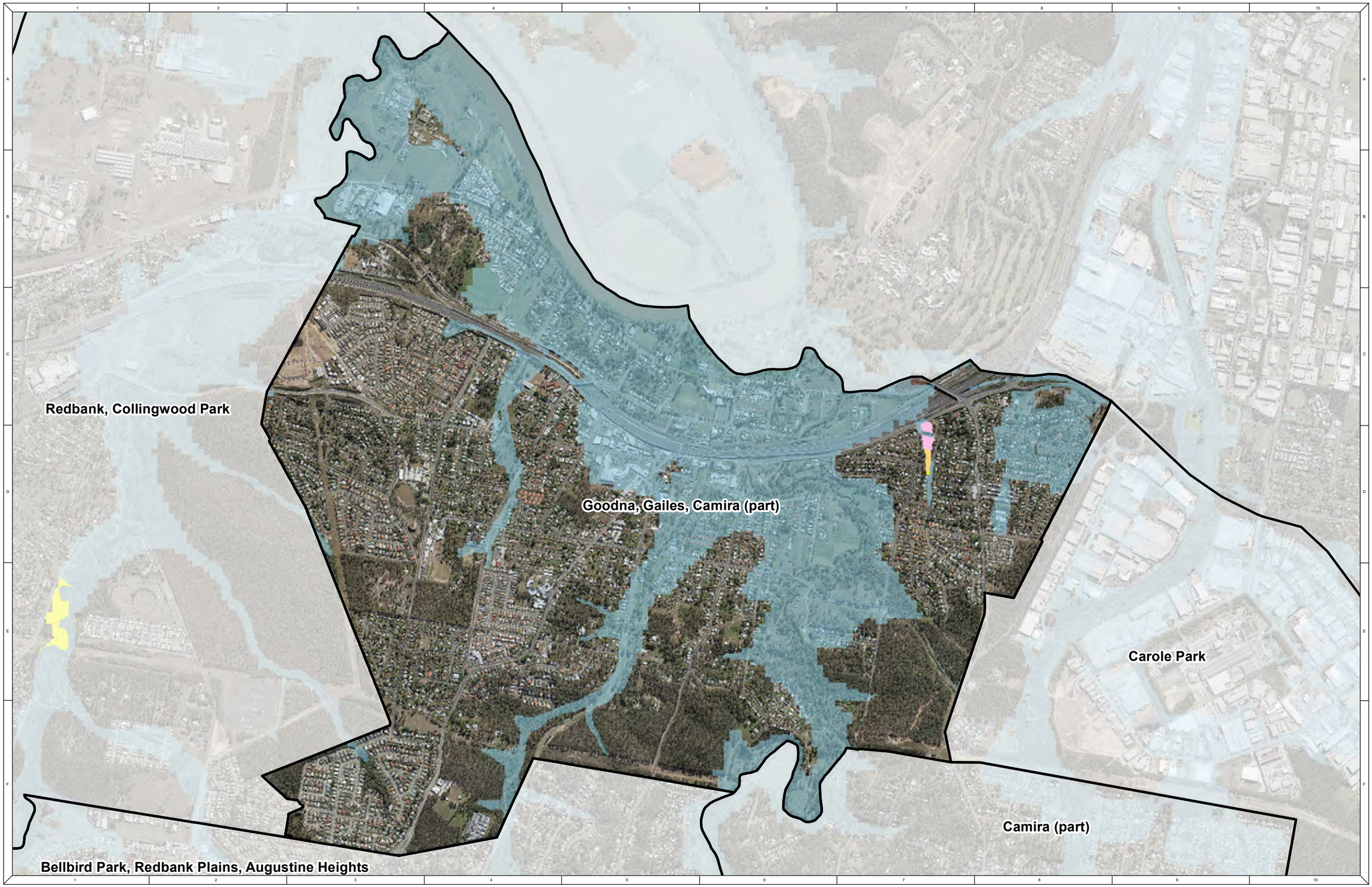
APPENDIX A
FLOOD HEIGHT ASSESSMENT DIFFERENCE MAPPING



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N
W E
S

ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:18,480 at A3

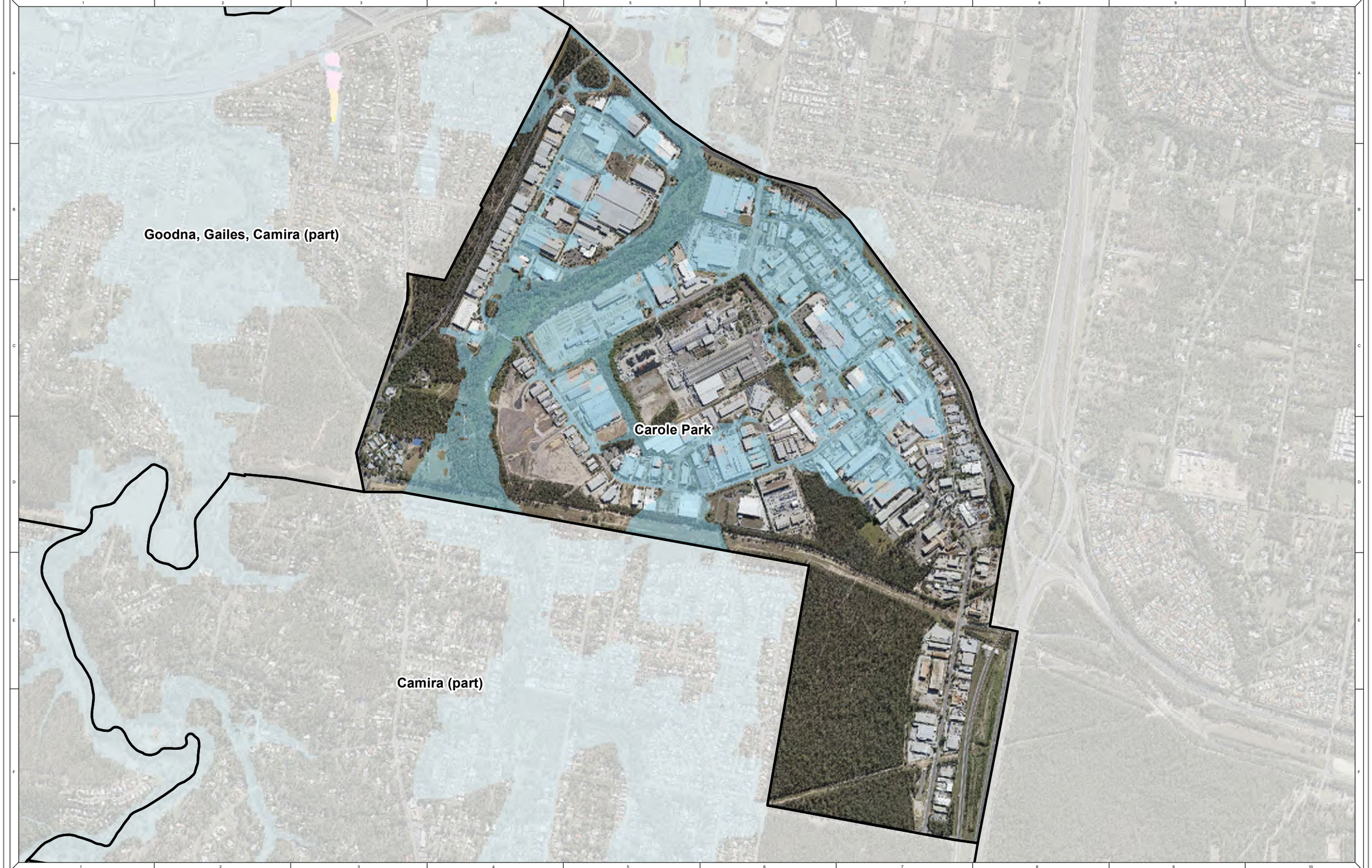
WATER TECHNOLOGY

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Goodna, Gailes, Camira (part)

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 1 of 30 | DRAWING NUMBER: 1



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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:14,210 at A3

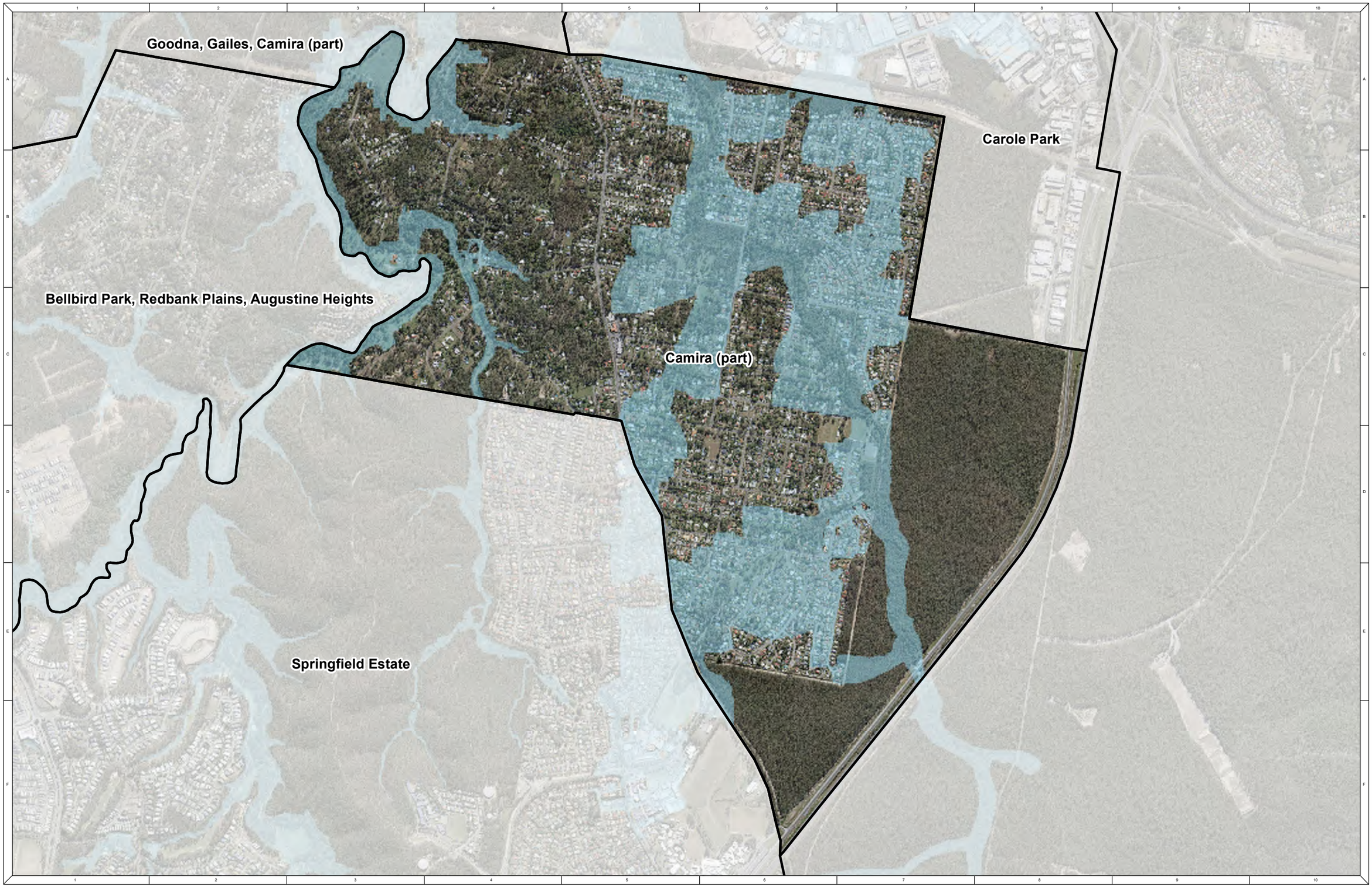
WATER TECHNOLOGY

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Carole Park

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 2 of 30 | DRAWING NUMBER: 2



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N
W E
S

ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:17,010 at A3

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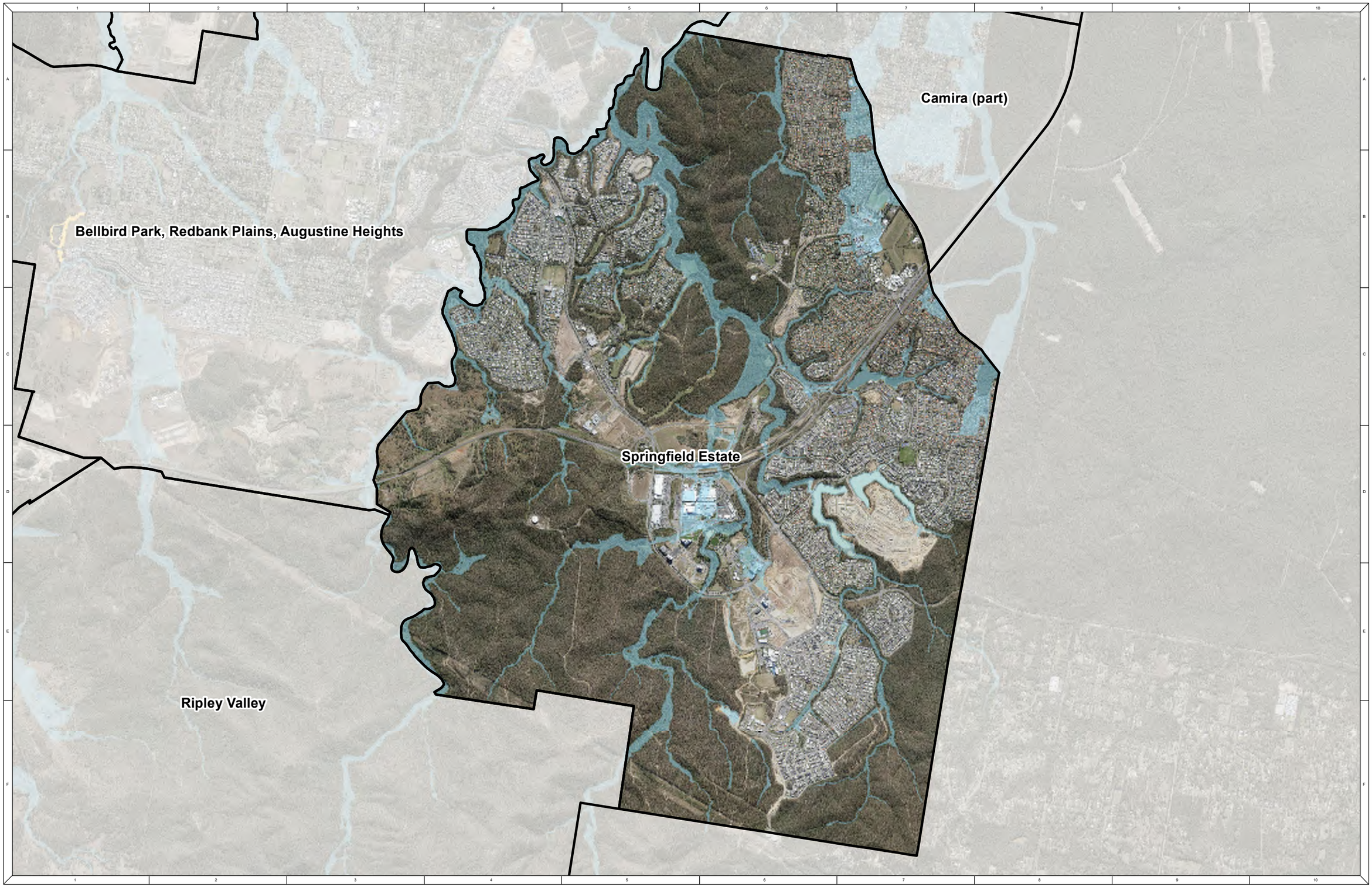
Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Camira (part)

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 3 of 30 | DRAWING NUMBER: 3



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N
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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:34,500 at A3

WATER TECHNOLOGY

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Springfield Estate

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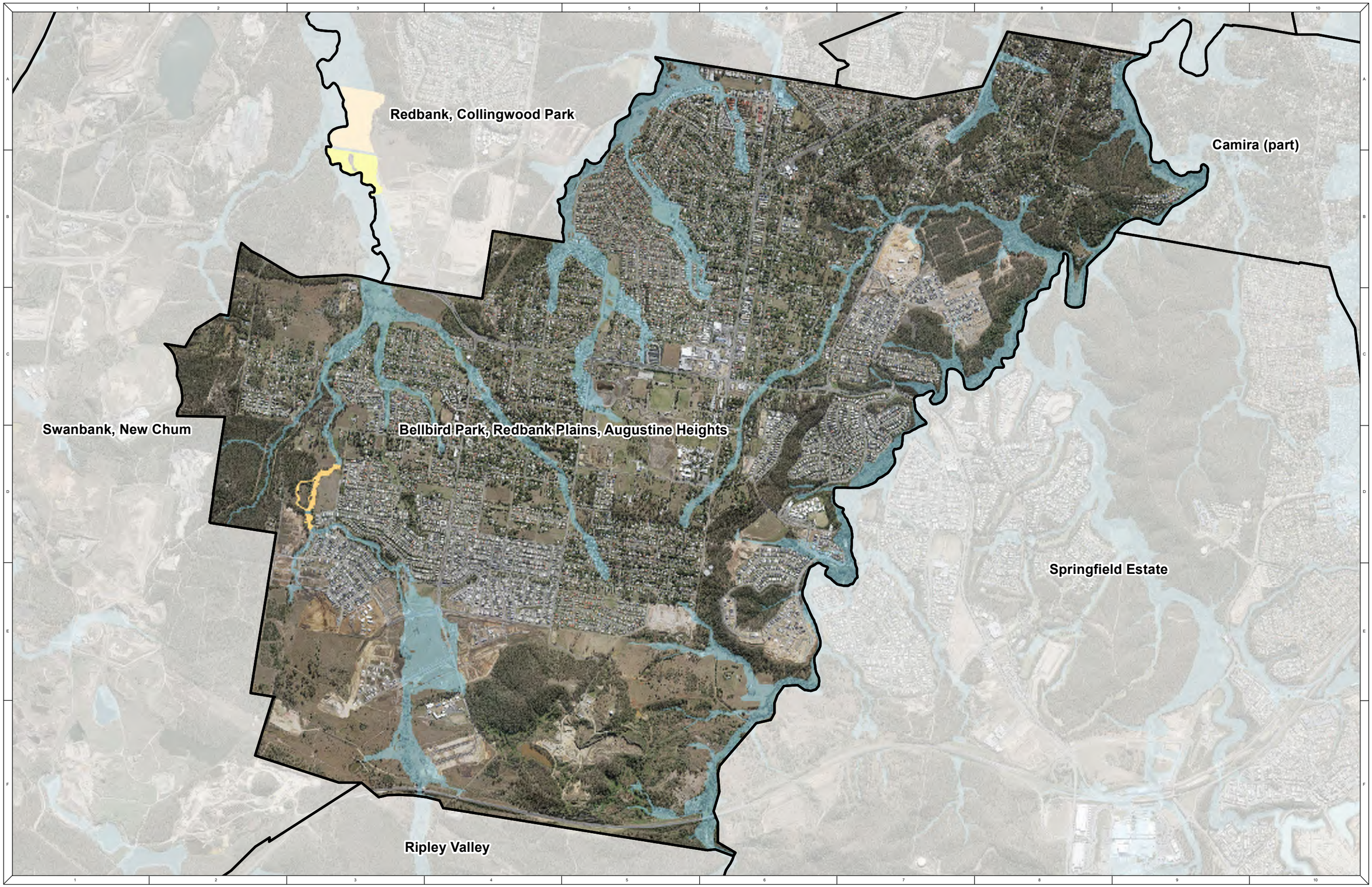
DATE: 5/07/2022 | SHEET: 4 of 30 | DRAWING NUMBER: 4



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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:26,710 at A3

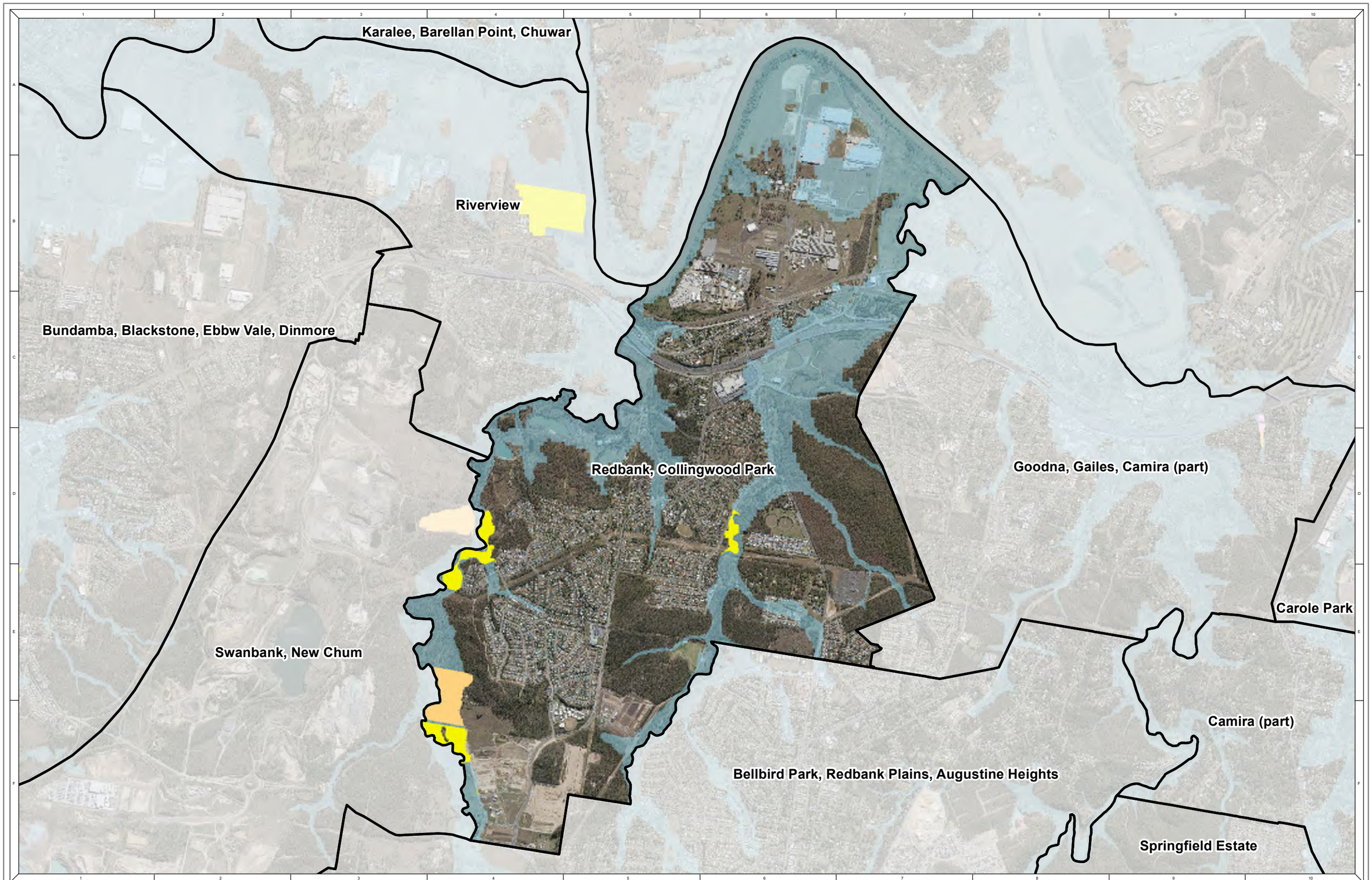
WATER TECHNOLOGY

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Bellbird Park, Redbank Plains, Augustine Heights

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 5 of 30 | DRAWING NUMBER: 5



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N
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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:30,090 at A3

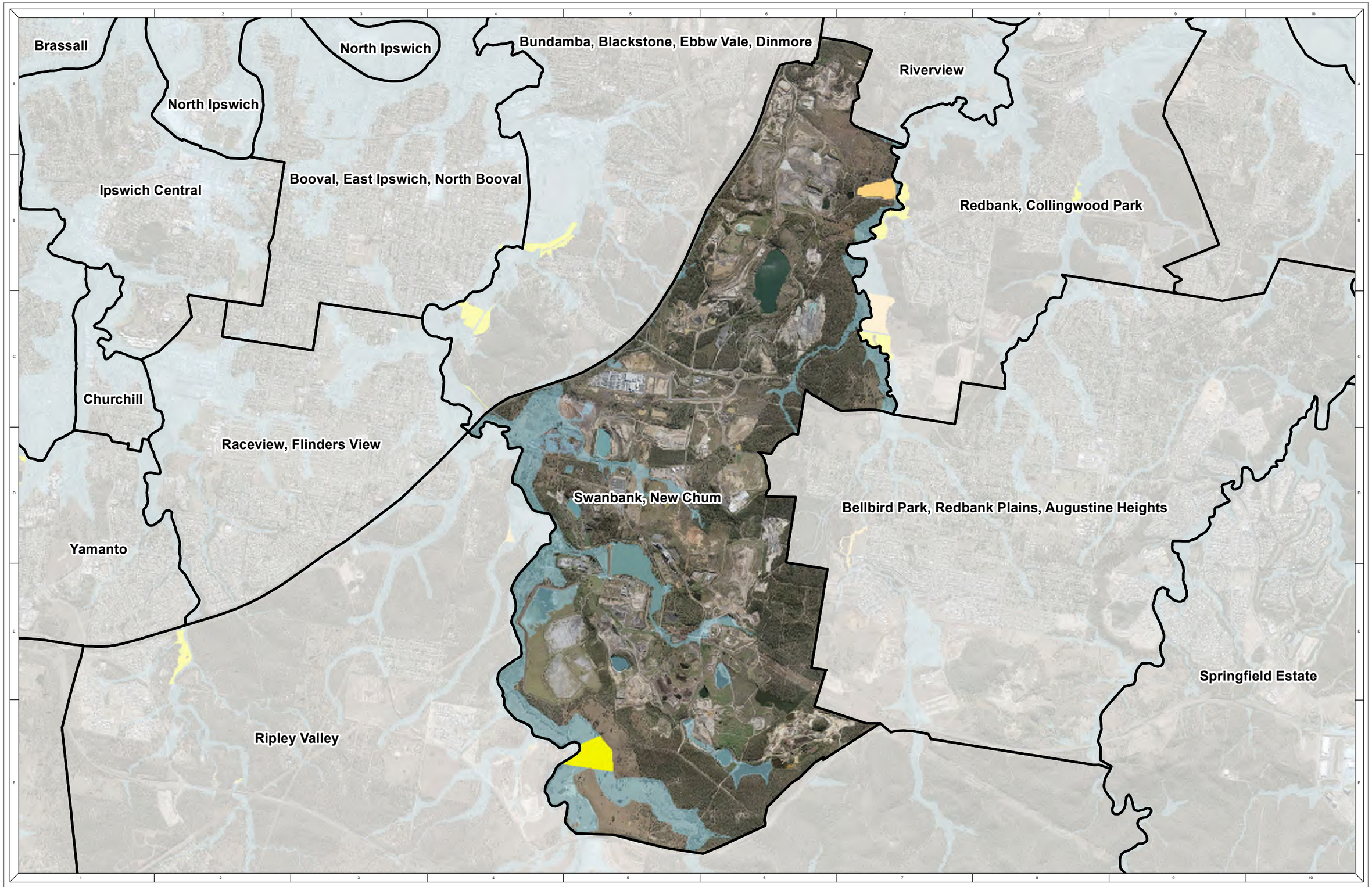
WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Redbank, Collingwood Park

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 6 of 30 | DRAWING NUMBER: 6



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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:42,820 at A3

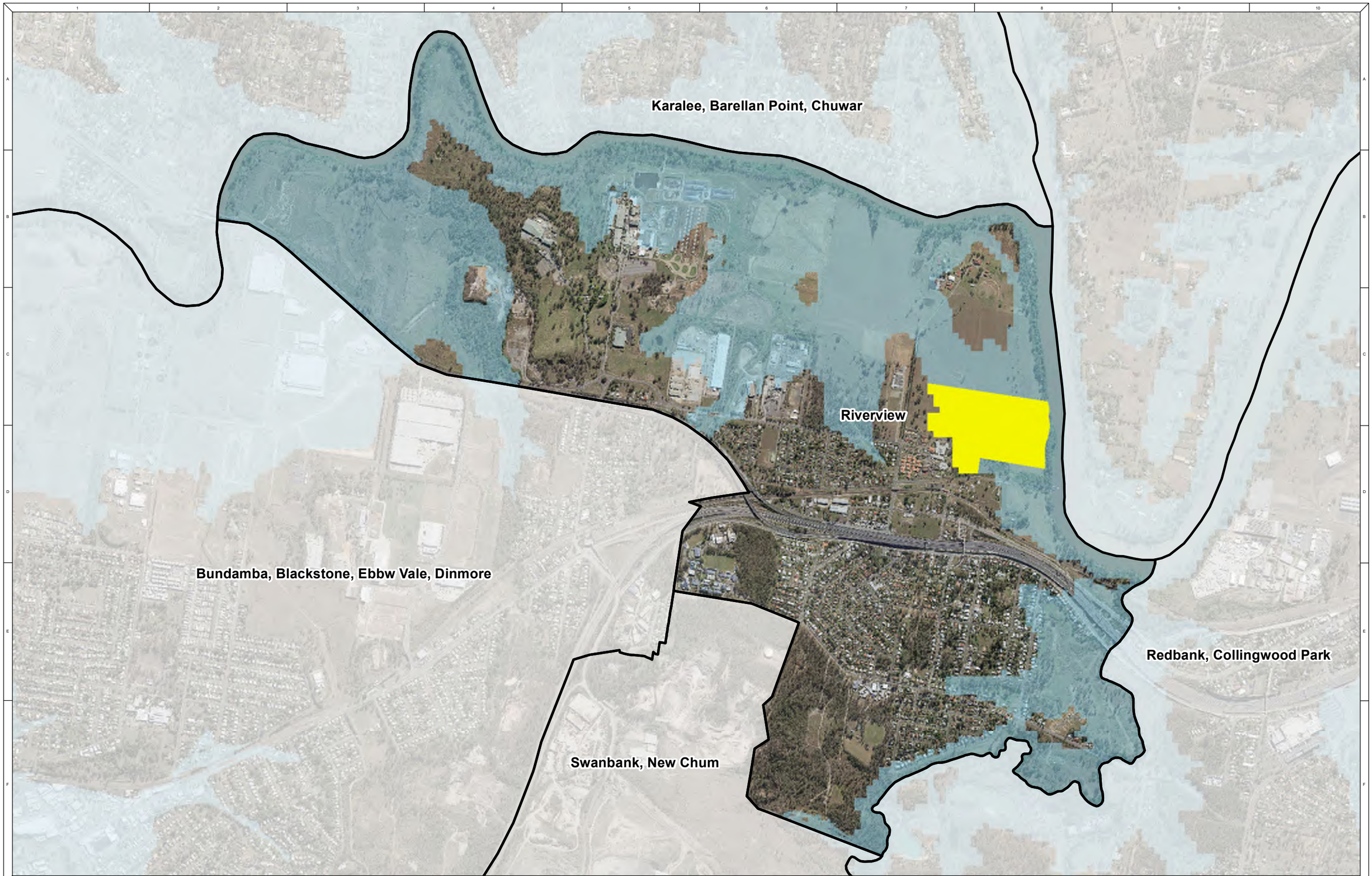
WATER TECHNOLOGY

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Swanbank, New Chum

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 7 of 30 | DRAWING NUMBER: 7



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N
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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:17,640 at A3

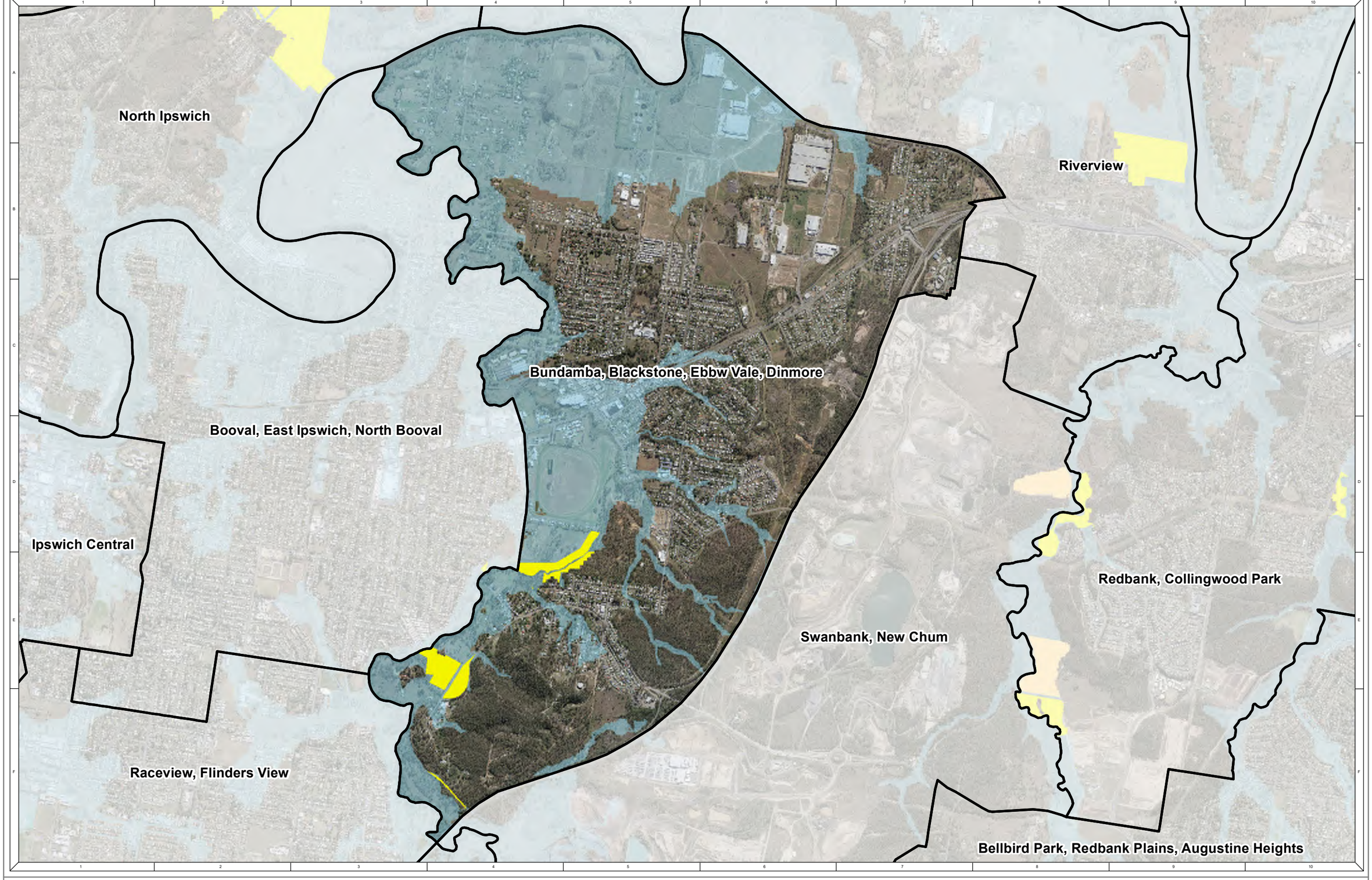
WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Riverview

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 8 of 30 | DRAWING NUMBER: 8



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N
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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:28,860 at A3

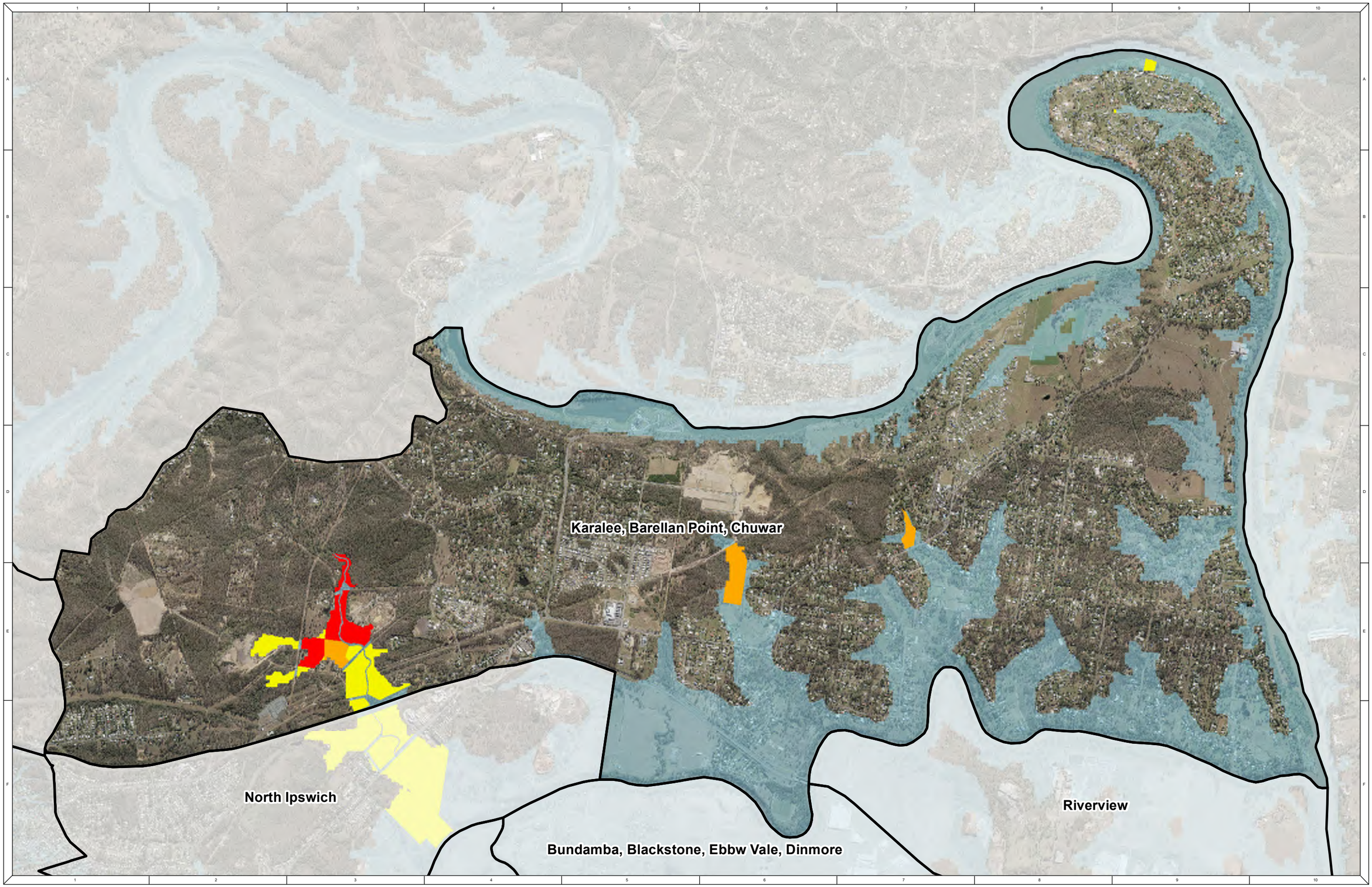
WATER TECHNOLOGY

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Bundamba, Blackstone, Ebbw Vale, Dinmore

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 9 of 30 | DRAWING NUMBER: 9



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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:28,400 at A3

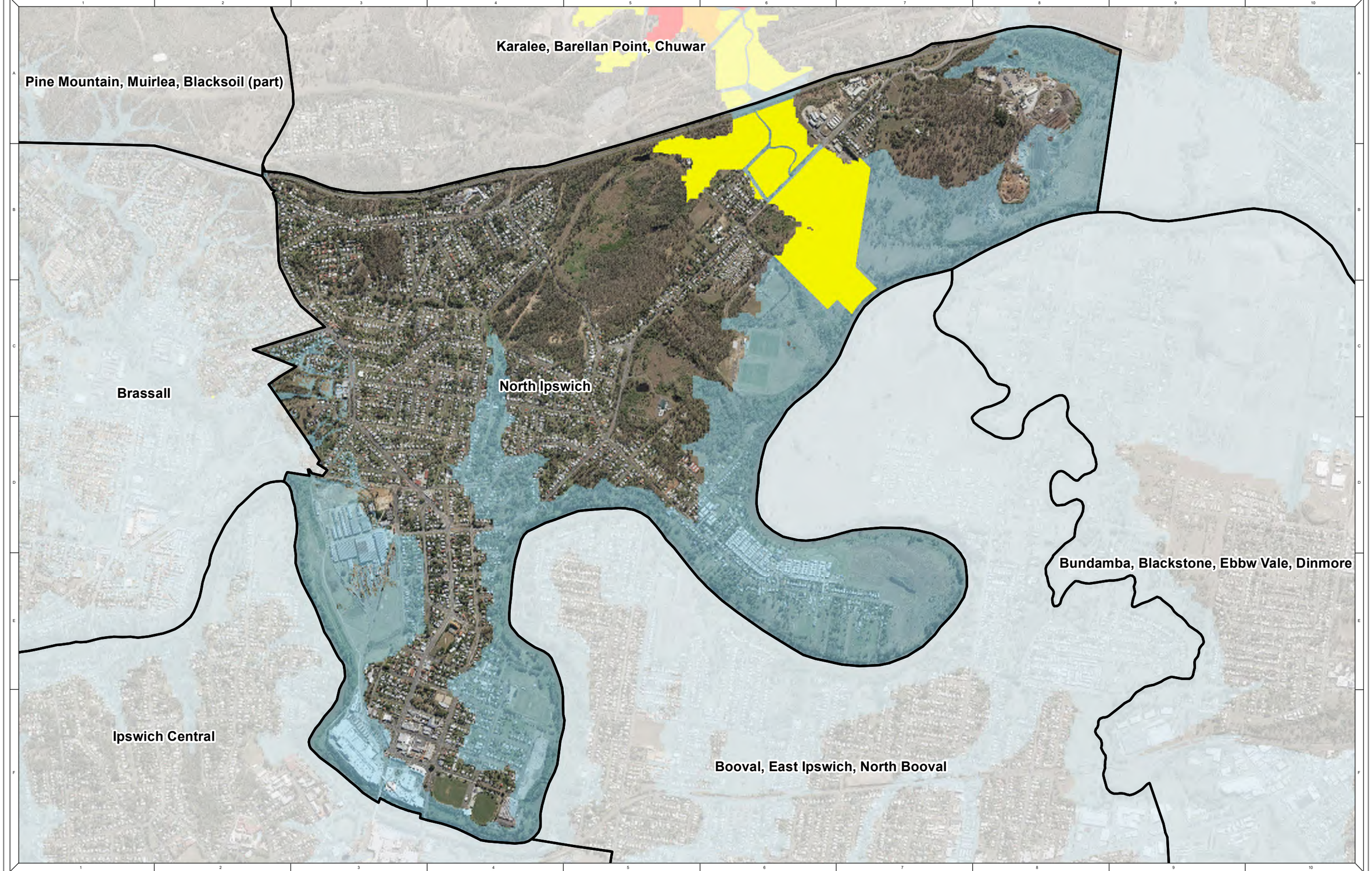
WATER TECHNOLOGY

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Karalee, Barellan Point, Chuwar

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 10 of 30 | DRAWING NUMBER: 10



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N W E S

ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:18,720 at A3

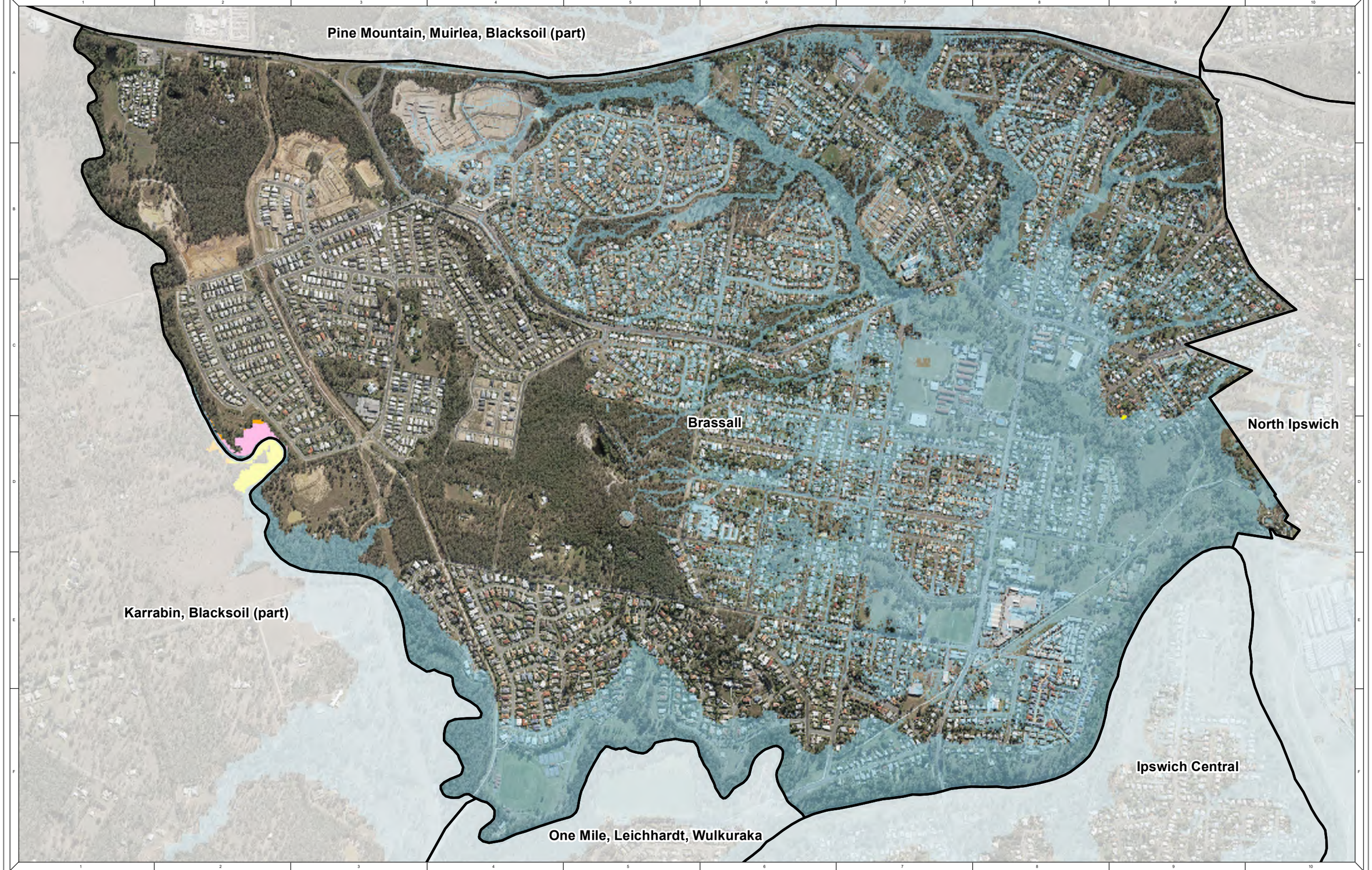
WATER TECHNOLOGY

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : North Ipswich

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 11 of 30 | DRAWING NUMBER: 11



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N
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ARFL > 1% AEP+CC Flood Level

0 - 0.5m	1- 2.5	7.5 -10	
0.5 -1	2.5 - 5	>10m	
	5 - 7.5	1% AEP+CC Flood Extent	

0 0.5 1 Kilometers

1:12,160 at A3

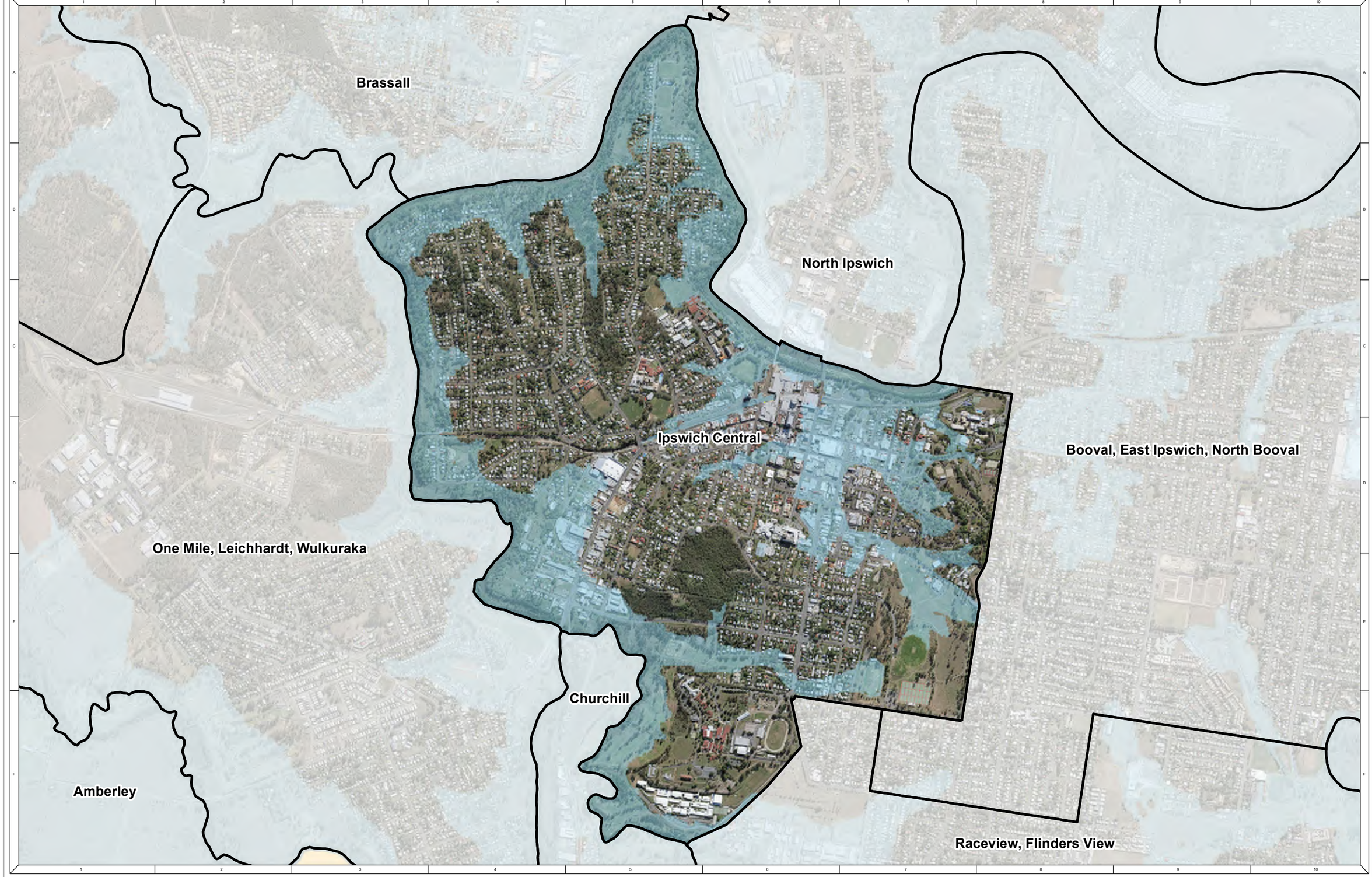
WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Brassall

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 12 of 30 | DRAWING NUMBER: 12



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N
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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:18,880 at A3

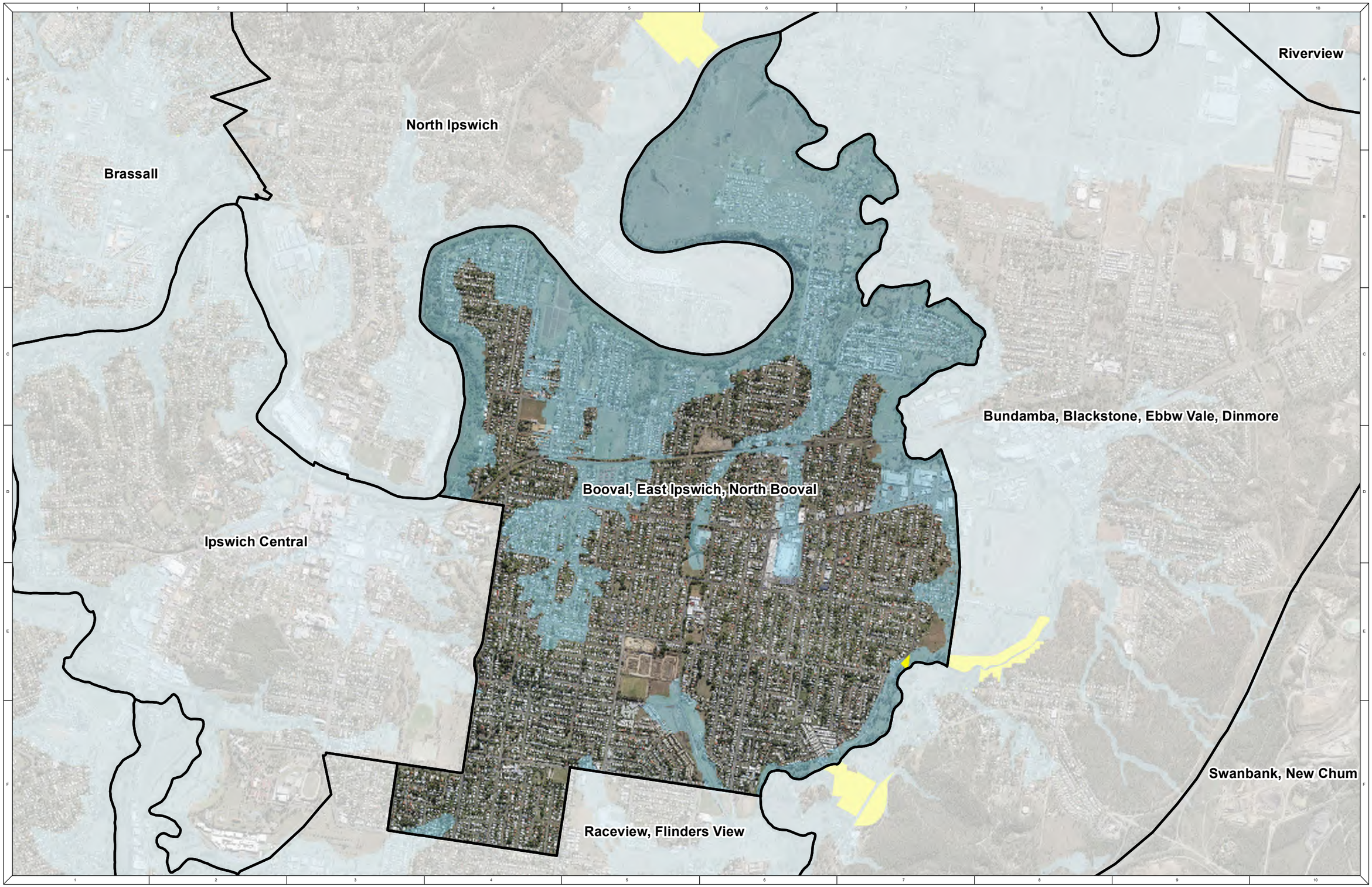
WATER TECHNOLOGY

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Ipswich Central

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 13 of 30 | DRAWING NUMBER: 13



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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:23,190 at A3

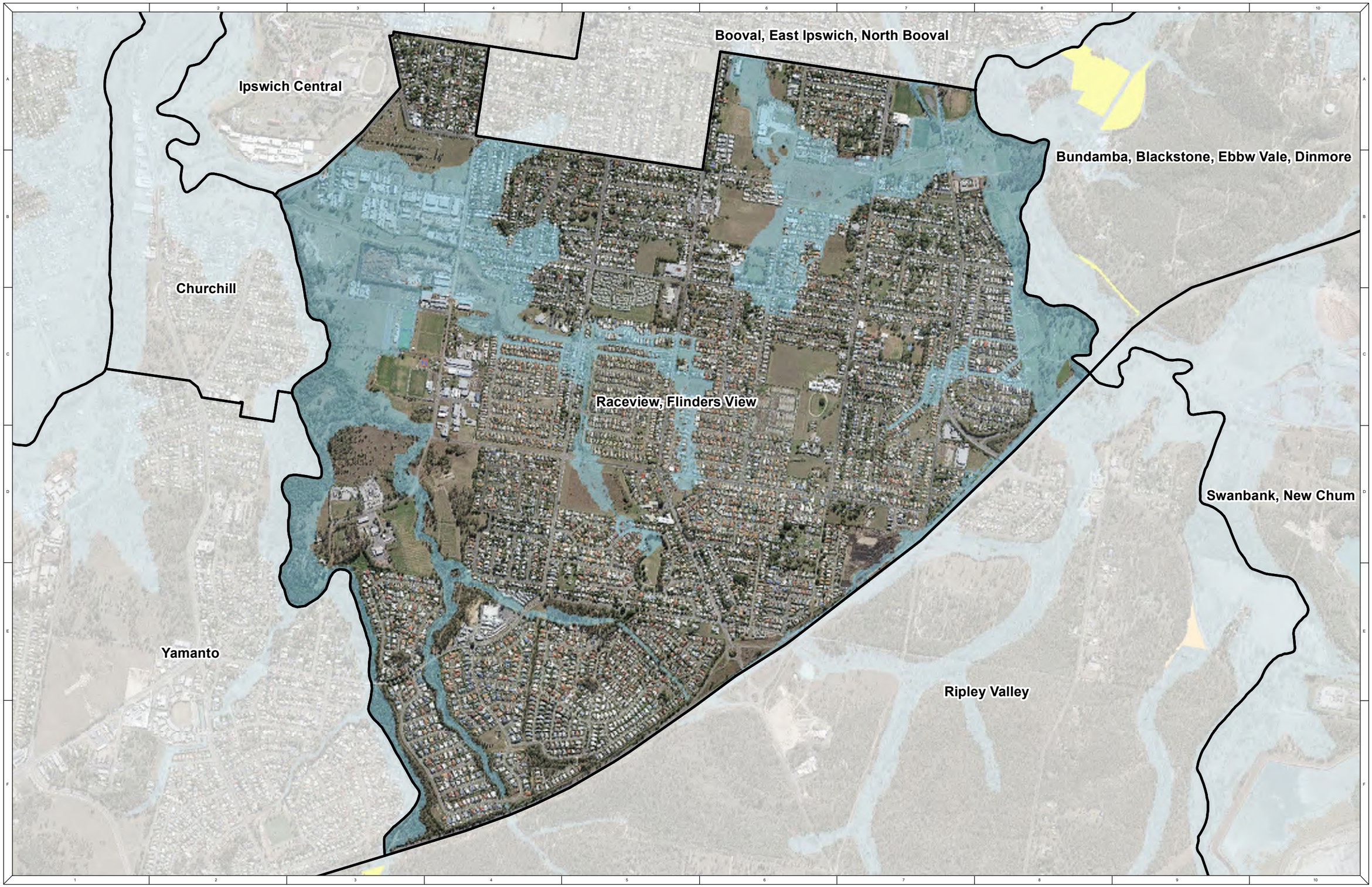
WATER TECHNOLOGY

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Booval, East Ipswich, North Booval

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 14 of 30 | DRAWING NUMBER: 14



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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:17,320 at A3

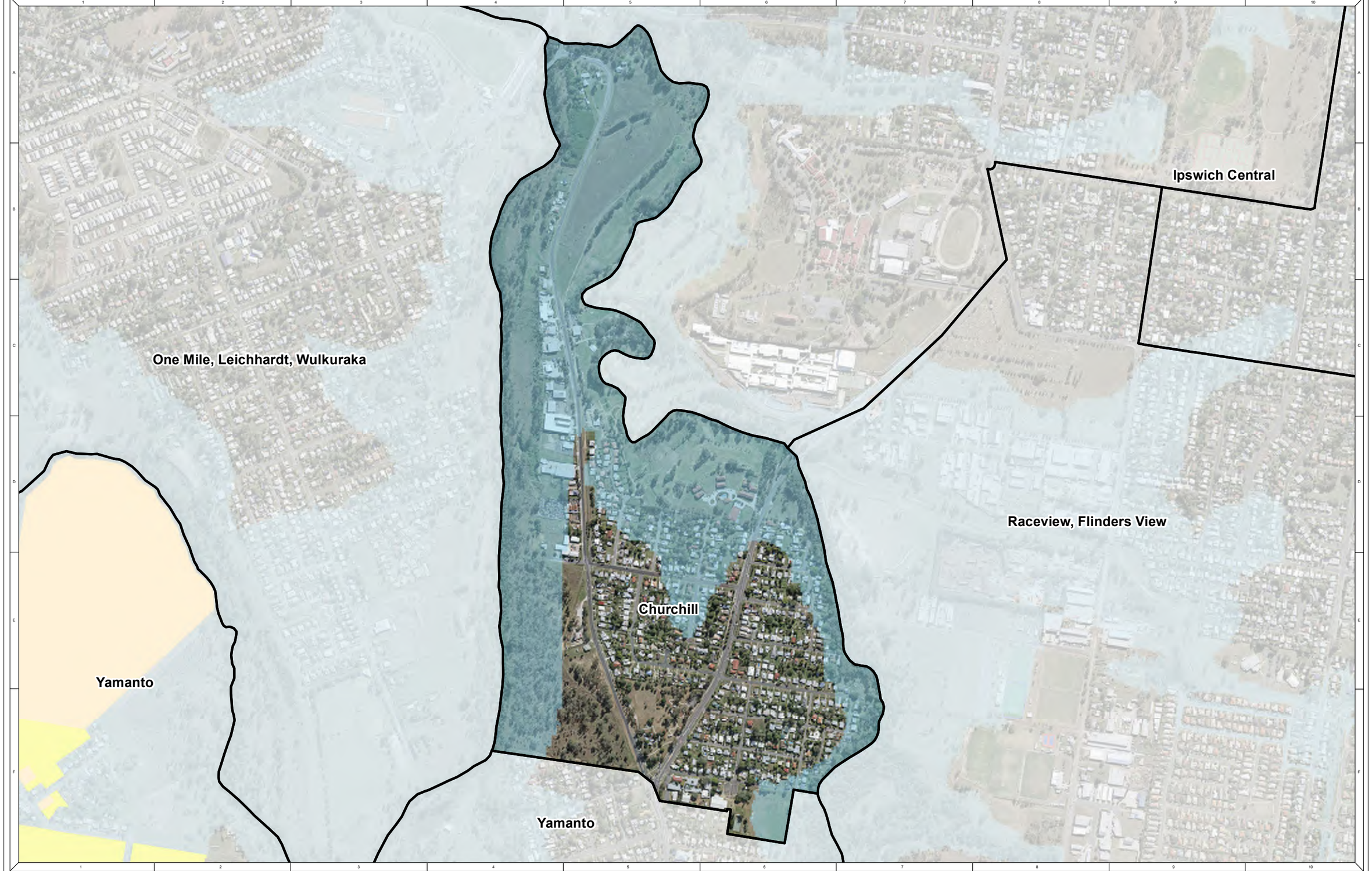
WATER TECHNOLOGY

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Raceview, Flinders View

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 15 of 30 | DRAWING NUMBER: 15



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N
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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers 1:9,830 at A3

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Churchill

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd
DATE: 5/07/2022 | SHEET: 16 of 30 | DRAWING NUMBER: 16

One Mile, Leichhardt, Wulkuraka

Churchill

Amberley

Raceview, Flinders View

Yamanto

Purga (part), Goolman, Peak Crossing

Ripley Valley

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N
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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:14,960 at A3

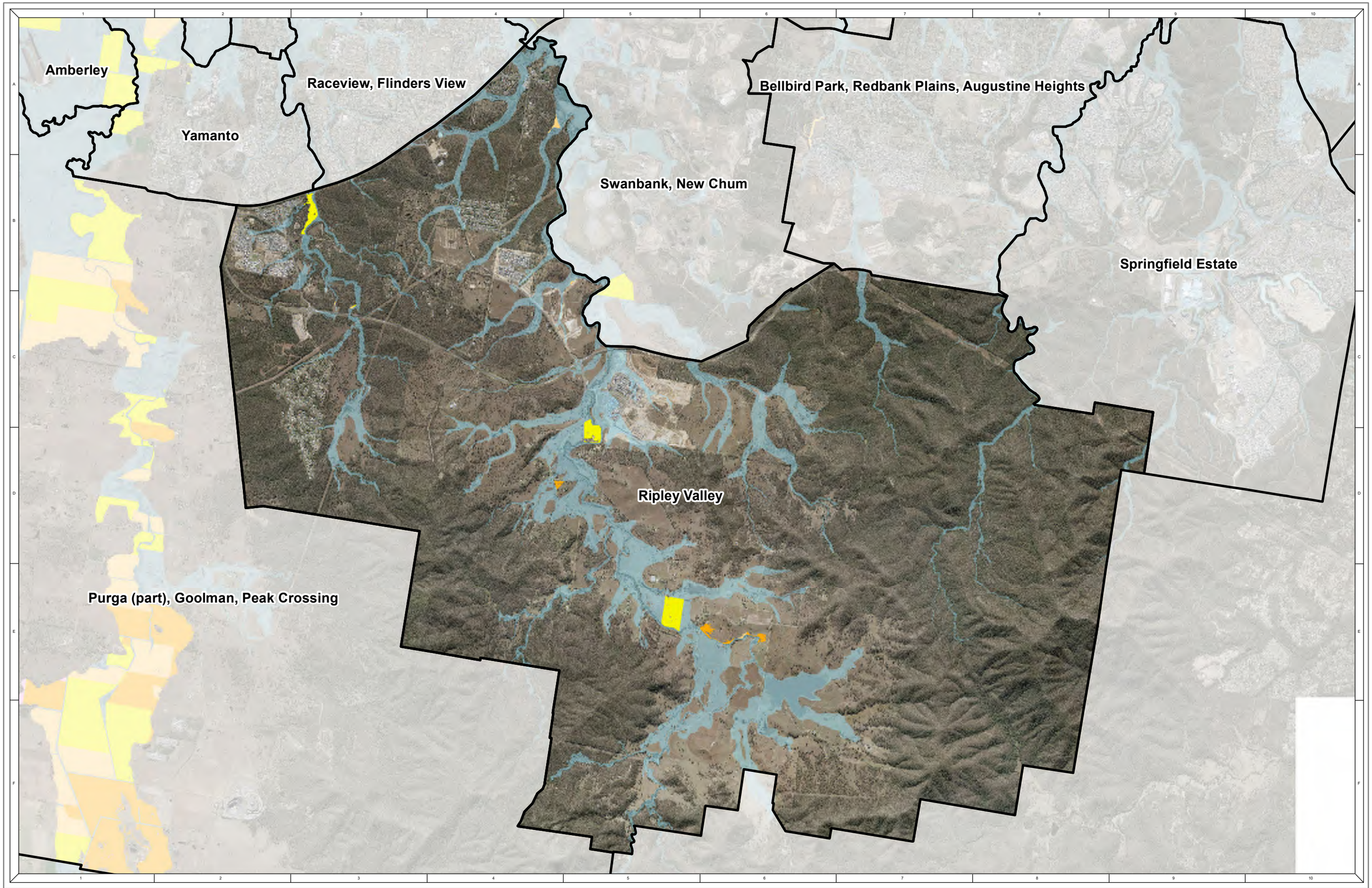
WATER TECHNOLOGY

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Yamanto

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 17 of 30 | DRAWING NUMBER: 17



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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:57,120 at A3

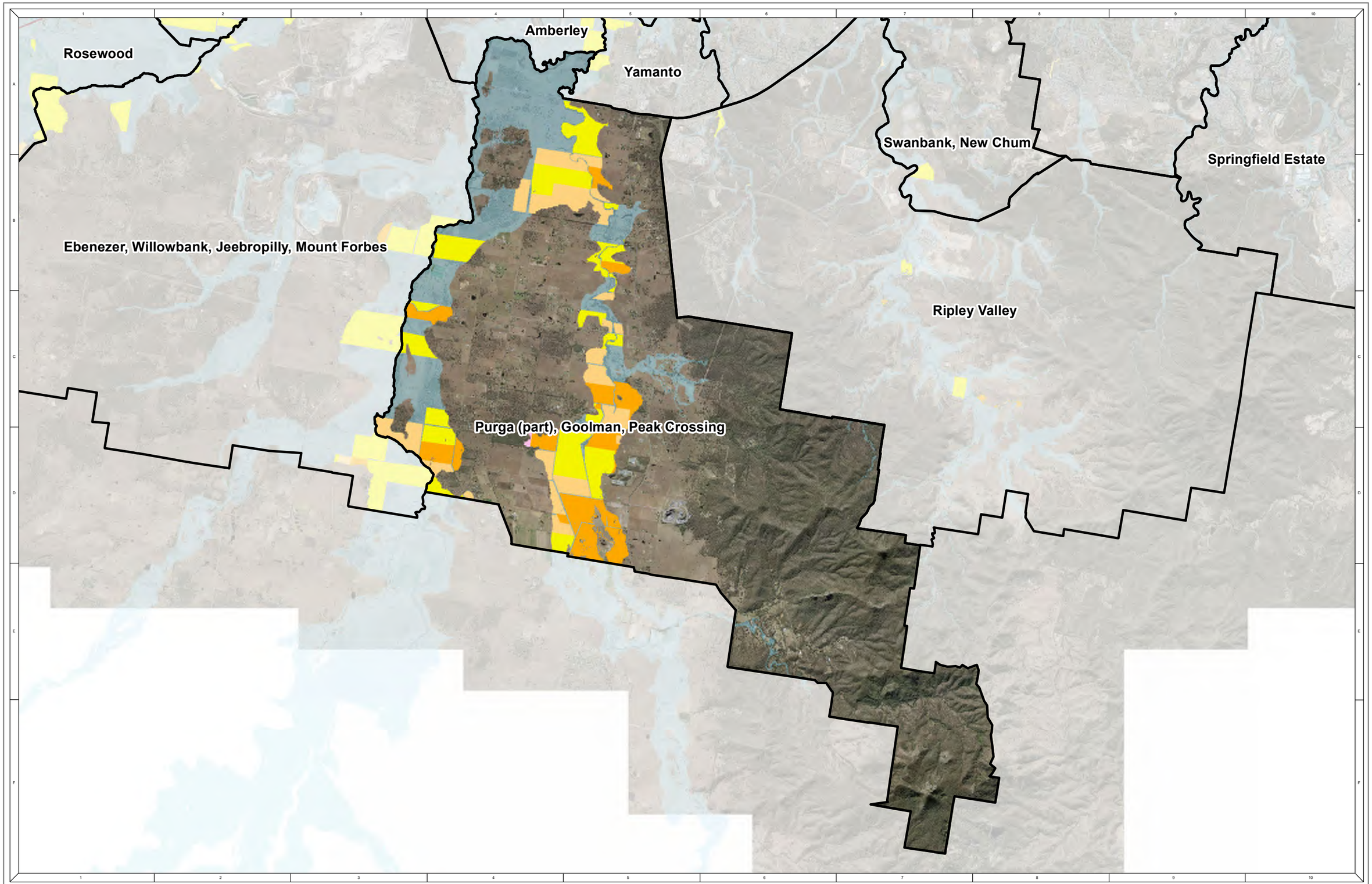
WATER TECHNOLOGY

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Ripley Valley

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 18 of 30 | DRAWING NUMBER: 18



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N
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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:86,370 at A3

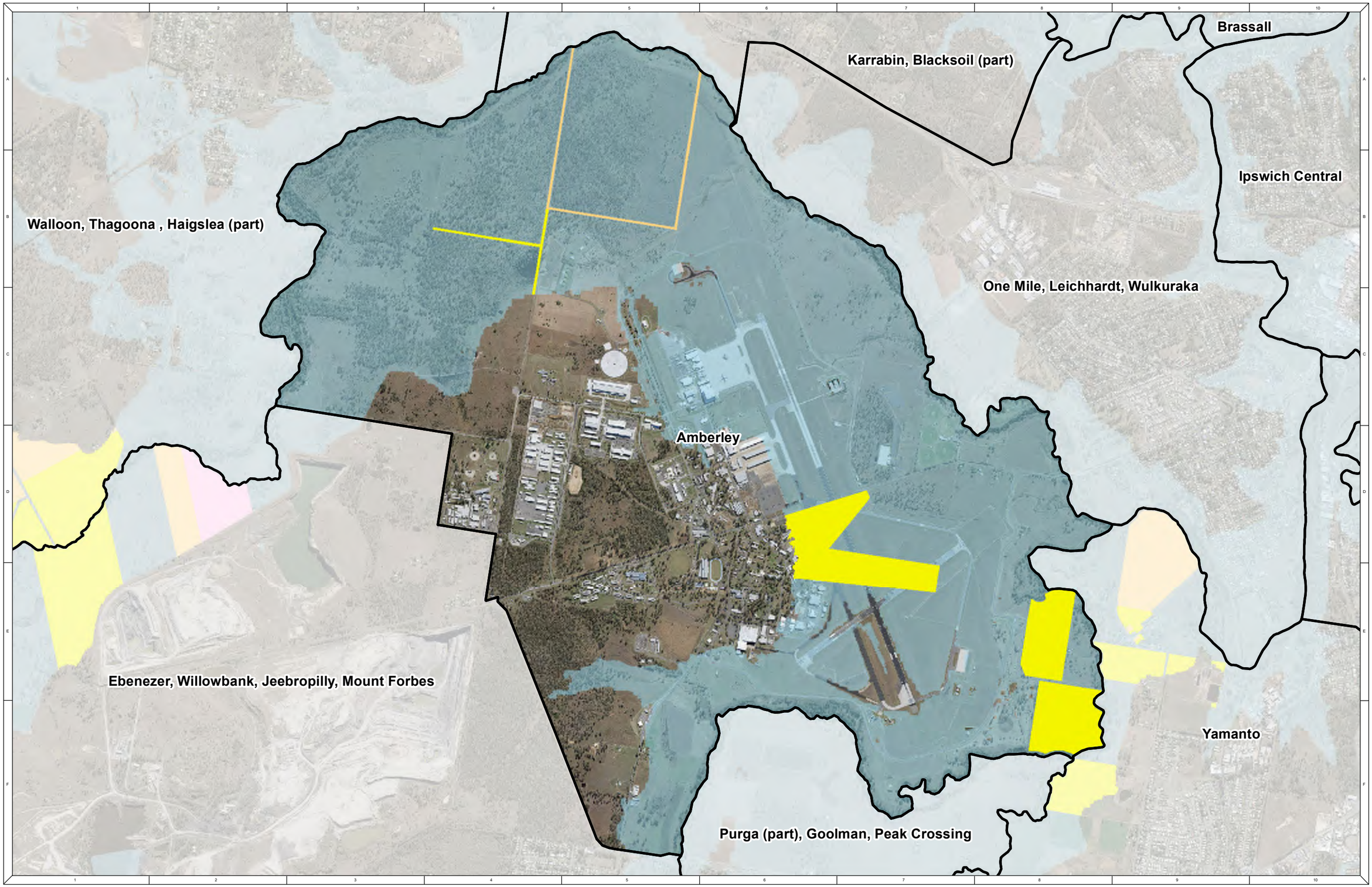
WATER TECHNOLOGY
WATER, DATA, & ENVIRONMENTAL CONSULTANTS

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Purga (part), Goolman, Peak Crossing

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 19 of 30 | DRAWING NUMBER: 19



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N
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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:26,710 at A3

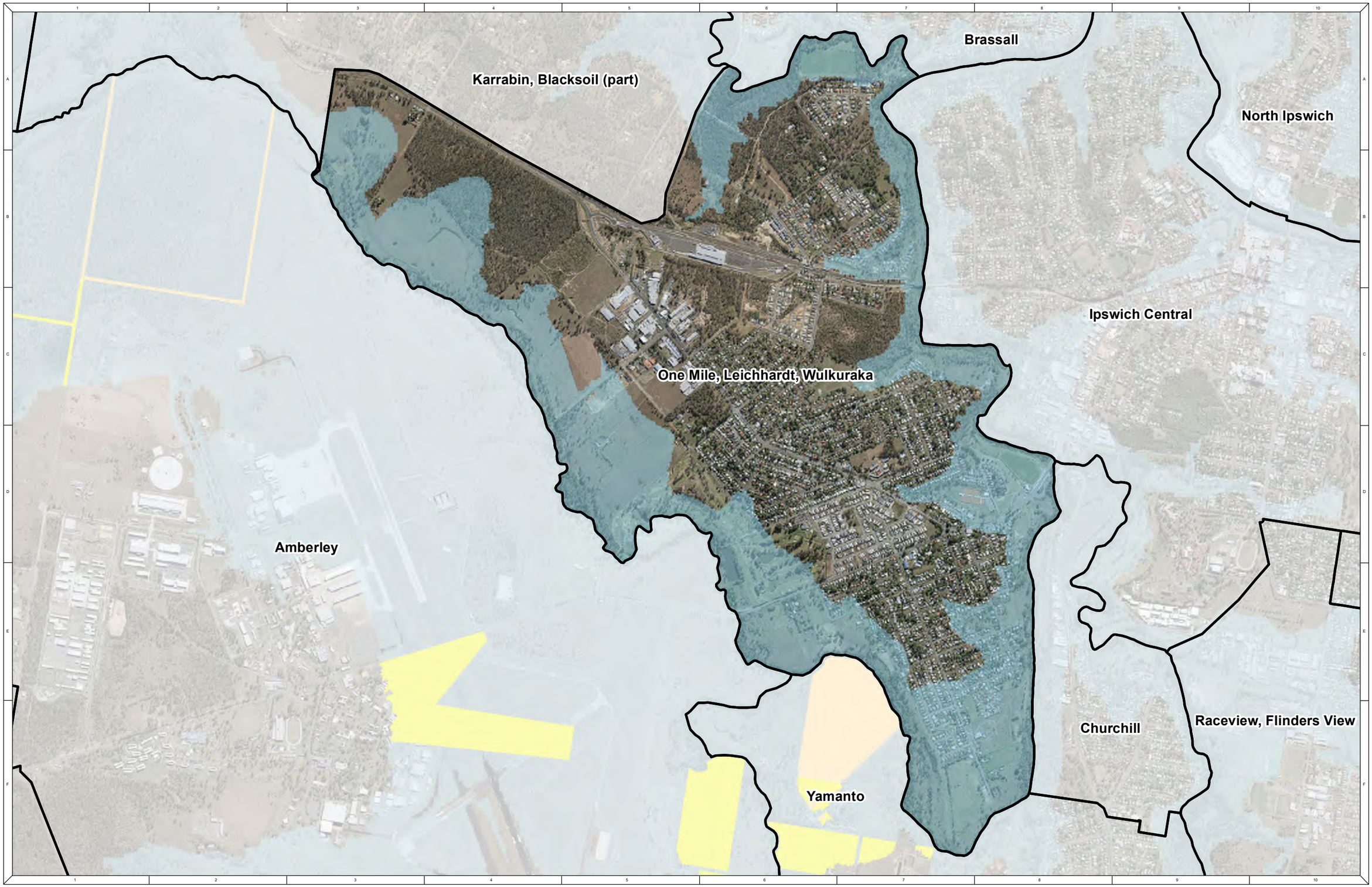
WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Amberley

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 20 of 30 | DRAWING NUMBER: 20



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N
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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:21,280 at A3

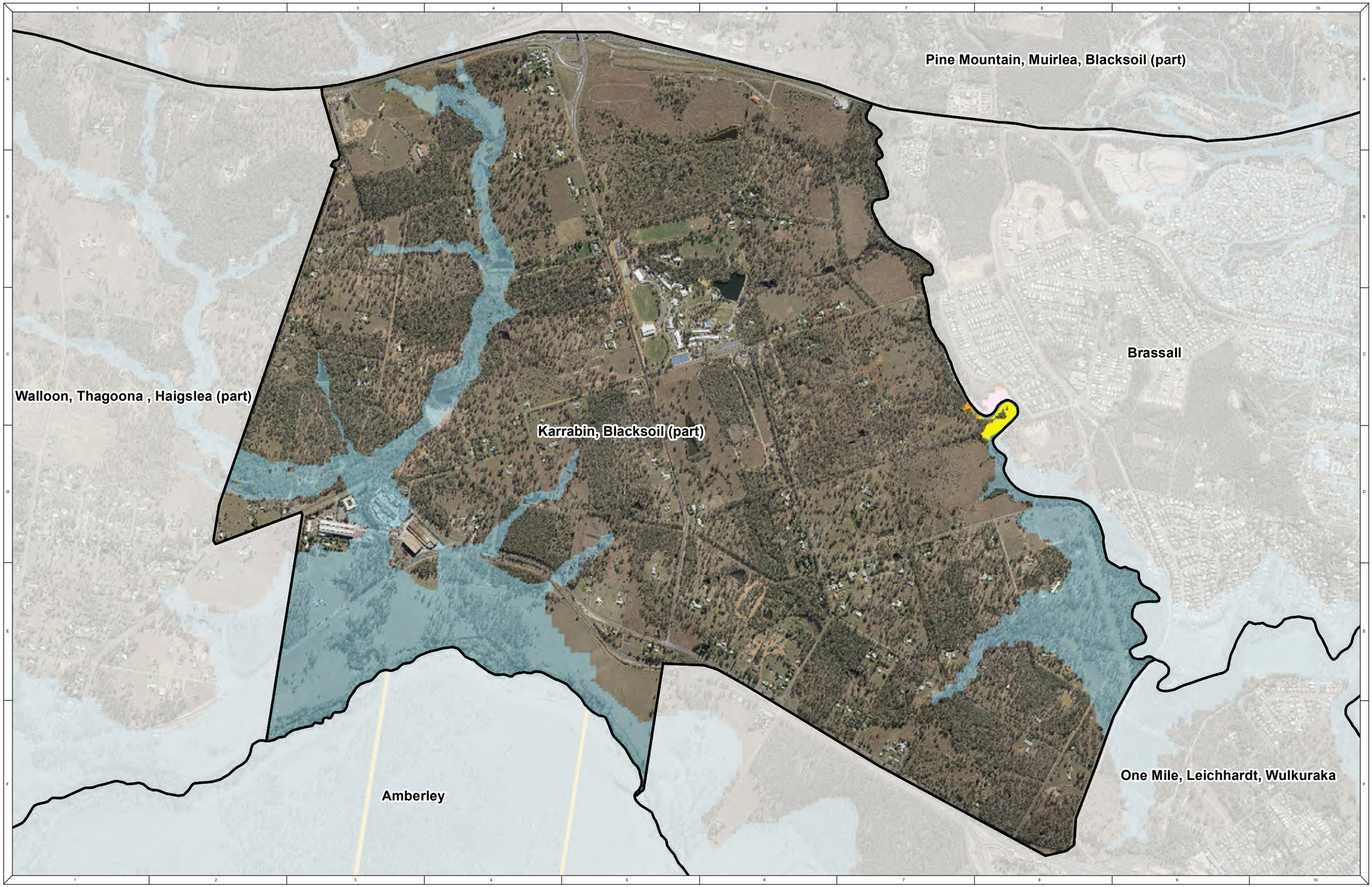
WATER TECHNOLOGY
WATER, DRAINAGE & ENVIRONMENTAL CONSULTANTS

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : One Mile, Leichhardt, Wulkuraka

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 21 of 30 | DRAWING NUMBER: 21



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N
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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:17,050 at A3

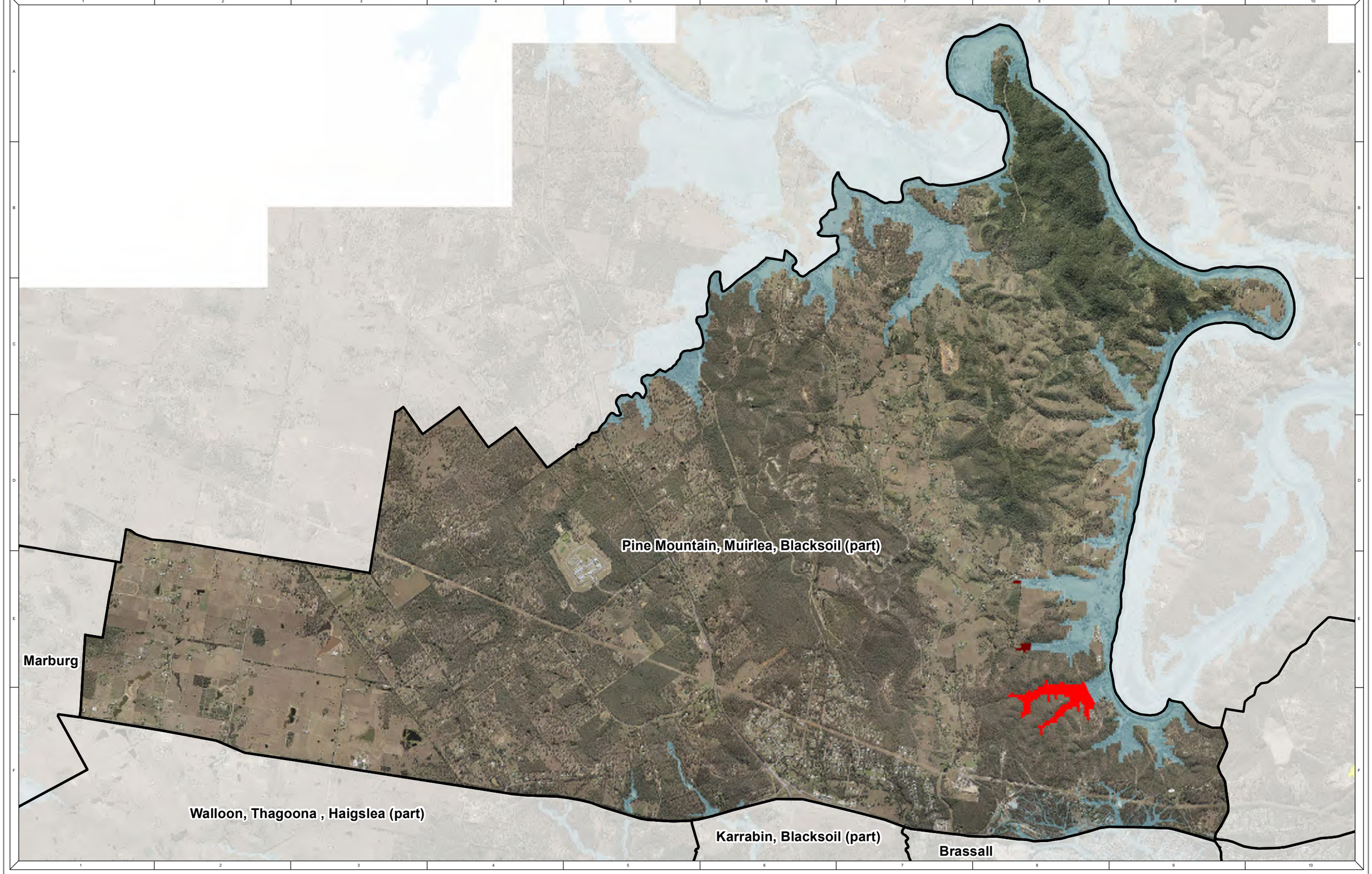
WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Karrabin, Blacksoil (part)

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 22 of 30 | DRAWING NUMBER: 22



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N
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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:43,740 at A3

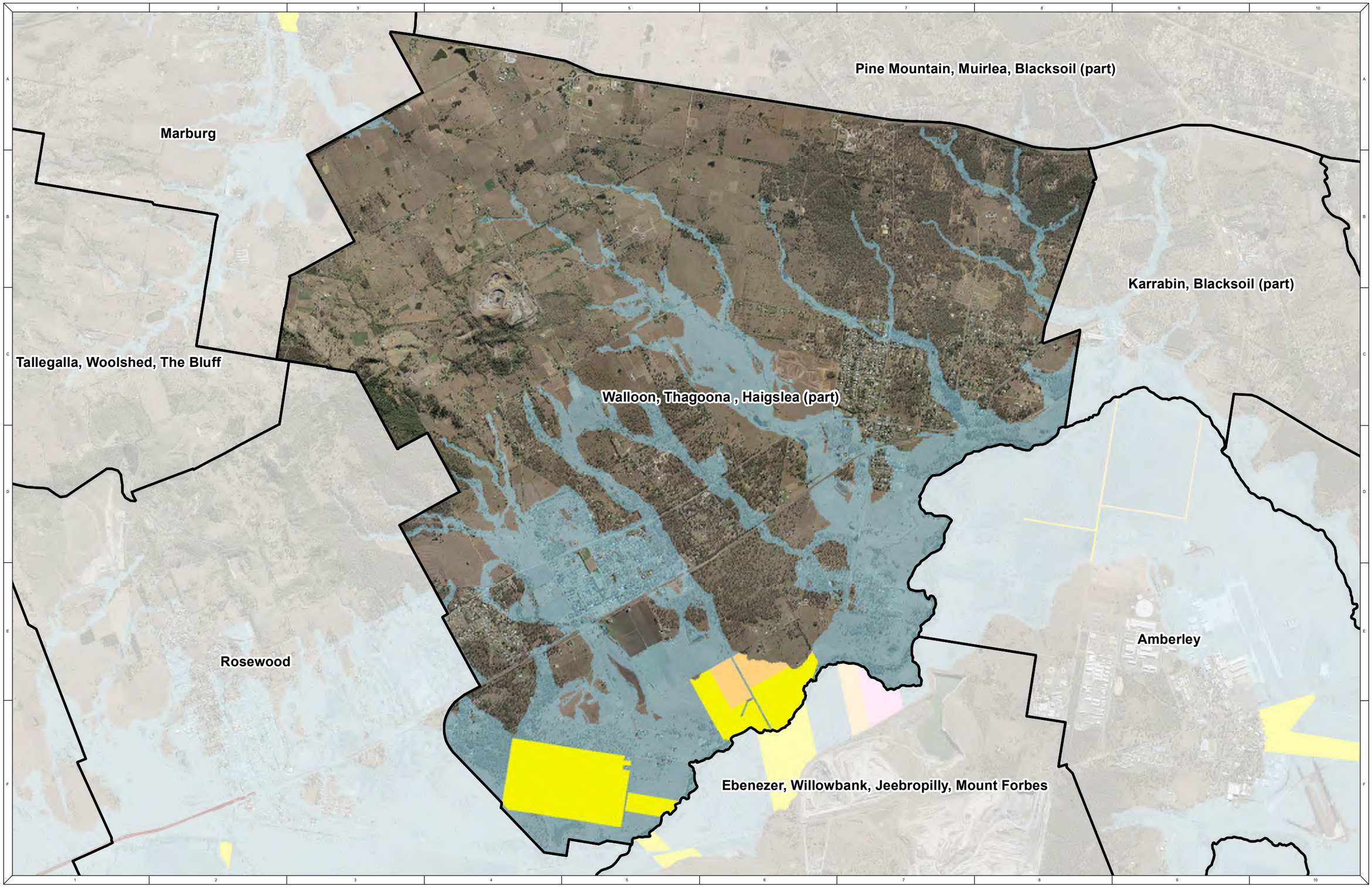
WATER TECHNOLOGY

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Pine Mountain, Muirlea, Blacksoil (part)

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 23 of 30 | DRAWING NUMBER: 23



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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:40,030 at A3

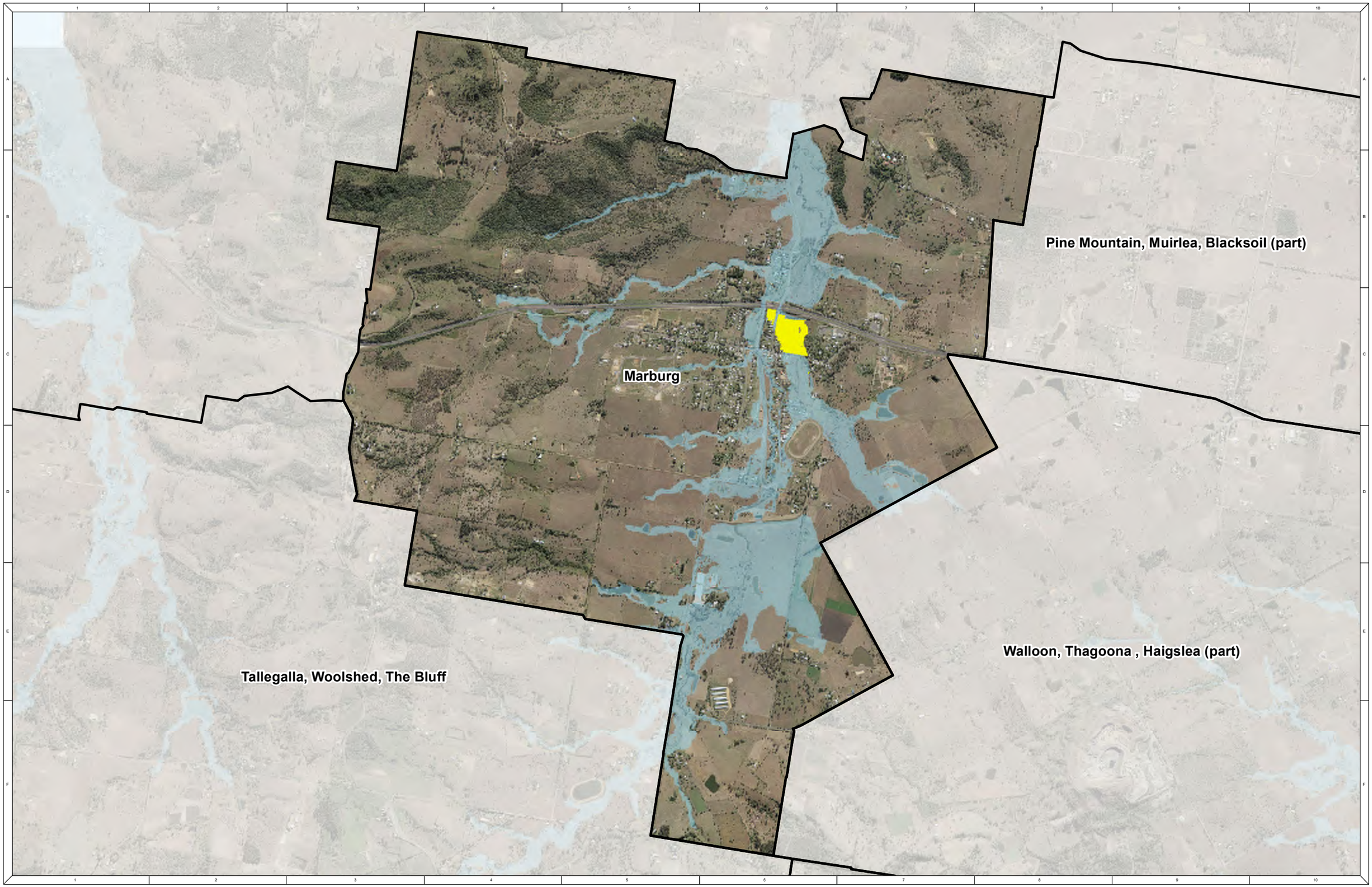
WATER TECHNOLOGY

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Walloon, Thagoona , Haigslea (part)

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

DATE: 5/07/2022 | SHEET: 24 of 30 | DRAWING NUMBER: 24



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N W E S

ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:26,140 at A3

WATER TECHNOLOGY

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Marburg

REFERENCE: M:\Temp\Ipswich\Ipswich_FloodHeightAssessment_Maps.mxd

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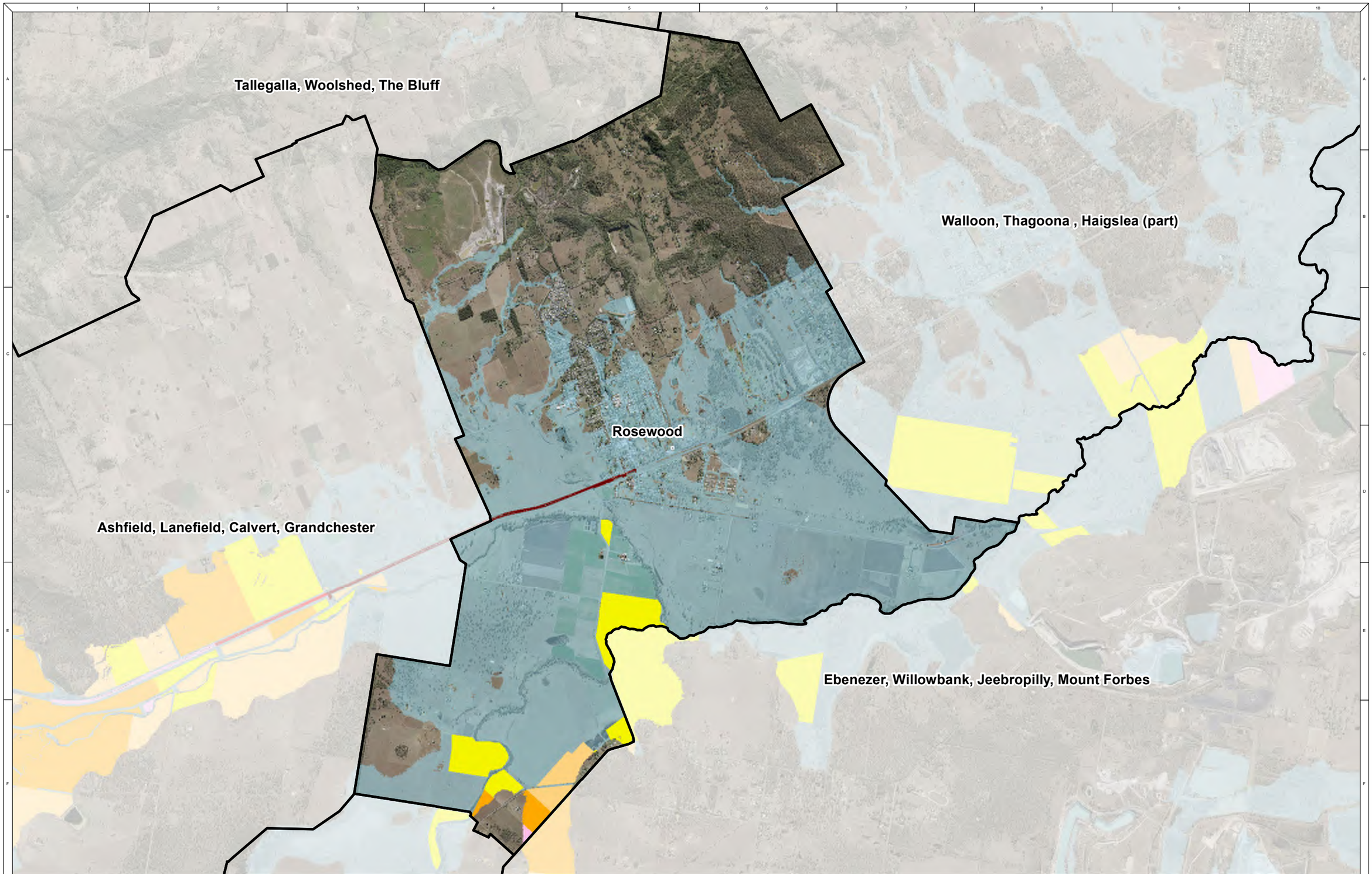

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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:39,400 at A3

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Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Rosewood

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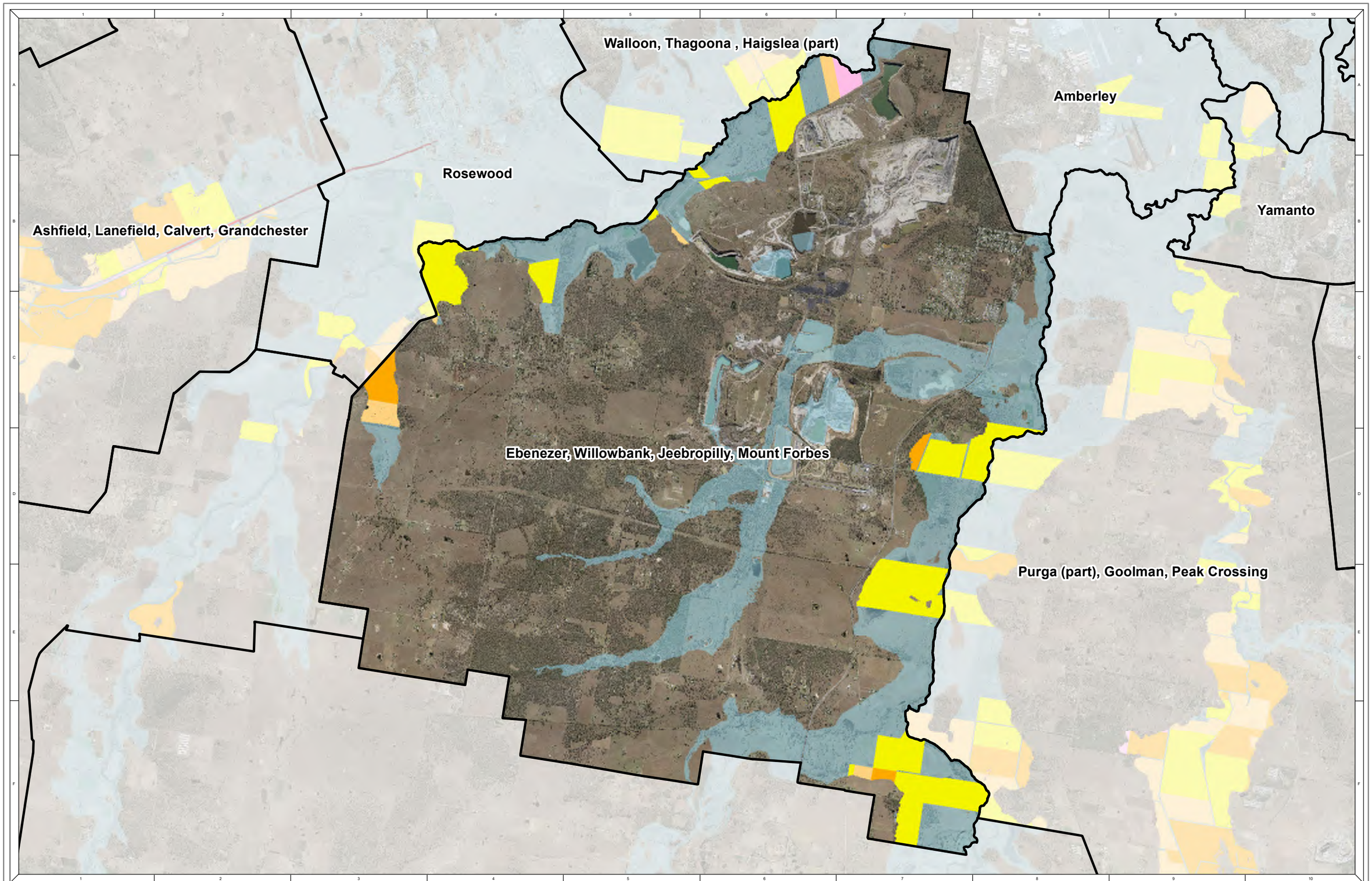

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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:60,540 at A3

WATER TECHNOLOGY

Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Ebenezer, Willowbank, Jeebropilly, Mount Forbes

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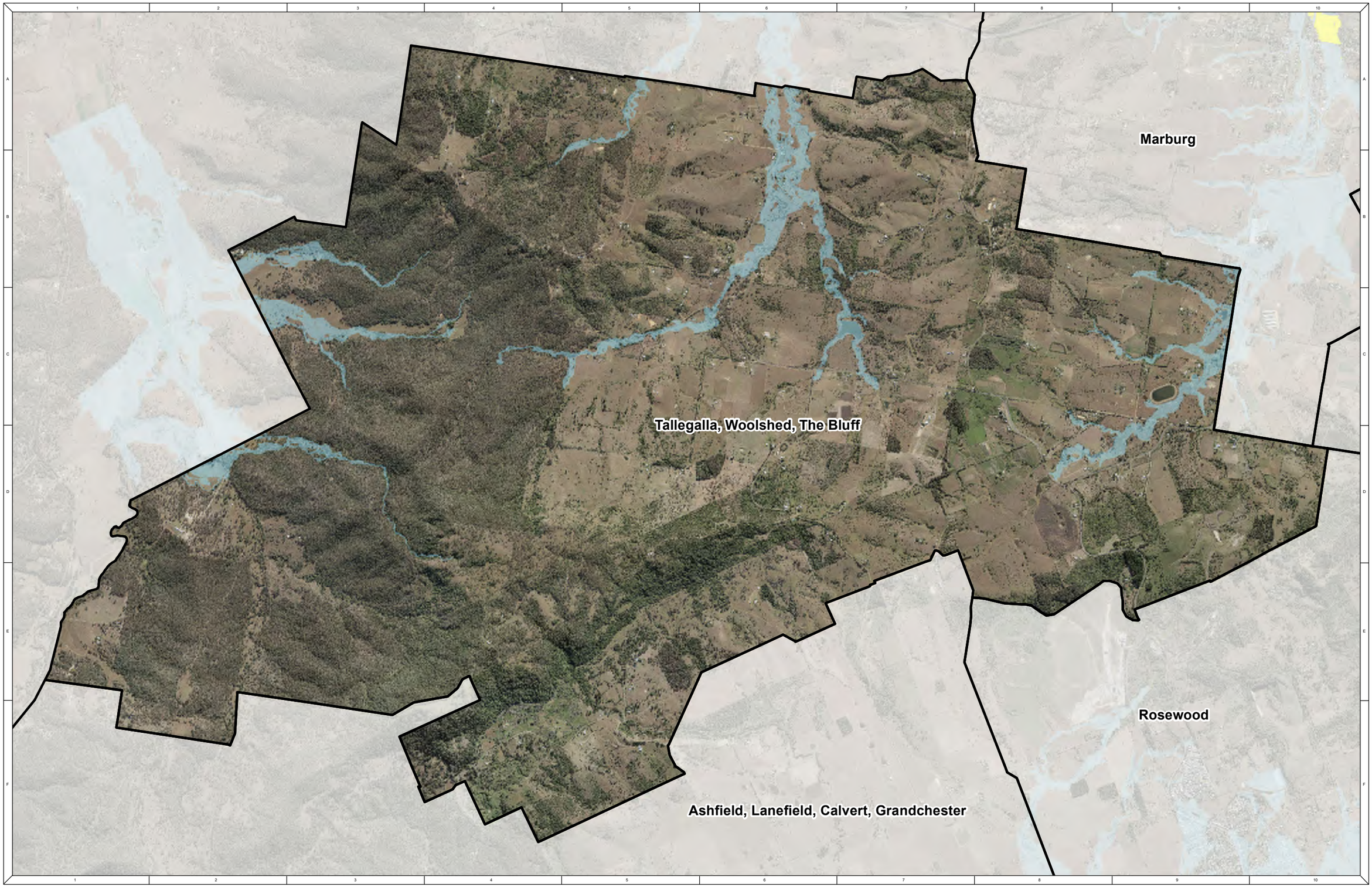

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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:32,530 at A3

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Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Tallegalla, Woolshed, The Bluff

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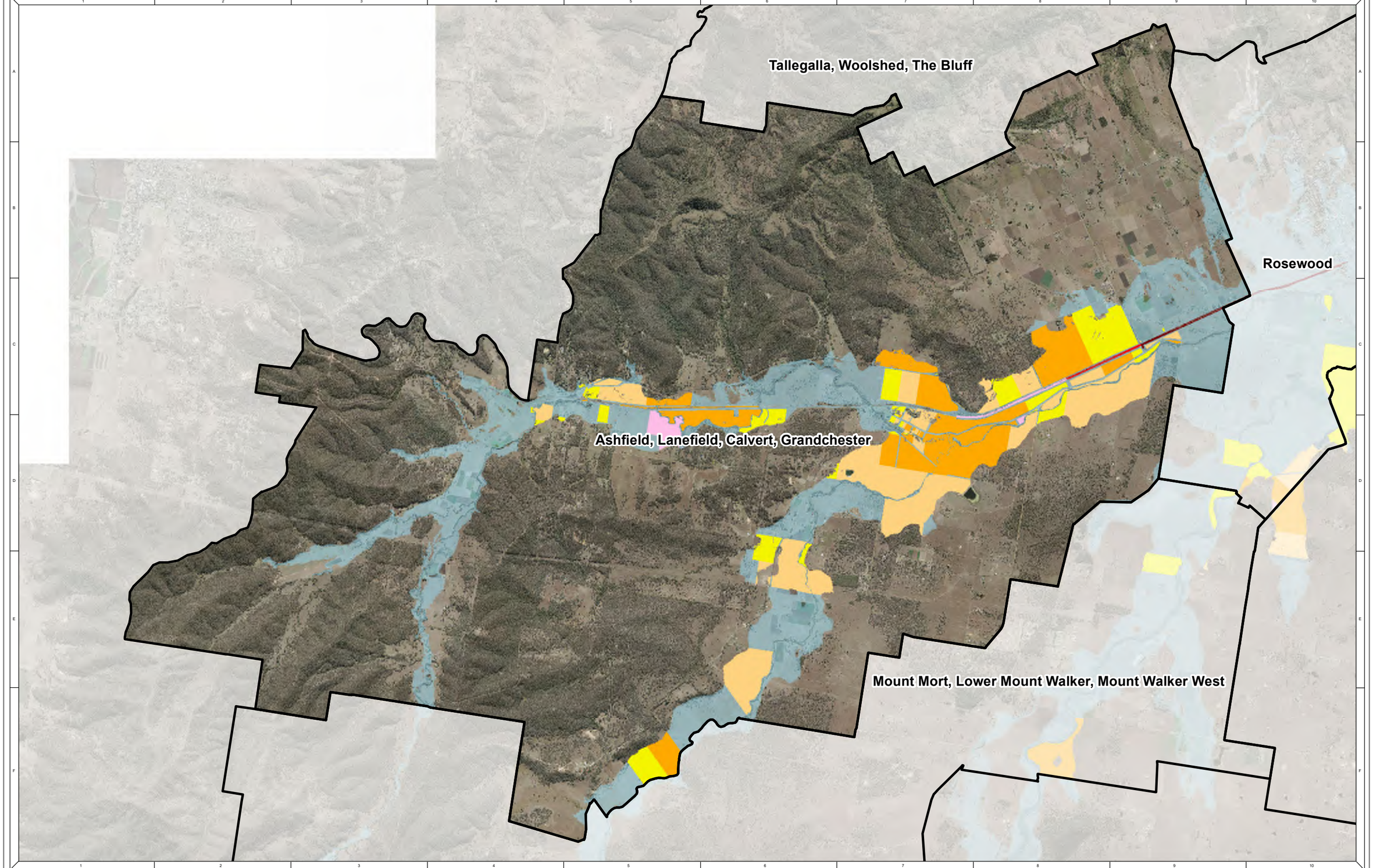

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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1 Kilometers

1:58,390 at A3

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Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Ashfield, Lanefield, Calvert, Grandchester

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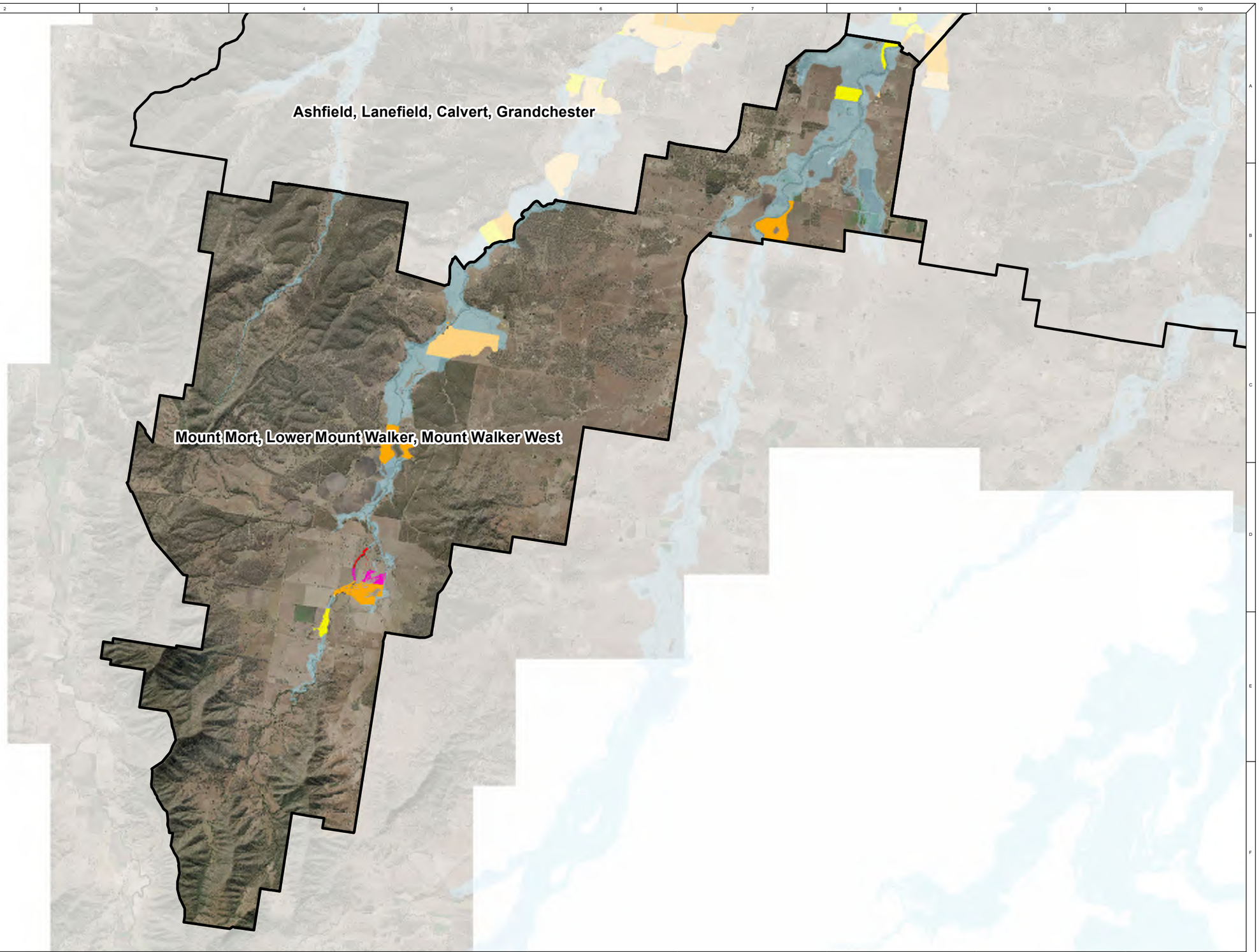

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ARFL > 1% AEP+CC Flood Level

- 0 - 0.5m
- 0.5 -1
- 1- 2.5
- 2.5 - 5
- 5 - 7.5
- 7.5 -10
- >10m
- 1% AEP+CC Flood Extent

0 0.5 1
Kilometers

1:92,550 at A3

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Ipswich Flood Height Assessment

AFRL > 1% AEP+CC : Mount Mort, Lower Mount Walker, Mount Walker West

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