

# Hume City Council

## Storm and Flood Emergency Plan

### A Sub-Plan of the Municipal Emergency Management Plan

For Hume City Council

And

VICSES Units Broadmeadows, Craigieburn and Sunbury

Version 5.2

Reviewed May 2020



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## List of Abbreviations & Acronyms

The following abbreviations and acronyms are used in the Plan:

The following abbreviations and acronyms are used in the Plan			
AAR	After Action Review	FZ	Floodway Zone
AEP	Annual Exceedance Probability	IC	Incident Controller
AHD	Australian Height Datum (the height of a location above mean sea level in metres)	ICC	Incident Control Centre
AIDR	Australian Institute of Disaster Resilience	IMT	Incident Management Team
AIIMS	Australasian Inter-service Incident Management System	IMS	Incident Management System
AoCC	Area of Operations Control Centre / Command Centre	EMLO	Emergency Management Liaison Officer
ARI	Average Recurrence Interval	LSIO	Land Subject to Inundation Overlay
ARMCANZ	Agricultural & Resource Management Council of Australia & New Zealand	MECC	Municipal Emergency Coordination Centre
AV	Ambulance Victoria	MEMP	Municipal Emergency Management Plan
BoM	Bureau of Meteorology	MEMPC	Municipal Emergency Management Planning Committee
CEO	Chief Executive Officer	MERC	Municipal Emergency Response Coordinator
CERA	Community Emergency Risk Assessment	MERO / MEMO	Municipal Emergency Resource Officer / Municipal Emergency Management Officer
CFA	Country Fire Authority	MFB	Metropolitan Fire and Emergency Services Board
CMA	Catchment Management Authority	MRM	Municipal Recovery Manager
RERC	Regional Emergency Response Coordinator	PMF	Probable Maximum Flood
RERCC	Regional Emergency Response Coordination Centre	RCC	Regional Control Centre
DHHS	Department of Health and Human Services	RDO	Regional Duty Officer
Dol	Department of Infrastructure	SBO	Special Building Overlay
DELWP	Department of Environment, Land, Water and Planning	SCC	State Control Centre
DJPR	Department of Economic Development, Jobs, Transport, Resources	SERP	State Emergency Response Plan
EMMV	Emergency Management Manual Victoria	SEWS	Standard Emergency Warning Signal
EMT	Emergency Management Team	SHERP	State Health Emergency Response Plan
EO	Executive Officer	SOP	Standard Operating Procedure
FO	Floodway Overlay	VicPol	Victoria Police
FWS	Flood Warning System	VICSES	Victoria State Emergency Service

## Glossary

Below are terms defined for the purpose of this plan:

Term	Definition
<b>Annual Recurrence Interval (ARI)</b>	The average, or expected, value of the period between exceedances of a given rainfall or flow total accumulated over a given duration
<b>Annual Exceedance Probability (AEP)</b>	The probability that a given total rainfall or flow is accumulated over a given duration will be exceeded in any one year
<b>Flash flooding</b>	Sudden unexpected flooding caused by local heavy rainfall or rainfall in another area. Often defined as flooding which occurs within six hours of the rain which causes flooding.
<b>Flood mapping</b>	The process where the extent of flooding is documented in mapping software based on flood studies and surface elevations
<b>Floodplain</b>	Area of land adjacent to a creek, river, estuary, lake, dam or artificial channel, which is subject to inundation.
<b>Hot spot</b>	A known flood problem area which has a history of repeat flooding of a road, crossing or property, often highlighted through anecdotal information and customer complaints. It is a localised issue which will vary from council to council.
<b>Natural drainage system</b>	Flow paths which are largely undeveloped by human sources, these include rivers, streams, natural depressions and wetlands. All natural systems greater than 60 ha are managed by Melbourne Water.
<b>Overland flooding</b>	Flooding by local runoff caused by heavier than usual rainfall. Overland flooding can be caused by local flow exceeding the capacity of an urban stormwater drainage system or by the backwater effects of mainstream flooding causing urban stormwater drainage system to overflow. For local government areas this is over the 5 year ARI in residential or over 10yr ARI in commercial/industrial. For Melbourne Water catchment areas this is for all other ARIs up to the 100yr ARI. Note that not all overland flows cause flooding under the definition in the Hume City Service Plan Appendices.
<b>Retarding Basin</b>	A Retarding Basin is a large, open, free draining basin that temporarily stores collected stormwater runoff. These basins are normally maintained in a dry condition between storm events.
<b>Stormwater drainage system</b>	A series of drains and waterways into which surface and stormwater flows. Features of a stormwater drainage system can include underground pipe drains, open channels, retarding basins, floodways, waterway improvements, water sensitive urban design, integrated water management systems and environment protection measures. All drainage under 60 ha is maintained and operated by Hume City Council
<b>Stormwater Runoff</b>	The amount of rainfall that enters the stormwater drainage system, (via pits, pipes, retarding basins, water sensitive structures, harvesting tanks and overland flow paths) after water which is not absorbed into the ground has been taken into account.

## Part 1. INTRODUCTION

### 1.1 Municipal Endorsement

This Municipal Storm and Flood Emergency Plan (MSFEP) has been prepared by Hume City Council MSFPC and with the authority of the Hume City Council MEMPC – (refer to section 1.6 endorsement of plan) pursuant to Section 20 of the *Emergency Management Act 1986* (as amended) and *Emergency Management Act 2013*.

This MSFEP is a sub plan to the Hume City Council Municipal Emergency Management Plan (MEMP), is consistent with the Emergency Management Manual Victoria (EMMV) and takes into account the outcomes of the Community Emergency Risk Assessment (CERA) process undertaken by the Municipal Emergency Management Planning Committee (MEMPC).

The Municipal Storm and Flood Emergency Plan is consistent with the Regional Flood Emergency Plan, Regional Storm Emergency Plan and State Flood Emergency Plan.

This Municipal Flood Emergency Plan is a result of the cooperative efforts of the Hume City Council Storm and Flood Planning Committee (MSFPC) and its member agencies.

Minor and administrative amendments will be made to this MSFEP from time to time without representing the plan to the MEMPC. Any major structural or policy changes will be considered before adoption.

This Plan is endorsed by the Hume City Council MEMPC as a sub-plan to the MEMP.

Agency Endorsement
<p>.....</p> <p>Ray Jasper Regional Manager Central Region VICSES</p> <p>Date:</p>

## 1.2 The Municipality

An outline of Hume City Council in terms of its location, demography and other general matters is provided in the Hume MEMP. An outline of the flood threat is provided in Appendix A of this Plan.

## 1.3 Purpose and Scope of this Storm and Flood Emergency Plan

The purpose of this MSFEP is to detail arrangements agreed for the planning, preparedness/prevention, response and recovery from flood and storm incidents within Hume City Council.

As such, the scope of the Plan is to:

- Identify the Storm and Flood Risk to Hume City Council;
- Support the implementation of measures to minimise the causes and impacts of storm and flood incidents within Hume City Council;
- Detail Response and Recovery arrangements including preparedness, Incident Management, Command and Control;
- Identify linkages with Local, Regional and State emergency and wider planning arrangements with specific emphasis on those relevant to flood.

## 1.4 Municipal Storm and Flood Planning Committee (MSFPC)

Membership of the Hume City Council Storm and Flood Planning Committee (MSFPC) will comprise of the following representatives from the following agencies and organisations:

- VICSES Regional Officer, Emergency Management (**Chair**),
- VICSES Unit Controller/s
- Hume City Council representatives,
- Victoria Police, (MERC)
- Melbourne Water/ Catchment Management Authority, as required
- Other agencies as required

## 1.5 Responsibility for Planning, Review & Maintenance of this Plan

This MSFEP must be maintained in order to remain effective.

VICSES through the Municipal Storm and Flood Planning Committee (MSFPC) has responsibility for preparing, reviewing, maintaining and distributing this plan.

The MSFPC will meet at least once per year, or as required.

The plans should be reviewed and where necessary, arrangements and information contained in it should be amended:

- Following any new flood or stormwater drainage study;
- Following change in non-structural and/or structural flood mitigation measures;
- After the occurrence of a significant storm or flood event within the Municipality.

## **1.6 Adoption of the Plan**

The MSFEP is endorsed by the MEMPC as a sub-plan of the MEMP. The MSFEP will be circulated to MSFPC members seeking acceptance of the plan following any large changes to the plan.

Upon acceptance, the plan is forwarded to the MEMPC for re-endorsement.

## **Part 2. BEFORE: PREVENTION / PREPAREDNESS ARRANGEMENTS**

### **2.1 Community Awareness for all Types of Storm and Flooding**

Details of this MSFEP will be released to the community through local media, VICSES Community Education programs, websites (VICSES and the Municipality) upon formal adoption by the City of Hume.

VICSES with the support of Hume City Council and Melbourne Water will coordinate community education programs for storm and flooding within the council area,(i.e. Local Flood Guides and public events).

### **2.2 Structural Flood Mitigation Measures**

Structural flood mitigation measures existing within the Hume City Council area are summarised in **Appendix C**.

### **2.3 Non-structural Flood Mitigation Measures**

#### **2.3.1 Exercising the Plan**

Arrangements for exercising this Plan will be at the discretion of the MEMPC. This Plan should be regularly exercised, preferably on an annual basis and reviewed following a significant event.

#### **2.3.2 Storm and Flood Warning**

Arrangements for storm and flood warning are contained within the State Flood Emergency Plan, State Storm Emergency Plan, the EMMV (Part 3) and on the BoM website <http://www.bom.gov.au>.

Specific details of local storm and flood warning system arrangements are provided in **Appendix E**.

#### **2.3.3 Local Knowledge**

Community Observers provide local knowledge to VICSES and the Incident Control Centre regarding local insights and the potential impacts and consequences of an incident and may assist with the dissemination of information to community members.

There are no official community observers within the Hume Municipality however local knowledge is incorporated into this plan through consultation with local response agencies. Previous event history and likely operational considerations are noted in the Flood Intelligence Cards in **Appendix C**. In line with the VICSES Local Knowledge Policy, reviews of this plan will be undertaken with input from multiple local sources to ensure appropriate local knowledge can be captured before, during and after incidents.

## **Part 3. DURING: RESPONSE ARRANGEMENTS**

### **3.1 Introduction**

#### **3.1.1 Activation of Response**

Storm and Flood response arrangements may be activated by the VICSES Central Region Duty Officer (RDO) or Incident Controller (IC).

The VICSES RDO or IC will activate agencies as required and as documented in the VICSES Central Region and State Storm Emergency Plans and State Flood Emergency Plan.

#### **3.1.2 Responsibilities**

There are a number of agencies with specific roles that will act in support of VICSES and provide support to the community in the event of a serious storm or flood within the City of Hume. These agencies will be engaged through the EMT.

The general roles and responsibilities of supporting agencies are as agreed within the City of Hume MEMP, EMMV part 7, State Flood Emergency Plan and Regional Storm and Flood Emergency Plans.

#### **3.1.3 Municipal Emergency Coordination Centre (MECC)**

The function, location, establishment and operation of the MECC will be as detailed in the City of Hume MEMP.

Liaison with the MECC will be through the VICSES RDO / IC or established ICC.

#### **3.1.4 Escalation**

Most storm and flood incidents are of local concern and an appropriate response can usually be coordinated using local resources. However, when these resources are exhausted, the State's arrangements provide for further resources to be made available, firstly from neighbouring Municipalities (on a regional basis) and then on a State-wide basis.

Resourcing and event escalation arrangements are described in Part 3 of the EMMV.

### **3.2 State Emergency Management Priorities**

To provide guidance to the IMT, the following state emergency management priorities shall form the basis of incident action planning processes:

1. Protection and preservation of life is paramount - this includes:
  - a. Safety of emergency response personnel, and;
  - b. Safety of community members including vulnerable community members and visitors/tourists.

2. Issuing of community information and community warnings detailing incident information that is timely, relevant and tailored to assist community members make informed decisions about their safety.;
3. Protection of critical infrastructure and community assets that supports community resilience;
4. Protection of residential property as a place of primary residence;
5. Protection of assets supporting individual livelihoods and economic production that supports individual and community financial sustainability
6. Protection of environmental and conservation assets that considers the cultural, biodiversity, and social values of the environment;

Circumstances may arise where the IC is required to vary these priorities, with the exception being that the protection of life should remain the highest. This shall be done in consultation with the State Controller and relevant stakeholders based on sound incident predictions and risk assessments.

### 3.3 The Six C's

Arrangements in this MSFEP must be consistent with the 6 C's detailed in State and Regional Storm and Flood Emergency Plans and the MEMP. For further information, refer to Part 3 of the EMMV.

- **Command:** Overall direction of response activity in an emergency.
- **Control:** Internal direction of personnel and resources within an agency.
- **Coordination:** Bringing together agencies and resources to ensure effective preparation for response and recovery.
- **Consequence:** Management of the effect of emergencies on individuals, communities, infrastructure and the environment.
- **Communication:** Engagement and provision of information across agencies and proactively with the community around preparation, response and recovery in emergencies.
- **Community Connection:** Understanding and connecting with trusted networks, leaders and communities around resilience and decision making.

#### 3.3.1 Control

Functions 5(a) 5 (b) and 5(c) at Part 2 of *the Victoria State Emergency Service Act 1986 (as amended)* detail the authority for VICSES to plan for and respond to storm and flood.

Part 7 of the EMMV prepared under the *Emergency Management Act 1986* and *Emergency Management Act 2013*, identifies VICSES as the Control Agency for storm and flood. It identifies DELWP as the Control Agency responsible for “*dam safety, water and sewerage asset related incidents*” and other emergencies.

All storm and flood response activities within the City of Hume including those arising from a dam failure or retarding basin / levee bank failure incident will therefore be under the control of the appointed Incident Controller, or his / her delegated representative.

### **3.3.2 Incident Controller (IC)**

As required, the IC will be appointed by VICSES as the Control Agency to command and control available resources in response to a storm or flood event on the advice of the Bureau of Meteorology (or other reliable source) that a storm or flood event will occur or is occurring. The Incident Controller responsibilities are as defined in Part 3 of the EMMV.

### **3.3.3 Incident Control Centre (ICC)**

As required, the Incident Controller will establish an Incident Control Centre (ICC) from which to initiate incident response command and control functions. The decision as to if and when the ICC should be activated, rests with the Control Agency, VICSES.

Predetermined Incident Control locations are:

- Sunshine ICC
- Burnley ICC
- Dandenong ICC
- Kangaroo Ground ICC
- Ferntree Gully ICC
- Woori Yallock ICC

### **3.3.4 Divisions and Sectors**

To ensure that effective Command and Control are in place, the Incident Controller may establish Divisions and Sectors depending upon the complexity of the event and resource capacities.

Predetermined Divisional Command locations are:

- Broadmeadows Unit LHQ, Mahoneys Road Campbellfield
- Essendon Unit LHQ, Bruce St , Moonee Ponds
- Brimbank Unit LHQ, Stadium Drive, Keilor Park

Sector Command locations are to be allocated on an as needs basis.

### **3.3.5 Incident Management Team (IMT)**

The Incident Controller will form an Incident Management Team (IMT) in line with AIIMS principles.

Refer to Part 3 of the EMMV for guidance on IMTs.

### **3.3.6 Incident Emergency Management Team (IEMT)**

The IC will establish a multi-agency Incident Emergency Management Team (IEMT) to assist with the storm or flood response. The IEMT will consist of key personnel, with appropriate authority, from stakeholder agencies and relevant organisations who need to be informed of strategic issues related to incident control and who are able to provide high level strategic guidance and policy advice to the IC for consideration in developing incident management strategies.

Organisations required within the IEMT, including Hume City Council will provide an Emergency Management Liaison Officer (EMLO) to the ICC if and as required as well as other staff and / or resources identified as being necessary, within the capacity of the organisation.

Refer to Part 3 of the EMMV for guidance on IEMTs.

### **3.3.7 On Receipt of a Flood Watch / Severe Weather Warning**

The IC or VICSES RDO until an incident controller is appointed, will undertake actions as defined within the Flood Intelligence Cards (**Appendix C**). General considerations by the VICSES RDO/ Incident Controller will be as follows:

- Review storm and flood intelligence to assess likely flood consequences
- Monitor weather and flood information – [www.bom.gov.au](http://www.bom.gov.au)
- Assess Command and Control requirements.
- Review local resources and consider needs for further resources regarding personnel, property protection, storm/flood rescue and air support
- Notify and brief appropriate officers. This includes RCC (if established), SCC (if established), City of Hume and other emergency services through the IEMT.
- Assess ICC readiness (including staffing of IMT and IEMT) and open if required
- Ensure flood bulletins and community information are prepared and issued to the community
- Monitor watercourses and undertake reconnaissance of low-lying areas
- Develop media and community information management strategy
- Ensure storm and flood mitigation works are being checked by owners
- Develop and issue incident action plan, if required
- Develop and issue situation report, if required

### **3.3.8 On Receipt of the First and Subsequent Storm and Flood Warnings**

The VICSES RDO or IC will undertake actions as defined within the Flood Intelligence Cards (**Appendix C**). General considerations by the VICSES RDO/ IC will be as follows:

- Develop an appreciation of current flood levels and predicted levels. Are floodwaters, rising, peaking or falling?
- Review flood and storm intelligence to assess likely consequences. Consider:
  - What areas may be at risk of inundation
  - What areas may be at risk of isolation
  - What areas may be at risk of indirect affects as a consequence of power, gas, water, telephone, sewerage, health, transport or emergency service infrastructure interruption
  - The characteristics of the populations at risk
- Determine what the at-risk community need to know and do as the storm and/or flood develops.

- Warn the at-risk community including ensuring that an appropriate warning and community information strategy is implemented. This includes details of:
  - The current storm and/or flood situation
  - Storm and/or Flood predictions
  - What the consequences of predicted activity or levels may be
  - Public safety advice
  - Who to contact for further information
  - Who to contact for emergency assistance
- Liaise with relevant asset owners as appropriate (i.e. water and power utilities)
- Implement response strategies as required based upon flood consequence assessment.
- Continue to monitor the flood situation – [www.bom.gov.au/vic/flood/](http://www.bom.gov.au/vic/flood/)
- Continue to conduct reconnaissance of low-lying areas

### 3.4 Community Information and Warnings

Guidelines for the distribution of community information and warnings are contained in the VICSES Central Region Flood Emergency Plan and the State Storm or Flood Emergency Plans.

Community information and warnings communication methods available include:

- Emergency Alert;
- Phone messages (including SMS);
- Radio and Television;
- Two-way radio;
- Mobile and fixed public address systems;
- Sirens;
- Verbal Messages (i.e. Doorknocking);
- Agency Websites, including VicEmergency website;
- VicEmergency hotline, previously VICSES Flood Storm Information Line;
- Variable Message Signs (i.e. road signs);
- Community meetings;
- Newspapers;
- Email;
- Telephone trees;
- Fax Stream;
- Newsletters;
- Letter drops;
- Social media and/or social networking sites (i.e. twitter and/or facebook).

Refer to **Appendix C** and **E** for the specific details of how community information and warnings are to be provided.

The release of flood bulletins and information with regard to response activities at the time of a flood event is the responsibility of VICSES, as the Control Agency.

Hume City Council has the responsibility to assist VICSES to warn individuals within the community including activation of flood warning systems, where they exist. Responsibility for public information, including media briefings, rest with VICSES as the Control Agency.

Other agencies such as CFA, MFB, DELWP and VicPol may be requested to assist VICSES with the communication of community storm or flood warnings.

In cases where severe flash flooding is predicted, dam failure or landslide is likely or flooding necessitating evacuation of communities is predicted, the Incident Controller may consider the use of the Emergency Alert System and Standard Emergency Warning System (SEWS).

DHHS will coordinate information regarding public health and safety precautions.

### **3.5 Media Communication**

The IC through the Public Information Unit established at the ICC will manage Media communication. If the ICC is not established, the RDO will manage all media communication. Hume City Council will work with the IC to ensure that consistent and timely messaging occurs.

### **3.6 Impact assessments (IA)**

Impact assessments can be conducted in accordance with Part 3 of the EMMV to assess and record the extent and nature of damage caused by storms or flooding. This information may then be used to provide the basis for further needs assessment and recovery planning by DHHS and applicable recovery agencies.

The control agency is responsible for coordinating the collection, collation and dissemination of IA information on a whole of government basis.

The purpose, function and conduct of IAs are outlined in the State Flood Emergency Plan. All IAs should be conducted in accordance with Part 3 of the EMMV

### **3.7 Preliminary Deployments**

When storm impact or flooding is expected to be severe enough to cut access to towns, suburbs and/or communities, the IC will consult with relevant agencies to ensure that resources are in place if required to provide emergency response. These resources might include emergency service personnel, food items and non-food items such as medical supplies, shelter, assembly areas, relief centres etc. in line with the Hume MEMP.

### **3.8 Response to Flash Flooding and Storms**

Emergency management response to flash flooding and storm activity should be consistent with the guideline for the emergency management of flash flooding contained within the VICSES Central Region Flood Emergency Plan and State Storm and Flood Emergency Plans.

When conducting pre-event planning for flash floods the following steps should be followed, and in the order as given:

1. Determine if there are barriers to evacuation by considering warning time, safe routes, resources available and etc;
2. Should evacuation be the adopted strategy, it must be supported by public information capability and a rescue contingency plan;
3. Where it is likely people will become trapped by floodwaters, safety advice needs to be provided to people at risk advising them not to attempt to flee by entering floodwater if they become trapped, and that it may be safer to seek the highest point within the building and to telephone 000 if they require rescue.
4. For buildings known to be structurally un-suitable an earlier evacuation trigger will need to be established (return to step 1 of this cycle).
5. If an earlier evacuation is not possible then specific preparations must be made to rescue occupants trapped in structurally unsuitable buildings either pre-emptively or as those people call for help.
6. Contact the Hume MERC and MERO/ MEMO at the earliest opportunity to allow relief preparation to commence

Due to the rapid development of flash flooding, it will often be difficult to establish evacuation (relief) centres ahead of actually triggering the evacuation. This is normal practice but this is insufficient justification for not adopting evacuation.

Response arrangements for flash flooding events may be contained in **Appendix C**.

Refer to VicRoads Website for arterial road closures <http://alerts.vicroads.vic.gov.au>.

### 3.9 Evacuation

In Victoria, evacuation is largely voluntary, however in particular circumstances, legislation provides some emergency services with authority to remove people from areas or prohibit their entry.

The decision to recommend or warn people to prepare to evacuate or to evacuate immediately rests with the Incident Controller and where possible the IEMT.

Once the decision is made, VicPol are responsible for the coordination of the evacuation process where possible. VICSES and other agencies will assist where practical. VICSES is responsible for the development and communication of evacuation warnings.

VicPol and/or Australian Red Cross may take on the responsibility of registering people affected by a flood or storm emergencies including those who have been evacuated.

Refer to the Evacuation Guidelines in Part 8 of the EMMV, Part 3 of the EMMV and the Hume MEMP for guidance of evacuations for flood or storm emergencies.

Refer to **Appendix D** of this Plan for detailed evacuation arrangements for the City of Hume.

### **3.10 Flood Rescue**

VicPol is the designated Control Agency for water rescue and coordinates rescues undertaken during flood events.

In order to activate water rescue services, VICSES as a Control Agency for overall flood response will identify areas at risk of requiring rescue and notify the Officer in Charge of the Water Police Search and Rescue Squad to request pre-deployment of rescue resources to those areas.

In conducting rescues VicPol may require the assistance of appropriately trained and equipped personnel. In these circumstances, appropriately trained and equipped VICSES units or other agencies may carry out rescues.

Rescue operations may be undertaken where voluntary evacuation is not possible, has failed or is considered too dangerous for an at-risk person or community. An assessment of available flood rescue resources (if not already done prior to the event) should be undertaken prior to the commencement of Rescue operations.

Rescue is considered a high-risk strategy to both rescuers and persons requiring rescue and should not be regarded as a preferred emergency management strategy. Rescuers should always undertake a dynamic risk assessment before attempting to undertake a flood rescue.

### **3.11 Aircraft Management**

Aircraft can be used for a variety of purposes during flood operations including evacuation, resupply, reconnaissance, intelligence gathering and emergency travel.

Air support operations will be conducted under the control of the IC in line with State Aircraft Unit Policy 01- Air Operations..

### **3.12 Resupply**

Communities, neighbourhoods or households can become isolated during storms or floods as a consequence of road closures or damage to roads, bridges and causeways. Under such circumstances, the need may arise to resupply isolated communities/properties with essential items.

When predictions/intelligence indicates that communities, neighbourhoods and/or households may become isolated, and if time permits, VICSES will advise businesses and/or households that they should stock up on essential items.

After the impact, VICSES may assist with the transport of essential items to isolated communities and assist with logistics functions.

Resupply operations are to be included as part of the emergency relief arrangements as outlined in the Hume MEMP.

### **3.13 Essential Infrastructure and Property Protection**

Essential Infrastructure and Property, e.g. roads, utilities and communications etc., may be affected in the event of a storm or flood.

The IC will ensure that owners of essential infrastructure are kept advised of the storm or flood situation. Essential Infrastructure providers must keep the IC informed of their status and ongoing ability to provide services.

Where possible, City of Hume will provide resources on request for essential infrastructure protection. The Incident Controller will determine the priorities related the use of sandbags, which will be consistent with the state emergency management priorities.

If VICSES sandbags are becoming limited in supply, then priority will be given to protection of Essential Infrastructure. If time permits, requests for supplementary supply should be carried out in line with the Hume MEMP.

Property may be protected by:

- Sandbagging to minimise entry of water into buildings
- Encouraging businesses and households to lift or move contents
- Construction of temporary levees in consultation with the Melbourne Water, Hume City Council and VicPol and within appropriate approval frameworks.

Refer to **Appendix C** for further specific details of infrastructure requiring protection. Sandbag collection points will be established as required.

### 3.14 Disruption to Services

Disruption to services other than essential infrastructure and property can occur in flood events. Refer to **Appendix C** and **D** for specific details of likely disruption to services and proposed arrangements to respond to service disruptions in the City of Hume.

### 3.15 Road Closures

Hume City Council, VicPol and VicRoads will carry out their formal functions of road closures. This includes the observation and placement of warning signs and road blocks to its designated local and regional roads, bridges, walking and bike trails. VicPol may liaise with Hume City Council staff and VicRoads as to the need to erect warning signs and / or close roads and bridges under its jurisdiction. VicRoads are responsible for designated main roads and highways and Hume City Council is responsible for the designated local and regional road network.

VicRoads, VicPol and Hume City Council will communicate community information regarding road closures as outlined in the Hume MEMP.

### 3.16 Dam Spilling/ Failure

DELWP is the Control Agency for dam safety incidents (e.g. breach, failure or potential breach / failure of a dam), however VICSES is the Control Agency for any flooding that may result.

DELWP and Melbourne Water have developed Dam Safety Emergency Plans for municipalities where it is applicable. Sets of Dam Failure Mapping are also available.

Major dams with potential to cause structural and community damage within the Municipality are contained in **Appendix A**.

### **3.17 Waste Water related Public Health Issues and Critical Sewerage Assets**

Inundation of critical sewerage assets including septic tanks and sewerage pump stations may result in water quality problems within the City of Hume. There are approximately 1100 properties with septic tanks within the municipality, mostly within Sunbury, Mickleham, Oaklands Junction and Bulla. The specific locations of these properties can be obtained from Council's Environmental Health Coordinator. Where this is likely to occur or has occurred the responsibility agency for the critical sewerage asset (Yarra Valley Water, City West Water or Western Water) should undertake the following:

- Advise VICSES and the Hume MERO of the security of critical sewerage assets to assist preparedness and response activities in the event of flood;
- Maintain or improve the security of critical sewerage assets;
- Check and correct where possible the operation of critical sewerage assets in times of flood;
- Advise the ICC in the event of inundation of critical sewerage assets.

It is the responsibility of the Hume City Council Environmental Health Officer to inspect and report to the MERO and the ICC on any water quality issues relating to flooding.

### **3.18 Access to Technical Specialists**

VICSES Manages contracts with private technical specialists who can provide technical assistance in the event of flood operations or geotechnical expertise. Refer to VICSES SOP061 for the procedure to engage these specialists.

### **3.19 After Action Review**

VICSES will coordinate the after action review arrangements of flood operations as soon as practical following an event.

All agencies involved in the flood or storm incident should be represented at the After Action Review.

## **Part 4. AFTER: EMERGENCY RELIEF AND RECOVERY ARRANGEMENTS**

### **4.1 General**

Arrangements for recovery from a storm or flood incident within Hume City Council are detailed in the Hume City Council MEMP and the Recovery Sub-plan.

### **4.2 Emergency Relief**

The decision to recommend the opening of an emergency relief centre rests with the Incident Controller. Incident Controllers are responsible for ensuring that relief arrangements have been considered and implemented where required under the State Emergency Relief and Recovery Plan (Part 4 of the EMMV).

The range and type of emergency relief services to be provided in response to a flood event will be dependent upon the size, impact, and scale of the storm/flood. Refer to Part 4 of the EMMV for details of the range of emergency relief services that may be provided.

Suitable emergency relief facilities identified for use during floods as with the associated relief and recovery arrangements are detailed in the Hume MEMP and the Hume Relief and Recovery sub-plan. The Hume MRM will facilitate access to emergency relief facilities as required.

### **4.3 Animal Welfare**

Matters relating to the welfare of livestock and companion animals, including feeding and rescue, are to be referred to DJPR and Hume Council.

Requests for emergency supply and/or delivery of fodder to stranded livestock or for livestock rescue are to be referred to DJPR.

Matters relating to the welfare of wildlife are to be referred to DELWP.

### **4.4 Transition from Response to Recovery**

VICSES as the Control Agency is responsible for ensuring effective transition from response to recovery. Transition should be done in consultation with emergency management teams (including IEMT and MRM). Further information about transition can be found in Part 4 of the EMMV.

## APPENDIX A - FLOOD THREATS FOR HUME CITY

### General

The City of Hume is on Melbourne's north-western urban-rural fringe, covering an area of 504 square kilometres. It is situated between 15 and 45 kilometres from Melbourne's CBD. Approximately 65 percent of the municipality is rural, 25 percent urban and 10 percent is occupied by Melbourne Airport. In 2020, the municipality had an estimated population of 241,018.

Hume is bounded (in a clockwise direction beginning with north) by the foothills of the Macedon Ranges, Merri Creek, the Western Ring Road, Maribyrnong River and Calder Freeway. Major waterways in addition to these include Jacksons Creek, Emu Creek, Deep Creek and Moonee Ponds Creek. These are all north-south draining creeks and, with the exception of Moonee Ponds Creek, flow into the Maribyrnong River.

The two main types of flooding experienced in the City of Hume are riverine (river or creek bank being overtopped) and overland (stormwater exceeding the capacity of the local drainage network). This occurs mainly as a result of intense storm events. Erosion of rural catchments is a major problem in the municipality, which can be exacerbated by overland flow and localised flooding.

### Description of Major Waterways and Drains

#### *Maribyrnong River*

The Maribyrnong River begins at the confluence of Jacksons and Deep Creeks in Keilor North/Bulla, just west of Melbourne Airport. On some older maps however, the waterway known as Deep Creek is actually represented as the Maribyrnong River. The river forms part of the southwestern boundary of the municipality from Bulla to Keilor, leaving the municipality above the confluence with Arundel Creek. See **Appendix G** for a schematic of the Maribyrnong River.

#### *Jacksons Creek and Emu Creek*

Jacksons Creek flows from Rosslynne Reservoir near Gisborne and partly forms the municipality's northern boundary, then turning south and flowing through Sunbury to Bulla. Emu Creek rises in Monegeetta, enters the City of Hume at Bolinda and flows in a southerly direction until Deep Creek in Bulla. See **Appendix G** for a schematic of the Maribyrnong river, including Jacksons and Emu Creeks.

#### *Deep Creek*

Deep Creek rises near Cobaw and enters the municipality north of Mickleham. It flows in a southerly direction until Bulla, where it joins with Jacksons Creek, the continuation of which is known as the Maribyrnong River. See **Appendix G** for a schematic of the Maribyrnong River, including Deep Creek.

#### *Moonee Ponds Creek*

Moonee Ponds Creek rises in Oaklands Junction east of Mickleham Road, flows south through the centre of the municipality and leaves it at Gowanbrae. It continues on to flow into the Yarra River in Docklands. See **Appendix G** for a schematic of Moonee Ponds Creek.

#### *Merri Creek*

Merri Creek rises at Heathcote Junctions and flows in a southerly direction and begins to form Hume’s eastern boundary at Kalkallo, remaining as the municipality’s eastern boundary until leaving it at Campbellfield. It continues on to flow into the Yarra River at Fairfield. See **Appendix G** for a schematic of Merri Creek.

Melbourne Water Drains & Waterways	Suburb/s	Melbourne Water Drains & Waterways	Suburb/s
Abercarn Ave Diversion Drive	Craigieburn	Kalkallo Creek	Craigieburn, Kalkallo & Mickleham
Ainslie Road Drain	Campbellfield	Keilor Park Drain	Melbourne Airport & Tullamarine
Aitken Creek	Craigieburn & Mickleham	Kenny St Drain	Attwood
Aitken Creek North	Craigieburn	Kirkham Drive Drain	Greenvale & Roxburgh Park
Anderson Rd Diversion Drain	Sunbury	Kismet Creek	Sunbury
Arundel Creek	Melbourne Airport	Kororoit Creek East Branch	Sunbury
Attwood Creek	Attwood, Greenvale & Westmeadows	Lancefield Rd Drain	Sunbury
Augusta Ave Drain	Campbellfield	Longview Creek	Sunbury
Blind Creek	Sunbury	Maffra St Drain	Coolaroo
Booths Drain	Westmeadows	Malcolm Creek	Craigieburn & Mickleham
Brodies Creek	Greenvale	Maribyrnong River	Keilor North & Keilor
Brook St Drain	Sunbury	McDougall Rd Drain	Sunbury
Brookfield Drain	Craigieburn & Mickleham	Merlynston Creek	Broadmeadows, Campbellfield, Coolaroo, Dallas & Somerton
Campbellfield Creek	Broadmeadows & Glenroy	Merri Creek	Craigieburn, Kalkallo, Campbellfield & Somerton
Coopers Rd Drain	Roxburgh Park & Somerton	Mount Ridley Rd Drain	Craigieburn
Craigieburn Rd Drain	Craigieburn & Mickleham	Otway Crescent Drain	Broadmeadows, Coolaroo, Meadow Heights & Roxburgh Park
Craigieburn South Drain	Craigieburn, Roxburgh Park & Somerton	Patullos Drain	Craigieburn, Greenvale, Roxburgh Park & Somerton
Craigieburn West Drain	Craigieburn	Railway Cres Drain	Broadmeadows
Deep Creek	Bulla, Clarkefield, Mickleham & Oaklands Junction	Shankland Drain	Meadow Heights & Roxburgh Park
Donnybrook Creek	Mickleham	Somerset Rd Drain	Campbellfield
Donnybrook Creek West	Mickleham	Somerton Reservoir Overflow Drain	Meadow Heights
Emu Creek	Wildwood	Steele Creek	Melbourne Airport & Tullamarine
Flax-Lily Creek	Craigieburn	Steele Creek North	Melbourne Airport & Tullamarine
Francis Boulevard Drain	Sunbury	Steele Creek North Branch	Melbourne Airport
Gladstone Park Drive	Gowanbrae	Sunningdale Ave Drain	Sunbury
Grand Boulevard Drain	Craigieburn	Tame Street Drain	Diggers Rest
Greenvale Drain	Greenvale	Theresa St Drain	Tullamarine
Harpers Creek	Sunbury	Warratina Drain	Broadmeadows
Heysen Drive Drain	Sunbury	Widford Rd Drain	Broadmeadows & Jacana
Jacksons Creek	Bulla & Sunbury	Yuroke Creek	Greenvale, Meadows Heights & Westmeadows

Table A1 – Melbourne Water Drains and Waterways within or bordering Hume City

## Historic Storms and Floods

Significant floods (with high flood gauge levels and likely flooding consequences to property and infrastructure) to have occurred within Hume City are as follows in the table below.

It is rare that a storm will affect all catchments in the municipality in the one event except in the most extreme situations. Results below highlighted in black indicate when stream level rise was significant enough to cause flooding along with the associated rainfall; while results in grey indicate stream level rise but unlikely enough to contribute to flooding at or around the gauge location. These results have been included however to show the relationship between these catchments and others that were recorded to indicate flooding.

Event	Jacksons Creek at Sunbury (230104A)		Deep Creek at Bulla (230102A)	Maribrnong River at Keilor North (230237A)	Moonee Ponds Creek at Jacana R/B (229665A)		Merri Creek at Craigieburn Nth (229627A)	Merri Creek at Somerton (229603A)	
	Rainfall at Gauge	Creek Height	Creek Height	River Height	Rainfall at Gauge	Creek Height	Creek Height	Rainfall at Gauge	Creek Height
Normal Water Level	-	0.75m	0.66m	0.25m	-	0.35m	0.13m	-	0.72m
<b>Minor Flood Class</b>	-	-	-	-	-	-	-	-	3.4m
<b>Moderate Flood Class</b>	-	-	-	-	-	-	-	-	3.7m
<b>Major Flood Class</b>	-	-	-	-	-	-	-	-	4.4m
15 <sup>th</sup> May 1974	-	-	<b>6.22m</b>	-	-	-	-	-	<b>4.97m</b>
18 <sup>th</sup> September 1975	-	1.90m	4.67m	-	-	-	-	-	3.30m
7 <sup>th</sup> April 1977	-	2.25m	3.35m	-	-	-	-	-	4.69m
8 <sup>th</sup> August 1978	-	4.00m	3.87m	-	-	-	<b>2.46m</b>	51mm / 25 hrs	3.11m
19 <sup>th</sup> November 1978	-	3.52m	2.21m	-	-	-	1.81m	89mm / 21 hrs	2.88m
16 <sup>th</sup> October 1983	-	5.08m	4.11m	-	-	-	2.30m	81mm / 40 hrs	3.36m
24 <sup>th</sup> October 1985	-	4.57m	1.33m	-	-	-	0.24m	19mm / 25 hrs	0.95m
30 <sup>th</sup> July 1987	-	4.57m	4.89m	-	-	-	2.39m	81mm / 37 hrs	3.87m
11 <sup>th</sup> June 1989	-	4.82m	4.41m	-	-	-	2.35m	63mm / 45 hrs	3.74m
18 <sup>th</sup> July 1990	-	3.91m	4.13m	-	-	-	2.13m	62mm / 57 hrs	3.53m
15 <sup>th</sup> September 1993	-	<b>5.14m</b>	<b>5.32m</b>	-	41mm / 81 hrs	0.19m	2.02m	37mm / 23 hrs	3.24m
6 <sup>th</sup> November 1995	-	3.34m	1.97m	-	-	1.46m	0.62m	27mm / 20 hrs	2.20m
24 <sup>th</sup> October 2000	-	2.80m	4.45m	5.89m	77mm / 49 hrs	6.85m	1.64m	65mm / 49 hrs	3.03m

Event	Jacksons Creek at Sunbury (230104A)		Deep Creek at Bulla (230102A)	Maribyrnong River at Keilor North (230237A)	Moonee Ponds Creek at Jacana R/B (229665A)		Merri Creek at Craigieburn Nth (229627A)	Merri Creek at Somerton (229603A)	
	Rainfall at Gauge	Creek Height	Creek Height	River Height	Rainfall at Gauge	Creek Height	Creek Height	Rainfall at Gauge	Creek Height
Normal Water Level	-	0.75m	0.66m	0.25m	-	0.35m	0.13m	-	0.72m
<b>Minor Flood Class</b>	-	-	-	-	-	-	-	-	3.4m
<b>Moderate Flood Class</b>	-	-	-	-	-	-	-	-	3.7m
<b>Major Flood Class</b>	-	-	-	-	-	-	-	-	4.4m
23 <sup>rd</sup> March 2001	-	1.55m	1.43m	1.16m	75mm / 38 hrs	7.72m	0.50m	71mm / 39 hrs	2.74m
3 <sup>rd</sup> February 2005	-	3.65m	3.37m	5.96m	157mm / 28 hrs	<b>12.57m</b>	2.13m	179mm / 28 hrs	4.28m
5 <sup>th</sup> September 2010	33mm / 21 hrs	2.29m	4.13m	5.50m	11mm / 21 hrs	0.84m	1.66m	11mm / 20 hrs	2.11m
28 <sup>th</sup> November 2010	135mm / 79 hrs	3.97m	3.72m	6.18m	58mm / 82 hrs	2.94m	1.78m	114mm / 82 hrs	2.84m
14 <sup>th</sup> January 2011	150mm / 101 hrs	4.25m	4.93m	<b>7.06m</b>	77mm / 100 hrs	2.80m	0.78m	87mm / 101 hrs	1.53m
5 <sup>th</sup> February 2011	52mm / 10 hrs	1.56m	2.62m	3.05m	62mm / 14 hrs	3.79m	0.54m	80mm / 13 hrs	2.73m
25 <sup>th</sup> December 2011	15mm / 2 hrs	1.18m	1.15m	-	39mm / 4 hrs	3.31m	-	42mm / 3 hrs	1.92m
19 <sup>th</sup> August 2012	44mm / 13 hrs	3.57m	3.25m	5.64m	13mm / 25 hrs	1.5m	1.41m	16mm / 26 hrs	2.02m
1 <sup>st</sup> June 2013	62mm / 9 hrs	1.68m	0.98m	-	74mm / 12 hrs	5.38m	1.83m	102mm / 11 hrs	3.43m
29 <sup>th</sup> December 2016	77mm / 9 hrs	1.70m	1.27m	1.24m	37mm / 2 hrs	8.25m	0.09m	70mm / 2 hrs	2.86m
10 <sup>th</sup> April 2017	71mm / 17 hrs	1.69m	0.87m	1.15m	32mm / 13 hrs	2.89m	0.23m	46mm / 17 hrs	1.6m
2 <sup>nd</sup> December 2017	34mm / 22 hrs	1.16m	0.73m	0.44m	52mm / 26 hrs	1.99m	0.22m	71mm / 41 hrs	1.57m
17 <sup>th</sup> June 2018	46mm / 22 hrs	1.27m	1.78m	1.80m	28mm / 13 hrs	4.66m	1.08m	38mm / 13 hrs	2.74m

Table A2 – Selection of Historical Flood Events along Jacksons Creek, Deep Creek, the Maribyrnong River, Moonee Ponds Creek & Merri Creek

## Dam Spilling / Failure

Flooding resulting from failure of the following dams is likely to cause significant structural and community damage within Hume City. See Dam Failure in Section 3 of this plan for more information. Note that if the storage capacity is reached and water flows over the spillway, this is not to be referred to as a flow release or a storage breach or failure.

Melbourne Water Dam	Location	Owner	Dam Capacity	Full Supply Level	Melway Reference
Greenvale Reservoir	Greenvale	Melbourne Water	27,195 ML	167.12m AHD	179D6

Table A3 – Melbourne Water Reservoirs that pose a risk to Hume City from Dam Failure

There are many private dams and several ornamental lakes within Hume with potential to cause localised property flooding impacts if failure was to occur. Locations of these waterbodies are maintained within Hume’s GIS system.

Service Reservoirs located within the Municipality are listed below.

Service Reservoir	Location	Owner	Material	Reservoir Capacity	Melway Reference
Broadmeadows	Blair Street, Broadmeadows	Melbourne Water	Steel Tank	18.6 ML	6 K5
Somerton Steel No.1	Kingfisher Lane, Roxburgh Park	Melbourne Water	Steel Tank	8.6 ML	179 H3
Somerton Steel No.2	Kingfisher Lane, Roxburgh Park	Melbourne Water	Steel Tank	22.7 ML	179 H3
Craigieburn No.1	Kosciuszko Drive, Craigieburn	Yarra Valley Water	Steel Tank	10 ML	386 E12
Craigieburn No. 2	Kosciuszko Drive, Craigieburn	Yarra Valley Water	Steel Tank	11 ML	386 E12
Yuroke	Garibaldi Road, Greenvale	Yarra Valley Water	Steel Tank	29.1 ML	179 A3
Mt Ridley	Mount Ridley Road, Mickleham	Yarra Valley Water	Steel Tank	12ML	387 A1
Mt Ridley non-drinking water	Mount Ridley Road, Mickleham	Yarra Valley Water	Steel Tank	10ML	387 A1

Table A4 – Melbourne Water Service Reservoirs in Hume City

## APPENDIX B - TYPICAL FLOOD PEAK TRAVEL TIMES

In using the information contained in this Appendix, consideration needs to be given to the time of travel of the flood peak. A flood on a 'dry' waterway will generally travel more slowly than a flood on a 'wet' waterway (eg. The first flood after a dry period will travel more slowly than the second flood in a series of floods). Hence, recent flood history, soil moisture and forecast weather conditions all need to be considered when using the following information to direct flood response activities.

Note that flooding will start some time ahead of the time indicated by the following travel times – these are the time between the flood peaks at respective sites.

Where negative values are shown in the table below this indicates that a flood peak may be expected at the gauge downstream before a separate flood peak is experienced at the upstream gauge. This phenomenon may be due to the location of the thunderstorm passing through the catchment between the two gauges, or because of the urban environment found downstream causing floodwaters to enter the waterway quicker than those in a more rural setting upstream. Lastly this may be because of the existence of a retarding basin between the two gauges.

### Typical Travel Times

Location From (gauge)	Location To (gauge)	Typical Travel Time	Comments
<b>JACKSONS CREEK</b>			
Jacksons Creek at Sunbury	Maribyrnong River at Keilor North	Between 3 hours and 7 hours	Note that inflows from Deep Creek will affect peak travel times between these gauges
	Maribyrnong River at Keilor	Between 5 hours and 10 hours	
<b>DEEP CREEK</b>			
Darraweit Guim	Bulla	Between 3 hours and 13 hours	Note that inflows from Emu Creek and other tributaries will affect peak travel times between these gauges
Konagaderra		Between 1 min and 4 hours	
Bolinda Creek at Clarkefield		Between 6 hours and 22 hours	
<b>MERRI CREEK</b>			
Craigieburn North	Somerton	Between Approximately 1 hour	Minor Flood Level at Somerton
		Somerton may peak before Craigieburn North, if not then travel times less than 1 hour likely	Moderate Flood Level at Somerton

Table B1 – Typical Flood Travel Times between gauges on the Maribyrnong River and Jacksons, Emu, Deep & Merri Creeks

## Historical Travel Times

Flood Event	Location From (gauge)	Location To (gauge)	Flood Peak Travel Time	Flood Class at
<b>JACKSONS CREEK</b>				<b>KEILOR</b>
18 <sup>th</sup> September 1975	Sunbury	Keilor	3 hours	Major
24 <sup>th</sup> October 1975	Sunbury	Keilor	13 hours	Major
23 <sup>rd</sup> September 1976	Sunbury	Keilor	7 hours	Moderate
7 <sup>th</sup> April 1977	Sunbury	Keilor	6 hours	Major
30 <sup>th</sup> June 1977	Sunbury	Keilor	5 hours	Major
8 <sup>th</sup> August 1978	Sunbury	Keilor	8 hours	Major
19 <sup>th</sup> November 1978	Sunbury	Keilor	8 hours	Major
16 <sup>th</sup> October 1983	Sunbury	Keilor	7 hours	Moderate
24 <sup>th</sup> October 1985	Sunbury	Keilor	6 hours	Minor
30 <sup>th</sup> July 1987	Sunbury	Keilor	8 hours	Moderate
11 <sup>th</sup> June 1989	Sunbury	Keilor	9 hours	Minor
18 <sup>th</sup> July 1990	Sunbury	Keilor	9 hours	Minor
15 <sup>th</sup> September 1993	Sunbury	Keilor	8 hours	Major
6 <sup>th</sup> November 1995	Sunbury	Keilor	24 hours	Below Minor
24 <sup>th</sup> October 2000	Sunbury	Keilor North	22 hours	Minor
		Keilor	28 hours	
3 <sup>rd</sup> February 2005	Sunbury	Keilor North	Keilor North peaked 3 hours before Sunbury	Minor
		Keilor	Less than 1 hour	
28 <sup>th</sup> November 2010	Sunbury	Keilor North	4 hours	Minor
		Keilor	8 hours	
14 <sup>th</sup> January 2011	Sunbury	Keilor North	21 hours	Moderate
		Keilor	25 hours	
19 <sup>th</sup> August 2012	Sunbury	Keilor North	4 hours	Minor
		Keilor	7 hours	
		Keilor	30 hours	
<b>DEEP CREEK</b>				<b>DARRAWEIT GUIM</b>
29 <sup>th</sup> July 1987	Clarkefield	Bulla	6 hours	Minor
	Darraweit Guim		4 hours	
	Konagaderra		Less than 1 hour	
15 <sup>th</sup> September 1993	Clarkefield	Bulla	7 hours	Minor
	Darraweit Guim		3 hours	
	Konagaderra		4 hours	
14 <sup>th</sup> January 2011	Clarkefield	Bulla	24 hours	Moderate
	Darraweit Guim		13 hours	
	Konagaderra		2 hours	
<b>MERRI CREEK</b>				<b>SOMERTON</b>
29 <sup>th</sup> July 1987	Craigieburn North	Somerton	Somerton peaked 2 hours before Craigieburn Nth	Moderate
11 <sup>th</sup> June 1989	Craigieburn North	Somerton	Less than 1 hour	Moderate
18 <sup>th</sup> July 1990	Craigieburn North	Somerton	1 hour	Minor
3 <sup>rd</sup> February 2005	Craigieburn North	Somerton	Somerton peaked 4 hours before Craigieburn Nth	Moderate

Flood Event	Location From (gauge)	Location To (gauge)	Flood Peak Travel Time	Flood Class at
1 <sup>st</sup> June 2013	Craigieburn North	Somerton	Somerton peaked 3 hours before Craigieburn North	Minor

Table B2 – Historical Flood Travel Times between gauges on the Maribyrnong River and Jacksons, Emu, Deep & Merri Creeks

# APPENDIX C1 – JACKSONS CREEK & SUNBURY FLOOD EMERGENCY PLAN

## Overview of Flooding Consequences

Sunbury is located approximately 32km northwest of Melbourne in a semi-rural town setting. Jacksons Creek is the prominent watercourse in the area, flowing from the northwest where it enters Hume City and forms the municipal’s northern border before heading south through Sunbury. From Sunbury Jacksons Creek continues south where it becomes the Maribyrnong River at the southern border of the Municipality. There are a number of tributaries of Jacksons Creek that make their way through Sunbury Township including Kismet, Blind and Harpers Creeks. High Intensity, short duration rainfall events can cause flash flooding in and around these tributaries and the number of stormwater drains, while prolonged rainfall may see Jacksons Creek flood. See mapping in **Appendix F** for more insight into flooding in the area.

*This Summary table is generated from Victorian Government data. The State of Victoria does not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for error, loss or damage which may arise from reliance upon it. All persons access this information should make appropriate enquiries to assess the currency of the data.*

### Summary of Consequences in a 1% AEP (100yr ARI) flood along Jacksons Creek and its stormwater tributaries in Sunbury

Property					
<b>Properties</b>	<b>14</b>				
Residential	13				
Commercial	0				
Industrial	0				
Public Land	0				
Rural	1				
Community Infrastructure					
Schools / Colleges	1	Salesian College			
Essential Infrastructure					
Sewerage Facilities	1	Pumping Station on Harpers Creek			
Drainage Facilities	2	Ashfield Estate Retarding Basin on Harpers Creek; Spavin Dam on Kismet Creek			
Tourism / Recreation					
Sports Facilities	1	Rupertswood Cricket Oval			
Recreation Facilities	2	Blind Creek walking trail; Kismet Creek bicycle trail			
Government Boundaries					
Local Gov’t Areas	1	Hume	CMA	1	Port Phillip & Westernport
Adjacent LGAs	2	Macedon Ranges; Brimbank	CFA District	1	District 14
SES Unit Area	2	Sunbury; Broadmeadows	MFB District	1	Northern

Table C1.1 – Consequence Summary of 1% AEP flood along Jacksons Creek

## Gauges and Warnings

Warnings are available for flooding expected along Jacksons Creek at the Rosslynne Reservoir in Gisborne. For other hydrographic/telemetry (river gauges) within the Municipality, Melbourne Water

does not provide any flood warning service at this point.

Hydrographic Monitoring Station	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge	Melway Ref
Jacksons Creek at Rosslyne Reservoir Head Gauge	230103	Rosslyne Reservoir, Gisborne	✓	✓	VicMap Central: 6443F1
Jacksons Creek at Sunbury	230104A	West side of the Creek, north side of Sunbury Road bridge, Sunbury	✓	✓	382 H5
Maribyrnong River d/s Jacksons Creek, Keilor North	230237A	Southwest side of River in Sydenham Park, Keilor North	✓		4 B7
Maribyrnong River at Keilor (SWRMP site)	230105A	South side of the River in Brimbank Park, Keilor East	✓	✓	14 J8

Table C1.2 – Hydrographic Monitoring Stations within the Jacksons Creek catchment

These Gauges may provide some warning of expected flooding. See the Melbourne Water website for more information on these gauges: <http://www.melbournewater.com.au/waterdata/rainfallandriverleveldata/Pages/Rainfall-and-river-level-new.aspx>. It is advised that residents monitor the Bureau of Meteorology's website <http://www.bom.gov.au/> and the VicEmergency website <https://emergency.vic.gov.au/> for any thunderstorm, flood or severe weather warnings present for their area.

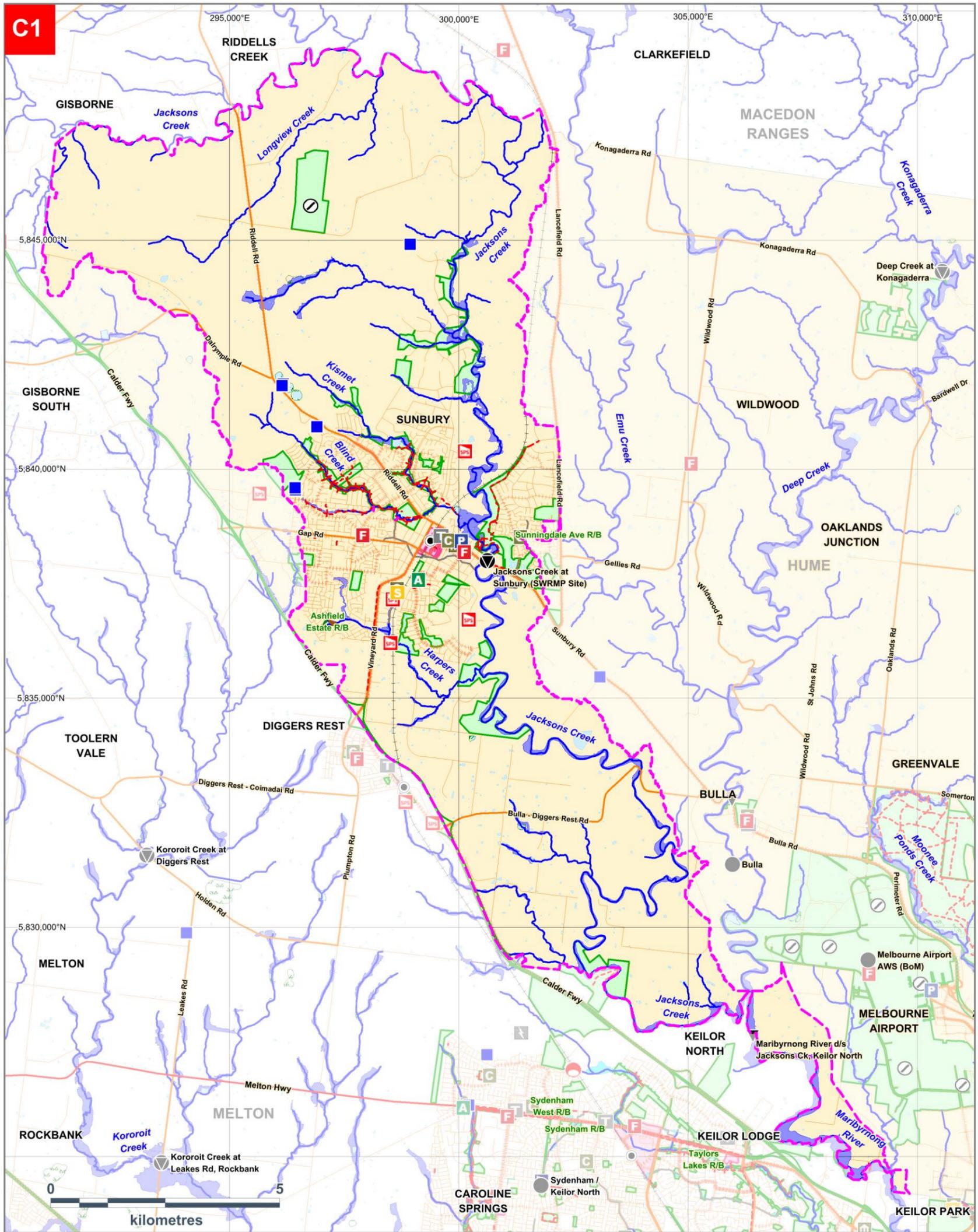
There is currently a Melbourne Water flood warning gauge on the Maribyrnong River downstream of Jacksons Creek that could be used to assist with public safety through the issue of flood warnings. This is at Keilor.

Gauge	River / Creek Flood Class Level		
	Minor	Moderate	Major
Maribyrnong River at Keilor (SWRMP site)	3.5	5.4	6.1

Table C1.3 – Gauges with established Flood Class Levels for the Jacksons Creek and Maribyrnong River catchments

At this site, the Bureau of Meteorology (the Bureau) in consultation with Melbourne Water will issue flood warnings if levels reach those classified above. This warning will be placed on the Bureau's website (<http://www.bom.gov.au/vic/warnings/index.shtml>) and the VicEmergency website <https://emergency.vic.gov.au/>. While Hume City monitors these warnings in times of high rainfall, there are no specific guidelines to advise how these situations should be responded to.

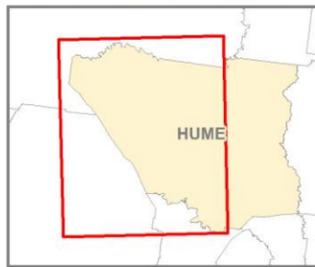
# Areas of Flood Risk



Map Produced by VICSES January 2020

**HUME CITY**  
Version 3, January 2020  
**C1. Areas of flood risk along Jacksons Creek and its stormwater tributaries**

- |                              |                                  |                      |
|------------------------------|----------------------------------|----------------------|
| Waterbody                    | Boundary for this Appendix       | Telephone Exchange   |
| 1% AEP Riverine Flood Extent | Melbourne Water Stormwater Drain | Municipal Depot      |
| 1% AEP Flash Flood Extent    | Creek / Channel                  | Community Centre     |
| Reserve / Park               | Bicycle / Walking Trail          | Police Station       |
| Commercial Precinct          | State Emergency Service          | Rain Gauge           |
| Bus Route (PTV)              | Fire Station                     | Stream Level Gauge   |
| Levee                        | Sewer Pumping Station            | Retail Water Storage |
| Power Terminal Station       | Drainage Pumping Station         |                      |
| Ambulance Station            | Airport                          |                      |



**SES VICTORIA** **Melbourne Water**

This map publication is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The contents of the information have not been independently verified by the Victoria State Emergency Service. No liability is accepted for any damage, loss or injury caused by errors or omissions in this information or for any action taken by any person in reliance upon it.

Figure C1 – Areas of flood risk around Sunbury and Jacksons Creek in Hume City and area covered by this Appendices

## Properties at Flood Risk

Properties listed in the table below are at risk from flooding either from Jacksons Creek or flash flooding along the number of stormwater creeks and drains. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Jacksons Creek (Sunbury) (Melbourne Water, September 2007), the Jacksons Creek (Bulla to Melbourne Airport) (Melbourne Water, November 2011) and the Kismet Creek (GHD, May 2008) flood mapping and risk assessment programs. Note that any multi-lot properties situated above ground floor likely impacted by isolation only with flooding on ground floor impacting access to common areas and/or carpark and storage facilities. Information on above ground-floor properties is not available in this list.

*This Property Flood Risk Table is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The contents of the information have not been independently verified by the Victoria State Emergency Service. No liability is accepted for any damage, loss or injury caused by errors or omissions in this information or for any action taken by any person in reliance upon it.*

Properties at risk from Flooding along Jacksons Creek and its stormwater tributaries during a 1% AEP event				
Residential	Commercial	Industrial	Rural	Public Use
Street No. at Risk	Street	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
80	Aldridge Drive	Sunbury	Kismet Creek	Riverine
60	Heysen Drive	Sunbury	Blind Creek & Heysen Dr Drain	Riverine
3-5	Macedon Street	Sunbury	Jacksons Creek	Riverine
1-5	Powlett Street	Sunbury	Jacksons Creek	Riverine
7	Powlett Street	Sunbury	Jacksons Creek	Riverine
7A	Powlett Street	Sunbury	Jacksons Creek	Riverine
9	Powlett Street	Sunbury	Jacksons Creek	Riverine
29	Powlett Street	Sunbury	Jacksons Creek	Riverine
31	Powlett Street	Sunbury	Jacksons Creek	Riverine
410	Racecourse Road	Sunbury	Jacksons Creek	Riverine
8	Ramsay Court	Sunbury	Blind Creek & Heysen Dr Drain	Riverine
191	Reservoir Road	Sunbury	Blind Creek & Heysen Dr Drain	Riverine
202	Reservoir Road	Sunbury	Blind Creek & Heysen Dr Drain	Riverine
204	Reservoir Road	Sunbury	Blind Creek & Heysen Dr Drain	Riverine
<b>Total</b>				
<b>14</b>				

Table C1.3 – Properties at risk of flooding along Jacksons Creek and its stormwater tributaries in Hume City

## Isolation

No major isolation risks exist for areas around Sunbury during a 1% AEP (100yr ARI) event. Some localised short-duration isolation may occur due to flash flooding.

## Essential Infrastructure

During an event, see the Public Transport Victoria's Website for details on delays or alterations to services. <http://ptv.vic.gov.au/live-travel-updates/>. A map of Public Transport routes within Hume City is available via the website at: <https://www.ptv.vic.gov.au/assets/default-site/more/maps/Local-area-maps/Metropolitan/e076ce6272/Hume-LAM-2020.pdf>

Apart from the roads outlined below, all other essential infrastructure and services areas around Sunbury are expected to remain unaffected by flooding during a 1% AEP (100yr ARI) event.

## Road Closures

The following roads are subject to closure during flooding around Sunbury. Check the VicRoads website for more details: <https://traffic.vicroads.vic.gov.au/>

VicRoads Roads flooded in a 1% AEP (100yr ARI) event
<ul style="list-style-type: none"><li>Unavailable</li></ul>

Table C1.4 – VicRoads possible road closures during a flooding event

Hume City Council Roads flooded in a 1% AEP (100yr ARI) event
<b>SUNBURY</b>
<ul style="list-style-type: none"><li>Reservoir Road</li><li>Spavin Drive</li></ul>

Table C1.5 – Hume City Council possible road closures during a flooding event

## Flood Mitigation

### Retarding Basins

Melbourne Water Retarding Basin	On Drain/ Waterway	Area	Storage Capacity	Spillway Crest Level	Full Supply Level	Embankment Crest Level	ANCOLD Hazard Rating	Houses In Flow Path (dam breach)	Melway Reference
Ashfield Estate	Harpers Creek	2.5 ha	14 ML	225.95m AHD	Unavailable	1.0m (227.4m AHD)	Low	Unavailable	381 J8

Table C1.6 – Melbourne Water Retarding Basins within the Jacksons Creek Catchment in Hume City

No formal Pumping Stations or Levees exist around Sunbury.

### Sewerage Infrastructure

Sewerage Infrastructure of note during a severe flood event located around Sunbury is contained within the following table.

#### Sewer Pumping Stations

Sewerage Pumping Station	On Drain / Waterway	Bank / Side of Waterway	Operator	Location	Melway Reference
	Harpers Creek	N/A	Western Water	105 Vineyard Road, Sunbury	382 B9

Table C1.7 – Sewer Pumping Stations within the Jacksons Creek Catchment in Hume City

### Command, Control and Coordination

VICSES will assume overall control of the response to flood incidents. Other agencies will be requested to support operations as detailed in this Plan. Control and coordination of a flood incident shall be carried out at the lowest effective level and in accordance with the State Emergency Response Plan (EMMV Part 3). During significant events, VICSES will conduct incident management using multi-agency resources.

## **Flood Impacts & Operational Considerations (Intelligence Cards)**

The tables on the following pages provide a breakdown of the possible consequences of flooding along Jacksons Creek and its stormwater tributaries at various creek heights or rain totals around Sunbury. These tables are to be used only as a guide as no two floods at a location will have identical impacts.

Intelligence Cards have been included for the following locations:

- Jacksons Creek, Sunbury
- Kismet and Blind Creeks, Sunbury

# FLOOD INTELLIGENCE CARD – SUNBURY GAUGE, JACKSONS CREEK

Version 3 – January 2020



Note: flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.

This Flood Intelligence Card publication is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The contents of the information have not been independently verified by the Victoria State Emergency Service. No liability is accepted for any damage, loss or injury caused by errors or omissions in this information or for any action taken by any person in reliance upon it.

LOCATION	West side of the Creek, north side of Sunbury Road bridge, Sunbury
MELWAY REFERENCE:	382 H5
STREAM:	Jacksons Creek
GAUGE NUMBER:	230104A
GAUGE ZERO:	182.1m AHD
GAUGE TYPE	Stream Level & Rain

MINOR:	Not Established
MODERATE:	Not Established
MAJOR	Not Established
LEVEE HEIGHT:	N/A
TELEMETRIC/MANUAL	Telemetric
HIGHEST RECORDED FLOOD:	5.14m (15 <sup>th</sup> September 1993)

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
2.5m	20% AEP (5yr ARI) Flood Level	<ul style="list-style-type: none"> <li>Bank Full Level</li> </ul>	
5.77m	1% AEP (100yr ARI) Flood Level	<p><b>Properties at Flood Risk</b>  <b>8 Properties in Total</b></p> <ul style="list-style-type: none"> <li>410 Racecourse Road, Sunbury</li> <li>3-5 Macedon Street, Sunbury</li> <li>1-5, 7, 7A, 9, 29 &amp; 31 Powlett Street, Sunbury</li> </ul> <p><b>Community Infrastructure Flooded</b></p> <ul style="list-style-type: none"> <li>Parts of Salesian College Grounds and Rupertswood Cricket Oval flooded</li> </ul> <p><b>Water Over Road</b></p> <ul style="list-style-type: none"> <li>Nil expected</li> </ul>	<p>VICSES will provide warnings using EM-COP to Hume Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident</p> <p>VICSES to respond on a request by request basis.</p>

Table C1.8 – Breakdown of likely consequences at various Sunbury gauge level heights along Jacksons Creek with operational considerations

# FLOOD INTELLIGENCE CARD – KISMET & BLIND CREEKS, SUNBURY (UNGAUGED)

Version 3 – January 2020



Note: flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.

This Flood Intelligence Card publication is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The contents of the information have not been independently verified by the Victoria State Emergency Service. No liability is accepted for any damage, loss or injury caused by errors or omissions in this information or for any action taken by any person in reliance upon it.

CLOSEST RAIN GAUGE	Jacksons Creek at Sunbury
LOCATION	West side of the Creek, north side of Sunbury Road bridge, Sunbury
MELWAY REF:	382 H5

GAUGE NUMBER	230104A
GAUGE TYPE	Stream Level & Rain
TELEMETRIC/MANUAL	Telemetric

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
34mm / 22 hrs	December 2017 Storm event	<ul style="list-style-type: none"> <li>Structural integrity issues identified in the dam wall at Spavin Drive Lake, suspected failure would occur if forecast rainfalls were realised. Forecast totals not received and wall remained stable. City of Hume investigated stabilising options, engaged a consultant and protective engineering works were completed following this event.</li> </ul>	Multiple properties generally not flood affected would have been inundated if dam wall failed. Properties doorknocked.
23mm in 10 mins; 38mm in 30 mins; 50mm in 1 hour; 62mm in 2 hours; 87mm in 6 hours; or 107mm in 12 hours  Note: rainfall depths are a very rough method of estimating flood events and have been used due to the ungauged nature of the catchment. This should be used as a guide only.	1% AEP (100 year ARI)	<p><b>Properties at Flood Risk</b></p> <p><b>6 Properties in Total</b></p> <p><b>Kismet Creek</b></p> <ul style="list-style-type: none"> <li>80 Aldridge Drive, Sunbury</li> </ul> <p><b>Blind Creek &amp; Heysen Drive Drain</b></p> <ul style="list-style-type: none"> <li>191, 202 &amp; 204 Reservoir Road, Sunbury</li> <li>8 Ramsay Court, Sunbury</li> <li>60 Heysen Drive, Sunbury</li> </ul> <p><b>Community Infrastructure Flooded</b></p> <p><b>Kismet Creek</b></p> <ul style="list-style-type: none"> <li>Kismet Creek Bicycle Trail flooded in parts</li> </ul> <p><b>Blind Creek &amp; Heysen Drive Drain</b></p> <ul style="list-style-type: none"> <li>Blind Creek Walking Trail flooded in parts</li> </ul> <p><b>Water Over Road</b></p> <p><b>Kismet Creek</b></p> <ul style="list-style-type: none"> <li>Spavin Drive, Sunbury next to Spavin Drive Lake, water level with road</li> </ul> <p><b>Blind Creek &amp; Heysen Drive Drain</b></p> <ul style="list-style-type: none"> <li>Reservoir Road, Sunbury at Stockfield Street</li> </ul>	VICSES will provide warnings using EM-COP to Hume Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident  VICSES to respond on a request by request basis.  Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements

Table C1.9 – Breakdown of possible consequences at various rainfall intensities around Sunbury with operational considerations

## APPENDIX C2 – DEEP CREEK & EMU CREEK FLOOD EMERGENCY PLAN

### Overview of Flooding Consequences

*This Summary table is generated from Victorian Government data. The State of Victoria does not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for error, loss or damage which may arise from reliance upon it. All persons access this information should make appropriate enquiries to assess the currency of the data.*

Summary of Consequences in a 1% AEP (100yr ARI) flood along Deep and Emu Creeks in Hume City					
<b>Property</b>					
<b>Properties</b>	<b>0</b>				
Residential	0				
Commercial	0				
Industrial	0				
Public Land	0				
Rural	0				
<b>Community Infrastructure</b>					
<b>Essential Infrastructure</b>					
Drainage Facilities	1	Sunningdale Avenue Retarding Basin on Sunningdale Ave Drain into Emu Creek			
<b>Tourism / Recreation</b>					
Recreation Facilities					
<b>Government Boundaries</b>					
Local Gov't Areas	1	Hume	CMA	1	Port Phillip & Westernport
Adjacent LGAs	2	Macedon Ranges; Mitchell	CFA District	1	District 14
SES Unit Area	4	Broadmeadows; Craigieburn; Gisborne; & Sunbury	MFB District	0	

Table C2.1 – Consequence Summary of 1% AEP flood along the Deep and Emu Creeks in Hume City

The Deep & Emu Creeks and surrounding rural areas of Wildwood, Mickleham, Oaklands Junction and Bulla form the central part of the Municipality of Hume City. The two creeks flow in a southerly direction from the Shires of Macedon Ranges & Mitchell where they converge approximately 4km upstream of Bulla township. Deep Creek continues south through Bulla before joining the Maribyrnong River 8km downstream. Rural farmland largely abuts the creeks and thus there is little impact expected to property with no floodplains in the region. A number of minor roads may become flooded from the creeks during a 1% AEP event including Quartz Street and Wildwood Road South in Bulla.

### Gauges and Warnings

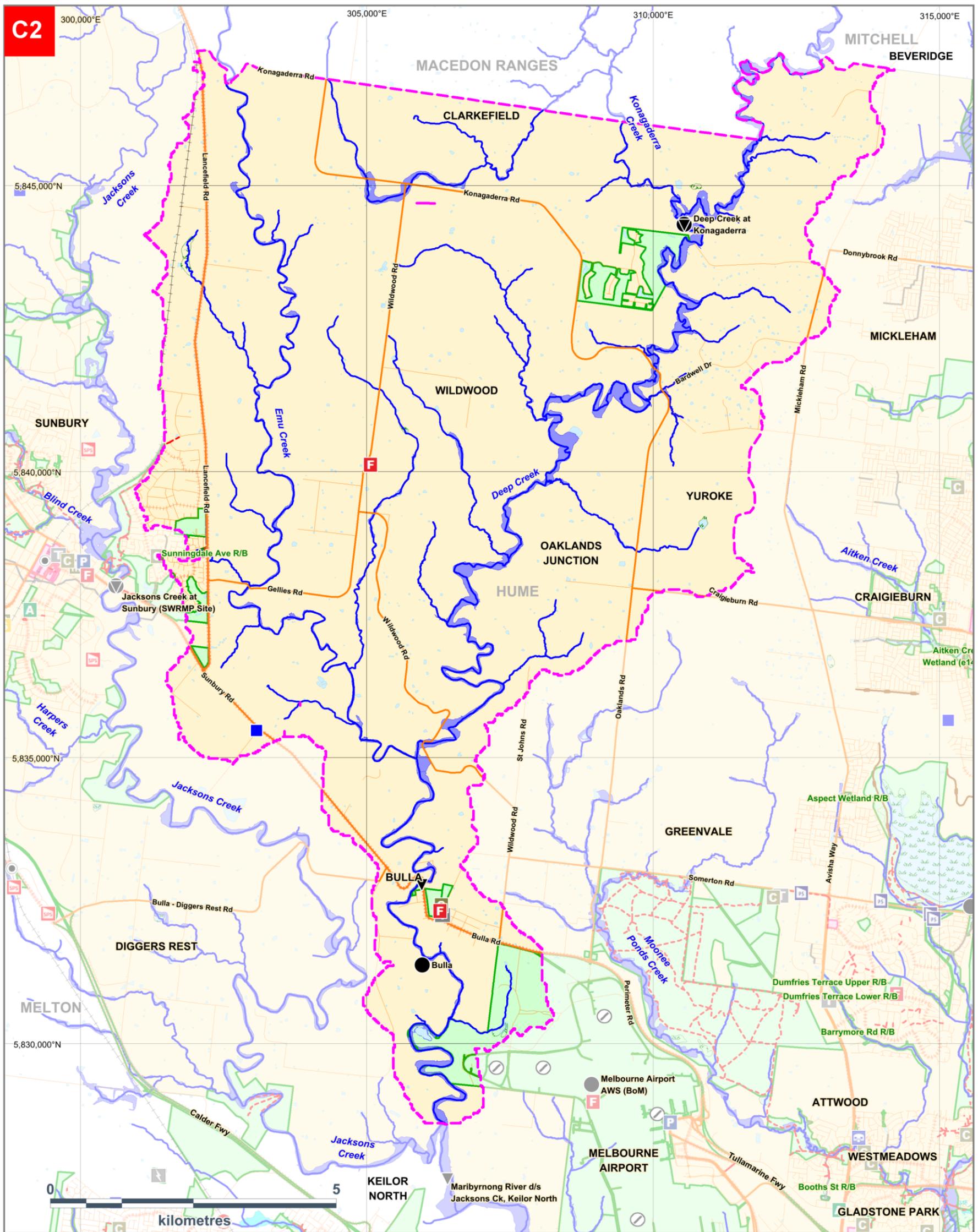
Warnings are available for flooding expected along Deep Creek at Darraweit Guim. For other hydrographic/telemetry (river gauges) within the Municipality, Melbourne Water does not provide any flood warning service at this point, due to the generally short warning times available.

Hydrographic Monitoring Station	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge	Melway Ref
Bolinda Creek at Clarkefield	230211A	North side of the creek, west side of Lancefield Rd, Clarkefield	✓		VicMap Central: 6361 A14
Bulla	587014	105 Loemans Rd, Bulla		✓	177 A10
Deep Creek at Bulla	230102A	South side of the creek at Bulla Rd bridge, Bulla	✓		177 A6
Deep Creek at Darraweit Guim	230100	East side of the creek, 200m South of Beveridge – Darraweit Guim Road, Wallan	✓	✓	VicMap Central: 6362 E8
Deep Creek at Konagaderra	230107A	West side of the creek 200m north of The Ridge Walking Trail, Oaklands Junction	✓	✓	365 C2

Table C2.2 – Hydrographic Monitoring Stations within the Deep & Emu Creeks catchment

These Gauges may provide some warning of expected flooding. See the Melbourne Water website for more information on these gauges: <http://www.melbournewater.com.au/waterdata/rainfallandriverleveldata/Pages/Rainfall-and-river-level-new.aspx>. It is advised that residents monitor the Bureau of Meteorology's website <http://www.bom.gov.au/> and the VicEmergency website <https://emergency.vic.gov.au/> for any thunderstorm, flood or severe weather warnings present for their area.

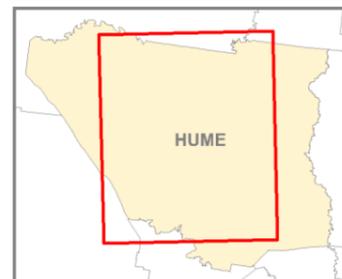
# Areas of Flood Risk



Map Produced by VICSES January 2020

**HUME CITY**  
Version 3, January 2020  
**C2. Areas of flood risk along Deep and Emu Creeks**

- |                              |                                  |                      |
|------------------------------|----------------------------------|----------------------|
| Waterbody                    | Boundary for this Appendix       | Telephone Exchange   |
| 1% AEP Riverine Flood Extent | Melbourne Water Stormwater Drain | Municipal Depot      |
| 1% AEP Flash Flood Extent    | Creek / Channel                  | Community Centre     |
| Reserve / Park               | Bicycle / Walking Trail          | Police Station       |
| Commercial Precinct          | State Emergency Service          | Fire Station         |
| Bus Route (PTV)              | Fire Station                     | Rain Gauge           |
| Levee                        | Sewer Pumping Station            | Stream Level Gauge   |
| Airport                      | Drainage Pumping Station         | Retail Water Storage |



**SES VICTORIA** **Melbourne Water**

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Figure C2 – Areas of flood risk around Deep & Emu Creeks in Hume City and area covered by this Appendix

## Properties at Flood Risk

Currently no properties have been identified as being at risk from flooding along the Deep and Emu Creeks in Hume City. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Deep Creek (Konagaderra to Bulla) (Melbourne Water, October 2015), the Deep Creek (Bulla to Melbourne Airport) (Melbourne Water, October 2013) and the Emu Creek (CPG, August 2012) flood mapping and risk assessment programs.

*This Property Flood Risk Table is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The contents of the information have not been independently verified by the Victoria State Emergency Service. No liability is accepted for any damage, loss or injury caused by errors or omissions in this information or for any action taken by any person in reliance upon it.*

Properties at risk from Flooding along Deep and Emu Creeks in Hume City during a 1% AEP event				
Residential	Commercial	Industrial	Rural	Public Use
Street No. at Risk	Street	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
<b>Total</b>				
<b>0</b>				

Table C2.3 – Properties at risk of flooding along Deep and Emu Creeks in Hume City

## Isolation

No major isolation risks exist for areas around Wildwood, Oaklands Junction & Bulla during a 1% AEP (100yr ARI) event. Some localised short-duration isolation may occur due to flash flooding.

## Essential Infrastructure

During an event, see the Public Transport Victoria's Website for details on delays or alterations to services. <http://ptv.vic.gov.au/live-travel-updates/>. A map of Public Transport routes within Hume City is available via the website at: <https://www.ptv.vic.gov.au/assets/default-site/more/maps/Local-area-maps/Metropolitan/e076ce6272/Hume-LAM-2020.pdf>

Apart from the roads outlined below, all other essential infrastructure and services areas around Wildwood, Oaklands Junction & Bulla are expected to remain unaffected by flooding during a 1% AEP (100yr ARI) event.

## Road Closures

The following roads are subject to closure during flooding around Wildwood, Oaklands Junction & Bulla. Check the VicRoads website for more details: <https://traffic.vicroads.vic.gov.au/>

VicRoads Roads flooded in a 1% AEP (100yr ARI) event
<ul style="list-style-type: none"><li>• Nil Expected</li></ul>

Table C2.4 – VicRoads possible road closures during a flooding event

Hume City Council Roads flooded in a 1% AEP (100yr ARI) event
<b>BULLA</b>
<ul style="list-style-type: none"><li>• Quartz Street</li></ul>
<ul style="list-style-type: none"><li>• Wildwood Road South</li></ul>

Table C2.5 – Hume City Council possible road closures during a flooding event

## Flood Mitigation

### Retarding Basins

Melbourne Water Retarding Basin	On Drain/ Waterway	Area	Storage Capacity	Spillway Crest Level	Full Supply Level	Embankment Crest Level	ANCOLD Hazard Rating	Houses In Flow Path (dam breach)	Melway Reference
Sunningdale Avenue	Sunningdale Ave Drain / Emu Creek	1.4 ha	14 ML	N/A	Unavailable	1.0m (219.0m AHD)	Low	Unavailable	383 A4

Table C2.6 – Melbourne Water Retarding Basins within the Deep & Emu Creeks catchment in Hume City

No formal Pumping Stations or Levees exist around Deep & Emu Creeks.

## Sewerage Infrastructure

There is no sewerage Infrastructure expected to be within the vicinity of floodwaters during severe flood events around Deep & Emu Creeks.

## Command, Control and Coordination

VICSES will assume overall control of the response to flood incidents. Other agencies will be requested to support operations as detailed in this Plan. Control and coordination of a flood incident shall be carried out at the lowest effective level and in accordance with the State Emergency Response Plan (EMMV Part 3). During significant events, VICSES will conduct incident management using multi-agency resources.

## Flood Impacts & Operational Considerations (Intelligence Cards)

The tables on the following pages provide a breakdown of the possible consequences of flooding along the Deep and Emu Creeks at various creek heights within Hume City. These tables are to be used only as a guide as no two floods at a location will have identical impacts.

Intelligence Cards have been included for the following locations:

- Bolinda Creek, Clarkefield
- Deep Creek, Konagaderra
- Deep Creek, Bulla

# FLOOD INTELLIGENCE CARD – CLARKEFIELD GAUGE, BOLINDA CREEK

Version 3 – January 2020



*Note: flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.*

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LOCATION	North side of the creek, west side of Lancefield Rd, Clarkefield
VICMAP REFERENCE:	Central: 6361 A14
STREAM:	Bolinda Creek
GAUGE NUMBER:	230211A
GAUGE ZERO:	317.87m AHD
GAUGE TYPE	Stream Level

MINOR:	Not Established
MODERATE:	Not Established
MAJOR	Not Established
LEVEE HEIGHT:	N/A
TELEMETRIC/MANUAL	Telemetric
HIGHEST RECORDED FLOOD:	2.53m (13 <sup>th</sup> January 2011)

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
2.53m	13 <sup>th</sup> January 2011 Flood Level Peak		
2.77m	1% AEP (100yr ARI) Flood Level	<p><b>Properties at Flood Risk</b>  <b>0 Properties in Total</b></p> <ul style="list-style-type: none"> <li>• Nil Expected</li> </ul> <p><b>Community Infrastructure Flooded</b></p> <ul style="list-style-type: none"> <li>• Nil Expected</li> </ul> <p><b>Water Over Road</b></p> <ul style="list-style-type: none"> <li>• Nil Expected</li> </ul>	VICSES to respond on a request by request basis.

Table C2.7 – Breakdown of likely consequences at various Clarkefield gauge level heights along Emu Creek in Hume City with operational considerations

# FLOOD INTELLIGENCE CARD – KONAGADERRA GAUGE, DEEP CREEK

Version 3 – January 2020



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LOCATION	West side of the creek 200m north of The Ridge Walking Trail, Oaklands Junction
MELWAY REFERENCE:	365 C2
STREAM:	Deep Creek
GAUGE NUMBER:	230107A
GAUGE ZERO:	152.727m AHD
GAUGE TYPE	Stream Level & Rain

MINOR:	Not Established
MODERATE:	Not Established
MAJOR	Not Established
LEVEE HEIGHT:	N/A
TELEMETRIC/MANUAL	Telemetric
HIGHEST RECORDED FLOOD:	8.72m (14 <sup>th</sup> January 2011)

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
8.72m	14 <sup>th</sup> January 2011 Flood Level Peak		
10.38m	1% AEP (100yr ARI) Flood Level	<p><b>Properties at Flood Risk</b>  <b>0 Properties in Total</b></p> <ul style="list-style-type: none"> <li>Nil Expected</li> </ul> <p><b>Community Infrastructure Flooded</b></p> <ul style="list-style-type: none"> <li>Nil Expected</li> </ul> <p><b>Water Over Road</b></p> <ul style="list-style-type: none"> <li>Wildwood Road South, Bulla</li> </ul>	<p>VICSES to respond on a request by request basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p>

Table C2.8 – Breakdown of likely consequences at various Konagaderra gauge level heights along Deep Creek with operational considerations

# FLOOD INTELLIGENCE CARD – BULLA GAUGE, DEEP CREEK

Version 3 – January 2020



*Note: flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.*

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LOCATION	South side of the creek at Bulla Rd bridge, Bulla
MELWAY REFERENCE:	177 A6
STREAM:	Deep Creek
GAUGE NUMBER:	230102A
GAUGE ZERO:	82.8m AHD
GAUGE TYPE	Stream Level

MINOR:	Not Established
MODERATE:	Not Established
MAJOR	Not Established
LEVEE HEIGHT:	N/A
TELEMETRIC/MANUAL	Telemetric
HIGHEST RECORDED FLOOD:	6.22m (15 <sup>th</sup> May 1974)

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
6.22m	15 <sup>th</sup> May 1974 Flood Level Peak		
6.24m	1% AEP (100yr ARI) Flood Level	<p><b>Properties at Flood Risk</b>  <b>0 Properties in Total</b></p> <ul style="list-style-type: none"> <li>• Nil Expected</li> </ul> <p><b>Community Infrastructure Flooded</b></p> <ul style="list-style-type: none"> <li>• Nil Expected</li> </ul> <p><b>Water Over Road</b></p> <ul style="list-style-type: none"> <li>• Wildwood Road South, Bulla</li> <li>• Quartz Street, Bulla</li> </ul>	<p>VICSES to respond on a request by request basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p>

Table C2.9 – Breakdown of likely consequences at various Bulla gauge level heights along Deep Creek with operational considerations

# APPENDIX C3 – MOONEE PONDS & YUROKE CREEKS FLOOD EMERGENCY PLAN

## Overview of Flooding Consequences

*This Summary table is generated from Victorian Government data. The State of Victoria does not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for error, loss or damage which may arise from reliance upon it. All persons access this information should make appropriate enquiries to assess the currency of the data.*

Summary of Consequences in a 1% AEP (100yr ARI) flood within the Moonee Ponds Creek catchment in Hume City					
<b>Property</b>					
<b>Properties</b>	<b>24</b>				
Residential	23				
Commercial	0				
Industrial	0				
Public Land	1	Broadmeadows Sports Club			
Rural	0				
<b>Community Infrastructure</b>					
Community Venues	1	Westmeadows Hall			
<b>Essential Infrastructure</b>					
Major Roads	3	Mickleham Road near Aitken College, Greenvale; Oaklands Road at Woodlands Historic Park, Greenvale; Pascoe Vale Road service Road, Meadow Heights			
Bus Routes	3	543; 540; 541			
Drainage Facilities	12	Retarding Basins			
<b>Tourism / Recreation</b>					
Sports Facilities	1	Broadmeadows Sports Club			
Recreation Facilities	2	Jacana Reserve; Bicycle Paths along Moonee Ponds Creek and Yuroke Creek			
<b>Government Boundaries</b>					
Local Gov't Areas	1	Hume	CMA	1	Port Phillip & Westernport
Adjacent LGAs	1	Moreland	CFA District	1	District 14
SES Unit Area	2	Broadmeadows; Craigieburn	MFB District	1	Northern

Table C3.1 – Consequence Summary of 1% AEP flood along Moonee Ponds and Yuroke Creeks in Hume City

Moonee Ponds Creek and the adjoining suburbs of Westmeadows, Attwood, Gladstone Park, Jacana and Broadmeadows are located approximately 15km north of Melbourne in an established residential area. Moonee Ponds Creek is the prominent watercourse in the area, flowing from the northwest at Oaklands Junction within Hume City Council. Yuroke Creek is a tributary of Moonee Ponds Creek and flows from the north in Greenvale, connecting with Moonee Ponds Creek along the border of Jacana and Gladstone Park.

The Jacana Retarding Basin is a large wetland at Jacana which straddles the border between Hume City Council and the City of Moreland. High Intensity, short duration rainfall events can cause flash flooding in and around the stormwater drains that connect Moonee Ponds Creek and Yuroke Creek, while prolonged rainfall may see either of these two creeks flood. See mapping in **Appendix F** for more insight into flooding in the area.

## Gauges and Warnings

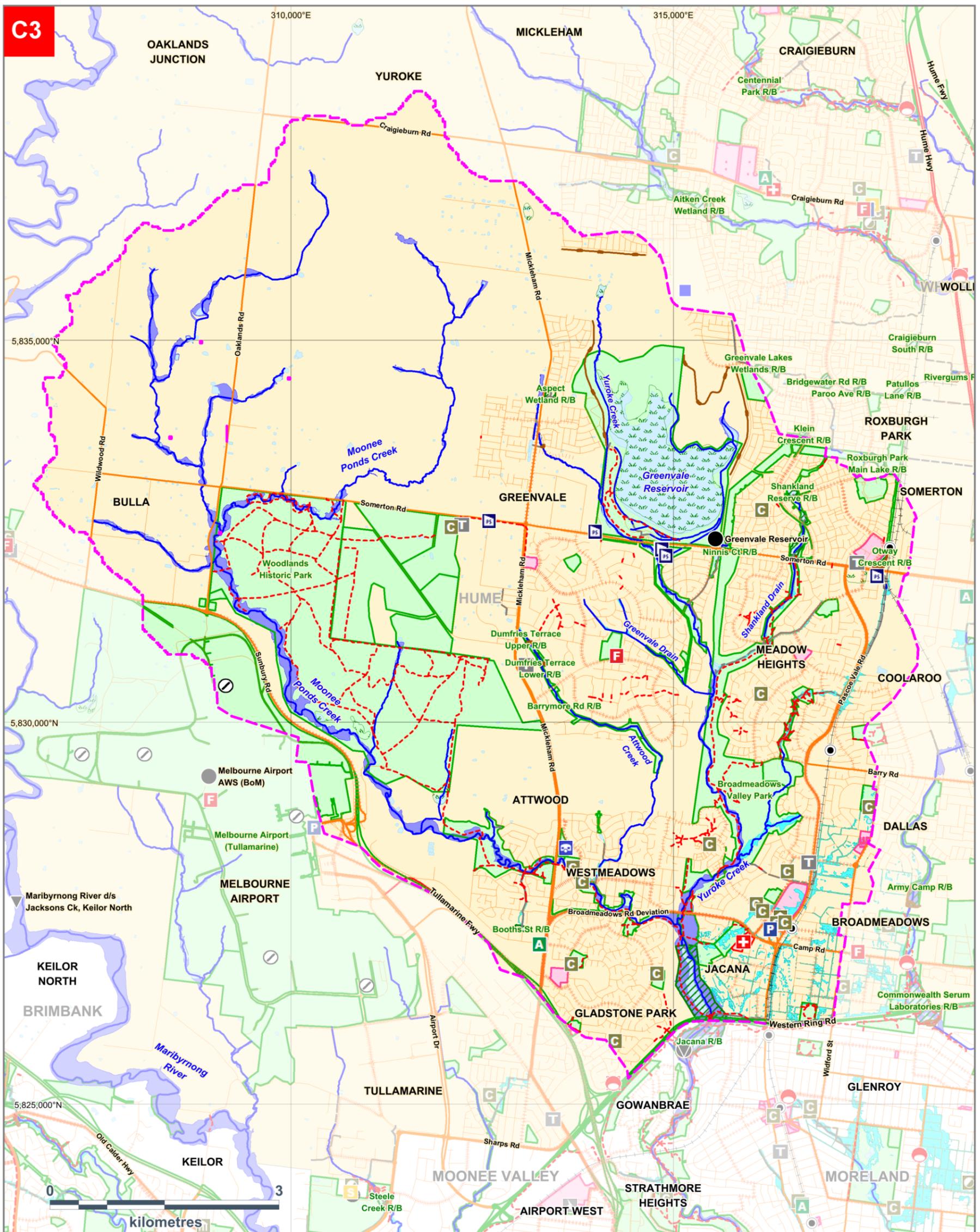
Neither the Bureau of Meteorology nor Melbourne Water currently provides flood forecasts for the Moonee Ponds or Yuroke Creeks. All flood response actions must therefore be driven by rainfall and / or river level observations. Telemetered water level / flood gauges are located at Jacana Retarding Basin within the Moonee Ponds Creek catchment.

Hydrographic Monitoring Station	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge	Melway Ref
Greenvale Reservoir	586028	Greenvale Reservoir, entrance off Somerton Road, Greenvale		✓	179 E8
Melbourne Airport AWS	86282	Melbourne Airport		✓	4 H3
Moonee Ponds Creek at Glenroy-Jacana Retarding Basin	229665A	Jacana Retarding Basin near Embankment, Glenroy	✓	✓	6D12

Table C3.2 – Hydrographic Monitoring Stations within the Moonee Ponds Creek catchment

These Gauges may provide some warning of expected flooding. See the Melbourne Water website for more information on these gauges: <http://www.melbournewater.com.au/waterdata/rainfallandriverveldata/Pages/Rainfall-and-river-level-new.aspx>. It is advised that residents monitor the Bureau of Meteorology's website <http://www.bom.gov.au/> and the VicEmergency website <https://emergency.vic.gov.au/> for any thunderstorm, flood or severe weather warnings present for their area.

# Areas of Flood Risk



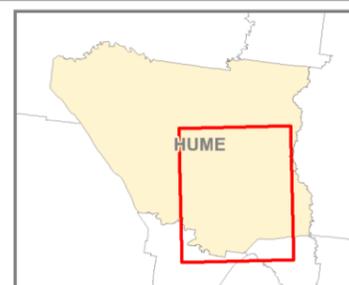
Map Produced by VICSES January 2020

## HUME CITY

Version 3, January 2020

### C3. Areas of flood risk along Moonee Ponds & Yuroke Creeks

- |  |                              |  |                                  |  |                      |
|--|------------------------------|--|----------------------------------|--|----------------------|
|  | Waterbody                    |  | Boundary for this Appendix       |  | Telephone Exchange   |
|  | 1% AEP Riverine Flood Extent |  | Melbourne Water Stormwater Drain |  | Municipal Depot      |
|  | 1% AEP Flash Flood Extent    |  | Creek / Channel                  |  | Community Centre     |
|  | Reserve / Park               |  | Bicycle / Walking Trail          |  | Police Station       |
|  | Commercial Precinct          |  | State Emergency Service          |  | Rain Gauge           |
|  | Bus Route (PTV)              |  | Fire Station                     |  | Stream Level Gauge   |
|  | Levee                        |  | Sewer Pumping Station            |  | Retail Water Storage |
|  | Power Terminal Station       |  | Drainage Pumping Station         |  |                      |
|  | Ambulance Station            |  | Airport                          |  |                      |



**SES VICTORIA** **Melbourne Water**

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Figure C3 – Areas of flood risk around Moonee Ponds & Yuroke Creeks in Hume City and area covered by this Appendix

## Properties at Flood Risk

Properties listed in the table below are at risk from flooding within the Moonee Ponds Creek catchment within Hume City during a 1% AEP flood event. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Moonee Ponds Creek (Melbourne Water, January 1996) and the Yuroke Creek (GHD, March 2012) flood mapping and risk assessment programs. Note that any multi-lot properties situated above ground floor likely impacted by isolation only with flooding on ground floor impacting access to common areas and/or carpark and storage facilities. Information on above ground-floor properties is not available in this list.

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Properties at risk from Flooding along Moonee Ponds, Yuroke Creeks and stormwater tributaries in Hume City during a 1% AEP event					
	Residential	Commercial	Industrial	Rural	Public Use
Street No. at Risk	Street	Suburb	Along Melbourne Water Watercourse	Flood Risk Type	
2	Coghill Street	Westmeadows	Attwood Creek	Flash	
94	Longford Crescent	Coolaroo	Otway Crescent Drain	Flash	
96	Longford Crescent	Coolaroo	Otway Crescent Drain	Flash	
98	Longford Crescent	Coolaroo	Otway Crescent Drain	Flash	
100	Longford Crescent	Coolaroo	Otway Crescent Drain	Flash	
102	Longford Crescent	Coolaroo	Otway Crescent Drain	Flash	
104	Longford Crescent	Coolaroo	Otway Crescent Drain	Flash	
1	Norval Crescent	Coolaroo	Otway Crescent Drain	Flash	
107-109	Raleigh Street	Westmeadows	Moonee Ponds Creek	Riverine	
111	Raleigh Street	Westmeadows	Moonee Ponds Creek	Riverine	
120	Raleigh Street	Westmeadows	Attwood Creek	Flash	
122	Raleigh Street	Westmeadows	Attwood Creek	Flash	
124	Raleigh Street	Westmeadows	Attwood Creek	Flash	
126	Raleigh Street	Westmeadows	Attwood Creek	Flash	
128	Raleigh Street	Westmeadows	Attwood Creek	Flash	
11	Redesdale Street	Meadow Heights	Otway Crescent Drain	Flash	
13	Redesdale Street	Meadow Heights	Otway Crescent Drain	Flash	
17	Redesdale Street	Meadow Heights	Otway Crescent Drain	Flash	
1	Seville Court	Meadow Heights	Otway Crescent Drain	Flash	
2	Seville Court	Meadow Heights	Otway Crescent Drain	Flash	
157-159	Sunset Boulevard	Jacana	Moonee Ponds Creek	Riverine	
9	Thalia Court	Meadow Heights	Otway Crescent Drain	Flash	
10	Thalia Court	Meadow Heights	Otway Crescent Drain	Flash	
12	Thalia Court	Meadow Heights	Otway Crescent Drain	Flash	
<b>Total</b>					
<b>24</b>					

Table C3.3 – Properties at risk of flooding along Moonee Ponds Creek catchment in Hume City

## Isolation

No major isolation risks exist for areas around Greenvale, Attwood, Meadow Heights, Westmeadows, Gladstone Park or Jacana during a 1% AEP (100yr ARI) event. Some localised short-duration isolation may occur due to flash flooding.

## Essential Infrastructure

During an event, see the Public Transport Victoria's Website for details on delays or alterations to services. <http://ptv.vic.gov.au/live-travel-updates/>. A map of Public Transport routes within Hume City is available via the website at: <https://www.ptv.vic.gov.au/assets/default-site/more/maps/Local-area-maps/Metropolitan/e076ce6272/Hume-LAM-2020.pdf>

Apart from the roads outlined below, all other essential infrastructure and services areas around Greenvale, Attwood, Meadow Heights, Westmeadows, Gladstone Park and Jacana are expected to remain unaffected by flooding during a 1% AEP (100yr ARI) event.

## Road Closures

The following roads are subject to closure during flooding around Greenvale, Attwood, Meadow Heights, Westmeadows, Gladstone Park and Jacana. Check the VicRoads website for more details: <https://traffic.vicroads.vic.gov.au/>

VicRoads Roads flooded in a 1% AEP (100yr ARI) event
<ul style="list-style-type: none"> <li>Mickleham Road, Greenvale near Aitken College</li> </ul>
<ul style="list-style-type: none"> <li>Pascoe Vale Road service road, Meadow Heights between Taggerty Drive and Dunkeld Street</li> </ul>
<ul style="list-style-type: none"> <li>Oaklands Road, Greenvale at Woodlands Historic Park</li> </ul>

Table C3.4 – VicRoads Possible Road Closures during a flooding event

Hume City Council Roads flooded in a 1% AEP (100yr ARI) event	
<b>BROADMEADOWS</b>	<b>OAKLANDS JUNCTION</b>
<ul style="list-style-type: none"> <li>Ripplebrook Drive</li> </ul>	<ul style="list-style-type: none"> <li>Oaklands Road</li> </ul>
<b>COOLAROO</b>	<b>WESTMEADOWS</b>
<ul style="list-style-type: none"> <li>Longford Crescent</li> </ul>	<ul style="list-style-type: none"> <li>Black Street</li> </ul>
<b>MEADOW HEIGHTS</b>	<ul style="list-style-type: none"> <li>Broad Street</li> </ul>
<ul style="list-style-type: none"> <li>Redesdale Street</li> </ul>	<ul style="list-style-type: none"> <li>Johnstone Street</li> </ul>
<ul style="list-style-type: none"> <li>Seville Court</li> </ul>	<ul style="list-style-type: none"> <li>Raleigh Street</li> </ul>
<ul style="list-style-type: none"> <li>Shankland Boulevard</li> </ul>	<b>YUROKE</b>
<ul style="list-style-type: none"> <li>Thalia Court</li> </ul>	<ul style="list-style-type: none"> <li>Dunhelen Lane</li> </ul>

Table C3.5 – Hume City Council possible road closures during a flooding event

## Flood Mitigation

### Retarding Basins

Melbourne Water Retarding Basin	On Drain/ Waterway	Area	Storage Capacity	Spillway Crest Level	Full Supply Level	Embankment Crest Level	ANCOLD Hazard Rating	Houses In Flow Path (dam breach)	Melway Reference
Aspect Wetland	Brodies Creek	2.0 ha	30.7 ML	188.5m AHD	Unavailable	2.5m (189m AHD)	Significant	Unavailable	178 K3
Barrymore Road	Broad St Drain	0.4 ha	1.8 ML	125.0m AHD	125.5m AHD	3.0m (126m AHD)	Very Low	0	5 K1
Booths Street	Booths Drain / Moonee Ponds Creek	0.7 ha	11 ML	Unavailable	96.2m AHD	1.7m (96.7m AHD)	High C	29	5 J8
Dumfries Terrace Lower	Broad St Drain	1.0 ha	5.0 ML	139.5m AHD	140m AHD	2.0m (140.1m AHD)	Very Low	0	178 J11
Dumfries Terrace Upper	Broad St Drain	0.4 ha	2.5 ML	143.3m AHD	143.8m AHD	2.0m	Very Low	0	178 J11
Greenvale Gardens	Brodies Creek	2.3 ha	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	178 J5
Ninnis Court	Kirkham Dr Drain / Yuroke Creek	0.4 ha	5.7 ML	147.6m AHD	Unavailable	3.5m (149.45m AHD)	Very Low	0	179 F8
Otway Crescent	Otway Crescent	1.5 ha	29 ML	Unavailable	Unavailable	1.5m (163.5m AHD)	Very Low	0	180 A8
Shankland Reserve RBs (2A)	Shankland Drain	1.0 ha	12 ML	175.8m AHD	Unavailable	1.5m (176.5m AHD)	High C	4	179 H6
Shankland Reserve RBs (2B)	Shankland Drain	0.7 ha	24 ML	168.8m AHD	Unavailable	4m	High C	13	179 H7
Shankland Reserve RBs (2C)	Shankland Drain	0.7 ha	27 ML	159.2m AHD	Unavailable	5m	Very Low	0	179 H8
Shankland Reserve RBs (2D)	Shankland Drain	2.0 ha	79 ML	149.3m AHD	Unavailable	5m	High C	60	179 H8

Table C3.6 – Melbourne Water Retarding Basins within the Moonee Ponds & Yuroke Creeks catchment in Hume City

No formal Pumping Stations or Levees exist around the Moonee Ponds & Yuroke Creeks.

## **Sewerage Infrastructure**

There is no sewerage Infrastructure expected to be within the vicinity of floodwaters during severe flood events around the Moonee Ponds & Yuroke Creeks.

## **Command, Control and Coordination**

VICSES will assume overall control of the response to flood incidents. Other agencies will be requested to support operations as detailed in this Plan. Control and coordination of a flood incident shall be carried out at the lowest effective level and in accordance with the State Emergency Response Plan (EMMV Part 3). During significant events, VICSES will conduct incident management using multi-agency resources.

## **Flood Impacts & Operational Considerations (Intelligence Cards)**

The tables on the following pages provide a breakdown of the possible consequences of flooding along the Moonee Ponds and Yuroke Creeks at various creek heights or rain totals within Hume City. These tables are to be used only as a guide as no two floods at a location will have identical impacts.

Intelligence Cards have been included for the following locations:

- Moonee Ponds Creek, Jacana
- Yuroke Creek Stormwater Tributaries

# FLOOD INTELLIGENCE CARD – JACANA R/B GAUGE, MOONEE PONDS CREEK

Version 3 – January 2020



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LOCATION	Jacana Retarding Basin near Embankment, Glenroy
MELWAY REFERENCE:	6 D12
STREAM:	Moonee Ponds Creek
GAUGE NUMBER:	229665A
GAUGE ZERO:	54.58m AHD
GAUGE TYPE	Stream Level & Rain

MINOR:	Not Established
MODERATE:	Not Established
MAJOR	Not Established
EMBANKMENT HEIGHT:	15.04m
TELEMETRIC/MANUAL	Telemetric
HIGHEST RECORDED FLOOD:	12.57m (3 <sup>rd</sup> February 2005)

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
12.0m		<ul style="list-style-type: none"> <li>Glory hole (intake structure) spillway level reached. Flows expected to increase downstream of the retarding basin.</li> </ul>	
12.52m		<ul style="list-style-type: none"> <li>Secondary spillway(outlet structure) level reached. (Spillway level lowered 0.9m from 13.42m in May 2016)</li> </ul>	
12.57m	February 2005 Flood Level Peak	3x average Feb rainfall in 24 hours	
15.62m		<ul style="list-style-type: none"> <li>Top of Embankment reached</li> </ul>	
15.9m	1% AEP (100yr ARI) Flood Level	<p><b>Properties at Flood Risk</b>  <b>3 Properties in Total</b>  <b>Moonee Ponds Creek</b></p> <ul style="list-style-type: none"> <li>107-109 &amp; 111A Raleigh Street, Westmeadows</li> <li>157-159 Sunset Boulevard, Jacana</li> </ul> <p><b>Community Infrastructure Flooded</b></p> <ul style="list-style-type: none"> <li>Bicycle Paths along Moonee Ponds Creek and Yuroke Creek flooded in parts</li> <li>Westmeadows Hall on Raleigh Street, Westmeadows</li> <li>Jacana Reserve, Jacana</li> </ul> <p><b>Water Over Road</b>  <b>Moonee Ponds Creek</b></p>	<p>VICSES will provide warnings using EM-COP to Hume Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident</p> <p>VICSES to respond on a request by request basis.</p>

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> <li>• Dunhelen Lane, Yuroke</li> <li>• Oaklands Road, Greenvale &amp; Oaklands Junction</li> <li>• Black Street, Westmeadows</li> </ul> <p><b>Yuroke Creek</b></p> <ul style="list-style-type: none"> <li>• Johnstone Street, Westmeadows at Yuroke Creek crossing next to Ripplebrook Drive</li> <li>• Ripplebrook Drive, Broadmeadows at Johnstone Street</li> </ul>	Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements

Table C3.7 – Breakdown of likely consequences at various Jacana gauge level heights along the Moonee Ponds and Yuroke Creeks with operational considerations

# FLOOD INTELLIGENCE CARD – MOONEE PONDS AND YUROKE CREEKS STORMWATER DRAINS (UNGAUGED)

Version 1 – January 2020



Note: flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.

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CLOSEST RAIN GAUGE	<b>Greenvale Reservoir</b>
LOCATION	<b>Greenvale Reservoir, entrance off Somerton Road, Greenvale</b>
MELWAY REF:	<b>179 E8</b>

GAUGE NUMBER	<b>586028</b>
GAUGE TYPE	<b>Rain</b>
TELEMETRIC/MANUAL	<b>Telemetric</b>

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
24mm in 10 mins; 38mm in 30 mins; 48mm in 1 hour; 61mm in 2 hours; 69mm in 3 hours; or 89mm in 6 hours  Note: rainfall depths are a very rough method of estimating flood events and have been used due to the ungauged nature of the catchment. This should be used as a guide only.	1% AEP (100 year ARI)	<ul style="list-style-type: none"> <li>Note: It is not known at what level infrastructure contained below starts being flooded</li> </ul> <p><b>Properties at Flood Risk</b></p> <p><b>21 Properties in Total</b></p> <p><b>Attwood Creek</b></p> <ul style="list-style-type: none"> <li>120, 122, 124, 126 &amp; 128 Raleigh Street, Westmeadows</li> <li>2 Coghill Street, Westmeadows</li> </ul> <p><b>Otway Crescent Drain</b></p> <ul style="list-style-type: none"> <li>94, 96, 98, 100, 102 &amp; 104 Longford Crescent, Coolaroo</li> <li>1 Norval Crescent, Coolaroo</li> <li>1 &amp; 2 Seville Court, Meadow Heights</li> <li>9, 10 &amp; 12 Thalia Court, Meadow Heights</li> <li>11, 13 &amp; 17 Redesdale Street, Meadow Heights</li> </ul> <p><b>Community Infrastructure Flooded</b></p> <ul style="list-style-type: none"> <li>Broadmeadows Sports Club on Sunset Boulevard, Jacana</li> </ul> <p><b>Essential Infrastructure Likely Impacted</b></p> <ul style="list-style-type: none"> <li>Bus Route 543 along Mickleham Road, Greenvale near Aitken College</li> <li>Bus Route 540 along Longford Crescent, Coolaroo</li> <li>Bus Route 541 along Shankland Boulevard, Meadow Heights</li> </ul> <p><b>Water Over Road</b></p> <p><b>Attwood Creek</b></p> <ul style="list-style-type: none"> <li>Broad Street, Westmeadows</li> </ul>	VICSES will provide warnings using EM-COP to Hume Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident  VICSES to respond on a request by request basis  Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements  If inundation of Mickleham Rd at Aitken College is deemed likely, students will be moved to nearby St Carlo Borromeo primary

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> <li>• Raleigh Street, Westmeadows</li> <li>• <b>Brodies Creek</b></li> <li>• Mickleham Road, Greenvale near Aitken College</li> <li>• <b>Shankland Drain</b></li> <li>• Shankland Boulevard, Meadow Heights</li> <li>• <b>Otway Crescent Drain</b></li> <li>• Pascoe Vale Road service Road, Meadow Heights between Taggerty Drive and Dunkeld Street</li> <li>• Longford Crescent, Coolaroo</li> <li>• Thalia Court, Meadow Heights</li> <li>• Seville Court, Meadow Heights</li> <li>• Redesdale Street, Meadow Heights</li> </ul>	<p>school in line with the school's emergency plan</p>

Table C1.16 – Breakdown of possible consequences at various rainfall intensities around the stormwater drains in the Moonee Ponds Creek catchment with operational considerations

## APPENDIX C4 – MERRI CREEK & CRAIGIEBURN FLOOD EMERGENCY PLAN

### Overview of Flooding Consequences

*This Summary table is generated from Victorian Government data. The State of Victoria does not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for error, loss or damage which may arise from reliance upon it. All persons access this information should make appropriate enquiries to assess the currency of the data.*

Summary of Consequences in a 1% AEP (100yr ARI) flood along Merri Creek					
<b>Property</b>					
<b>Properties</b>	<b>0</b>				
Residential	0				
Commercial	0				
Industrial	0				
Public Land	0				
Rural	0				
<b>Community Infrastructure</b>					
<b>Essential Infrastructure</b>					
<b>Tourism / Recreation</b>					
<b>Government Boundaries</b>					
Local Gov't Areas	1	Hume	CMA	1	Port Phillip & Westernport
Adjacent LGAs	4	Darebin; Mitchell; Moreland; Whittlesea	CFA District	1	District 14
SES Unit Area	2	Broadmeadows; Craigieburn	MFB District	1	Northern

Table C4.1 – Consequence Summary of 1% AEP flood along Merri Creek in Hume City

Merri Creek and the adjoining suburbs of Kalkallo, Craigieburn, Somerton & Campbellfield are located between 14-30km north of Melbourne in a mixed residential and industrial area. Merri Creek is the prominent watercourse in the area, flowing from the north through the Shire of Mitchell. A number of tributaries and stormwater drains connect to Merri Creek through Hume City Council including Kalkallo Creek, Aitken Creek and the Somerset Road Drain.

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**Summary of Consequences in a 1% AEP (100yr ARI) flood along Merri Creek’s stormwater tributaries in Hume City**

Property					
<b>Properties</b>	<b>10</b>				
Residential	0				
Commercial	0				
Industrial	10				
Public Land	0				
Rural	0				
Community Infrastructure					
Essential Infrastructure					
Major Roads	2	Donnybrook Road, Kalkallo; and Sydney Road, Campbellfield			
Bus Routes	2	531; 538			
Drainage Facilities	12	Retarding Basins. Ornamental Lakes also present in catchment.			
Sewerage Facilities	6	3 Pumping Stations; and 3 Emergency Relief Points			
Tourism / Recreation					
Sports Facilities	1	Craigieburn Public Golf Course			
Caravan Parks	1	Sylvan Caravan Park on Sydney Road, Campbellfield			
Government Boundaries					
Local Gov’t Areas	1	Hume	CMA	1	Port Phillip & Westernport
Adjacent LGAs	4	Darebin; Mitchell; Moreland; Whittlesea	CFA District	1	District 14
SES Unit Area	2	Broadmeadows; Craigieburn	MFB District	1	Northern

Table C4.2 – Consequence Summary of 1% AEP flood along Merri Creek’s stormwater tributaries in Hume City

High Intensity, short duration rainfall events can cause flash flooding in and around these tributaries, while prolonged rainfall may see Merri Creek flood. See mapping in **Appendix F** for more insight into flooding in the area.

## Gauges and Warnings

Warnings are available for flooding expected along Merri Creek at Somerton. For other hydrographic/telemetry (river gauges) within the Municipality, Melbourne Water does not provide any flood warning service at this point, due to the generally short warning times available.

Hydrographic Monitoring Station	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge	Melway Ref
Merri Creek at Summerhill Road, Craigieburn North	229627A	West side of the creek 200m south of Summerhill Rd, Craigieburn	✓	✓	387 H3
Merri Creek at Craigieburn Road East, Craigieburn	229257A	East side of the creek at Craigieburn Rd bridge, Wollert	✓		387 E10
Merri Creek at Somerton	229603A	West side of the creek, 200m north of Cooper Street, Somerton	✓	✓	180 J9
Wallan	586146	Wallan Bowling Club, Windham St, Wallan		✓	646 B12

Table C4.3 – Hydrographic Monitoring Stations within the Merri Creek catchment

These Gauges may provide some warning of expected flooding. See the Melbourne Water website for more information on these gauges: <http://www.melbournewater.com.au/waterdata/rainfallandriverleveldata/Pages/Rainfall-and-river-level-new.aspx>. It is advised that residents monitor the Bureau of Meteorology's website <http://www.bom.gov.au/> and the VicEmergency website <https://emergency.vic.gov.au/> for any thunderstorm, flood or severe weather warnings present for their area.

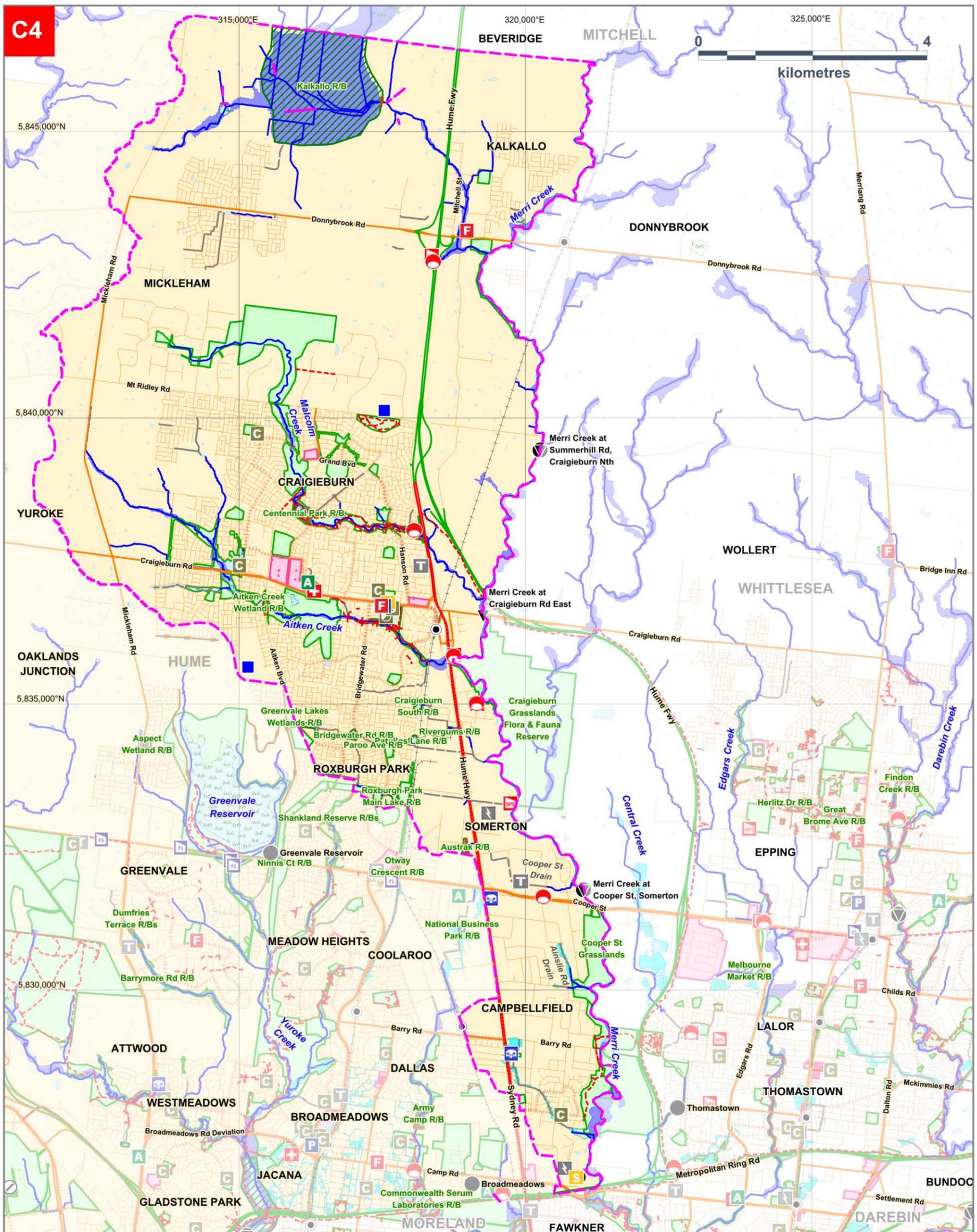
There is currently a Melbourne Water flood warning gauge on Merri Creek that could be used to assist with public safety in Hume City through the issue of flood warnings. This is at Somerton.

Gauge	River / Creek Flood Class Level		
	Minor	Moderate	Major
Merri Creek at Somerton	3.4m	3.7m	4.4m

Table C4.4 – Gauges with established Flood Class Levels for Merri Creek

At this site on Merri Creek, the Bureau of Meteorology (the Bureau) in consultation with Melbourne Water will issue flood warnings if levels reach those classified above. This warning will be placed on the Bureau's website (<http://www.bom.gov.au/vic/warnings/index.shtml>) and the VicEmergency website <https://emergency.vic.gov.au/>. While Hume City monitors these warnings in times of high rainfall, there are no specific guidelines to advise how these situations should be responded to.

Areas of Flood Risk



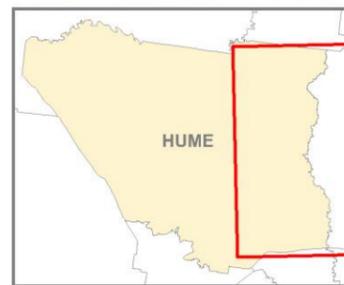
Map Produced by VICSES January 2020

**HUME CITY**

Version 3, January 2020

**C4. Areas of flood risk along Merri Creek and its stormwater tributaries**

- |  |                              |  |                                  |  |                      |
|--|------------------------------|--|----------------------------------|--|----------------------|
|  | Waterbody                    |  | Boundary for this Appendix       |  | Telephone Exchange   |
|  | 1% AEP Riverine Flood Extent |  | Melbourne Water Stormwater Drain |  | Municipal Depot      |
|  | 1% AEP Flash Flood Extent    |  | Creek / Channel                  |  | Community Centre     |
|  | Reserve / Park               |  | Bicycle / Walking Trail          |  | Police Station       |
|  | Commercial Precinct          |  | State Emergency Service          |  | Rain Gauge           |
|  | Bus Route (PTV)              |  | Fire Station                     |  | Stream Level Gauge   |
|  | Levee                        |  | Sewer Pumping Station            |  | Retail Water Storage |
|  | Power Terminal Station       |  | Drainage Pumping Station         |  |                      |
|  | Ambulance Station            |  | Airport                          |  |                      |



This map publication is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The contents of the information have not been independently verified by the Victoria State Emergency Service. No liability is accepted for any damage, loss or injury caused by errors or omissions in this information or for any action taken by any person in reliance upon it.

Figure C4 – Areas of flood risk along Merri Creek and around Craigieburn in Hume City and area covered by this Appendix

## Properties at Flood Risk

Currently no properties have been identified as being at risk from flooding along Merri Creek in Hume City during a 1% AEP event. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Merri Creek (Beverage to Craigieburn) (Melbourne Water, March 1991) and the Merri Creek (Craigieburn to Campbellfield) (Melbourne Water, April 2009) flood mapping and risk assessment programs.

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Properties at risk from Flooding along Merri Creek in Hume City during a 1% AEP event				
Residential	Commercial	Industrial	Rural	Public Use
Street No. at Risk	Street	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
<b>Total</b>				
<b>0</b>				

Table C4.5 – Properties at risk of flooding along Merri Creek in Hume City

Properties listed in the table below are at risk from flooding along Merri Creek's stormwater tributaries in Hume City. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Aitken Creek (Melbourne Water), Malcolm Creek (Melbourne Water, December 2012) and the Somerset Road Drain (Melbourne Water, April 1998) flood mapping and risk assessment programs. Note that any multi-lot properties situated above ground floor likely impacted by isolation only with flooding on ground floor impacting access to common areas and/or carpark and storage facilities. Information on above ground-floor properties is not available in this list.

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Properties at risk from Flash Flooding along Merri Creek's stormwater Tributaries in Hume City						
Residential			Commercial	Industrial	Rural	Public Use
Street No. at Risk in AEP Event			Address	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
20% AEP	5% AEP	1% AEP				
		✓	209-219 Barry Road	Campbellfield	Somerset Road Drain	Flash
		✓	223 Barry Road	Campbellfield	Somerset Road Drain	Flash
✓	✓	✓	1/41 Horne Street	Campbellfield	Somerset Road Drain	Flash
✓	✓	✓	2/41 Horne Street	Campbellfield	Somerset Road Drain	Flash
✓	✓	✓	1/43 Horne Street	Campbellfield	Somerset Road Drain	Flash
✓	✓	✓	2/43 Horne Street	Campbellfield	Somerset Road Drain	Flash
✓	✓	✓	1/89 Somerset Road	Campbellfield	Somerset Road Drain	Flash
✓	✓	✓	2/89 Somerset Road	Campbellfield	Somerset Road Drain	Flash
✓	✓	✓	4 Sycamore Crescent	Campbellfield	Somerset Road Drain	Flash
✓	✓	✓	1754-1762 Sydney Road	Campbellfield	Somerset Road Drain	Flash
Totals						
7	8	10				

Table C4.6 – Properties at risk of flash flooding along Merri Creek's stormwater tributaries in Hume City

## Isolation

No major isolation risks exist for areas around Kalkallo, Craigieburn, Somerton & Campbellfield during a 1% AEP (100yr ARI) event. Some localised short-duration isolation may occur due to flash flooding.

## Essential Infrastructure

During an event, see the Public Transport Victoria's Website for details on delays or alterations to services. <http://ptv.vic.gov.au/live-travel-updates/>. A map of Public Transport routes within Hume City is available via the website at: <https://www.ptv.vic.gov.au/assets/default-site/more/maps/Local-area-maps/Metropolitan/e076ce6272/Hume-LAM-2020.pdf>

Apart from the roads outlined below, all other essential infrastructure and services areas around Kalkallo, Craigieburn, Somerton & Campbellfield are expected to remain unaffected by flooding during a 1% AEP (100yr ARI) event.

## Road Closures

The following roads are subject to closure during flooding around Kalkallo, Craigieburn, Somerton & Campbellfield. Check the VicRoads website for more details: <https://traffic.vicroads.vic.gov.au/>

VicRoads Roads flooded in a 1% AEP (100yr ARI) event
<ul style="list-style-type: none"> <li>Donnybrook Road, Kalkallo at Kalkallo Creek crossing</li> </ul>
<ul style="list-style-type: none"> <li>Sydney Road, Campbellfield south of Barry Road</li> </ul>

Table C4.7 – VicRoads Possible Road Closures during a flooding event

Hume City Council Roads flooded in a 1% AEP (100yr ARI) event	
CAMPBELLFIELD	CRAIGIEBURN
<ul style="list-style-type: none"> <li>Barry Road</li> </ul>	<ul style="list-style-type: none"> <li>Brookville Drive</li> </ul>
<ul style="list-style-type: none"> <li>Berwick Road</li> </ul>	<ul style="list-style-type: none"> <li>Waterview Boulevard</li> </ul>
<ul style="list-style-type: none"> <li>Fordson Road</li> </ul>	<ul style="list-style-type: none"> <li>Whites Lane</li> </ul>
<ul style="list-style-type: none"> <li>Horne Street</li> </ul>	
<ul style="list-style-type: none"> <li>Premier Drive</li> </ul>	
<ul style="list-style-type: none"> <li>Somerset Road</li> </ul>	
<ul style="list-style-type: none"> <li>Sycamore Crescent</li> </ul>	

Table C4.8 – Hume City Council Possible Road Closures during a flooding event

## Flood Mitigation

### Retarding Basins

Melbourne Water Retarding Basin	On Drain/Waterway	Area	Storage Capacity	Spillway Crest Level	Full Supply Level	Embankment Crest Level	ANCOLD Hazard Rating	Houses In Flow Path (dam breach)	Melway Reference
Aitken Creek Wetland	Aitken Creek	6.7 ha	234 ML	Unavailable	Unavailable	3.3m (210.3m AHD)	Significant	Unavailable	386 E9
Austrak	Coopers Rd Drain	1.9 ha	31.9 ML	Unavailable	Unavailable	Unavailable	High C	15	180 D8
Bridgewater Road	Patullos Drain	2.1 ha	9 ML	N/A	185.0m AHD	0.5m (186.8m AHD)	Very Low	10	179 J3
Centennial Park	Malcolm Creek	5.5 ha	65 ML	218.1m AHD	Unavailable	3.0m (218.1m AHD)	Very Low	0	386 J5
Craigieburn South	Craigieburn South Drain	1.9 ha	21 ML	Unavailable	177.45m AHD	1.3m-2.0m (178.0m AHD)	Very Low	0	180 B1
Greenvale Lakes Wetlands	Patullos Drain	2.6 ha	11 ML	Unavailable	Unavailable	1.3m (197.3m AHD)	Very Low	0	179 G2
Kalkallo	Kalkallo Creek	388 ha	4,700 ML	231.3m AHD	231.42m AHD	5.4m (232.3m AHD)	High C	4	366 H1
Klein Crescent	Coopers Rd Drain	0.5 ha	13 ML	N/A	186.4m AHD	(187.8m AHD)	Very Low	0	179 J4
Paroo Avenue	Patullos Drain	0.7 ha	21 ML	N/A	180.95m AHD	(181.6m AHD)	Very Low	0	179 K3
Patullos Lane	Patullos Drain	2.0 ha	17 ML	N/A	174.1m AHD	1.0m (175.3m AHD)	High C	18	180 B3
Rivergums	Craigieburn South Drain	1.1 ha	7.4 ML	168.55m AHD	168.55m AHD	0.8m (168.85m AHD)	Low	2	180 D3
Roxburgh Park Main Lake	Coopers Rd Drain	2.8 ha	58 ML	Unavailable	173.2m AHD	2.5m (173.5m AHD)	Significant	19	180 A5

Table C4.9 – Melbourne Water Retarding Basins within the Merri Creek catchment in Hume City

No formal Pumping Stations or Levees exist around Merri Creek and its tributaries in Hume City.

## Sewerage Infrastructure

Sewerage Infrastructure of note during a severe flood event located around Merri Creek and its stormwater tributaries is contained within the following two tables.

### Sewer Pumping Stations

Sewerage Pumping Station	On Drain / Waterway	Bank / Side of Waterway	Operator	Location	Melway Reference
Craigieburn	Merri Creek at Aitken Creek	West	Yarra Valley Water	Yarra Valley Water Craigieburn Sewerage Treatment Plant	387 D11
Donnybrook Road	Kalkallo Creek Tributary	N/A	Yarra Valley Water	Hume Freeway Kalkallo Off-Ramp north bound, Kalkallo	367 C6
Dunlop Olympic	Cooper St Drain	N/A	Yarra Valley Water	O'Herns Road, Somerton	180 F6

Table C4.10 – Sewer Pumping Stations within the Merri Creek Catchment in Hume City

### Sewer Emergency Relief Points

There are Sewer Emergency Relief Points along Merri Creek and its stormwater tributaries in Hume that will likely affect floodwater conditions should they be activated. Contact the Infrastructure Operator EMLO/Duty Officer for information on any recent or planned releases at a Sewer Emergency Relief Point as part of a Dynamic Risk Assessment (DRA) if work is to be conducted at or downstream of the outlet.

On Drain / Waterway	Bank / Side of Waterway	Operator	Location	Melway Reference
Kalkallo Creek Tributary	N/A	Yarra Valley Water	Hume Freeway Kalkallo Off-Ramp north bound, Kalkallo	367 C6
Malcolm Creek	North	Yarra Valley Water	Malcolm Creek Linear Park Elsternwick Way, Craigieburn	387 B6
Merri Creek at Aitken Creek confluence	West	Yarra Valley Water	Yarra Valley Water Craigieburn Sewerage Treatment Plant	387 D11

Table C4.11 – Sewer Emergency Relief Points in the Merri Creek Catchment in Hume City

## Command, Control and Coordination

VICSES will assume overall control of the response to flood incidents. Other agencies will be requested to support operations as detailed in this Plan. Control and coordination of a flood incident shall be carried out at the lowest effective level and in accordance with the State Emergency Response Plan (EMMV Part 3). During significant events, VICSES will conduct incident management using multi-agency resources.

## **Flood Impacts & Operational Considerations (Intelligence Cards)**

The tables on the following pages provide a breakdown of the possible consequences of flooding along Merri Creek and its stormwater tributaries at various creek heights or rain totals within Hume City. These tables are to be used only as a guide as no two floods at a location will have identical impacts.

Intelligence Cards have been included for the following locations:

- Merri Creek, Craigieburn North
- Merri Creek, Craigieburn
- Merri Creek, Somerton
- Merri Creek Stormwater Tributaries

# FLOOD INTELLIGENCE CARD – CRAIGIEBURN NORTH GAUGE, MERRI CREEK

Version 3 – January 2020



*Note: flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.*

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LOCATION	<b>West side of the creek 200m south of Summerhill Rd, Craigieburn</b>
MELWAY REFERENCE:	<b>387 H3</b>
STREAM:	<b>Merri Creek</b>
GAUGE NUMBER:	<b>229627A</b>
GAUGE ZERO:	<b>194.073m AHD</b>
GAUGE TYPE	<b>Stream Level &amp; Rain</b>

MINOR:	<b>Not Established</b>
MODERATE:	<b>Not Established</b>
MAJOR	<b>Not Established</b>
LEVEE HEIGHT:	<b>N/A</b>
TELEMETRIC/MANUAL	<b>Telemetric</b>
HIGHEST RECORDED FLOOD:	<b>4.90m (15<sup>th</sup> May 1974)</b>

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
4.9m	1% AEP (100yr ARI) Flood Level 15 <sup>th</sup> May 1974 Flood Level Peak	<ul style="list-style-type: none"> <li>Nil Expected in Hume City</li> </ul>	VICSES to respond on a request by request basis.

Table C4.10 – Breakdown of likely consequences at various Craigieburn North gauge level heights along Merri Creek with operational considerations

# FLOOD INTELLIGENCE CARD – CRAIGIEBURN GAUGE, MERRI CREEK

Version 3 – January 2020



*Note: flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.*

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LOCATION	<b>East side of the creek at Craigieburn Rd bridge, Wollert</b>
MELWAY REFERENCE:	<b>387 E10</b>
STREAM:	<b>Merri Creek</b>
GAUGE NUMBER:	<b>229257A</b>
GAUGE ZERO:	<b>172.14m AHD</b>
GAUGE TYPE	<b>Stream Level</b>

MINOR:	<b>Not Established</b>
MODERATE:	<b>Not Established</b>
MAJOR	<b>Not Established</b>
LEVEE HEIGHT:	<b>N/A</b>
TELEMETRIC/MANUAL	<b>Telemetric</b>
HIGHEST RECORDED FLOOD:	<b>1.97m (1<sup>st</sup> June 2013)</b>

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
3.62m	1% AEP (100yr ARI) Flood Level	<ul style="list-style-type: none"> <li>Nil expected in Hume City</li> </ul>	VICSES to respond on a request by request basis.

Table C4.11 – Breakdown of likely consequences at various Craigieburn gauge level heights along Merri Creek with operational considerations

# FLOOD INTELLIGENCE CARD – SOMERTON GAUGE, MERRI CREEK

Version 3 – January 2020



Note: flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.

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LOCATION	West side of the creek, 200m north of Cooper Street, Somerton
MELWAY REFERENCE:	180 J9
STREAM:	Merri Creek
GAUGE NUMBER:	229603A
GAUGE ZERO:	125.048m AHD
GAUGE TYPE	Stream Level & Rain

MINOR:	3.4m
MODERATE:	3.7m
MAJOR	4.4m
LEVEE HEIGHT:	N/A
TELEMETRIC/MANUAL	Telemetric
HIGHEST RECORDED FLOOD:	4.97m (15 <sup>th</sup> May 1974)

Creek Height	Flood Class or Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
3.3m		<ul style="list-style-type: none"> <li>Bank Full Level</li> </ul>	
3.4m	MINOR FLOOD LEVEL	<ul style="list-style-type: none"> <li>Nil expected in Hume City</li> </ul>	
3.7m	MODERATE FLOOD LEVEL	<ul style="list-style-type: none"> <li>Nil expected in Hume City</li> </ul>	
4.4m	MAJOR FLOOD LEVEL	<ul style="list-style-type: none"> <li>Nil expected in Hume City</li> </ul>	
4.97m	15 <sup>th</sup> May 1974 Flood Level Peak		
5.2m	1% AEP (100yr ARI) Flood Level (Major)	<ul style="list-style-type: none"> <li>Nil expected in Hume City</li> </ul>	VICSES to respond on a request by request basis.

Table C4.12 – Breakdown of likely consequences at various Somerton gauge level heights along Merri Creek with operational considerations

# FLOOD INTELLIGENCE CARD – MERRI CREEK STORMWATER TRIBUTARIES (UNGAUGED)

Version 3– January 2020



Note: flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.

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CLOSEST RAIN GAUGE	<b>Merri Creek at Somerton</b>
LOCATION	<b>West side of the creek, 200m north of Cooper Street, Somerton</b>
MELWAY REF:	<b>180 J9</b>

GAUGE NUMBER	<b>229603A</b>
GAUGE TYPE	<b>Stream Level &amp; Rain</b>
TELEMETRIC/MANUAL	<b>Telemetric</b>

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
38mm in 13 hours	17 <sup>th</sup> June 2018 Flood Event	<b>Aitken Creek - Dam</b> (Ornamental Lake) overtopped, flooding property at 206 Central Park Ave, Craigieburn	VICSES unit provided sandbags and pumps to divert water and protect property
16mm in 10 mins; 26mm in 30 mins; 34mm in 1 hour; 44mm in 2 hours; 62mm in 6 hours; or 78mm in 12 hours  Note: rainfall depths are a very rough method of estimating flood events and have been used due to the ungauged nature of the catchment. This should be used as a guide only.	5% AEP (20 year ARI)	<p><b>Properties at Flood Risk (Over-Floor)</b>  <b>7 Properties in Total</b>  <b>Somerset Road Drain, Campbellfield</b></p> <ul style="list-style-type: none"> <li>Factories 1-2/41 &amp; Factories 1-2/43 Horne Street, Campbellfield</li> <li>Factories 1-2/89 Somerset Road, Campbellfield</li> <li>1754-1762 Sydney Road, Campbellfield</li> </ul> <p><b>Community Infrastructure Flooded</b>  <b>Somerset Rd Drain, Campbellfield</b></p> <ul style="list-style-type: none"> <li>Sylvan Caravan Park on Sydney Road, Campbellfield affected by property flooding</li> </ul> <p><b>Water Over Road</b>  <b>Somerset Rd Drain, Campbellfield</b></p> <ul style="list-style-type: none"> <li>Sydney Road, Campbellfield south of Barry Road</li> <li>Berwick Road, Campbellfield</li> <li>Fordson Road, Campbellfield</li> <li>Sycamore Crescent, Campbellfield between Waratah Street and Somerset Road</li> <li>Somerset Road, Campbellfield at Sycamore Crescent</li> <li>Horne Street, Campbellfield</li> </ul>	<p>VICSES to respond on a request by request basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p> <p>Caravan park owners are aware of risk, nil over-floor flooding or access issues expected</p>

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
<p>19mm in 10 mins; 32mm in 30 mins; 42mm in 1 hour; 53mm in 2 hours; 75mm in 6 hours; or 94mm in 12 hours</p> <p>Note: rainfall depths are a very rough method of estimating flood events and have been used due to the ungagged nature of the catchment. This should be used as a guide only.</p>	<p>2% AEP (50 year ARI)</p>	<p><b>Properties at Flood Risk (Over-Floor)</b> <b>8 Properties in Total</b> <b>Somerset Road Drain, Campbellfield</b></p> <ul style="list-style-type: none"> <li>Factories 1-2/41 &amp; Factories 1-2/43 Horne Street, Campbellfield</li> <li>Factories 1-2/89 Somerset Road, Campbellfield</li> <li>4 Sycamore Crescent, Campbellfield</li> <li>1754-1762 Sydney Road, Campbellfield</li> </ul> <p><b>Community Infrastructure Flooded</b> <b>Somerset Rd Drain, Campbellfield</b></p> <ul style="list-style-type: none"> <li>Sylvan Caravan Park on Sydney Road, Campbellfield affected by property flooding</li> </ul> <p><b>Water Over Road</b> <b>Kalkallo Creek</b></p> <ul style="list-style-type: none"> <li>Donnybrook Road, Kalkallo at Kalkallo Creek crossing</li> <li>Brookville Drive, Craigieburn at Kalkallo Creek crossing</li> </ul> <p><b>Ainslie Road Drain, Campbellfield</b></p> <ul style="list-style-type: none"> <li>Premier Drive, Campbellfield</li> </ul> <p><b>Somerset Road Drain, Campbellfield</b></p> <ul style="list-style-type: none"> <li>Barry Road, Campbellfield east of Sydney Road</li> <li>Sydney Road, Campbellfield south of Barry Road</li> <li>Berwick Road, Campbellfield</li> <li>Fordson Road, Campbellfield</li> <li>Sycamore Crescent, Campbellfield between Waratah Street and Somerset Road</li> <li>Somerset Road, Campbellfield at Sycamore Crescent</li> <li>Horne Street, Campbellfield</li> </ul>	<p>VICSES may provide warnings using EM-COP to Hume Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident</p> <p>VICSES to respond on a request by request basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p>
<p>22mm in 10 mins; 37mm in 30 mins; 48mm in 1 hour; 60mm in 2 hours; 85mm in 6 hours; or 106mm in 12 hours</p> <p>Note: rainfall depths are a very rough method of estimating flood events and have been used due to the ungagged nature of the catchment. This should be used as a guide only.</p>	<p>1% AEP (100 year ARI)</p>	<p><b>Properties at Flood Risk (Over-Floor)</b> <b>10 Properties in Total</b> <b>Somerset Road Drain, Campbellfield</b></p> <ul style="list-style-type: none"> <li>209-219 &amp; 223 Barry Road, Campbellfield</li> <li>Factories 1-2/41 &amp; Factories 1-2/43 Horne Street, Campbellfield</li> <li>Factories 1-2/89 Somerset Road, Campbellfield</li> <li>4 Sycamore Crescent, Campbellfield</li> <li>1754-1762 Sydney Road, Campbellfield</li> </ul> <p><b>Community Infrastructure Flooded</b> <b>Somerset Road Drain, Campbellfield</b></p> <ul style="list-style-type: none"> <li>Sylvan Caravan Park on Sydney Road, Campbellfield</li> </ul> <p><b>Aitken Creek, Craigieburn</b></p> <ul style="list-style-type: none"> <li>Craigieburn Public Golf Course flooded in parts</li> </ul> <p><b>Essential Infrastructure Likely Impacted</b> <b>Somerset Road Drain, Campbellfield</b></p> <ul style="list-style-type: none"> <li>Bus Routes 531 and 538 along Somerset and Sydney Roads, Campbellfield</li> </ul>	<p>VICSES will provide warnings using EM-COP to Hume Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident</p> <p>VICSES to respond on a request by request basis.</p>

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<p><b>Water Over Road</b></p> <p><b>Kalkallo Creek</b></p> <ul style="list-style-type: none"> <li>• Donnybrook Road, Kalkallo at Kalkallo Creek crossing</li> <li>• Brookville Drive, Craigieburn at Kalkallo Creek crossing</li> </ul> <p><b>Aitken Creek, Craigieburn</b></p> <ul style="list-style-type: none"> <li>• Whites Lane, Craigieburn at Aitken Creek crossing</li> <li>• Waterview Boulevard, Craigieburn at Aitken Creek Wetland</li> </ul> <p><b>Ainslie Road Drain, Campbellfield</b></p> <ul style="list-style-type: none"> <li>• Premier Drive, Campbellfield</li> </ul> <p><b>Somerset Road Drain, Campbellfield</b></p> <ul style="list-style-type: none"> <li>• Barry Road, Campbellfield east of Sydney Road</li> <li>• Sydney Road, Campbellfield south of Barry Road</li> <li>• Berwick Road, Campbellfield</li> <li>• Fordson Road, Campbellfield</li> <li>• Sycamore Crescent, Campbellfield between Waratah Street and Somerset Road</li> <li>• Somerset Road, Campbellfield at Sycamore Crescent</li> <li>• Horne Street, Campbellfield</li> </ul>	<p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p>

Table C4.13 – Breakdown of possible consequences at various rainfall intensities around Kalkallo, Craigieburn, Roxburgh Park, Somerton and Campbellfield with operational considerations

# APPENDIX C5 – MERLYNSTON CREEK FLOOD EMERGENCY PLAN

## Overview of Flooding Consequences

*This Summary table is generated from Victorian Government data. The State of Victoria does not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for error, loss or damage which may arise from reliance upon it. All persons access this information should make appropriate enquiries to assess the currency of the data.*

Summary of Consequences in a 1% AEP (100yr ARI) flood along the Merlynston and Campbellfield Creeks in Hume					
<b>Property</b>					
<b>Properties</b>	<b>51</b>				
Residential	0				
Commercial	28				
Industrial	23				
Public Land	0				
Rural	0				
<b>Community Infrastructure</b>					
<b>Essential Infrastructure</b>					
Sewerage Facilities	3	1 Pumping Station and 2 Emergency Relief Points			
Drainage Facilities	3	Retarding Basins			
<b>Tourism / Recreation</b>					
<b>Government Boundaries</b>					
Local Gov't Areas	1	Hume	CMA	1	Port Phillip & Westernport
Adjacent LGAs	1	Moreland	CFA District	0	
SES Unit Area	2	Broadmeadows; and Craigieburn	MFB District	1	Northern

Table C5.1 – Consequence Summary of 1% AEP flood along the Merlynston and Campbellfield Creeks in Hume

Merlynston Creek in Hume City Council and the surrounding suburbs of Campbellfield, Coolaroo, Dallas and Broadmeadows are located between 14-19km north of Melbourne in a predominantly industrial area. Merlynston Creek is the prominent watercourse in the area, beginning in Campbellfield and flowing south into the City of Moreland. Campbellfield Creek also begins in Broadmeadows where it connects with Merlynston Creek in Fawkner.

The Merlynston/Campbellfield catchment is small and flash flooding is the primary concern for consequences/impacts. See mapping in **Appendix F** for more insight into flooding in the area.

## Gauges and Warnings

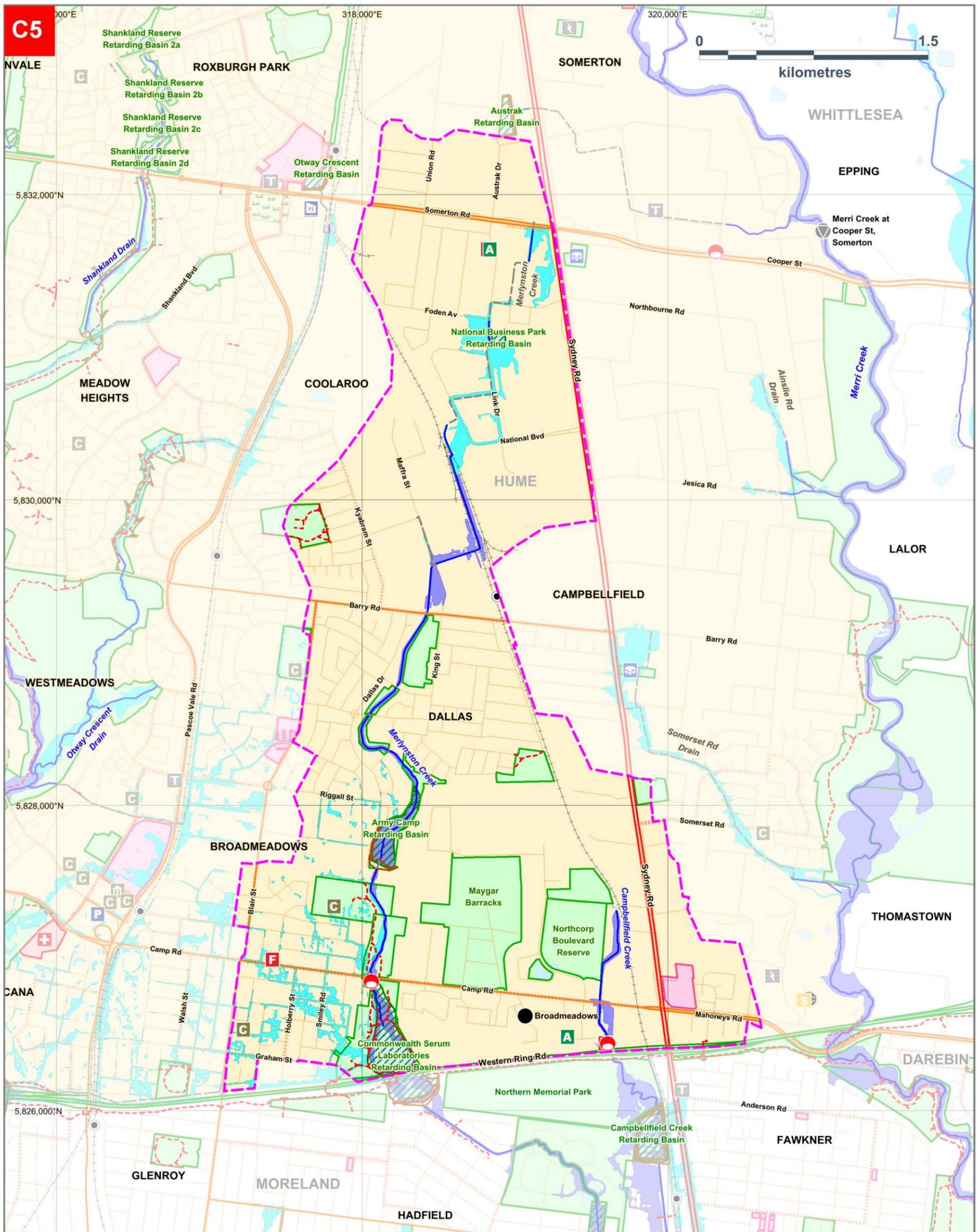
Neither the Bureau of Meteorology nor Melbourne Water currently provides flood forecasts for Merlynston Creek. All flood response actions must therefore be driven by rainfall and / or river level observations. A telemetered water level / flood gauge is located at Fawkner within the Merlynston Creek catchment.

Gauges	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge	Melway Ref
Broadmeadows	229857	Glenlitta Avenue, Broadmeadows		✓	7 D10
Merlynston Creek at Fawkner Cemetery	229402A	Sussex Street, Hadfield	✓	✓	17 E5

Table C5.2 – Hydrographic Monitoring Stations within the Merlynston Creek catchment

These Gauges may provide some warning of expected flooding. See the Melbourne Water website for more information on these gauges: <http://www.melbournewater.com.au/waterdata/rainfallandriverleveldata/Pages/Rainfall-and-river-level-new.aspx>. It is advised that residents monitor the Bureau of Meteorology's website <http://www.bom.gov.au/> and the VicEmergency website <https://emergency.vic.gov.au/> for any thunderstorm, flood or severe weather warnings present for their area.

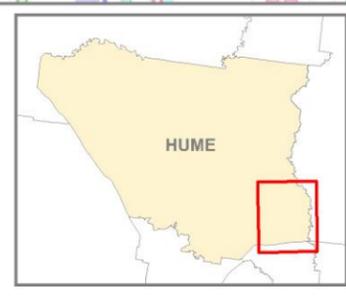
# Areas of Flood Risk



Map Produced by VICSES January 2020

**HUME CITY**  
Version 3. January 2020  
**C5. Areas of flood risk along Merlynston Creek and its stormwater tributaries**

- |                              |                                  |                      |
|------------------------------|----------------------------------|----------------------|
| Waterbody                    | Boundary for this Appendix       | Telephone Exchange   |
| 1% AEP Riverine Flood Extent | Melbourne Water Stormwater Drain | Municipal Depot      |
| 1% AEP Flash Flood Extent    | Creek / Channel                  | Community Centre     |
| Reserve / Park               | Bicycle / Walking Trail          | Police Station       |
| Commercial Precinct          | State Emergency Service          | Rain Gauge           |
| Levee                        | Fire Station                     | Stream Level Gauge   |
| Bus Route (PTV)              | Sewer Pumping Station            | Retail Water Storage |
| Power Terminal Station       | Drainage Pumping Station         |                      |
| Ambulance Station            | Sewer Emergency Relief Point     |                      |



**SES VICTORIA**  
**Melbourne Water**

This map publication is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The contents of the information have not been independently verified by the Victoria State Emergency Service. No liability is accepted for any damage, loss or injury caused by errors or omissions in this information or for any action taken by any person in reliance upon it.

Figure C5 – Areas of flood risk along Merlynston Creek in Hume City and area covered by this appendix

## Properties at Flood Risk

Properties listed in the table below are at risk from flooding over-floor along the Merlynston and Campbellfield Creeks in Hume City. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Merlynston Creek (WBM, September 2013) flood mapping and risk assessment program. Note that any multi-lot properties situated above ground floor likely impacted by isolation only with flooding on ground floor impacting access to common areas and/or carpark and storage facilities. Information on above ground-floor properties is not available in this list.

*This Property Flood Risk Table is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The contents of the information have not been independently verified by the Victoria State Emergency Service. No liability is accepted for any damage, loss or injury caused by errors or omissions in this information or for any action taken by any person in reliance upon it.*

Properties at risk from Flooding Over-Floor along the Merlynston and Campbellfield Creeks in Hume City						
Residential			Commercial	Industrial	Rural	Public Use
Street No. at Risk in AEP Event			Address	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
10% AEP	5% AEP	1% AEP				
		✓	358 Barry Road	Campbellfield	Merlynston Creek	Flash
		✓	402-410 Barry Road	Coolaroo	Merlynston Creek	Flash
		✓	37-45 Camp Road	Broadmeadows	Campbellfield Creek	Flash
✓	✓	✓	3 Foden Avenue	Campbellfield	Merlynston Creek	Flash
	✓	✓	5A Foden Avenue	Campbellfield	Merlynston Creek	Flash
	✓	✓	5 Foden Avenue	Campbellfield	Merlynston Creek	Flash
	✓	✓	7A Foden Avenue	Campbellfield	Merlynston Creek	Flash
	✓	✓	7 Foden Avenue	Campbellfield	Merlynston Creek	Flash
		✓	9 Foden Avenue	Campbellfield	Merlynston Creek	Flash
	✓	✓	51 Link Drive	Campbellfield	Merlynston Creek	Flash
		✓	2/53 Link Drive	Campbellfield	Merlynston Creek	Flash
		✓	55-57 Link Drive	Campbellfield	Merlynston Creek	Flash
		✓	59-61 Link Drive	Campbellfield	Merlynston Creek	Flash
		✓	71-73 Link Drive	Campbellfield	Merlynston Creek	Flash
		✓	72 Link Drive	Campbellfield	Merlynston Creek	Flash
		✓	104-118 Link Drive	Campbellfield	Merlynston Creek	Flash
		✓	36-40A Maffra Street	Coolaroo	Merlynston Creek	Flash
	✓	✓	42A Maffra Street	Coolaroo	Merlynston Creek	Flash
✓	✓	✓	143-147 National Boulevard	Campbellfield	Merlynston Creek	Flash
		✓	144-168 National Boulevard	Campbellfield	Merlynston Creek	Flash
		✓	1727-1787 Sydney Road	Campbellfield	Merlynston Creek	Flash
		✓	1805-1825 Sydney Road	Campbellfield	Merlynston Creek	Flash
		✓	1831-1833 Sydney Road	Campbellfield	Merlynston Creek	Flash
		✓	3A The Crossway	Campbellfield	Merlynston Creek	Flash
		✓	1A/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	1B/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	1C/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	1D/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	2A/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash

Properties at risk from Flooding Over-Floor along the Merlynston and Campbellfield Creeks in Hume City						
Residential		Commercial	Industrial	Rural	Public Use	
Street No. at Risk in AEP Event			Address	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
10% AEP	5% AEP	1% AEP				
		✓	2B/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	2C/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	2D/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	3B/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	3A/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	3C/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	3D/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	4B/1-13The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	4A/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	4C/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	4D/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	5B/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	5A/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	5C/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	5D/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	6B/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	6C/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	7B/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	8B/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	9B/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	10B/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
		✓	11B/1-13 The Gateway	Broadmeadows	Campbellfield Creek	Flash
<b>Totals</b>						
<b>2</b>	<b>8</b>	<b>51</b>				

Table C5.3 – Properties at risk of flooding along the Merlynston and Campbellfield Creeks in Hume City

## Isolation

No major isolation risks exist for areas around Campbellfield, Coolaroo, Dallas & Broadmeadows during a 1% AEP (100yr ARI) event. Some localised short-duration isolation may occur due to flash flooding.

## Essential Infrastructure

During an event, see the Public Transport Victoria's Website for details on delays or alterations to services. <http://ptv.vic.gov.au/live-travel-updates/>. A map of Public Transport routes within Hume City is available via the website at: <https://www.ptv.vic.gov.au/assets/default-site/more/maps/Local-area-maps/Metropolitan/e076ce6272/Hume-LAM-2020.pdf>

Apart from the roads outlined below, all other essential infrastructure and services areas around Campbellfield, Coolaroo, Dallas & Broadmeadows are expected to remain unaffected by flooding during a 1% AEP (100yr ARI) event.

## Road Closures

The following roads are subject to closure during flooding around Campbellfield, Coolaroo, Dallas & Broadmeadows. Check the VicRoads website for more details: <https://traffic.vicroads.vic.gov.au/>

VicRoads Roads flooded in a 1% AEP (100yr ARI) event
<ul style="list-style-type: none"><li>• Nil Expected</li></ul>

Table C5.4 – VicRoads possible road closures during a flooding event

Hume City Council Roads flooded in a 1% AEP (100yr ARI) event
<b>CAMPBELLFIELD</b>
<ul style="list-style-type: none"><li>• Foden Avenue</li></ul>
<ul style="list-style-type: none"><li>• National Boulevard</li></ul>
<ul style="list-style-type: none"><li>• Somerton Park Drive</li></ul>
<b>COOLAROO</b>
<ul style="list-style-type: none"><li>• Maffra Street</li></ul>

Table C5.5 – Hume City Council possible road closures during a flooding event

## Flood Mitigation

### Retarding Basins

Melbourne Water Retarding Basin	On Drain/ Waterway	Area	Storage Capacity	Spillway Crest Level	Full Supply Level	Embankment Crest Level	ANCOLD Hazard Rating	Houses In Flow Path (dam breach)	Melway Reference
Army Camp	Merlynston Creek	5.3 ha	126 ML	121.4m AHD	122m AHD	8.5m (122.8m AHD)	High A	4	7 B7
Comm Serum Laboratories	Merlynston Creek	16 ha	382 ML	102.2m AHD	103.1m AHD	10.1m (103.7m AHD)	High A	56	7 B11
National Business Park	Merlynston Creek	0.4 ha	13 ML	Unavailable	Unavailable	N/A (In cut)	Very Low	0	180 D11

Table C5.6 – Melbourne Water Retarding Basins within the Merlynston Creek catchment in Hume City

No formal Pumping Stations or Levees exist around Campbellfield, Coolaroo, Dallas & Broadmeadows.

### Sewerage Infrastructure

Sewerage Infrastructure of note during a severe flood event located within the Merlynston Creek catchment in Hume City is contained within the following two tables.

#### Sewer Pumping Stations

Sewerage Pumping Station	On Drain / Waterway	Bank / Side of Waterway	Operator	Location	Melway Reference
Camp Road	Campbellfield Creek	West	Yarra Valley Water	The Gateway, Broadmeadows	7 F11

Table C5.7 – Sewer Pumping Stations within the Merlynston Creek Catchment in Hume City

## Sewer Emergency Relief Points

There are Sewer Emergency Relief Points along the Merlynston and Campbellfield Creeks that will likely affect floodwater conditions should they be activated. Contact the Infrastructure Operator EMLO/Duty Officer for information on any recent or planned releases at a Sewer Emergency Relief Point as part of a Dynamic Risk Assessment (DRA) if work is to be conducted at or downstream of the outlet.

On Drain / Waterway	Bank / Side of Waterway	Operator	Location	Melway Reference
Campbellfield Creek	West	Yarra Valley Water	The Gateway, Broadmeadows	7 F11
Merlynston Creek	West	Yarra Valley Water	Camp Road, Broadmeadows	7 B9

Table C5.8 – Sewer Emergency Relief Points in the Merlynston Creek Catchment in Hume City

## Command, Control and Coordination

VICSES will assume overall control of the response to flood incidents. Other agencies will be requested to support operations as detailed in this Plan. Control and coordination of a flood incident shall be carried out at the lowest effective level and in accordance with the State Emergency Response Plan (EMMV Part 3). During significant events, VICSES will conduct incident management using multi-agency resources.

## Flood Impacts & Operational Considerations (Intelligence Cards)

The tables on the following pages provide a breakdown of the possible consequences of flooding along the Merlynston and Campbellfield Creeks at various creek heights within Hume City. These tables are to be used only as a guide as no two floods at a location will have identical impacts.

Intelligence Cards have been included for the following locations:

- Merlynston Creek at Fawkner

# FLOOD INTELLIGENCE CARD – FAWKNER GAUGE, MERLYNSTON CREEK

Version 3 – January 2020



*Note: flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.*

*This Flood Intelligence Card publication is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The contents of the information have not been independently verified by the Victoria State Emergency Service. No liability is accepted for any damage, loss or injury caused by errors or omissions in this information or for any action taken by any person in reliance upon it.*

LOCATION	<b>Fawkner Cemetery on Sussex Street, Hadfield</b>
MELWAY REFERENCE:	<b>17 E5</b>
STREAM:	<b>Merlynston Creek</b>
GAUGE NUMBER:	<b>229402A</b>
GAUGE ZERO:	<b>64.61m AHD</b>
GAUGE TYPE	<b>Stream Level &amp; Rain</b>

MINOR:	<b>Not Established</b>
MODERATE:	<b>Not Established</b>
MAJOR	<b>Not Established</b>
LEVEE HEIGHT:	<b>N/A</b>
TELEMETRIC/MANUAL	<b>Telemetric</b>
HIGHEST RECORDED FLOOD:	<b>2.61m (3<sup>rd</sup> December 2003)</b>

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
2.25m	20% AEP (5yr ARI) Flood Level	<b>Water Over Road (over 300mm depth)</b> <b>Merlynston Creek</b> <ul style="list-style-type: none"> <li>Somerton Park Drive, Campbellfield at Foden Avenue</li> </ul>	Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements
2.56m	10% AEP (10yr ARI) Flood Level	<b>Properties at Flood Risk (Over-Floor)</b> <b>2 Properties in Total</b> <b>Merlynston Creek</b> <ul style="list-style-type: none"> <li>3 Foden Avenue, Campbellfield</li> <li>143-147 National Boulevard, Campbellfield</li> </ul> <b>Water Over Road (over 300mm depth)</b> <b>Merlynston Creek</b> <ul style="list-style-type: none"> <li>Foden Avenue, Campbellfield at Somerton Park Drive</li> <li>Somerton Park Drive, Campbellfield at Foden Avenue</li> </ul>	VICSES to respond on a request by request basis.  Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements
2.80m	5% AEP (20yr ARI) Flood Level	<b>Properties at Flood Risk (Over-Floor)</b> <b>8 Properties in Total</b> <b>Merlynston Creek</b> <ul style="list-style-type: none"> <li>3, 5, 5A, 7 &amp; 7A Foden Avenue, Campbellfield</li> <li>51 Link Drive, Campbellfield</li> <li>42A Maffra Street, Coolaroo</li> <li>143-147 National Boulevard, Campbellfield</li> </ul>	VICSES to respond on a request by request basis.  Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<p><b>Water Over Road (over 300mm depth)</b></p> <p><b>Merlynston Creek</b></p> <ul style="list-style-type: none"> <li>Foden Avenue, Campbellfield at Somerton Park Drive</li> <li>Somerton Park Drive, Campbellfield at Foden Avenue</li> <li>Maffra Street, Coolaroo north of Barry Road</li> </ul>	
2.98m	2% AEP (50yr ARI) Flood Level	<p><b>Properties at Flood Risk (Over-Floor)</b></p> <p><b>20 Properties in Total</b></p> <p><b>Merlynston Creek</b></p> <ul style="list-style-type: none"> <li>358 Barry Road, Campbellfield</li> <li>402-410 Barry Road, Coolaroo</li> <li>3, 5, 5A, 7 &amp; 7A Foden Avenue, Campbellfield</li> <li>51, 2/53, 55-57, 59-61, 71-73, 72 &amp; 104-118 Link Drive, Campbellfield</li> <li>36-40A &amp; 42A Maffra Street, Coolaroo</li> <li>143-147 &amp; 144-168 National Boulevard, Campbellfield</li> <li>1727-1787 &amp; 1805-1825 Sydney Road, Campbellfield</li> </ul> <p><b>Water Over Road (over 300mm depth)</b></p> <p><b>Merlynston Creek</b></p> <ul style="list-style-type: none"> <li>Foden Avenue, Campbellfield at Somerton Park Drive</li> <li>Somerton Park Drive, Campbellfield at Foden Avenue</li> <li>National Boulevard, Campbellfield</li> <li>Maffra Street, Coolaroo north of Barry Road</li> </ul>	<p>VICSES may provide warnings using EM-COP to Hume Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident</p> <p>VICSES to respond on a request by request basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p>
3.31m	1% AEP (100yr ARI) Flood Level	<p><b>Properties at Flood Risk (Over-Floor)</b></p> <p><b>51 Properties in Total</b></p> <p><b>Merlynston Creek</b></p> <ul style="list-style-type: none"> <li>358 Barry Road, Campbellfield</li> <li>402-410 Barry Road, Coolaroo</li> <li>3, 5, 5A, 7, 7A &amp; 9 Foden Avenue, Campbellfield</li> <li>51, 2/53, 55-57, 59-61, 71-73, 72 &amp; 104-118 Link Drive, Campbellfield</li> <li>36-40A &amp; 42A Maffra Street, Coolaroo</li> <li>143-147 &amp; 144-168 National Boulevard, Campbellfield</li> <li>1727-1787, 1805-1825 &amp; 1931-1833 Sydney Road, Campbellfield</li> <li>3A The Crossway, Campbellfield</li> </ul> <p><b>Campbellfield Creek</b></p> <ul style="list-style-type: none"> <li>37-45 Camp Road, Broadmeadows</li> <li>Factories 1A-D/1-13, 2A-D/1-13, 3A-D/1-13, 4A-D/1-13, 5A-D/1-13, 6B-C/1-13, 7B/1-13, 8B/1-13, 9B/1-13, 10B/1-13 &amp; 11B/1-13 The Gateway, Broadmeadows</li> </ul> <p><b>Water Over Road (over 300mm depth)</b></p> <p><b>Merlynston Creek</b></p> <ul style="list-style-type: none"> <li>Foden Avenue, Campbellfield at Somerton Park Drive</li> <li>Somerton Park Drive, Campbellfield at Foden Avenue</li> <li>National Boulevard, Campbellfield</li> </ul>	<p>VICSES may provide warnings using EM-COP to Hume Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident</p> <p>VICSES to respond on a request by request basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p>

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> <li data-bbox="546 204 1008 226">Maffra Street, Coolaroo north of Barry Road</li> </ul>	

Table C5.9 – Breakdown of likely consequences at various Fawcner gauge level heights along the Merlynston and Campbellfield Creeks in Hume City with operational considerations

## APPENDIX D - FLOOD EVACUATION ARRANGEMENTS

### Phase 1 - Decision to Evacuate

The Incident Controller may make the decision to evacuate an at-risk community under the following circumstances:

- Properties are likely to become inundated;
- Properties are likely to become isolated and occupants are not suitable for isolated conditions;
- Public health is at threat as a consequence of flooding and evacuation is considered the most effective risk treatment. This is the role of the Health Commander of the incident to assess and manage. Refer to the State Health Emergency Response Plan (SHERP) for details);
- Essential services have been damaged and are not available to a community and evacuation is considered the most effective risk treatment.

The following should be considered when planning for evacuation:

- Anticipated flood consequences and their timing and reliability of predictions;
- Size and location of the community to be evacuated;
- Likely duration of evacuation;
- Forecast weather;
- Flood Models;
- Predicted timing of flood or storm consequences;
- Time required to conduct the evacuation;
- Time available to conduct the evacuation;
- Evacuation priorities and evacuation planning arrangements;
- Access and egress routes available and their potential flood liability;
- Current and likely future status of essential infrastructure;
- Resources required to conduct the evacuation;
- Resources available to conduct the evacuation;
- Shelter including Emergency Relief Centres, Assembly Areas etc.;
- Vulnerable people and facilities;
- Transportation;
- Registration
- People of CALD background and transient populations;
- Safety of emergency service personnel;
- Different stages of an evacuation process.

The decision to evacuate is to be made by the IC in consultation with the MERC, MERO, DHHS, Health Commander and other key agencies and expert advice (CMA's and Flood Intelligence specialists).

Triggers for evacuation, e.g. specific flood heights are predicted or are likely to occur will be considered when planning evacuation.

No triggers for the City of Hume have been defined.

## **Phase 2 – Warning**

Warnings may include a warning to prepare to evacuate and a warning to evacuate immediately. Once the decision to evacuate has been made, the at-risk community will be warned to evacuate. Evacuation warnings can be disseminated via methods listed in part 3 of this plan.

Evacuation warning messages will be developed and issued by VICSES in consultation with the MERO, MERC, DHHS and other key agencies and expert advice (CMA's and Flood Intelligence specialists).

## **Phase 3 – Withdrawal**

Withdrawal will be controlled by VicPol. VICSES may provide advice regarding most appropriate evacuation routes and locations for at-risk communities to evacuate to.

VICSES, CFA, AV and Local Government will provide resources where available to support VicPol/VicRoads with route control and may assist VicPol in arranging evacuation transportation.

VicPol will control security of evacuated areas.

Evacuees will be encouraged to move using their own transport where possible. Transport for those without vehicles or other means will be arranged.

### **Vulnerable People in Emergencies**

Vulnerable people living in the community will be identified through funded agencies, community service organisations or other community networks. Such people will be assessed against the definition of a vulnerable person and may qualify for registration on the Vulnerable Persons Register (VPR). A list of facilities where vulnerable people may be located is also kept by Council. These may be funded facilities including education, health and childcare, Commonwealth regulated aged care facilities and other locally identified facilities. Further information on Vulnerable People in Emergencies can be obtained from Hume Council's MRM.

Landing zones for helicopters are located at:

- Melbourne Airport
- Sports fields may be used dependant on condition

Special needs groups are identified in Council's 'residents at risk' register. This can be done through community network organisations. Further information on Council's 'residents at risk' register can be obtained from MEMP via the MERO/ MEMO.

## Phase 4 – Shelter

Emergency Relief/Recovery Centres and/or assembly areas which cater for people's basic needs may be established to meet the immediate needs of people affected by storms or flooding.

Relief Centres will be determined dependant on the location and size of the event. Relief centres and/or assembly areas that may be used are noted in the MEMP and Recovery Plan.

VicPol in consultation with VICSES will liaise with Local Government and DHHS (where regional coordination is required) via the relevant control centre to plan for the opening and operation of relief centres. This can best be achieved through the Incident Emergency Management Team (IEMT).

### Animal Shelter

The need for animal shelter compounds will be determined dependant on the location and size of the event. The MEMP provides details for animal shelters.

### Caravans

Caravan Parks within the City of Hume where flooding may pose a risk are contained in **Appendix C**.

## Phase 5 – Return

Return will be consistent with the Strategic Plan for the Return of Community

The IC in consultation with VicPol will determine when it is safe for evacuees to return to their properties and will arrange for the notification of the community.

VicPol will manage the return of evacuated people with the assistance of other agencies as required.

Considerations for deciding whether to evacuate include:

- Current flood or storm situation;
- Status of flood mitigation systems;
- Size and location of the community;
- Access and egress routes available and their status;
- Resources required to coordinate the return;
- Special needs groups;
- Forecast weather;
- Transportation particularly for people without access to transport

## Disruption to Services

Disruption to a range of services can occur in the event of a flood. This may include road closures affecting school bus routes, water treatment plant affecting potable water supplies etc.

Service	Impact	Trigger Point for action	Strategy/Temporary Measures
School Bus Services (local)	General road closures across network leading to student pick-ups being suspended	Inundation of road network and associated damage to an extent that it is unsafe for vehicles to use road	Aitken College emergency plans allow for student movement prior to inundation of roads at school entrance
School Bus Services (other)	General road closures across network requiring detours for other services through the area	Inundation of road network and associated damage to an extent that it is unsafe for vehicles to use road	Alternate routes via clearly signed detours. Alternate routes to be determined by Council Traffic Engineers. Council works crews to install and monitor detour signage. Council Network Inspectors to monitor road conditions, closure signage and detour signage.

## Essential Infrastructure and Property Protection

Essential Infrastructure and properties (e.g. roads, power supply, communications etc.) that require protection will be determined dependant on the event.

The City of Hume with the assistance of VICSES may establish a sandbag collection point or points for use by emergency management agencies; this will be determined by the location and the requirements of the flood event. For small scale events, sandbags can be purchased by the public from most hardware and garden suppliers.

## Rescue

There are no waterborne resources available within Hume City Council to assist with rescue operations. Requests for other Hume Council resources to support rescue activities should be forwarded to the MECC or through the appropriate MERO or EMLO.

Boats may be available through VICSES RDO/ ICC and VicPol resources requested via RERC.

No High risk areas/communities ( i.e. low-lying islands where rescues might be required have been identified, other than the occurrence of flash flooding over roadways.

## APPENDIX E - FLOOD WARNING SYSTEMS

### Flood and Storm Warning

Flood and Storm Warning products and Flood Class Levels can be found on the BoM website. Flood Warning Products include Severe Thunderstorm Warnings, Severe Weather Warnings, Flood Watches and Flood Warnings. See next page for an example of a BoM Flood Warning on the VicEmergency page

### Flood Bulletins

VICSES distributes flood emergency information to the media through “Flood Bulletins”. Flood Bulletins provide BoM Flood Warning information as well as information regarding possible flood consequences and safety advice, not contained in BoM Flood Warning products. VICSES uses the title Flood Bulletin to ensure emphasis is placed upon BoM Flood Warning product titles.

The relevant VICSES RDO or the established ICC will normally be responsible for drafting, authorising and issuing issue Flood Bulletins, using the VicEmergency system.

Flood Bulletins should refer to the warning title within the Bulletin header, for example Flood Bulletin for Major Flood Warning on Yarra River.

Flood Bulletins should follow the following structure

- What is the current flood situation;
- What is the predicted flood situation;
- What are the likely flood consequences;
- What should the community do in response to flood warnings;
- Where to seek further information;
- Who to call if emergency assistance is required.

It is important that the description of the predicted flood situation is consistent with and reflects the relevant BoM Flood Warning.

Flood Bulletins should be focused on specific gauge (or in the absence of gauges, catchment) reference areas, that is the area in which flood consequences specifically relate to the relevant flood gauge.

Flood Bulletins should be prepared and issued after receipt of each Flood Watch and Flood Warning from the BoM, or after Severe Weather or Thunderstorm Warnings indicating potential for severe flash flooding.

To ensure flood bulletins are released in a timely manner, standardised flood bulletins may be drafted based on different scenarios, prior to events occurring. The standardised flood bulletins can then be adapted to the specifics of the event occurring or predicted to occur.

### Local Flood Warning System Arrangements

There are no local flood warning system arrangements within the City of Hume.

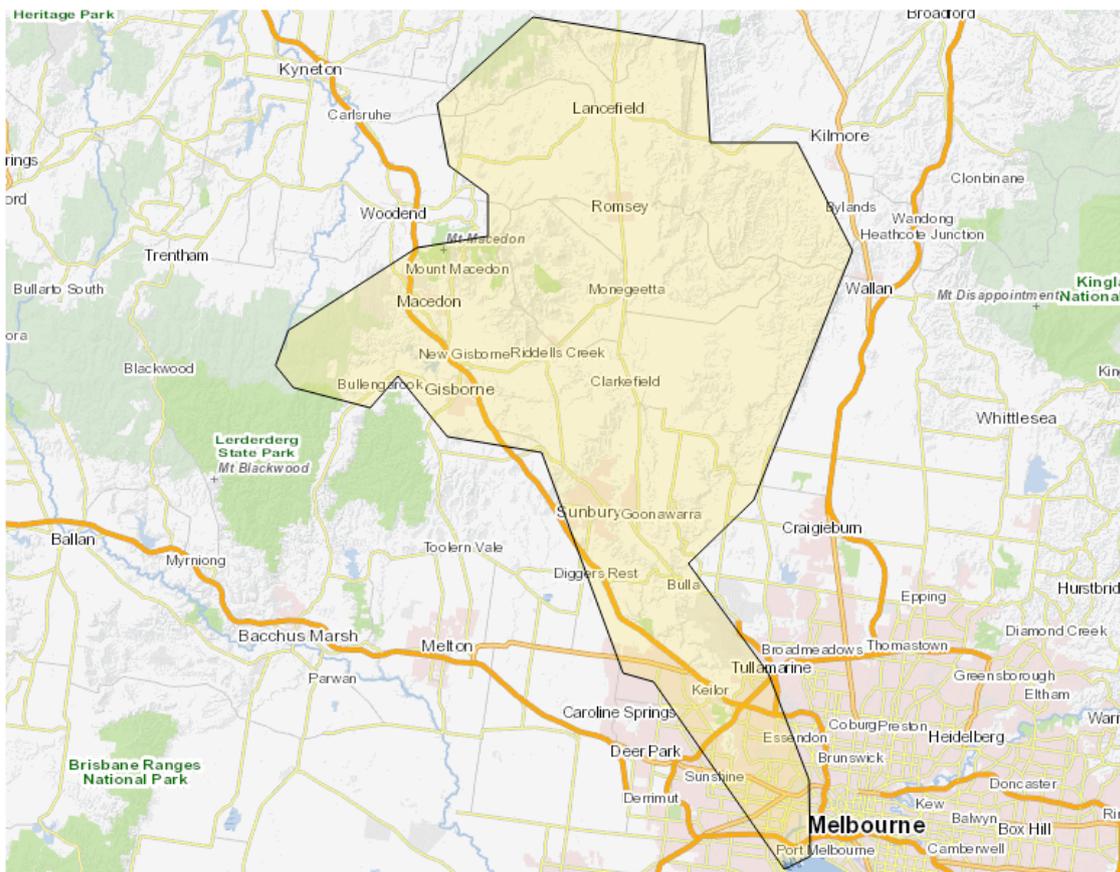
## BOM Flood Warning Example



### ADVICE - FLOOD

**Incident Location:** Maribyrnong  
**Incident Name:** MaribyrnongFloodSept2016  
**Issued:** Set at publish time  
**Next Update Expected:**

### Map



## APPENDIX F – MAPS AND SCHEMATICS

### Flood Extent Maps Overview

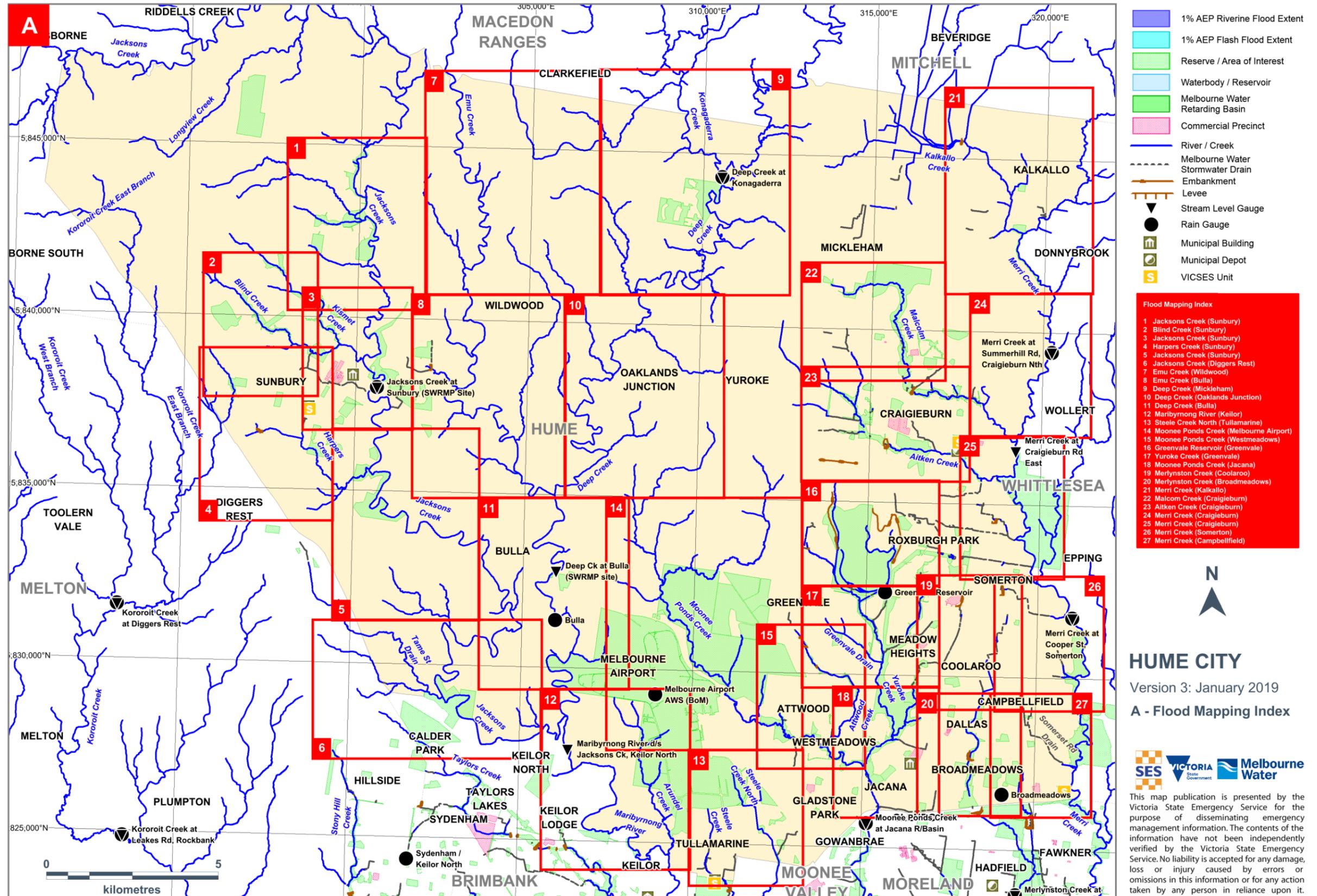
Maps considered useful to flood response are included in this Appendix. They include:

- A map outlining a series of flooding hot spot maps within Hume City.
- A map showing the Municipal boundary together with the open waterways and underground stormwater drainage pipe network within Hume City and the 1% AEP (100-year ARI) flood extents (sourced from Melbourne Water GIS).
- A set of 27 maps showing flooding hot spots within Hume City together with the 1% AEP (100-year ARI) flood extents (sourced from the Melbourne Water GIS).

**Note that:**

- The mapping/data provided in this Appendix has been developed from Melbourne Water and other sources and taken from historical records and flood modelling. It may not include more recent data or local anecdotal information. It is planned that the mapping/data be updated as further studies or modelling is completed and other Information obtained.
- Maps showing the Special Building Overlay and Land Subject to Inundation Overlay are included in the Hume Planning Scheme can be used as a guide to areas that may flood during an event. The maps can be found in hard copy form at the Council's main office or online at the Department of Environment, Land, Water & Planning website <https://mapshare.vic.gov.au/vicplan/>.
- Maps showing 1 in 100-year ARI (1% AEP) flood extents and floodways (together with volume, height and water quality data) are shown at DELWP's mapshare website <http://mapshare.maps.vic.gov.au/MapShareVic/index.html?viewer=MapShareVic.PublicSite&locale=en-AU>

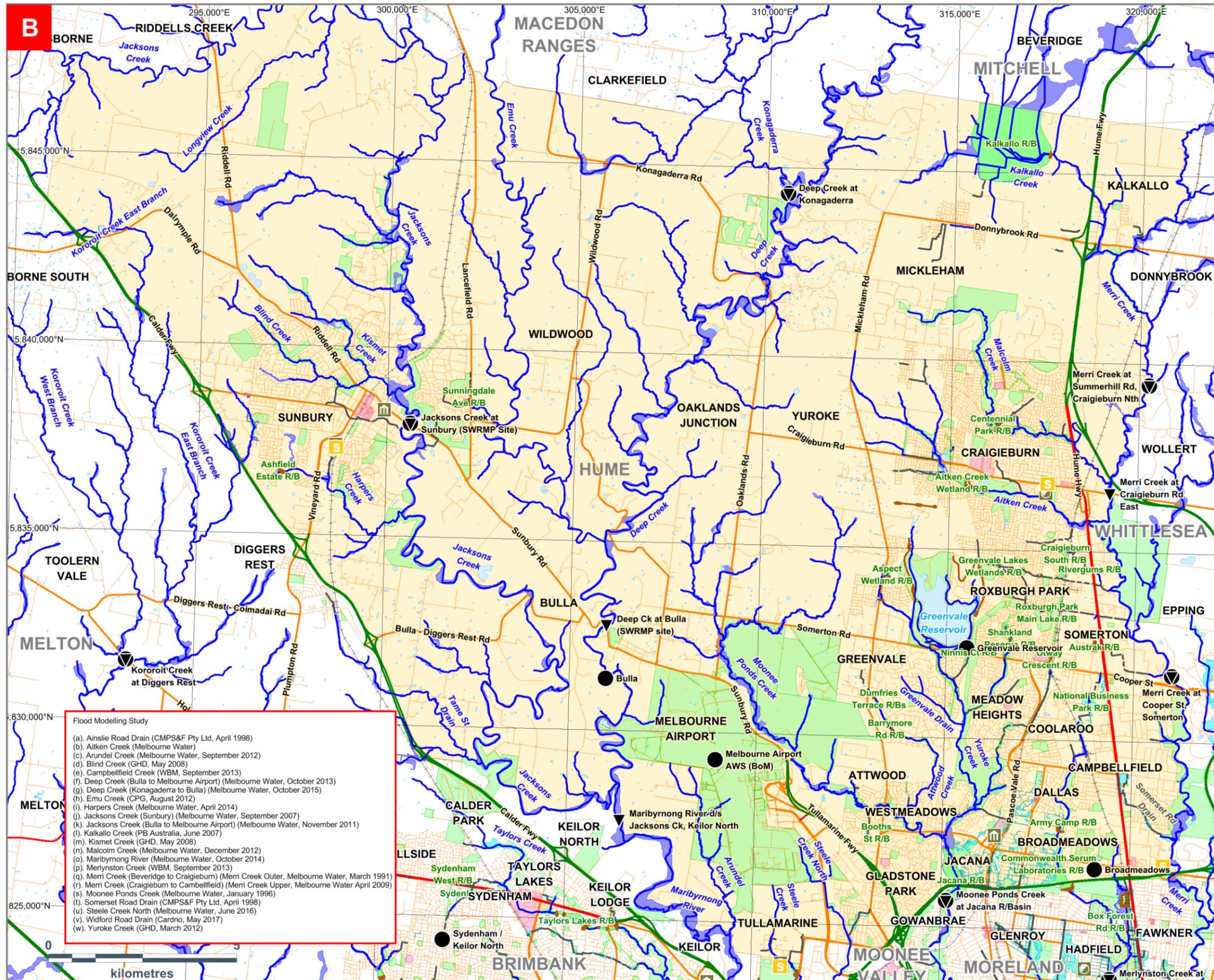
Hume City Municipal Maps (sourced Melbourne Water GIS)



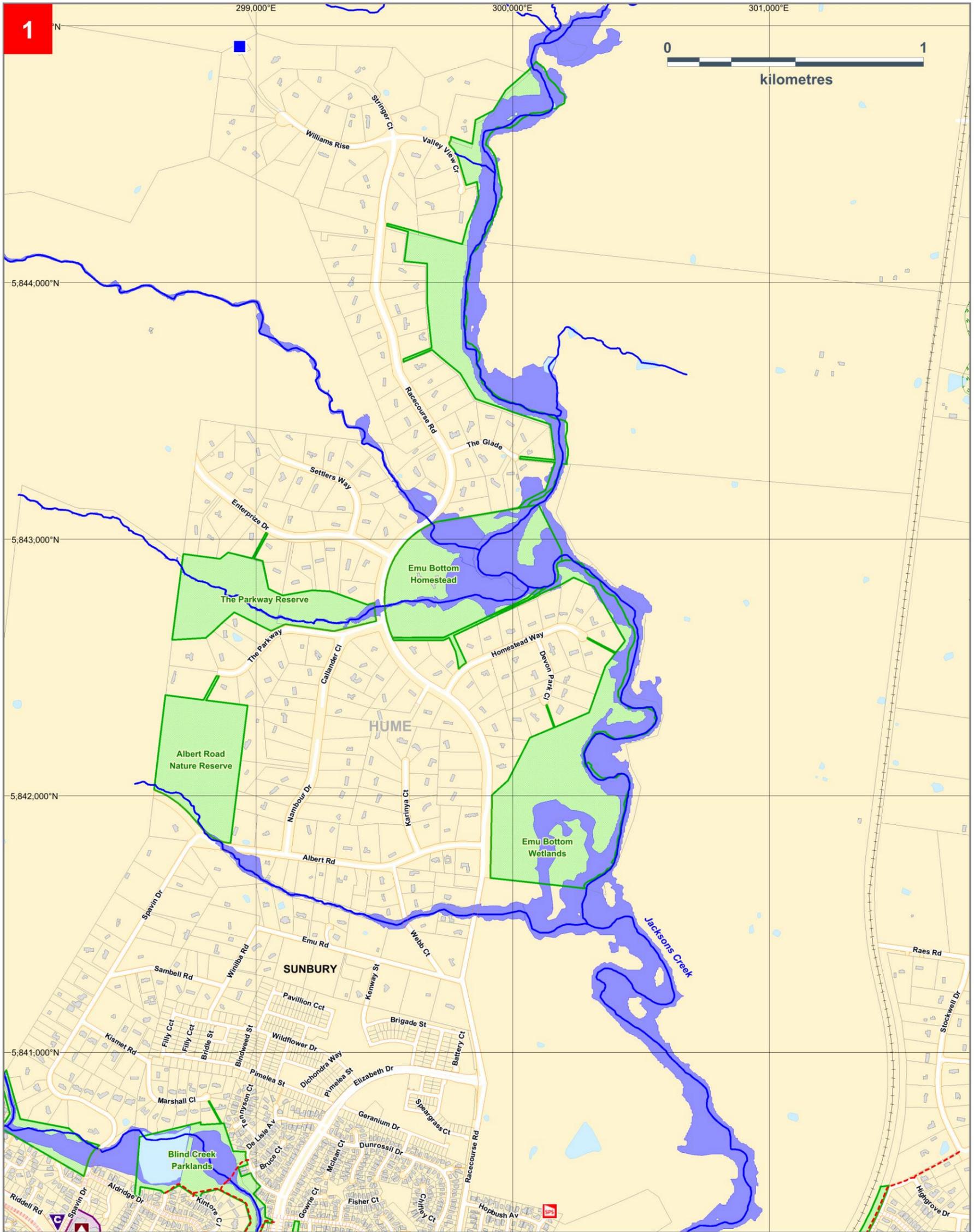
**HUME CITY**  
Version 3: January 2019  
A - Flood Mapping Index



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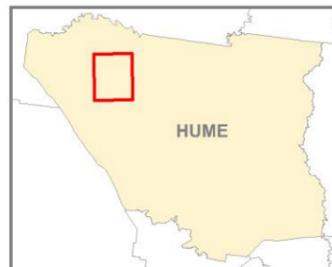
# Flood Extent Maps (sourced Melbourne Water GIS)



Jacksons Creek flood modelling completed by Melbourne Water, September 2007. Map Produced by VICSES December 2019.

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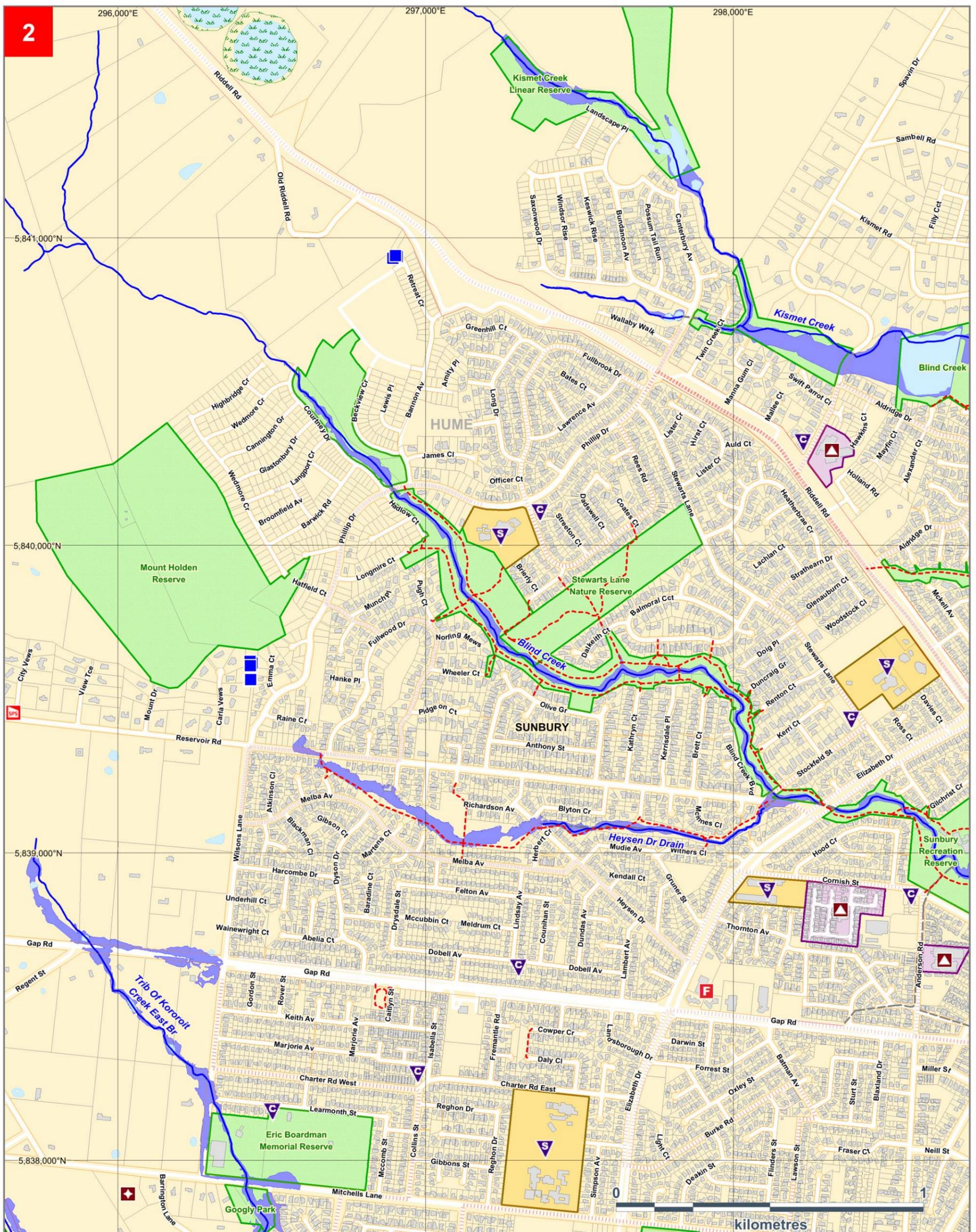
## HUME CITY 1% AEP (100yr ARI) Flooding 1. Jacksons Creek (Sunbury)



**VICTORIA**  
State Government

**Melbourne Water**

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Blind Creek flood modelling completed by GHD, May 2008. Map Produced by VICSES December 2019.

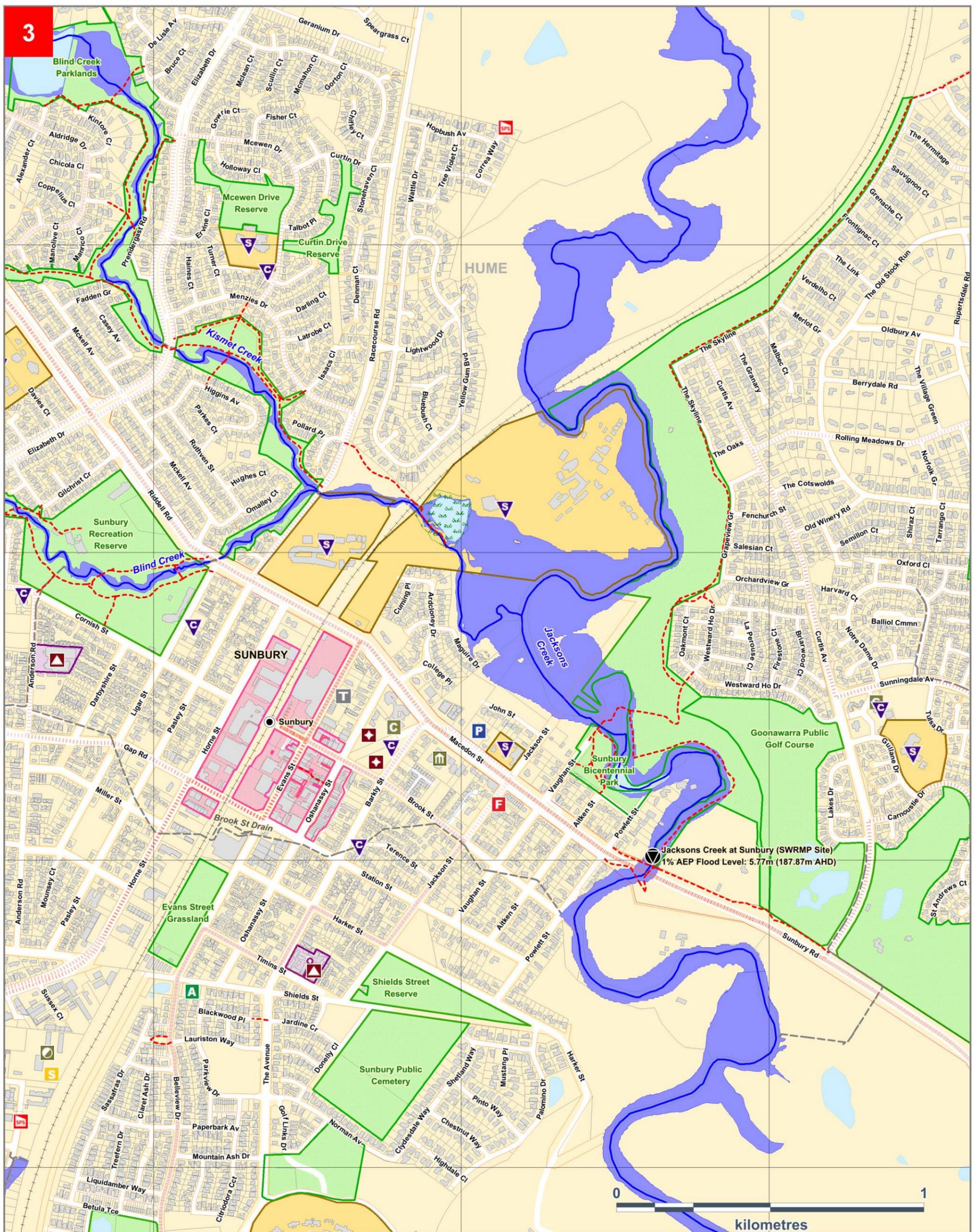
- |  |  |  |                          |  |                       |
|--|--|--|--------------------------|--|-----------------------|
|  | Building   |  | Creek / Waterway         |  | VICSES Unit           |
|  | Waterbody  |  | Bus Route (PTV)          |  | Sewer Pumping Station |
|  | 1% AEP Riverine Flood Extent (Depth Unavailable) |  | School / College         |  | Ambulance Station     |
|  | Reserve / Park                                   |  | Childcare / Kindergarten |  | Municipal Depot       |
|  | Melbourne Water Retarding Basin Embankment       |  |                          |  |                       |



**SES VICTORIA**  
**Melbourne Water**

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**HUME CITY**  
 1% AEP (100yr ARI) Flooding  
**2. Blind Creek (Sunbury)**



Jacksons Creek flood modelling completed by Melbourne Water, September 2007. Blind Creek flood modelling completed by GHD, May 2008. Map Produced by VICSES December 2019.

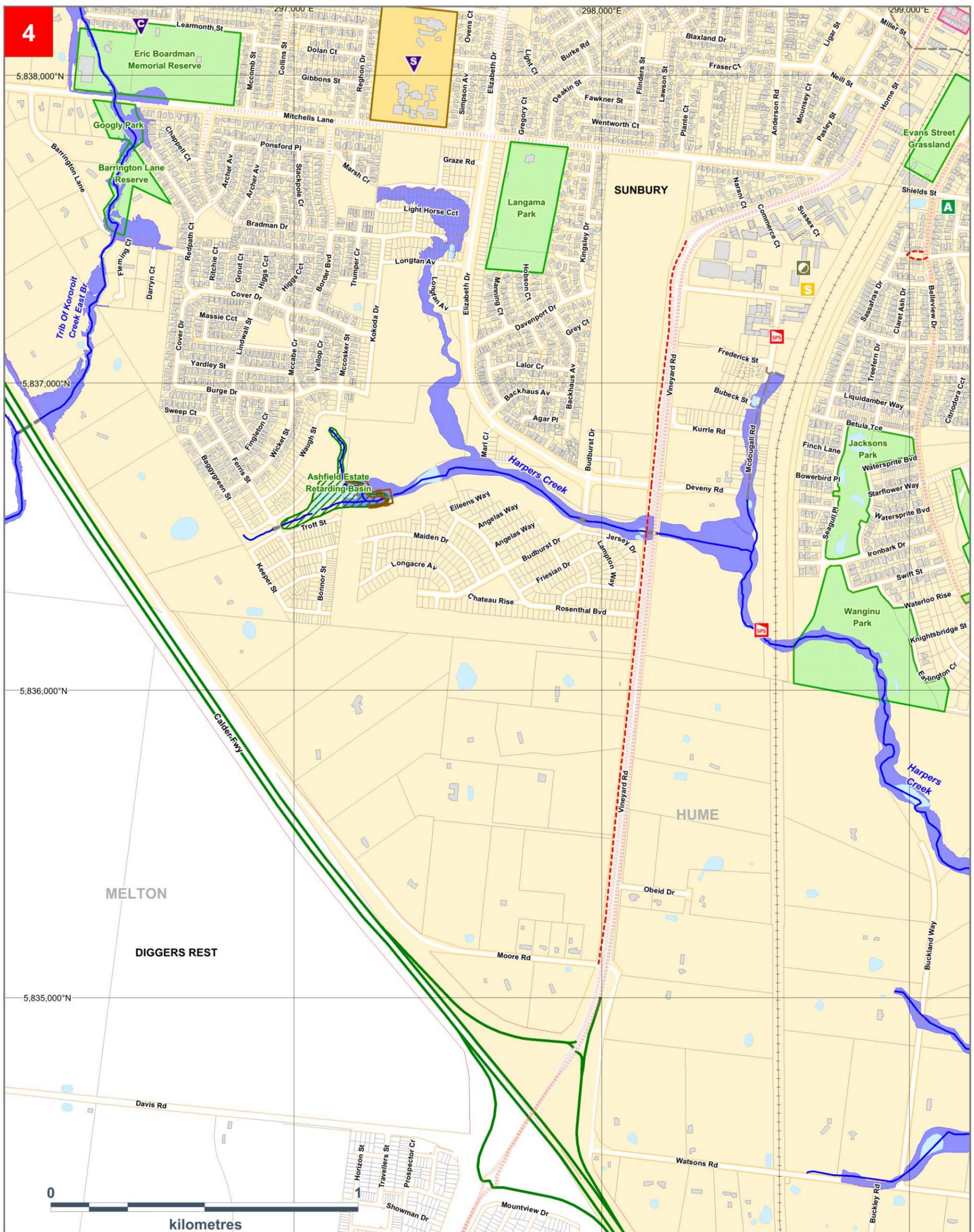
**HUME CITY**  
 1% AEP (100yr ARI) Flooding  
**3. Jacksons Creek (Sunbury)**

- |  |  |  |                          |  |                       |
|--|--|--|--------------------------|--|-----------------------|
|  | Building   |  | Creek / Waterway         |  | VICSES Unit           |
|  | Waterbody  |  | Bus Route (PTV)          |  | Sewer Pumping Station |
|  | 1% AEP Riverine Flood Extent (Depth Unavailable) |  | School / College         |  | Fire Station          |
|  | Reserve / Park                                   |  | Ambulance Station        |  | Police Station        |
|  | Commercial Precinct                              |  | Childcare / Kindergarten |  | Aged Care Facility    |
|  | Melbourne Water Stormwater Drain                 |  | Municipal Depot          |  | Community Centre      |
|  | Stream Level Gauge & 1% AEP Flood Level          |  | Municipal Offices        |  | Place Of Worship      |
|  | Rain Gauge                                       |  | Telephone Exchange       |  |                       |



**SES VICTORIA** State Government **Melbourne Water**

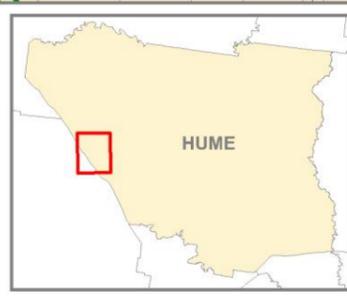
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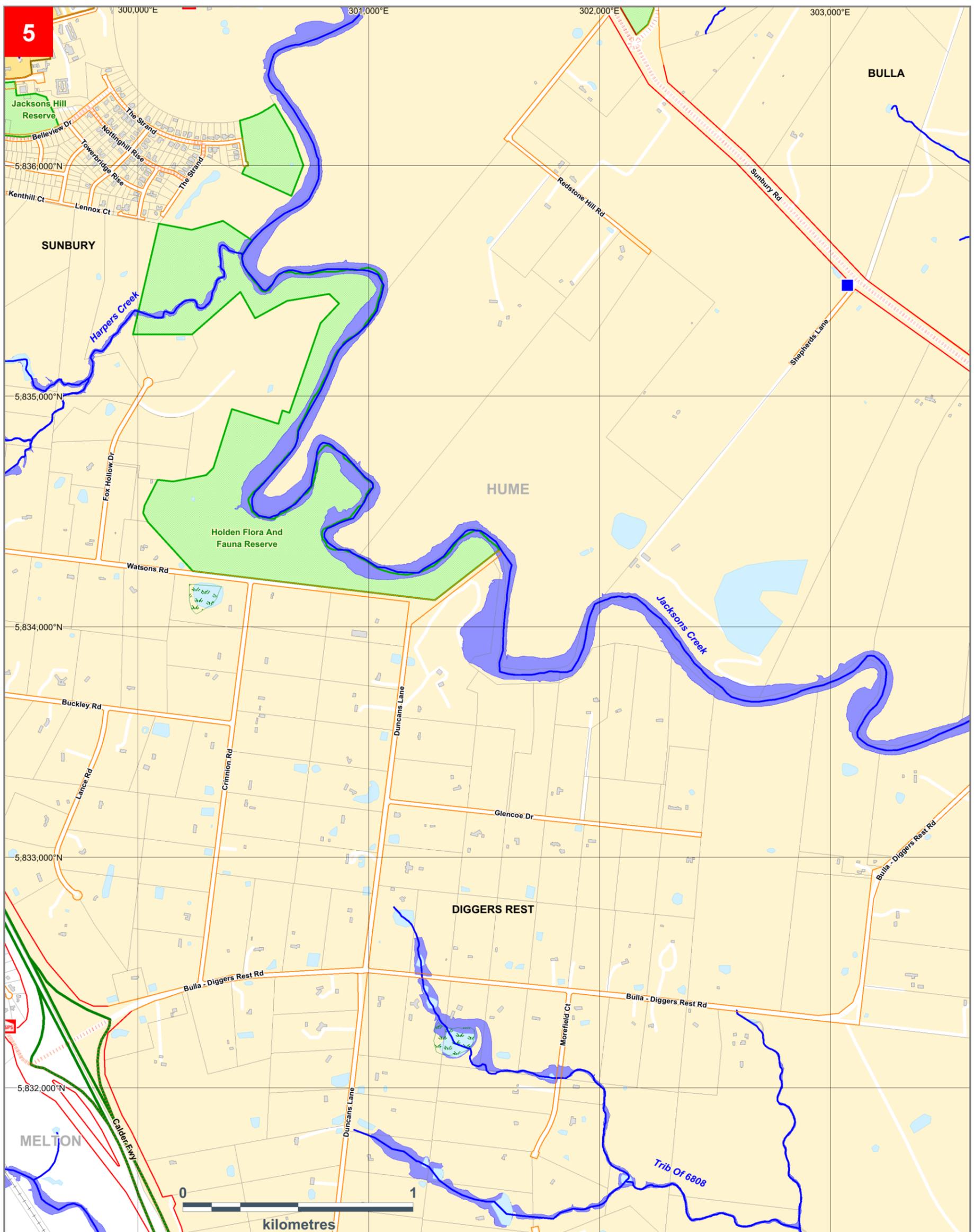
Jacksons Creek flood modelling completed by Melbourne Water, November 2011. Map Produced by VICSES December 2019.

- |  |  |  |                          |  |                       |
|--|--|--|--------------------------|--|-----------------------|
|  | Building   |  | Creek / Waterway         |  | VICSES Unit           |
|  | Waterbody  |  | Bus Route (PTV)          |  | Sewer Pumping Station |
|  | 1% AEP Riverine Flood Extent (Depth Unavailable) |  | School / College         |  | Ambulance Station     |
|  | Reserve / Park                                   |  | Childcare / Kindergarten |  | Municipal Depot       |
|  | Melbourne Water Retarding Basin                  |  |                          |  |                       |
|  | Embankment                                       |  |                          |  |                       |

**HUME CITY**  
1% AEP (100yr ARI) Flooding  
**4. Harpers Creek (Sunbury)**



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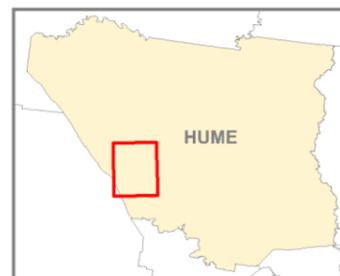
Jacksons Creek flood modelling completed by Melbourne Water, November 2011. Map Produced by VICSES December 2019.

- Building
- Waterbody
- 1% AEP Riverine Flood Extent (Depth Unavailable)
- Reserve / Park
- Creek / Waterway
- Bus Route (PTV)
- Retail Water Storage
- School / College

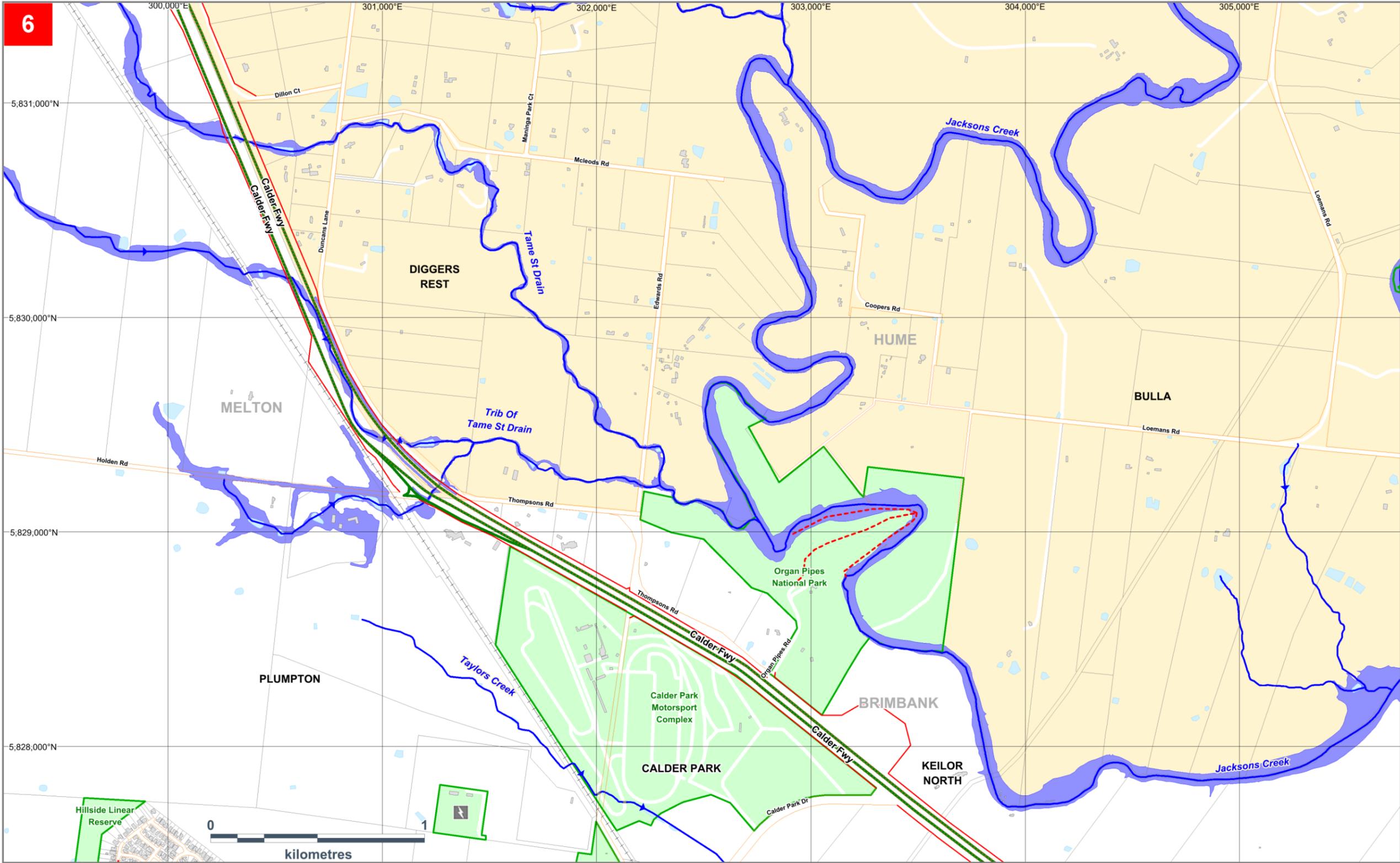
**HUME CITY**

1% AEP (100yr ARI) Flooding

**5. Jacksons Creek (Sunbury)**



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Flood modelling completed by Melbourne Water. Map Produced by VicSES December 2019.

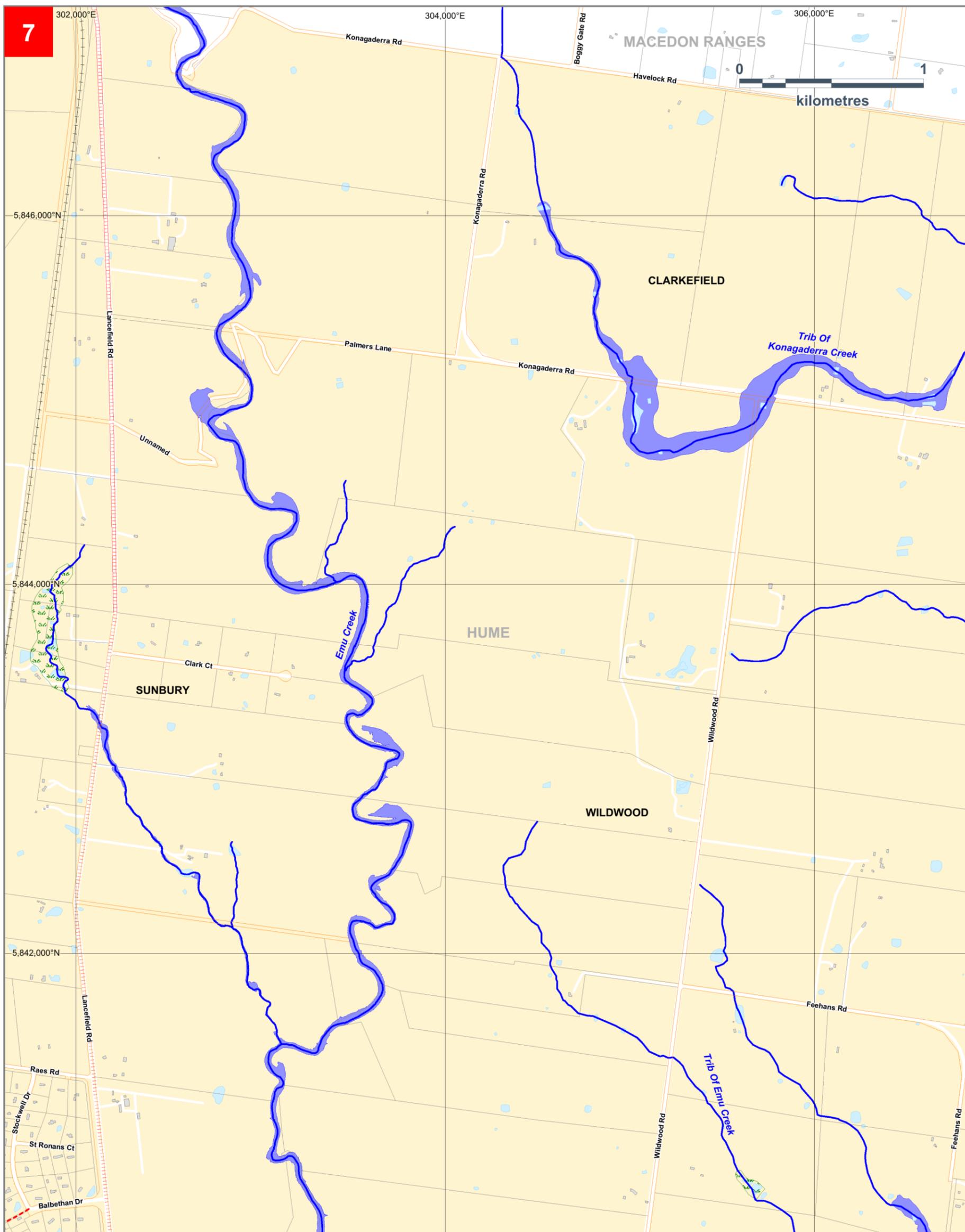
**HUME CITY**  
 1% AEP (100yr ARI) Flooding  
**6. Jacksons Creek**  
**(Diggers Rest)**

- Building
- Area of Interest
- Waterbody
- 1% AEP Riverine Flood Extent (Depth Unavailable)
- Melbourne Water Stormwater Drain
- Creek / Channel
- Bicycle / Walking Trail
- Bus Route (PTV)
- Power Terminal Station



**SES VICTORIA** **Melbourne Water**

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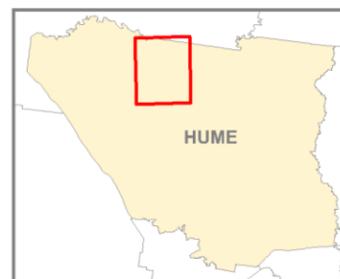
Emu Creek flood modelling completed by CPG, August 2012. Map Produced by VICSES December 2019.

- Building
- Waterbody
- 1% AEP Riverine Flood Extent (Depth Unavailable)
- Reserve / Park
- Natural Wetland
- Creek / Waterway
- Bus Route (PTV)
- Bicycle / Walking Trail

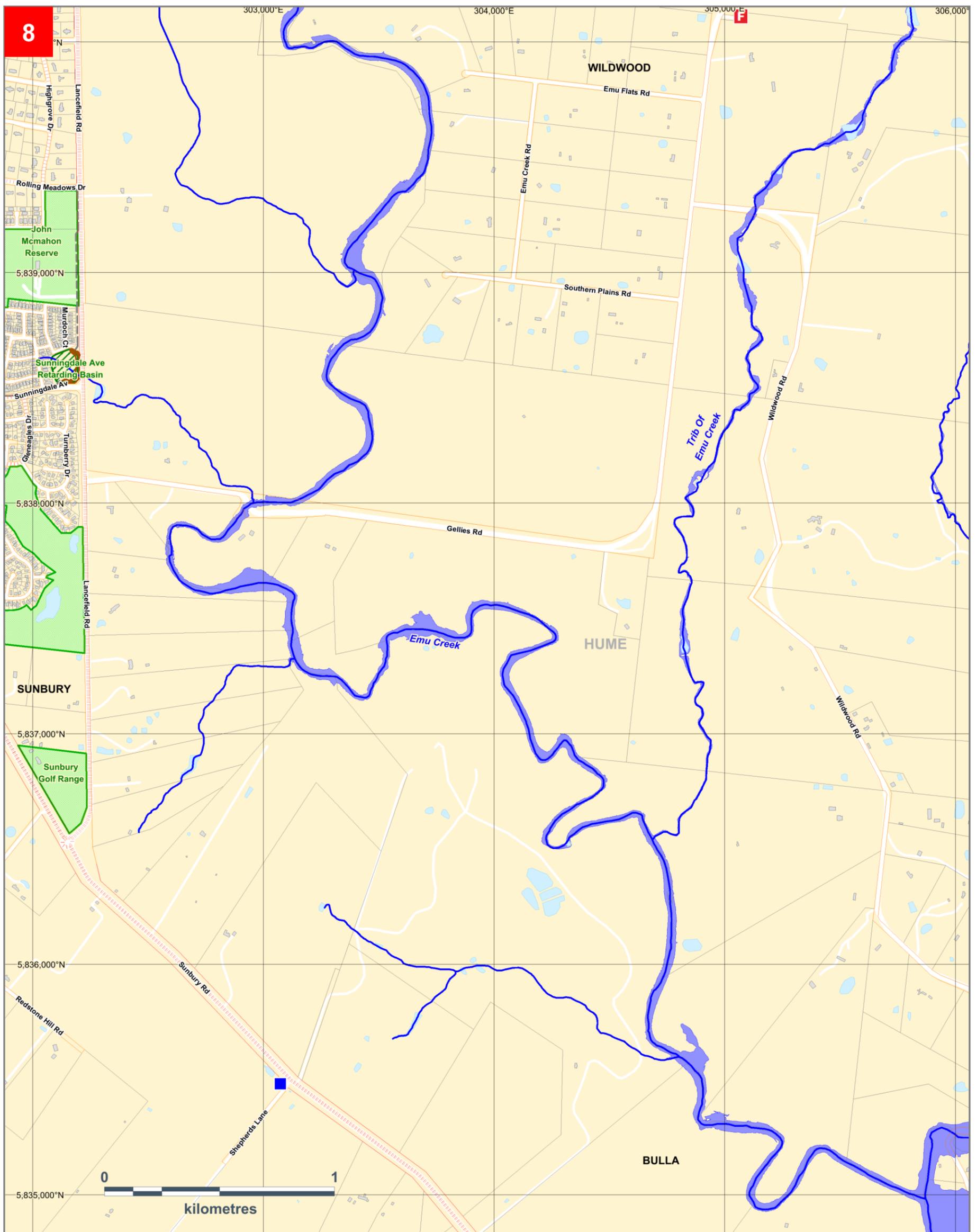
### HUME CITY

1% AEP (100yr ARI) Flooding

#### 7. Emu Creek (Wildwood)

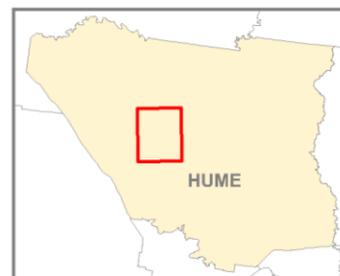


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Emu Creek flood modelling completed by CPG, August 2012. Map Produced by VICSES December 2019.

- |  |  |  |                      |
|--|--|--|----------------------|
|  | Building   |  | Creek / Waterway     |
|  | Waterbody  |  | Bus Route (PTV)      |
|  | 1% AEP Riverine Flood Extent (Depth Unavailable) |  | Embankment           |
|  | Reserve / Park                                   |  | Retail Water Storage |
|  | Melbourne Water Retarding Basin                  |  |                      |

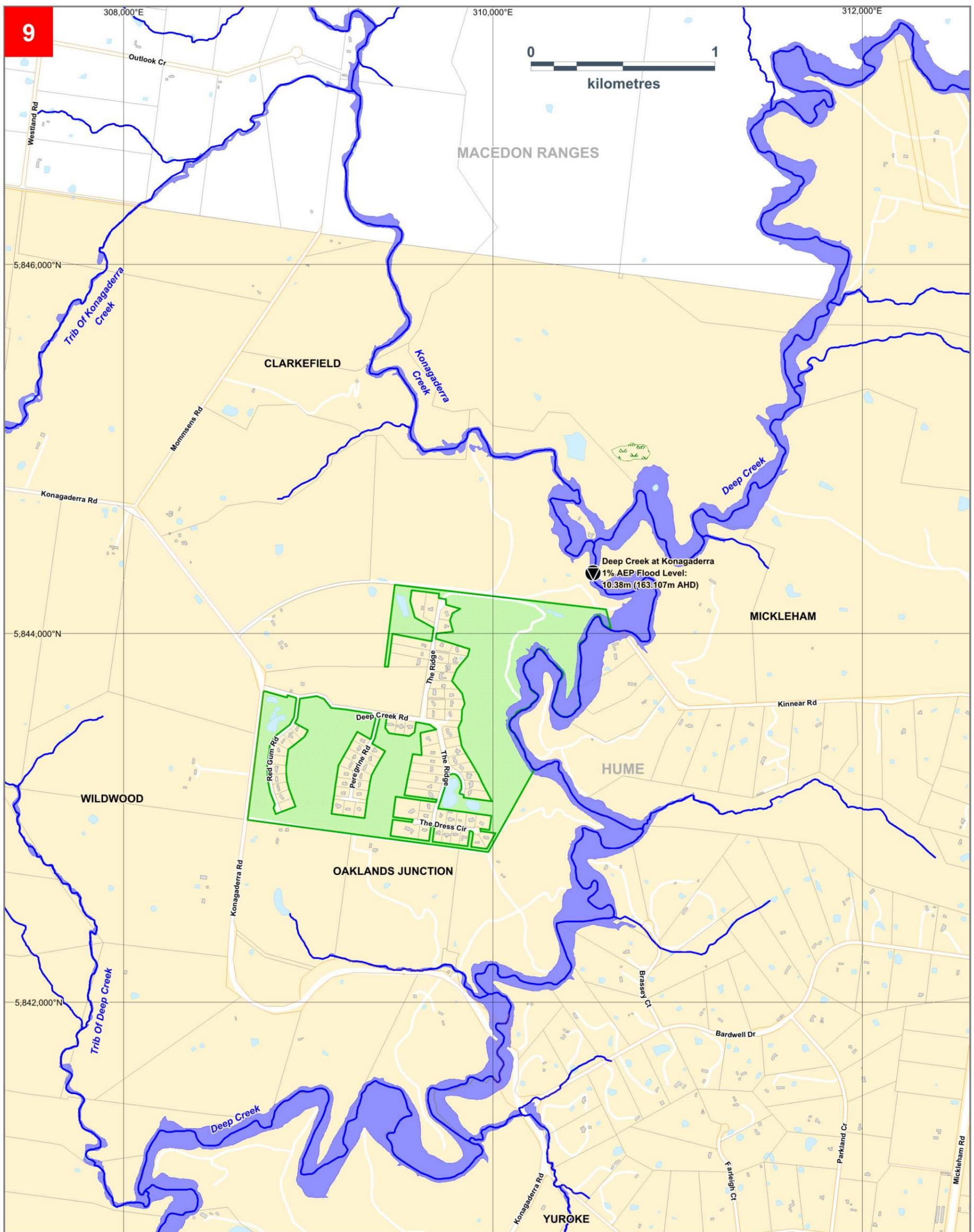


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## HUME CITY

1% AEP (100yr ARI) Flooding

### 8. Emu Creek (Bulla)



Deep Creek flood modelling completed by Melbourne Water, October 2015. Map Produced by VICSES December 2019.

- Building
- Waterbody
- 1% AEP Riverine Flood Extent (Depth Unavailable)
- Reserve / Park
- Creek / Waterway
- Stream Level Gauge & 1% AEP Flood Level
- Rain Gauge

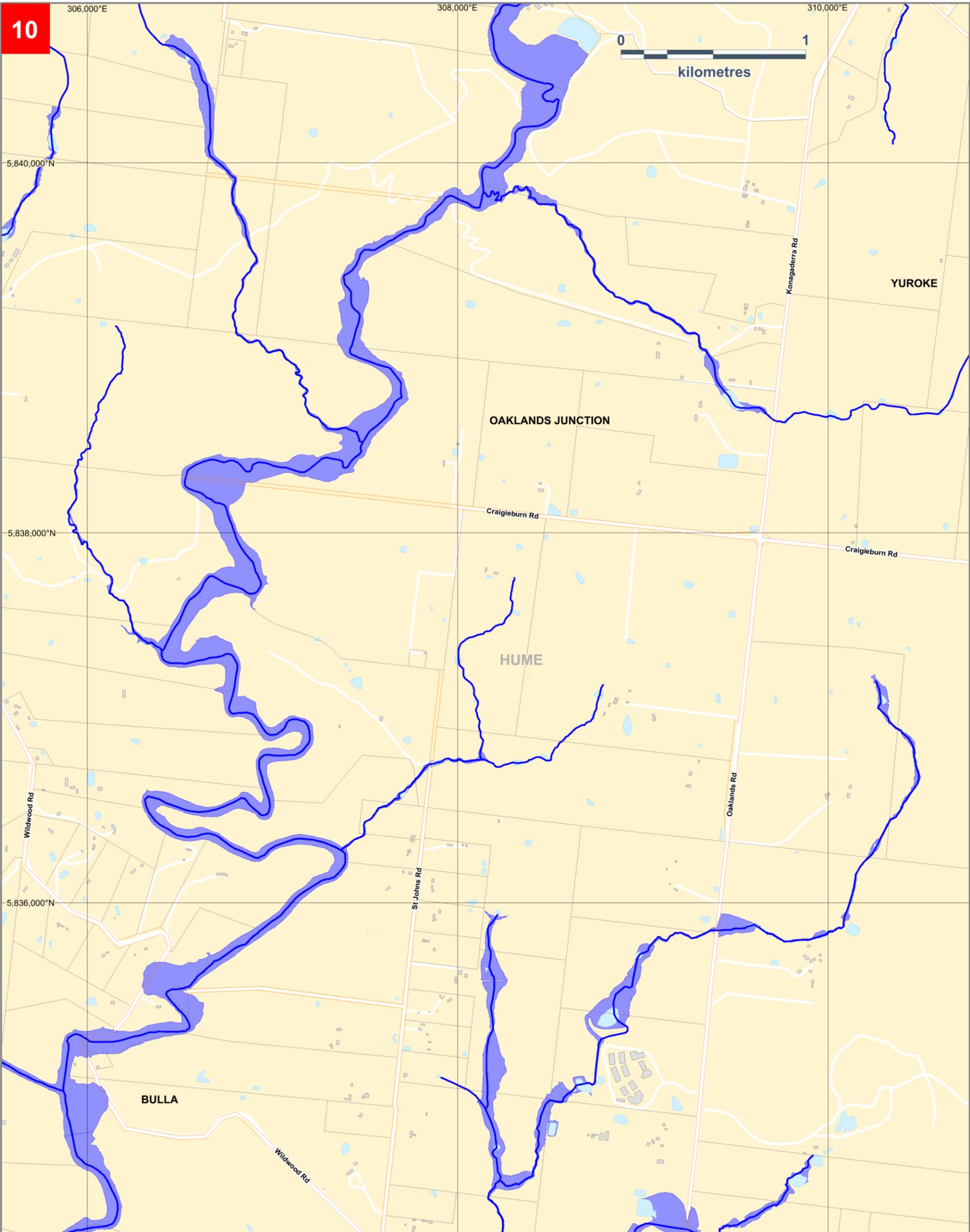
### HUME CITY

1% AEP (100yr ARI) Flooding

#### 9. Deep Creek (Mickleham)



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Deep Creek flood modelling completed by Melbourne Water, October 2015. Map Produced by VICSES December 2019.

-  Building
-  Waterbody
-  1% AEP Riverine Flood Extent (Depth Unavailable)
-  Creek / Waterway

**HUME CITY**  
 1% AEP (100yr ARI) Flooding  
**10. Deep Creek**  
 (Oaklands Junction)

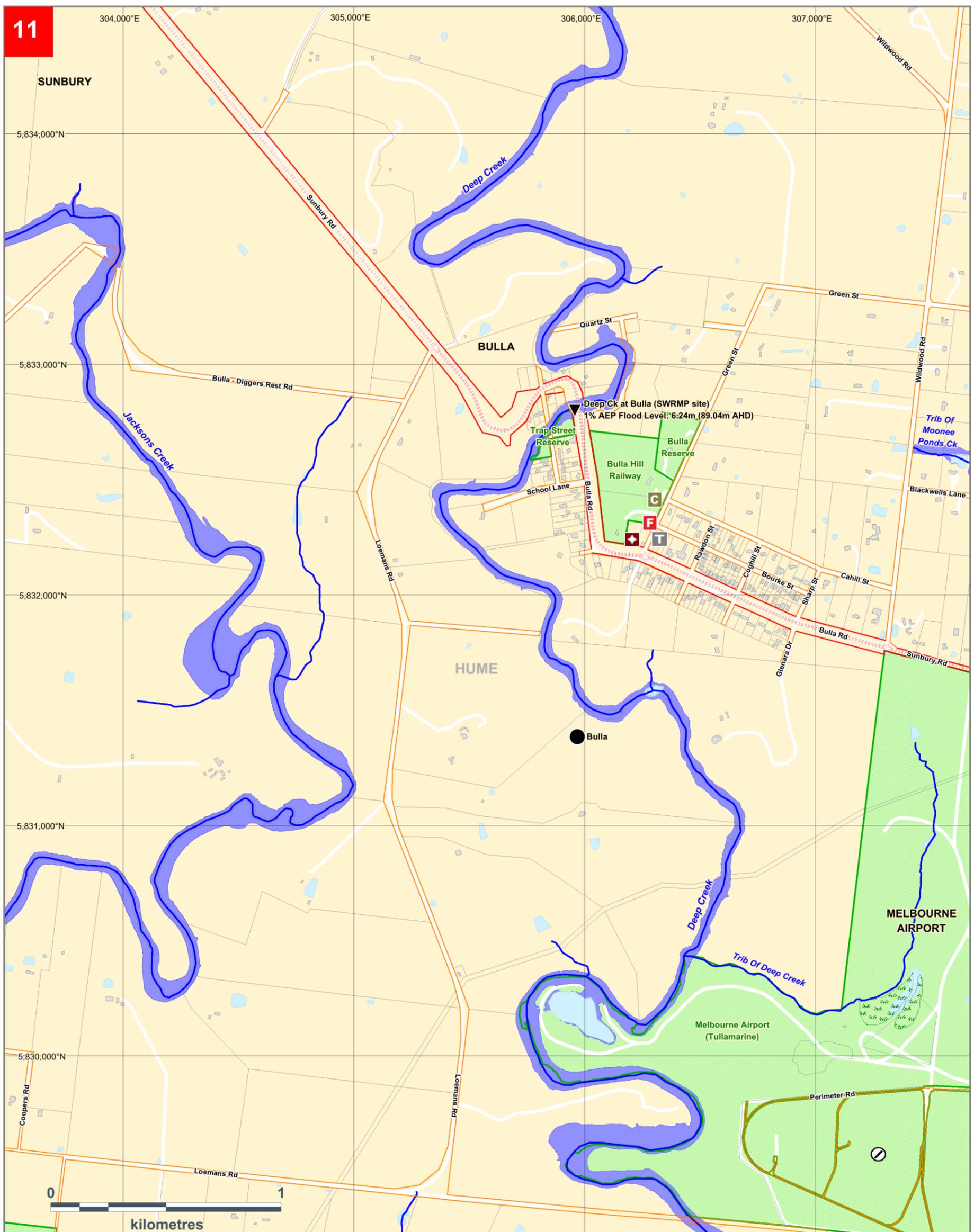


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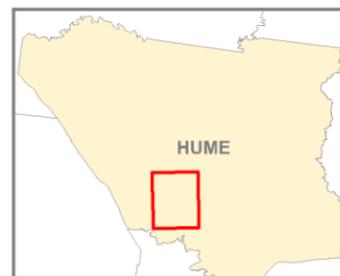
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Jacksons Creek flood modelling completed by Melbourne Water, November 2011. Map Produced by VICSES December 2019.

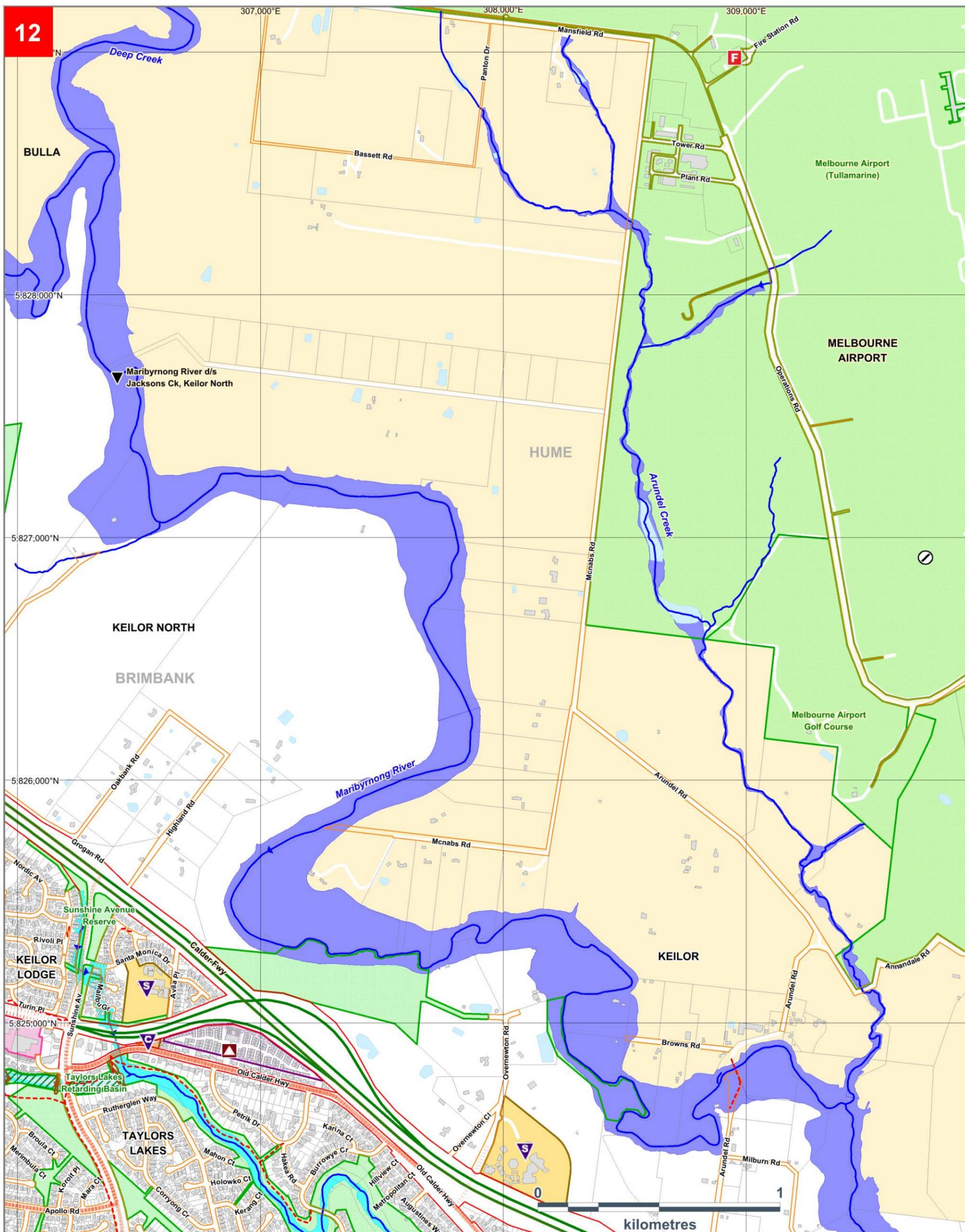
**HUME CITY**  
 1% AEP (100yr ARI) Flooding  
**11. Deep Creek (Bulla)**

- |  |                  |   |
|--|------------------|---|
| Building   | Fire Station     | Telephone Exchange                      |
| Waterbody  | Community Centre | Airport / Airfield                      |
| 1% AEP Riverine Flood Extent (Depth Unavailable) | Place Of Worship | Stream Level Gauge & 1% AEP Flood Level |
| Reserve / Park                                   | Rain Gauge       |   |
| Creek / Waterway                                 |                  |   |
| Bus Route (PTV)                                  |                  |   |



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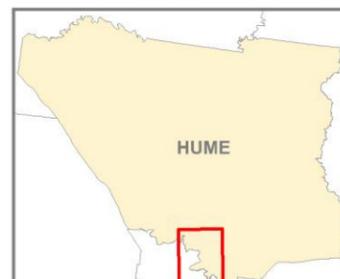
Maribyrnong River flood modelling completed by Melbourne Water, October 2014. Arundel Creek flood modelling completed by Melbourne Water September 2012. Map Produced by VICSES December 2019.

**HUME CITY**

1% AEP (100yr ARI) Flooding

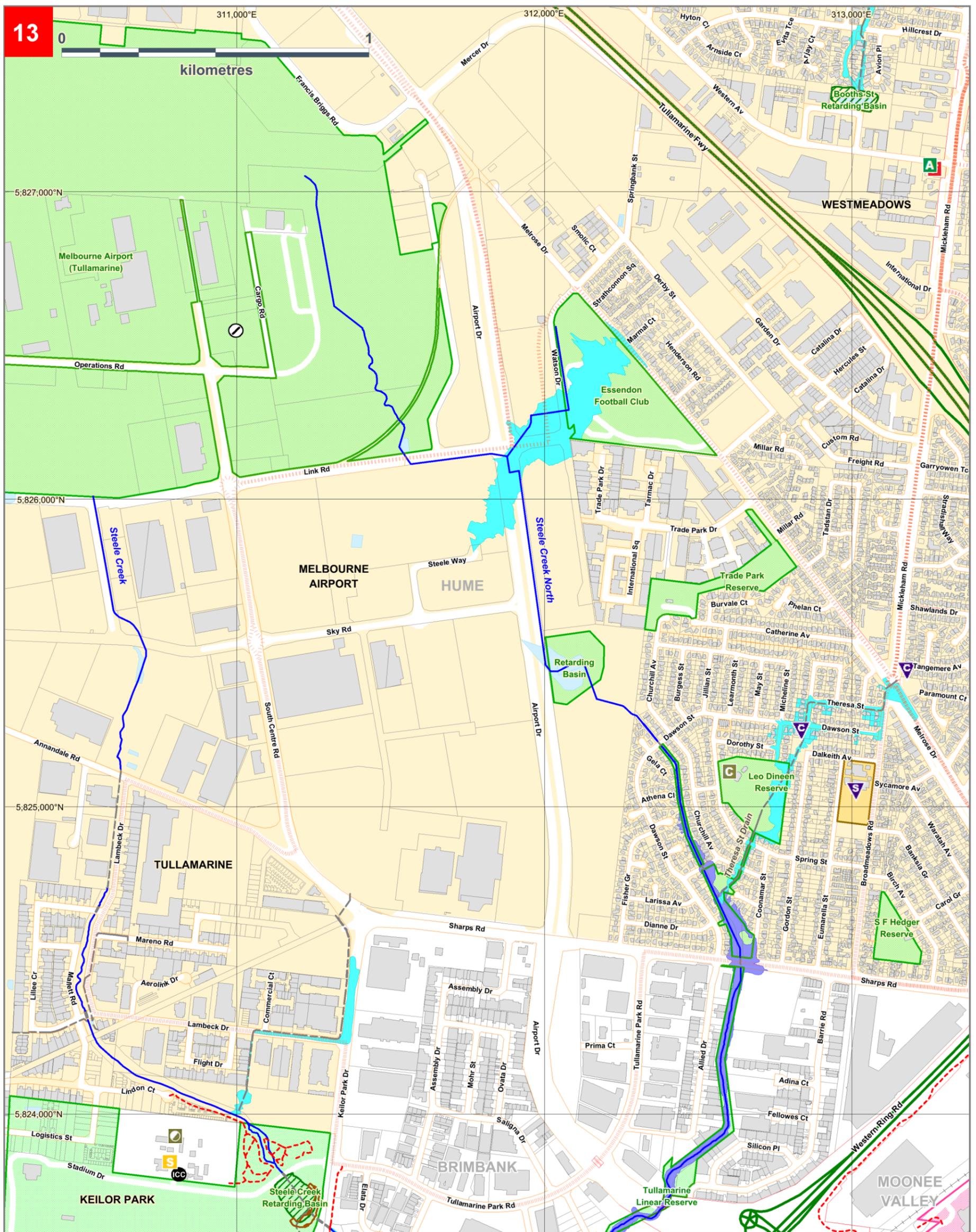
**12. Maribyrnong River (Keilor)**

- Building
- Waterbody
- 1% AEP Flash Flood Extent (Depth Unavailable)
- 1% AEP Riverine Flood Extent (Depth Unavailable)
- Reserve / Park
- Shopping Precinct
- Creek / Waterway
- Melbourne Water Stormwater Drain
- Bicycle / Walking Trail
- Bus Route (PTV)
- Airport
- Aged Care Facility
- Fire Station
- School / College
- Kindergarten / Child Care
- Stream Level Gauge & 1% AEP Flood Level



N

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Steele Creek North flood modelling completed by Melbourne Water, June 2016. Map Produced by VICSES December 2019.

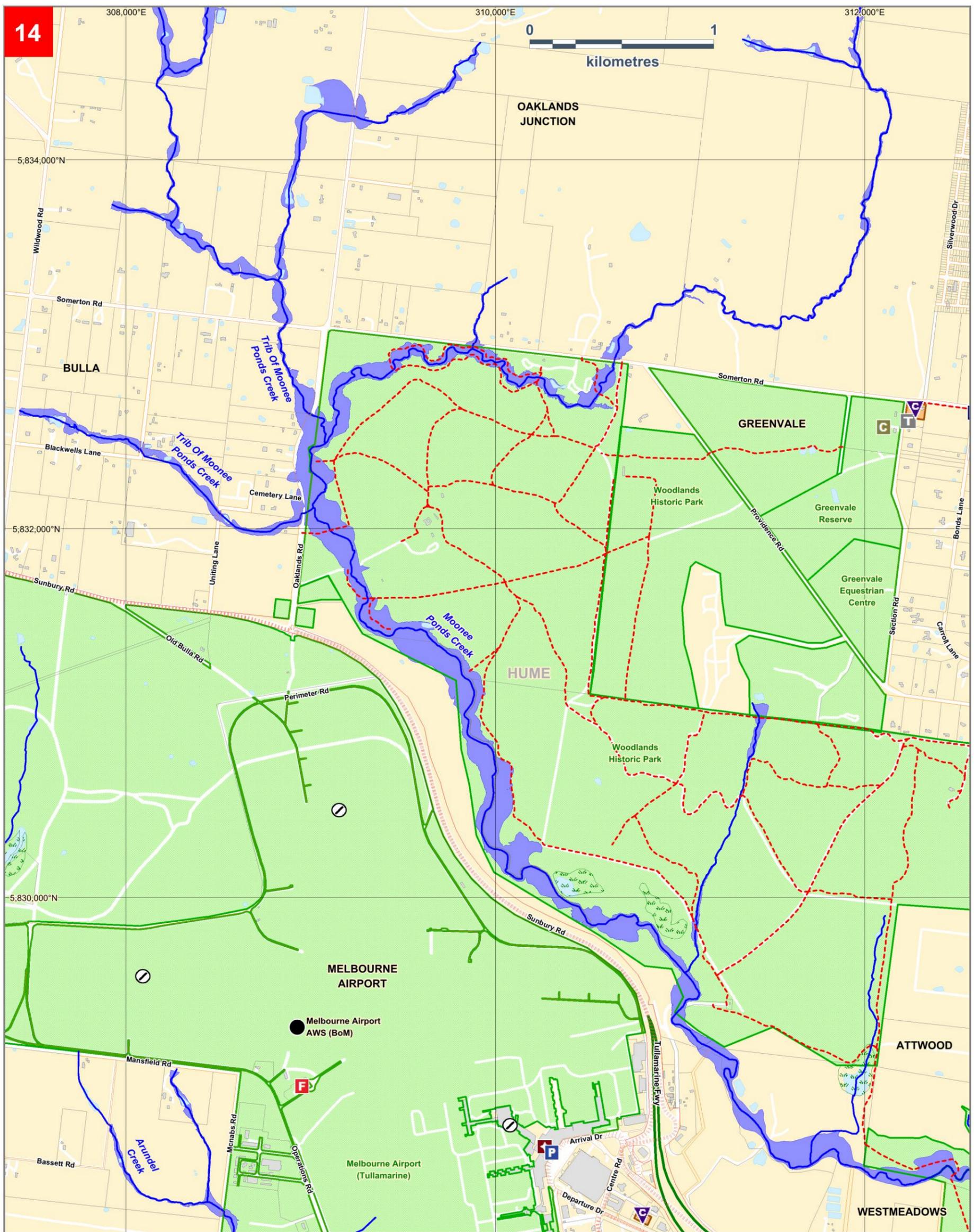
**HUME CITY**  
 1% AEP (100yr ARI) Flooding  
**13. Steele Creek North**  
 (Tullamarine)

- |  |  |  |                    |  |                          |
|--|--|--|--------------------|--|--------------------------|
|  | Building   |  | Creek / Waterway   |  | VICSES Unit              |
|  | Waterbody  |  | Bus Route (PTV)    |  | School / College         |
|  | 1% AEP Riverine Flood Extent (Depth Unavailable) |  | Embankment         |  | Fire Station             |
|  | 1% AEP Flash Flood Extent (Depth Unavailable)    |  | Airport / Airfield |  | Childcare / Kindergarten |
|  | Reserve / Park                                   |  | Ambulance Station  |  | Municipal Depot          |
|  | Melbourne Water Retarding Basin                  |  | Community Centre   |  |                          |
|  | Melbourne Water Stormwater Drain                 |  |                    |  |                          |



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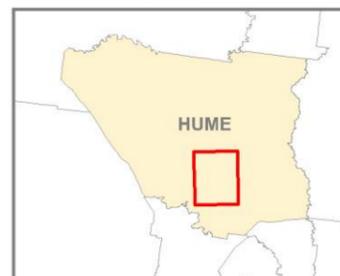
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Deep Creek flood modelling completed by Melbourne Water, October 2015. Map Produced by VICSES December 2019.

**HUME CITY**  
 1% AEP (100yr ARI) Flooding  
**14. Moonee Ponds Creek**  
 (Melbourne Airport)

- |  |  |  |                          |  |                |
|--|--|--|--------------------------|--|----------------|
|  | Building   |  | Airport / Airfield       |  | Police Station |
|  | Waterbody  |  | Community Centre         |  | Rain Gauge     |
|  | 1% AEP Riverine Flood Extent (Depth Unavailable) |  | Place Of Worship         |  |                |
|  | Natural Wetland                                  |  | Telephone Exchange       |  |                |
|  | Creek / Waterway                                 |  | Childcare / Kindergarten |  |                |
|  | Bicycle / Walking Trail                          |  | Fire Station             |  |                |
|  | Bus Route (PTV)                                  |  |                          |  |                |



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Moonee Ponds Creek flood modelling completed by Melbourne Water, January 1996. Map Produced by VICSES December 2019.

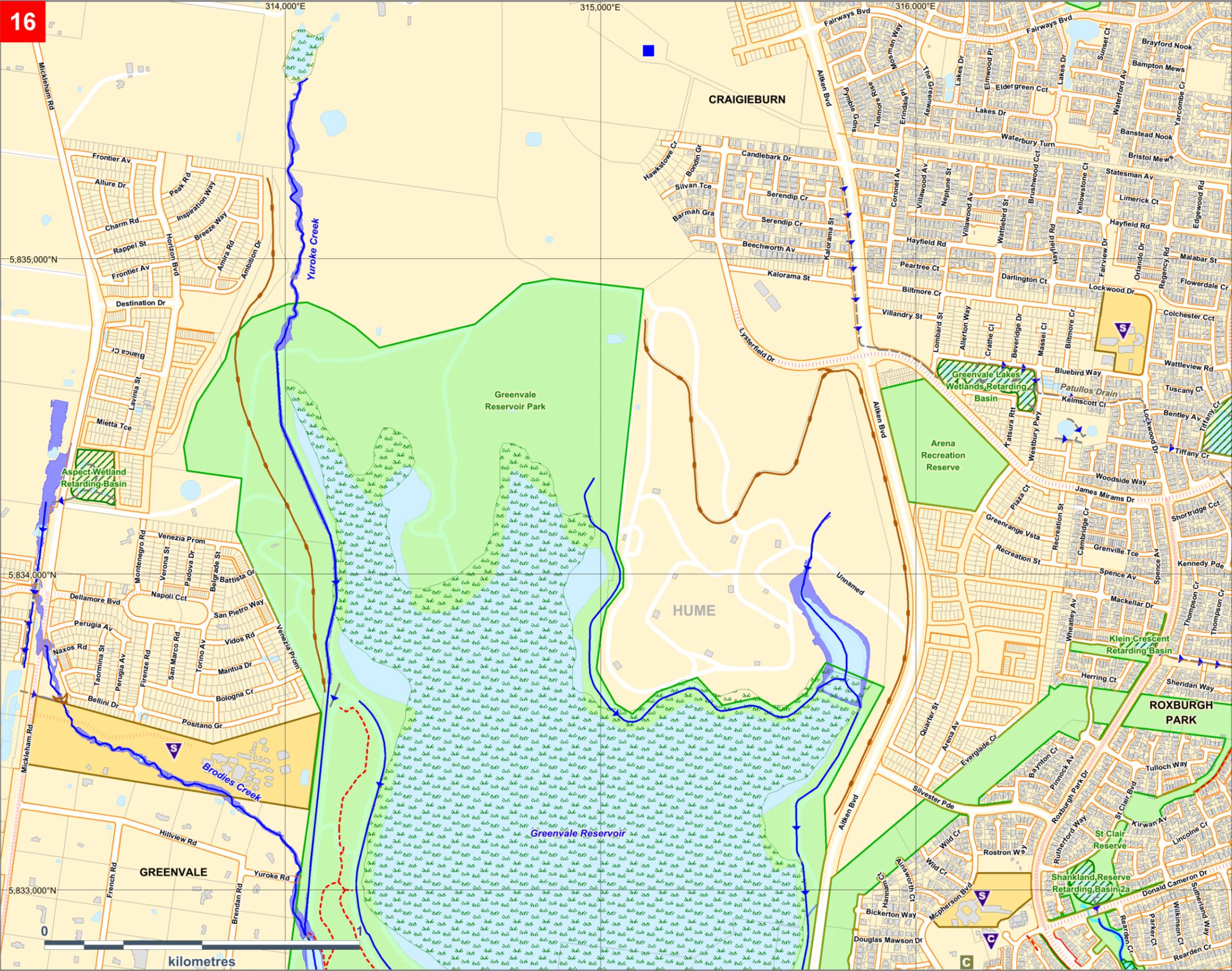
**HUME CITY**  
 1% AEP (100yr ARI)  
 Flooding  
**15. Moonee Ponds Creek**  
 (Westmeadows)

- |  |                                  |                          |
|--|----------------------------------|--------------------------|
| Building   | Embankment                       | Telephone Exchange       |
| Waterbody  | Melbourne Water Stormwater Drain | Community Centre         |
| 1% AEP Flash Flood Extent (Depth Unavailable)    | Bicycle / Walking Trail          | Childcare / Kindergarten |
| 1% AEP Riverine Flood Extent (Depth Unavailable) | Bus Route (PTV)                  | School / College         |
| Reserve / Park                                   | Creek / Waterway                 | Caravan Park             |
| Melbourne Water Retarding Basin                  | Aged Care Facility               |                          |
|  | Fire Station                     |                          |

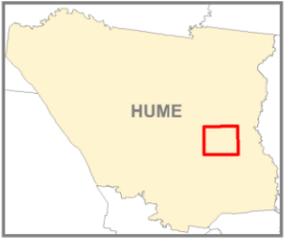


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- Building
- Area of Interest
- Waterbody
- Shopping Precinct
- 1% AEP Flash Flood Extent (Depth Unavailable)
- 1% AEP Riverine Flood Extent (Depth Unavailable)
- Melbourne Water Retarding Basin
- Creek / Waterway
- Bicycle / Walking Trail
- Bus Routes (PTV)
- Melbourne Water Stormwater Drain
- Embankment
- School / College
- Kindergarten / Child Care
- Community Centre



**HUME CITY**  
 1% AEP (100yr ARI) Flooding  
 16. Greenvale Reservoir (Greenvale)



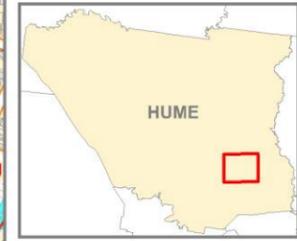
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Yuroke Creek flood modelling completed by GHD, March 2012. Map Produced by VicSES January 2020.

17



- Building
- Area of Interest
- Waterbody
- Shopping Precinct
- 1% AEP Flash Flood Extent (Depth Unavailable)
- 1% AEP Riverine Flood Extent (Depth Unavailable)
- Melbourne Water Retarding Basin
- Creek / Waterway
- Bicycle / Walking Trail
- Bus Routes (PTV)
- Melbourne Water Stormwater Drain
- Aged Care Facility
- Place Of Worship
- School / College
- Kindergarten / Child Care
- Fire Station
- Community Centre
- Telephone Exchange
- Drainage Pumping Station
- Rain Gauge



**HUME CITY**  
 1% AEP (100yr ARI) Flooding  
 17. Yuroke Creek (Greenvale)



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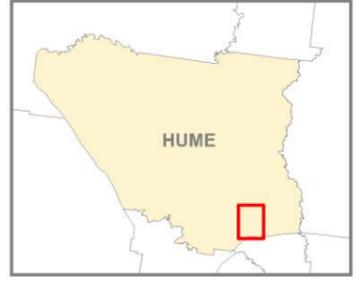
Yuroke Creek flood modelling completed by GHD, March 2012. Map Produced by VicSES January 2020.



Moonee Ponds Creek flood modelling completed by Melbourne Water, January 1996. Widdford Road Drain flood modelling completed by Cardno, May 2017. Map Produced by VICSES December 2019.

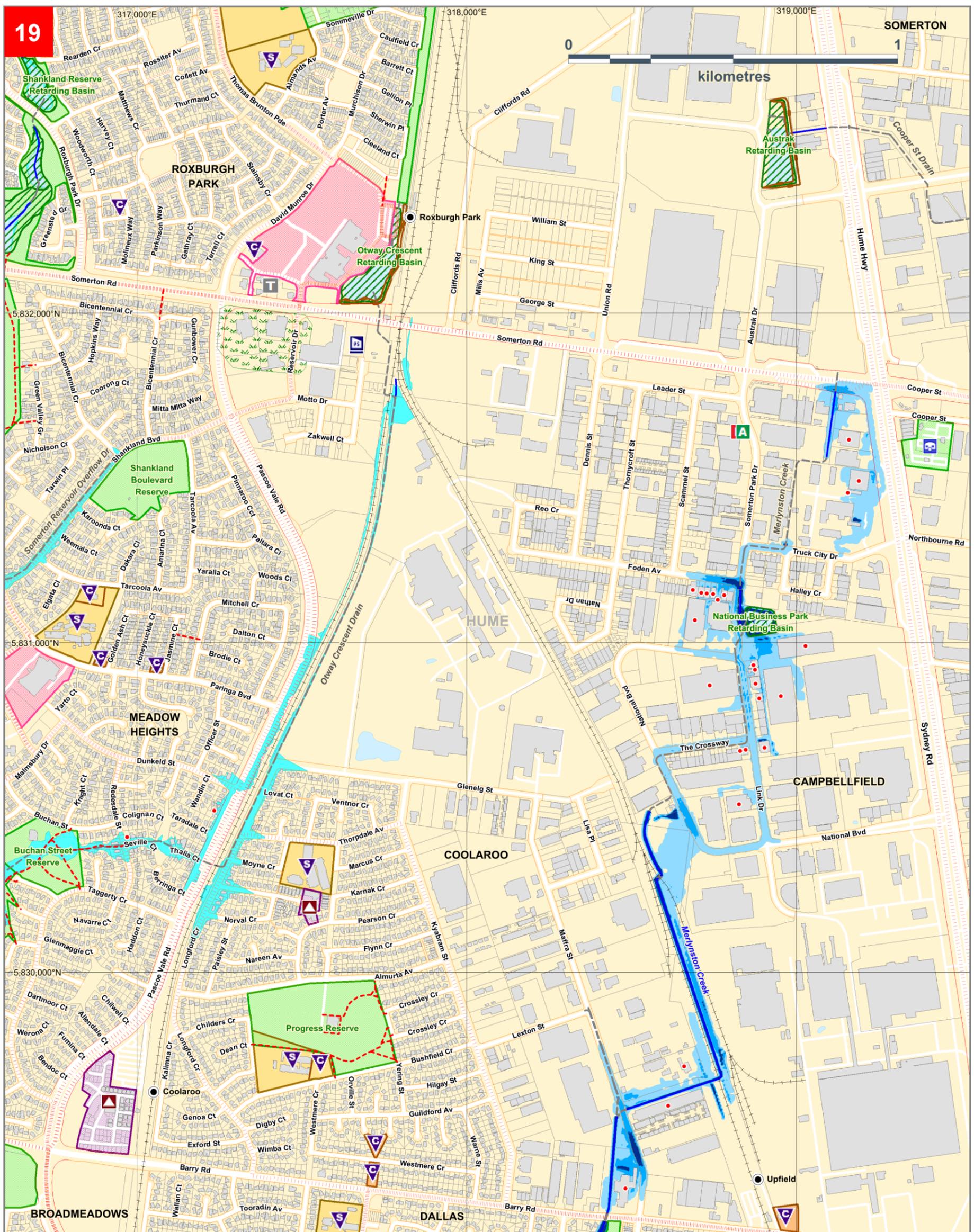
- |   |                         |                                 |
|---|-------------------------|---------------------------------|
| Building                                      | Greater than 60cm       | Telephone Exchange              |
| Waterbody                                     | Between 30cm and 60cm   | Community Centre                |
| 1% AEP Flash Flood Extent (Depth Unavailable) | Up to 30cm              | Childcare / Kindergarten        |
| Reserve / Park                                | Bicycle / Walking Trail | School / College                |
| Melbourne Water Retarding Basin               | Bus Route (PTV)         | Police Station                  |
| Commercial Precinct                           | Creek / Waterway        | 1% AEP Over-Floor Flooding Risk |
| Embankment                                    | Aged Care Facility      | Hospital                        |
| Melbourne Water Stormwater Drain              | Municipal Offices       |                                 |

**HUME CITY**  
 1% AEP (100yr ARI)  
 Flooding  
**18. Moonee Ponds Creek**  
 (Jacana)



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Merlynston Creek flood modelling completed by WBM, September 2013. Map Produced by VICSES December 2019.

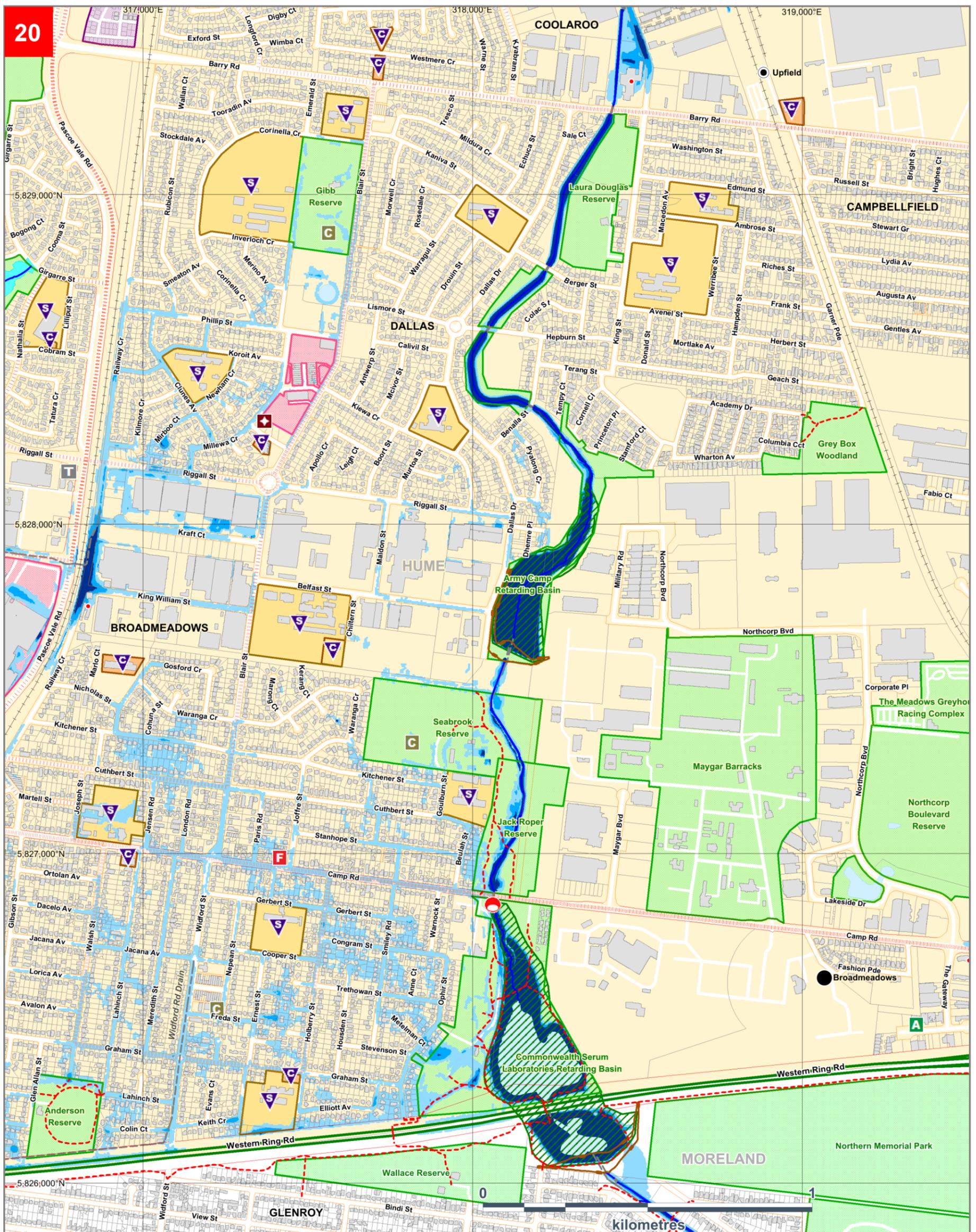
- |  |   |   |
|--|---|---|
| <ul style="list-style-type: none"> <li> Building</li> <li> Waterbody</li> <li> 1% AEP Flash Flood Extent (Depth Unavailable)</li> <li> Reserve / Park</li> <li> Melbourne Water Retarding Basin</li> <li> Commercial Precinct</li> <li> Embankment</li> <li> Melbourne Water Stormwater Drain</li> </ul> | <p><b>1% AEP Flood Depth</b></p> <ul style="list-style-type: none"> <li> Greater than 60cm</li> <li> Between 30cm and 60cm</li> <li> Up to 30cm</li> <li> Bicycle / Walking Trail</li> <li> Bus Route (PTV)</li> <li> Creek / Waterway</li> <li> Aged Care Facility</li> <li> Drainage Pumping Station</li> </ul> | <ul style="list-style-type: none"> <li> Telephone Exchange</li> <li> Fire Station</li> <li> Childcare / Kindergarten</li> <li> School / College</li> <li> Ambulance Station</li> <li> 1% AEP Over-Floor Flooding Risk</li> <li> Caravan Park</li> </ul> |
|--|---|---|

**HUME CITY**  
1% AEP (100yr ARI)  
Flooding  
**19. Merlynston Creek**  
(Coolaroo)



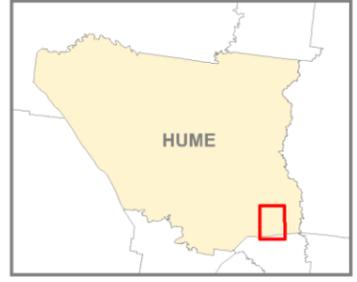
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Merlynston Creek flood modelling completed by WBM, September 2013. Widford Road Drain flood modelling completed by Cardno, May 2017. Map Produced by VICSES December 2019.

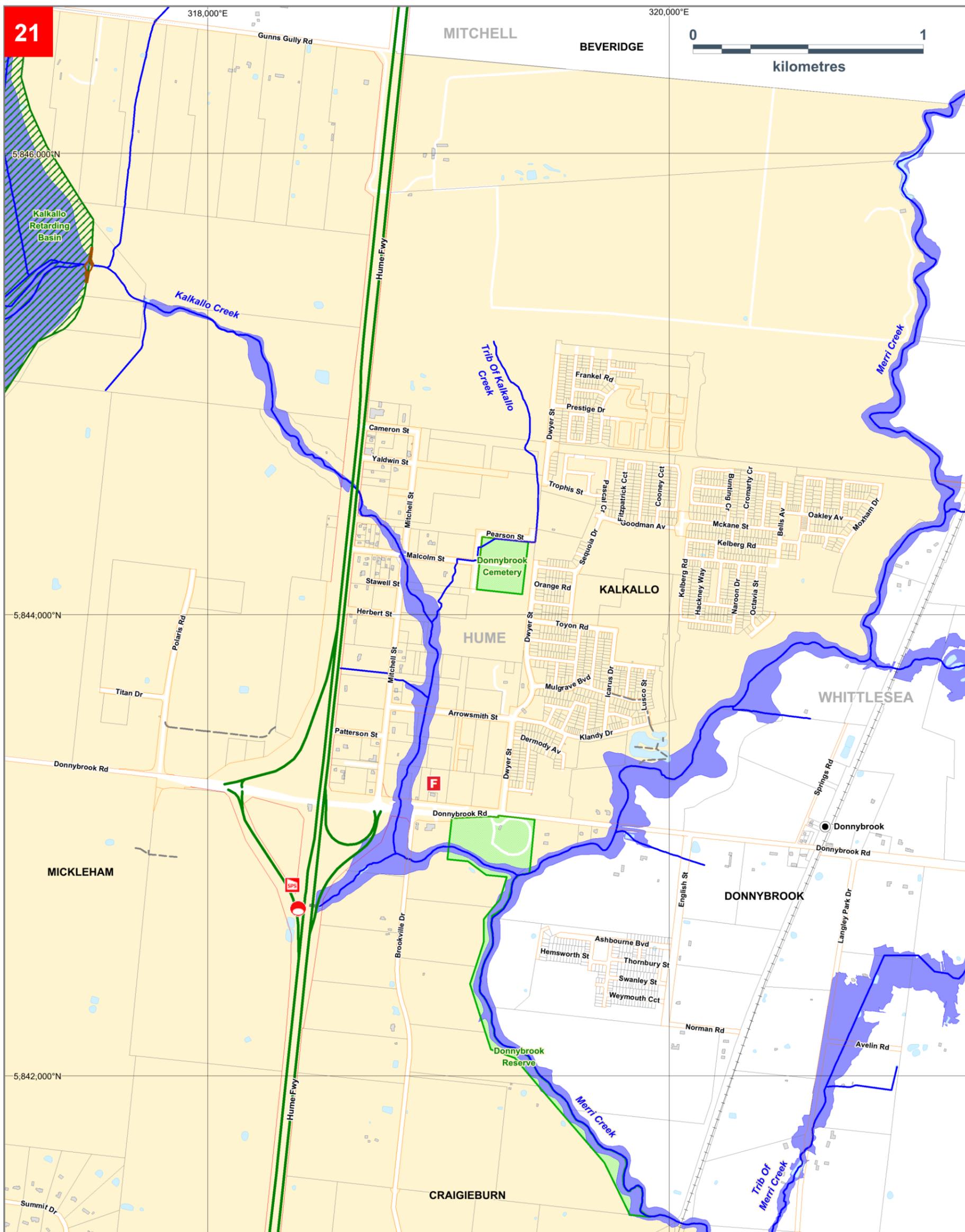
<p><b>HUME CITY</b> 1% AEP (100yr ARI) Flooding <b>20. Merlynston Creek (Broadmeadows)</b></p>	<table border="0"> <tr> <td></td> <td>Building</td> <td></td> <td>Greater than 60cm</td> <td></td> <td>Telephone Exchange</td> </tr> <tr> <td></td> <td>Waterbody</td> <td></td> <td>Between 30cm and 60cm</td> <td></td> <td>Fire Station</td> </tr> <tr> <td></td> <td>1% AEP Flash Flood Extent (Depth Unavailable)</td> <td></td> <td>Up to 30cm</td> <td></td> <td>Childcare / Kindergarten</td> </tr> <tr> <td></td> <td>Reserve / Park</td> <td></td> <td>Bicycle / Walking Trail</td> <td></td> <td>School / College</td> </tr> <tr> <td></td> <td>Melbourne Water Retarding Basin</td> <td></td> <td>Bus Route (PTV)</td> <td></td> <td>Ambulance Station</td> </tr> <tr> <td></td> <td>Commercial Precinct</td> <td></td> <td>Creek / Waterway</td> <td></td> <td>1% AEP Over-Floor Flooding Risk</td> </tr> <tr> <td></td> <td>Embankment</td> <td></td> <td>Place Of Worship</td> <td></td> <td>Sewer Emergency Relief Point</td> </tr> <tr> <td></td> <td>Melbourne Water Stormwater Drain</td> <td></td> <td>Community Centre</td> <td></td> <td></td> </tr> </table>		Building		Greater than 60cm		Telephone Exchange		Waterbody		Between 30cm and 60cm		Fire Station		1% AEP Flash Flood Extent (Depth Unavailable)		Up to 30cm		Childcare / Kindergarten		Reserve / Park		Bicycle / Walking Trail		School / College		Melbourne Water Retarding Basin		Bus Route (PTV)		Ambulance Station		Commercial Precinct		Creek / Waterway		1% AEP Over-Floor Flooding Risk		Embankment		Place Of Worship		Sewer Emergency Relief Point		Melbourne Water Stormwater Drain		Community Centre			<table border="0"> <tr> <td></td> <td>Rain Gauge</td> </tr> </table>		Rain Gauge
	Building		Greater than 60cm		Telephone Exchange																																															
	Waterbody		Between 30cm and 60cm		Fire Station																																															
	1% AEP Flash Flood Extent (Depth Unavailable)		Up to 30cm		Childcare / Kindergarten																																															
	Reserve / Park		Bicycle / Walking Trail		School / College																																															
	Melbourne Water Retarding Basin		Bus Route (PTV)		Ambulance Station																																															
	Commercial Precinct		Creek / Waterway		1% AEP Over-Floor Flooding Risk																																															
	Embankment		Place Of Worship		Sewer Emergency Relief Point																																															
	Melbourne Water Stormwater Drain		Community Centre																																																	
	Rain Gauge																																																			



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Merri Creek flood modelling completed by Melbourne Water. ap Produced by VICSES December 2019.

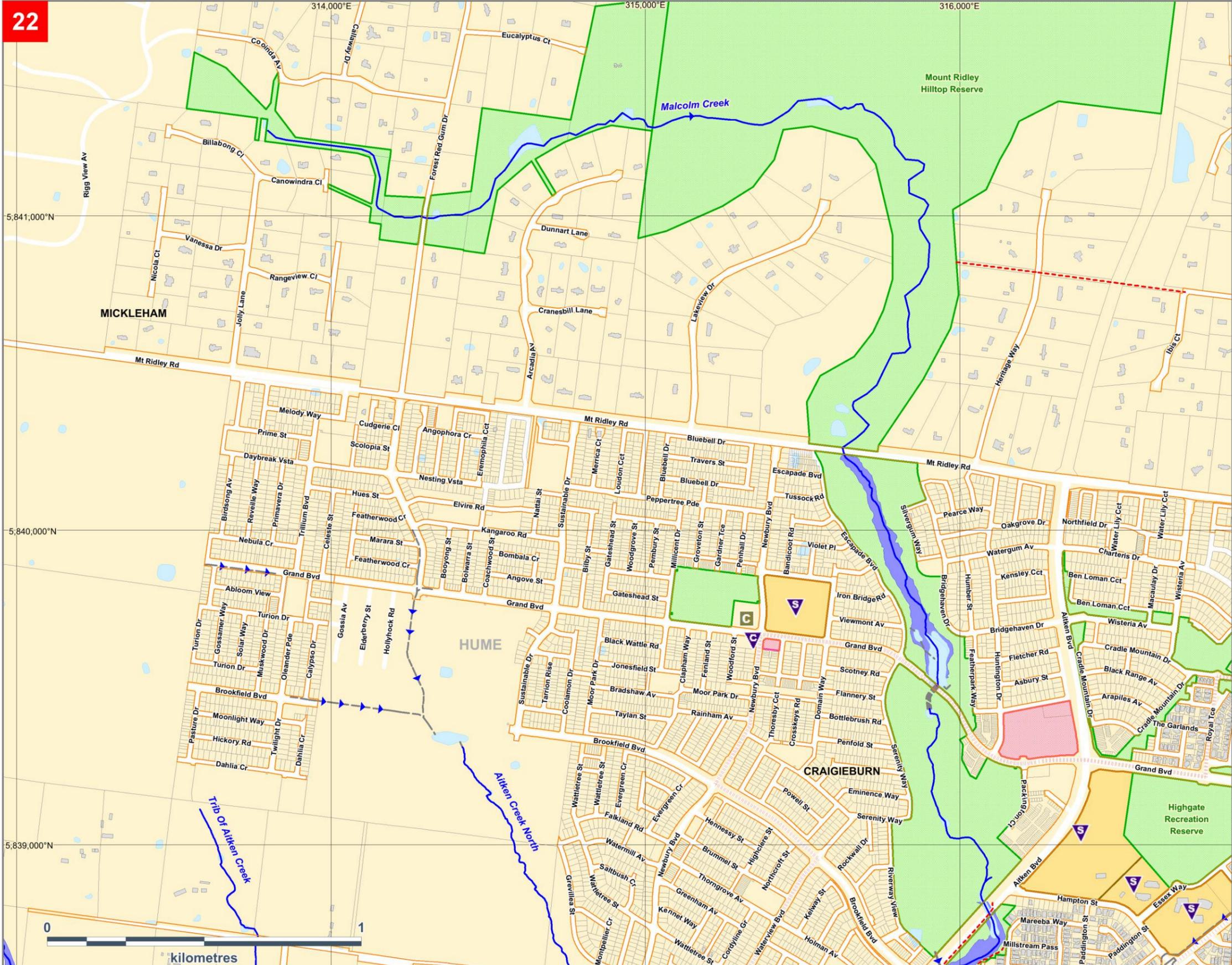
- Building
- Waterbody
- 1% AEP Riverine Flood Extent (Depth Unavailable)
- Reserve / Park
- Creek / Waterway
- Sewer Emergency Relief Point
- F Fire Station
- S Sewer Pumping Station

**HUME CITY**  
 1% AEP (100yr ARI) Flooding  
**21. Merri Creek**  
**(Kalkallo)**

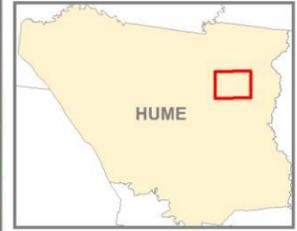


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-  Building
-  Area of Interest
-  Waterbody
-  Shopping Precinct
-  1% AEP Riverine Flood Extent (Depth Unavailable)
-  Creek / Waterway
-  Bicycle / Walking Trail
-  Bus Routes (PTV)
-  Melbourne Water Stormwater Drain
-  School / College
-  Kindergarten / Child Care
-  Community Centre

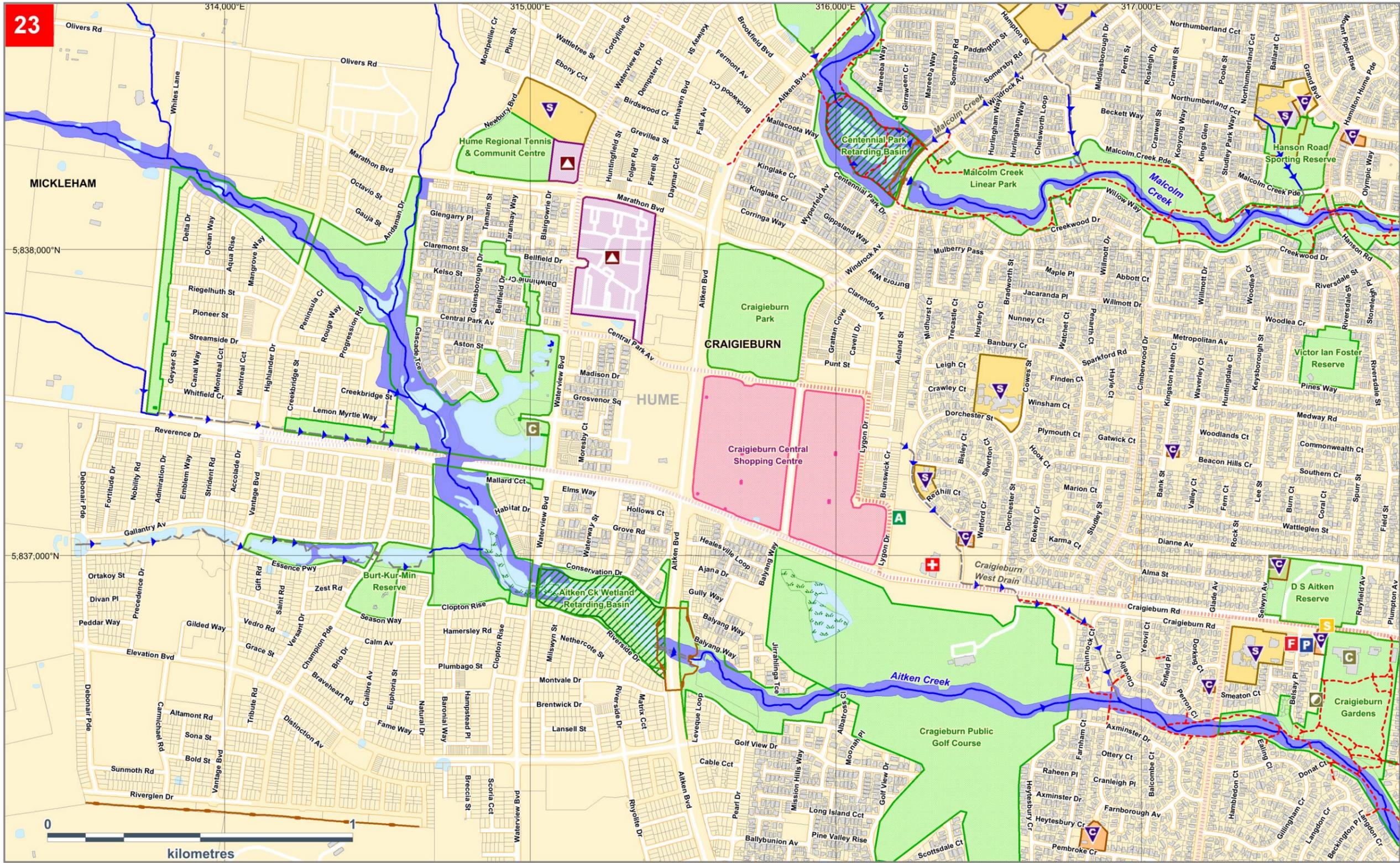


**HUME CITY**  
 1% AEP (100yr ARI) Flooding  
 22. Malcolm Creek  
 (Craigieburn)



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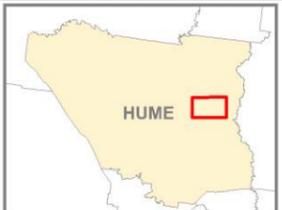
Malcolm Creek flood modelling completed by Melbourne Water, December 2012. Map Produced by VicSES January 2020.



Aitken Creek flood modelling completed by Melbourne Water. Map produced by VicSES January 2020.

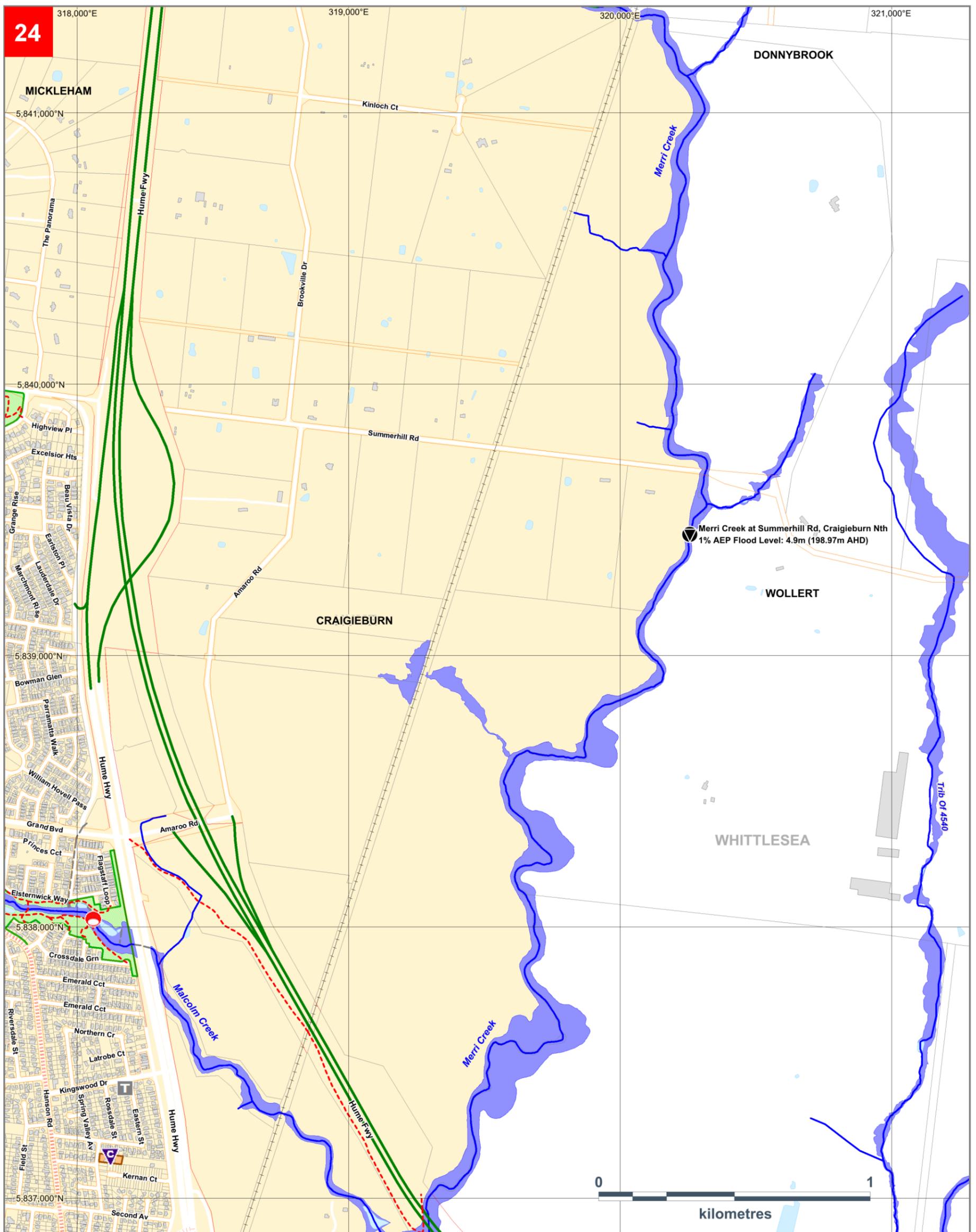
**HUME CITY**  
 1% AEP (100yr ARI) Flooding  
**23. Aitken Creek**  
**(Craigieburn)**

- |                                 |  |                           |                  |
|---------------------------------|--|---------------------------|------------------|
| Building                        | 1% AEP Riverine Flood Extent (Depth Unavailable) | Aged Care Facility        | School / College |
| Area of Interest                | Melbourne Water Stormwater Drain                 | Child Care / Kindergarten | Fire Station     |
| Waterbody                       | Creek / Channel                                  | Ambulance Station         | Municipal Depot  |
| Shopping Precinct               | Embankment                                       | Community Centre          | Hospital         |
| Melbourne Water Retarding Basin | Bicycle / Walking Trail                          | State Emergency Service   | Police Station   |
|                                 | Bus Route (PTV)                                  |                           |                  |



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Merri Creek flood modelling completed by Melbourne Water. ap Produced by VICSES December 2019.

- Building
- Waterbody
- 1% AEP Riverine Flood Extent (Depth Unavailable)
- Reserve / Park
- Creek / Waterway
- Sewer Emergency Relief Point
- Stream Level Gauge & 1% AEP Flood Level
- Rain Gauge

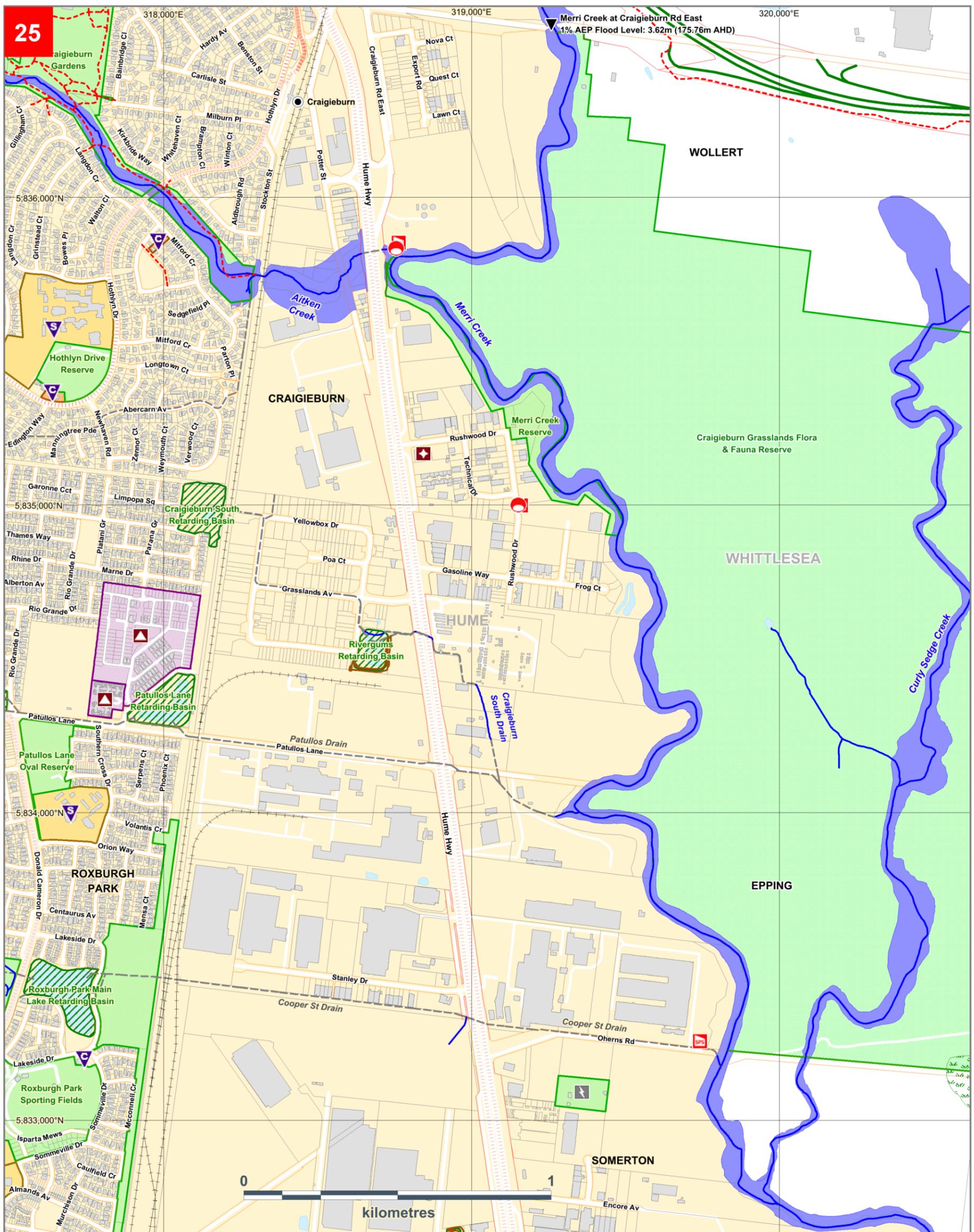
## HUME CITY

1% AEP (100yr ARI) Flooding

### 24. Merri Creek (Craigieburn)

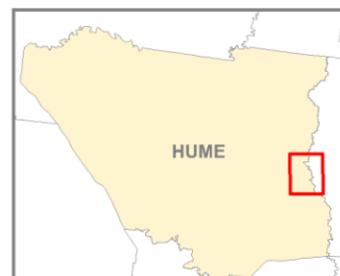


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Merri Creek flood modelling completed by Melbourne Water. Map Produced by VICSES December 2019.

- Building
- Waterbody
- 1% AEP Riverine Flood Extent (Depth Unavailable)
- Reserve / Park
- Creek / Waterway
- Sewer Emergency Relief Point
- Stream Level Gauge & 1% AEP Flood Level
- Rain Gauge

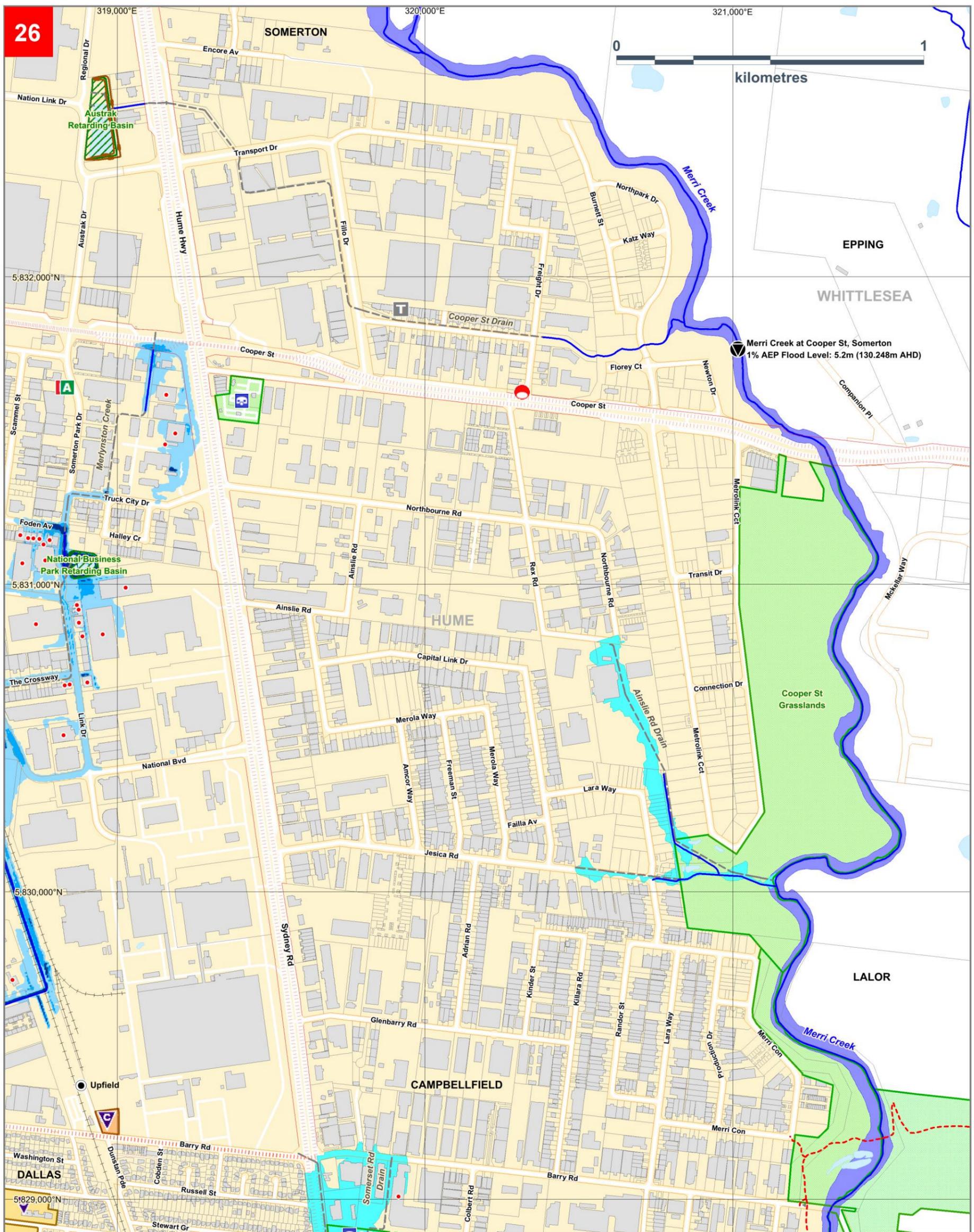


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## HUME CITY

1% AEP (100yr ARI) Flooding

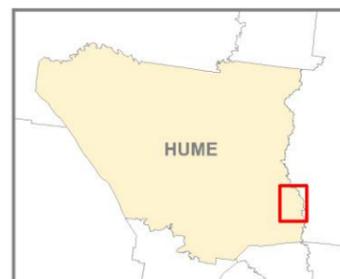
### 25. Merri Creek (Craigieburn)



Merri Creek flood modelling completed by Melbourne Water, April 2009. Map Produced by VICSES December 2019.

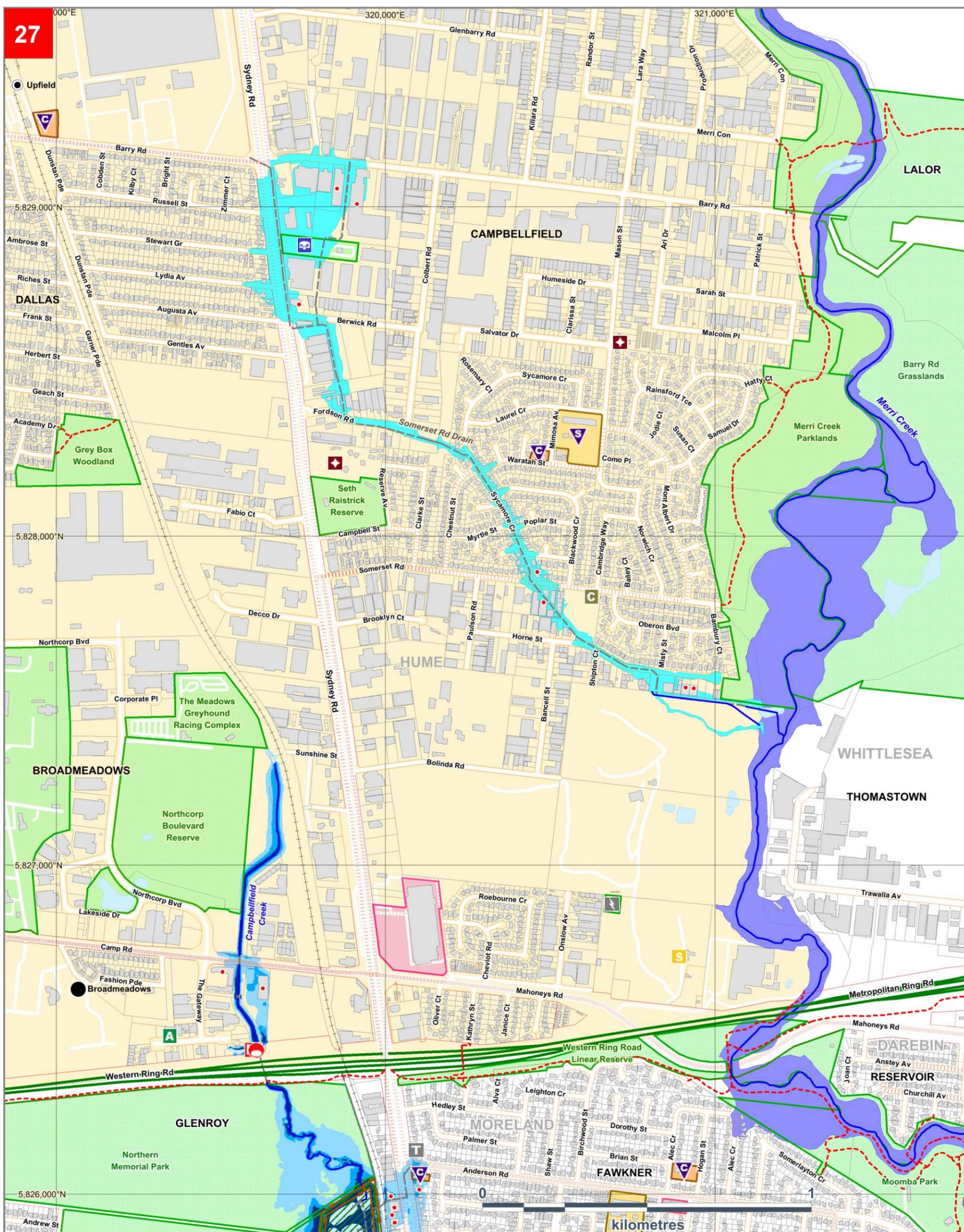
**HUME CITY**  
 1% AEP (100yr ARI) Flooding  
**26. Merri Creek**  
 (Somerton)

- |  |  |  |   |  |                                 |
|--|--|--|---|--|---------------------------------|
|  | Building   |  | Greater than 60cm                       |  | Telephone Exchange              |
|  | Waterbody  |  | Between 30cm and 60cm                   |  | Caravan Park                    |
|  | 1% AEP Riverine Flood Extent (Depth Unavailable) |  | Up to 30cm                              |  | Childcare / Kindergarten        |
|  | 1% AEP Flash Flood Extent (Depth Unavailable)    |  | Bicycle / Walking Trail                 |  | Fire Station                    |
|  | Reserve / Park                                   |  | Bus Route (PTV)                         |  | Ambulance Station               |
|  | Melbourne Water Retarding Basin                  |  | Creek / Waterway                        |  | 1% AEP Over-Floor Flooding Risk |
|  | Melbourne Water Stormwater Drain                 |  | Stream Level Gauge & 1% AEP Flood Level |  | Sewer Emergency Relief Point    |
|  | Embankment                                       |  | Rain Gauge                              |  |                                 |



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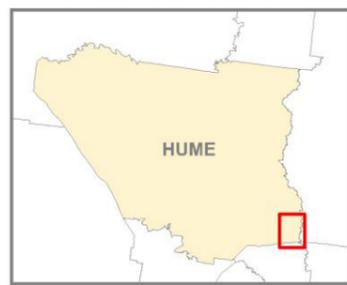
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Merri Creek flood modelling completed by Melbourne Water, April 2009. Map Produced by VICSES December 2019.

**HUME CITY**  
 1% AEP (100yr ARI)  
 Flooding  
**27. Merri Creek**  
**(Campbellfield)**

- |  |  |  |                         |  |                                 |  |                  |
|--|--|--|-------------------------|--|---------------------------------|--|------------------|
|  | Building   |  | Greater than 60cm       |  | Telephone Exchange              |  | School / College |
|  | Waterbody  |  | Between 30cm and 60cm   |  | Caravan Park                    |  | Rain Gauge       |
|  | 1% AEP Riverine Flood Extent (Depth Unavailable) |  | Up to 30cm              |  | Childcare / Kindergarten        |  |                  |
|  | 1% AEP Flash Flood Extent (Depth Unavailable)    |  | Bicycle / Walking Trail |  | Sewer Pumping Station           |  |                  |
|  | Reserve / Park                                   |  | Bus Route (PTV)         |  | Ambulance Station               |  |                  |
|  | Melbourne Water Retarding Basin                  |  | Creek / Waterway        |  | 1% AEP Over-Floor Flooding Risk |  |                  |
|  | Commercial Precinct                              |  | Place Of Worship        |  | Sewer Emergency Relief Point    |  |                  |
|  | Embankment                                       |  | Community Centre        |  | State Emergency Service         |  |                  |
|  | Melbourne Water Stormwater Drain                 |  | Power Terminal Station  |  |                                 |  |                  |



**VICTORIA**  
 State Government  
**Melbourne Water**

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## Catchment Schematics

Schematics detailing the drainage catchments relevant for this municipality have been included in this Appendix. Each Schematic outlines the drainage system comprising of rivers, creeks or storm-water drains contained within one of the major catchments in the Port Phillip & Westernport Region.

Within each Schematic, there are details useful to flood response such as those relating to gauges, towns, rivers, creeks, drains and reservoirs. Historical facts and figures may also be shown.

The schematics also detail the response boundaries for SES Units and local government, and provide a reference link to the corresponding Municipal Flood Emergency Plan.

Details within these Catchment Schematics reflect those contained within either other sections of this Municipal Flood Emergency Plan or refer to other Municipal Flood Emergency Plans. These details have been filtered to contain only key facts. For more information on a gauge, drainage system or town consult the corresponding Flood Emergency Plan

Note that not all waterways or drains are included in the schematics, only those that are likely to contribute to flooding further on along the drainage system. Note also the flow direction; the schematics either flow from the top of the page to the bottom, or vice versa.



# Maribyrnong River Catchment Schematic

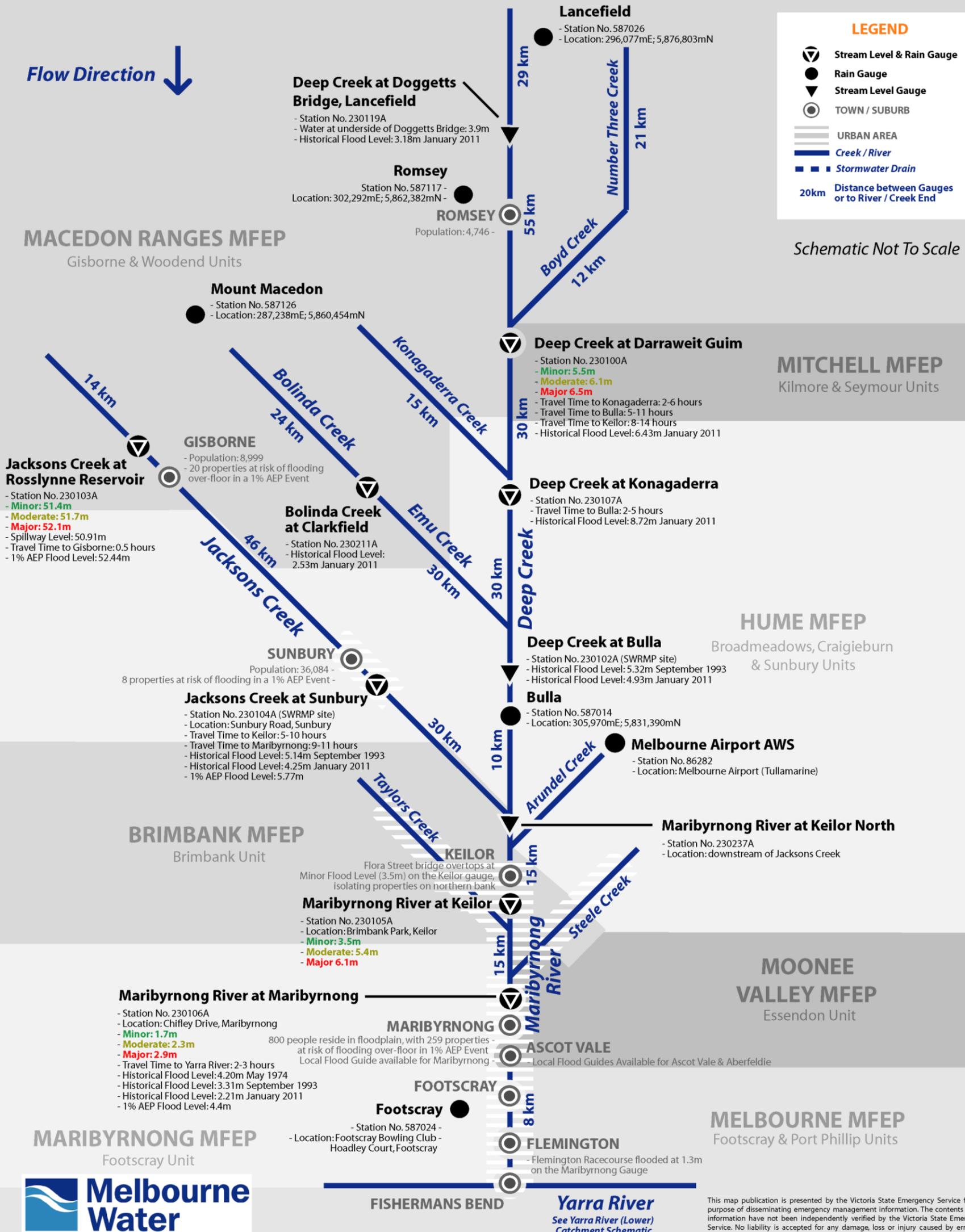
Version 4 - January 2020

Flow Direction ↓

### LEGEND

- Stream Level & Rain Gauge
- Rain Gauge
- Stream Level Gauge
- TOWN / SUBURB
- URBAN AREA
- Creek / River
- Stormwater Drain
- 20km Distance between Gauges or to River / Creek End

Schematic Not To Scale



Information Sources: Melbourne Water Flood Warning Manual; Municipal Flood Emergency Plans; Melbourne Water GIS; Melbourne Water HYDSTRA Database; ABS Census 2016

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# Moonee Ponds Creek Catchment Schematic

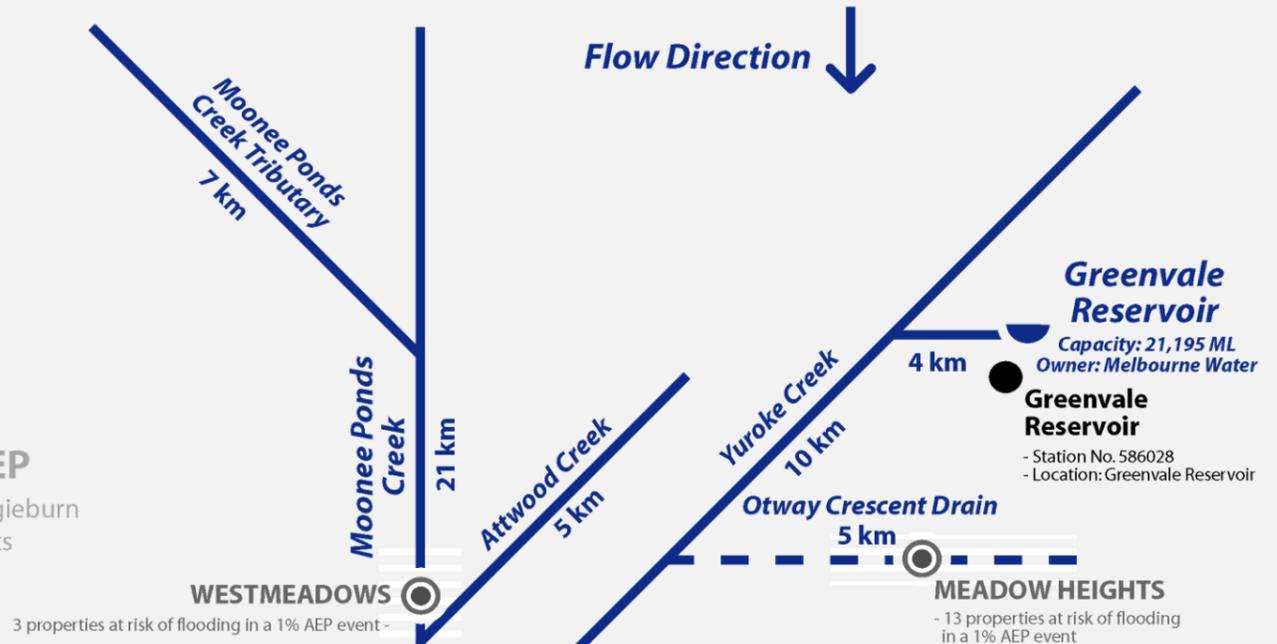
Version 4 - April 2019

**LEGEND**

- Stream Level & Rain Gauge
- Rain Gauge
- Stream Level Gauge
- TOWN / SUBURB
- Reservoir / Dam / Lake
- URBAN AREA
- Creek / River
- Stormwater Drain
- 20km Distance between Gauges or to River / Creek End

Schematic Not To Scale

**HUME MSFEP**  
Broadmeadows, Craigieburn & Sunbury Units



## Jacana Retarding Basin

**Moonee Ponds Creek at Jacana Retarding Basin**

- Station No. 229665A
- Location: Jacana Retarding Basin, Glenroy
- Historical Flood Level: 12.57m (3rd February 2005)
- Spillway Level (Glory Hole): 12.0m
- Spillway Level (Secondary): 13.5m
- Embankment Level (Crest): 15.04m
- 1% AEP Flood Level: 15.09m

**Essendon North**

- Station No. 586182
- Location: Essendon Reservoir, Essendon Airport

**MOONEE VALLEY MSFEP**  
Essendon Unit

**OAK PARK**  
- 7 properties at risk of flooding in a 1% AEP event

**GLENROY**  
- 97 properties at risk of flooding over-floor in a 1% AEP event  
- 49 properties at risk of flooding over-floor in a 5% AEP event  
- 24 properties at risk of flooding over-floor in a 20% AEP event

**MORELAND MSFEP**  
Broadmeadows Unit

Westbreen Creek: 4 km

Melville Main Drain: 5 km

**COBURG**  
- 94 properties at risk of flooding over-floor in a 1% AEP event  
- 10 properties at risk of flooding over-floor in a 5% AEP event  
- 2 properties at risk of flooding over-floor in a 20% AEP event

**BRUNSWICK WEST**  
- 140 properties at risk of flooding over-floor in a 1% AEP event  
- 32 properties at risk of flooding over-floor in a 5% AEP event  
- 1 property at risk of flooding over-floor in a 20% AEP event

**Moonee Ponds Creek at Flemington**

- Station No. 229643A
- Location: Delhi Court, Travancore
- Historical Flood Level: 2.61m (3rd February 2005)
- 1% AEP Flood Level: 2.94m

**MELBOURNE MSFEP**  
Footscray & Port Phillip Units

**NORTH MELBOURNE**  
8 properties at risk of flooding - over-floor in a 1% AEP event

**Docklands**  
- Station No. 586182  
- Location: North Wharf, Docklands

← **Yarra River**  
See Yarra River (Lower) Catchment Schematic

**Yarra River at Southbank**

- Station No. 229663A
- Location: Spencer Street, Southbank
- Historical Flood Level: 1.88m (3rd February 2005)
- 1% AEP Flood Level: 1.6m



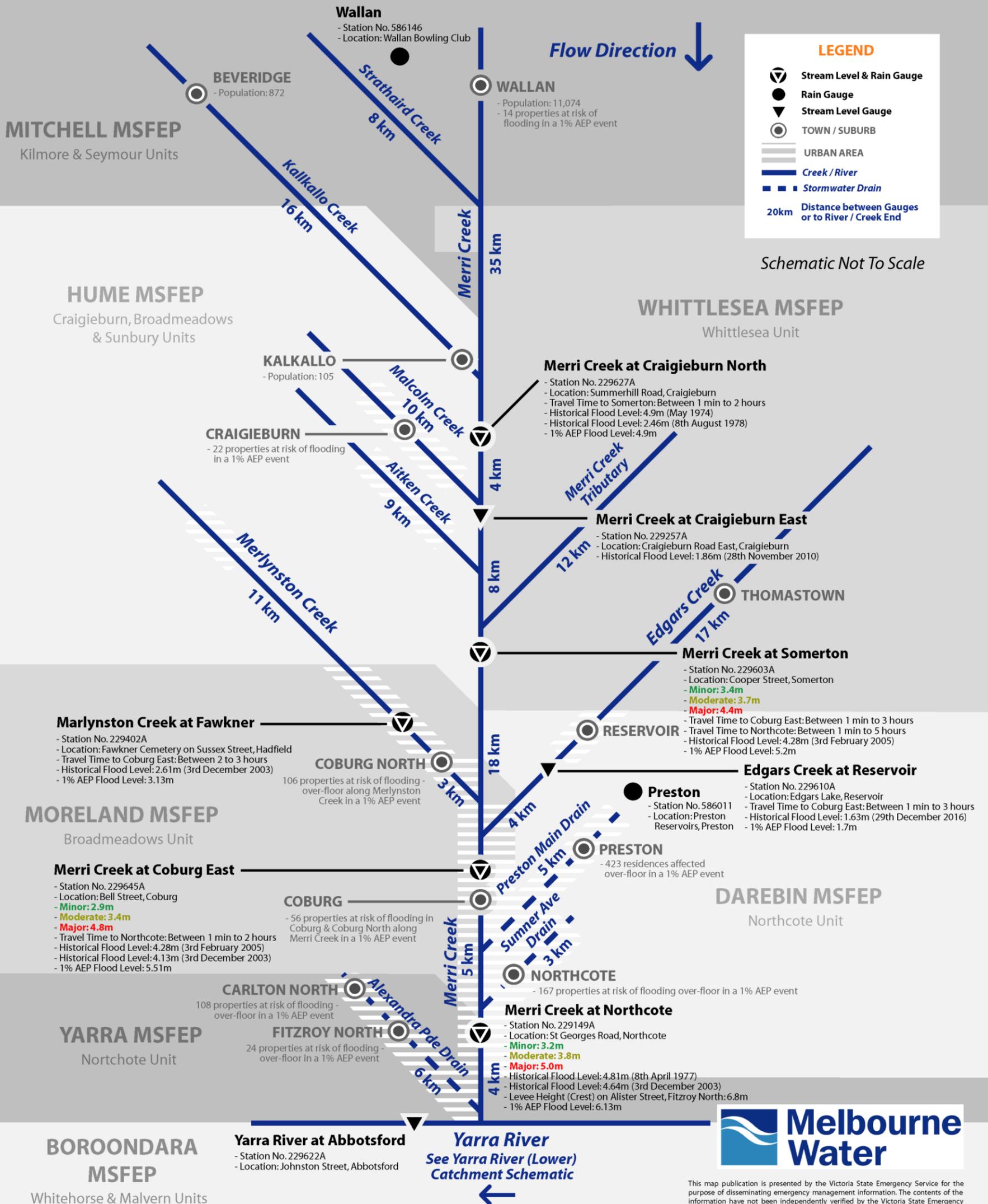
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Information Sources: Melbourne Water Flood Warning Manual; Municipal Flood Emergency Plans; Melbourne Water GIS; Melbourne Water HYDSTRA Database; ABS Census 2016



# Merri Creek Catchment Schematic

Version 5 - April 2019



Information Sources: Melbourne Water Flood Warning Manual; Municipal Flood Emergency Plans; Melbourne Water GIS; Melbourne Water HYDSTRA Database; ABS Census 2016

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## APPENDIX G – SEVERE WEATHER (STORM) EVENTS

### Overview

Hume municipality is susceptible to severe weather events because of a combination of its undulating terrain, peri urban boundary location and wind exposed properties. Storm events the City of Hume may be subject to include wind storms, dust storms, hailstorms, and thunderstorms (including lightning activity). There have also been occurrences of atmospheric downbursts/microburst within adjacent municipalities. Blocked drains and pits, or drainage systems that may be insufficiently sized for the level of development in the City of Hume also contribute to the effects of storm activity.

Severe storm activity could result in injuries and increase in road accidents. Damaging wind events will tend to lead to trees down, with damage to the built and natural environment. Obstructions across roads could disrupt services, affect community functioning and have great potential for road traffic delays. Infrastructure near waterways such as pedestrian bridges may become damaged either directly, or from debris that has been washed into the current. Debris that had been washed or blown onto rail networks could also cause delayed to passenger and freight networks.

This Appendix uses Request for Assistance data from the Victoria State Emergency Service (VICSES) to display areas at risk from severe weather events.

### VICSES requests for assistance

The Victoria State Emergency Service records requests for assistance made by the public during severe weather events. Table G1 below is a breakdown of requests by suburb and damage type during the period June 2010 and January 2020 in relation to severe weather and storm events.

VicSES Request for Assistance (Jun 2010 – Jan 2020)					
Suburb	Building Damage	Flooding	Tree Down	Tree Down Traffic Hazard	Other*
Attwood	27	5	11	14	2
Broadmeadows	130	21	86	36	2
Bulla	7	5	12	31	0
Campbellfield	75	43	41	43	0
Clarkefield (part)	0	0	0	8	0
Coolaroo	28	9	19	9	0
Craigieburn	293	110	120	109	3
Dallas	73	14	36	22	0
Diggers Rest (part)	5	1	3	3	0
Fawkner (part)	4	0	0	2	0
Gladstone Park	106	14	79	30	1
Greenvale	94	34	39	26	0
Jacana	30	1	18	8	0
Kalkallo	5	0	1	6	0
Keilor (part)	0	0	2	3	0
Meadow Heights	120	23	65	25	1
Melbourne Airport	2	0	1	24	0
Mickleham	24	14	14	23	0
Oaklands Junction	3	3	4	32	0
Roxburgh Park	116	43	48	50	3
Somerton	7	5	0	12	1

Sunbury	474	222	429	247	4
Tullamarine (part)	93	27	55	37	0
Westmeadows	82	10	56	27	0
Wildwood	2	1	5	16	0
Yuroke	4	3	3	6	0

Table G1 – Breakdown of Severe Weather Requests for Assistance received by VICSES Units Broadmeadows, Craigieburn and Sunbury by suburb

\* Loose Debris / Object, Rescue Structure Collapse, Rescue Persons Trapped (during a severe weather event), Sandbag Request

\*RFAs captured are those that occurred in conjunction with storm/ severe weather activity. Single incident RFAs that have occurred in calm weather have not been included.

\*\*RFAs relating to Rescues, Assist fire service, Assist police, Message, SES incident other etc. have not been included in the dataset

Table 2 is a breakdown of requests for assistance by date (month) and damage type. High figures during November 2010 were the result of high intensity rainfall following passage of intense storm bands leading to building damage, road and property flooding and major traffic delays on the Western Ring Road. High December 2011 figures are the result of an intense storm with large hail that moved across the north west metropolitan suburbs on Christmas Day causing significant building damage and some flooding issues.

More recently, large storms in June 2014, March 2015, October and Decembers 2016 and July 2017 caused extensive damage to property and increased road congestion as high winds caused trees to fall on properties and across roads.

High rates of subdivision and development within the municipality have led to the reformation of farm dams into wetlands and ornamental lakes. During high rainfall storm events in December 2017 and June 2018, issues around dam overtopping in close proximity to properties or dam failure potential were identified.

VICSES Request for Assistance (Jun 2010 – Jan 2020)					
Date	Building Damage	Flooding	Tree Down	Tree Down Traffic Hazard	Other*
June 2010	21	0	22	3	0
July 2010	10	1	7	1	0
August 2010	13	1	12	7	0
September 2010	5	1	5	3	0
October 2010	19	18	3	5	0
November 2010	36	107	9	15	3
December 2010	14	29	9	4	0
January 2011	15	28	12	11	0
February 2011	15	10	10	9	0
March 2011	1	3	0	0	0
April 2011	5	4	2	1	0
May 2011	3	2	2	3	0
June 2011	3	2	5	4	0
July 2011	5	0	3	0	0
August 2011	1	2	1	2	0
September 2011	20	21	18	4	0
October 2011	4	0	0	0	0
November 2011	13	12	6	6	0
December 2011	151	54	60	33	0
January 2012	13	3	12	13	0
February 2012	41	16	22	11	0
March 2012	12	1	2	2	0
April 2012	2	2	4	5	0

VICSES Request for Assistance (Jun 2010 – Jan 2020)					
Date	Building Damage	Flooding	Tree Down	Tree Down Traffic Hazard	Other*
May 2012	6	2	2	1	0
June 2012	4	1	4	4	0
July 2012	3	4	4	1	0
August 2012	5	13	1	4	0
September 2012	34	4	28	17	0
October 2012	6	1	3	1	0
November 2012	6	1	6	2	0
December 2012	12	0	10	12	0
January 2013	3	2	3	8	0
February 2013	50	20	5	5	0
March 2013	18	4	23	14	0
April 2013	2	0	5	0	0
May 2013	12	17	2	7	0
June 2013	24	12	0	2	0
July 2013	5	5	6	14	0
August 2013	14	0	18	8	0
September 2013	10	3	17	12	0
October 2013	34	1	40	23	0
November 2013	1	1	1	1	0
December 2013	8	2	8	6	0
January 2014	6	0	14	11	0
February 2014	4	0	5	5	0
March 2014	2	0	2	1	0
April 2014	4	0	3	2	0
May 2014	1	0	8	1	0
June 2014	52	0	53	32	0
July 2014	25	0	24	12	0
August 2014	5	0	5	2	0
September 2014	18	6	14	8	0
October 2014	5	1	8	7	0
November 2014	3	2	5	2	0
December 2014	15	2	10	11	0
January 2015	27	5	11	15	0
February 2015	20	2	8	62	0
March 2015	22	1	35	17	0
April 2015	11	2	3	2	0
May 2015	0	1	1	2	0
June 2015	2	1	2	6	0
July 2015	10	5	6	1	0
August 2015	3	1	0	2	0
September 2015	2	2	0	0	0
October 2015	5	5	0	3	0
November 2015	10	3	20	14	0
December 2015	40	0	8	6	0
January 2016	10	2	3	5	0
February 2016	1	1	1	4	0
March 2016	10	0	5	10	0
April 2016	1	0	1	1	0
May 2016	22	4	17	11	0
June 2016	9	1	2	2	0
July 2016	9	3	11	7	0
August 2016	6	1	5	5	0
September 2016	4	6	2	13	0
October 2016	85	0	79	45	0
November 2016	10	2	6	3	0
December 2016	77	100	8	12	2
January 2017	7	0	4	1	0
February 2017	18	5	5	8	0
March 2017	14	1	6	3	0

VICSES Request for Assistance (Jun 2010 – Jan 2020)					
Date	Building Damage	Flooding	Tree Down	Tree Down Traffic Hazard	Other*
April 2017	19	5	1	3	0
May 2017	4	1	0	3	0
June 2017	1	3	0	0	0
July 2017	47	0	36	24	0
August 2017	13	0	9	4	0
September 2017	6	3	5	3	0
October 2017	3	0	4	3	1
November 2017	5	2	4	6	0
December 2017	54	21	6	3	3
January 2018	11	6	5	6	0
February 2018	1	0	7	6	0
March 2018	7	4	3	5	0
April 2018	2	2	5	3	0
May 2018	20	4	5	2	0
June 2018	23	27	4	2	1
July 2018	9	0	1	8	0
August 2018	9	0	1	5	0
September 2018	5	0	0	1	0
October 2018	3	0	3	1	2
November 2018	44	15	16	12	1
December 2018	8	6	7	3	0
January 2019	6	1	16	10	0
February 2019	10	2	6	2	0
March 2019	12	3	12	4	0
April 2019	1	1	3	1	0
May 2019	6	6	2	3	0
June 2019	8	1	2	2	0
July 2019	5	0	3	1	0
August 2019	8	2	2	2	0
September 2019	6	2	3	2	0
October 2019	8	2	14	9	0
November 2019	22	0	37	22	1
December 2019	5	0	8	7	2
January 2020	23	14	17	1	1

Table 2 – Breakdown of severe weather requests for assistance received by VICSES Units Broadmeadows, Craigieburn and Sunbury within City of Hume by date

\* Loose Debris / Object, Rescue Structure Collapse, Rescue Persons Trapped (during a severe weather event), Sandbag Request

\*\*RFAs captured are those that occurred in conjunction with storm/ severe weather activity. Single incident RFAs that have occurred in calm weather have not been included.

# VICSES Requests For Assistance mapping

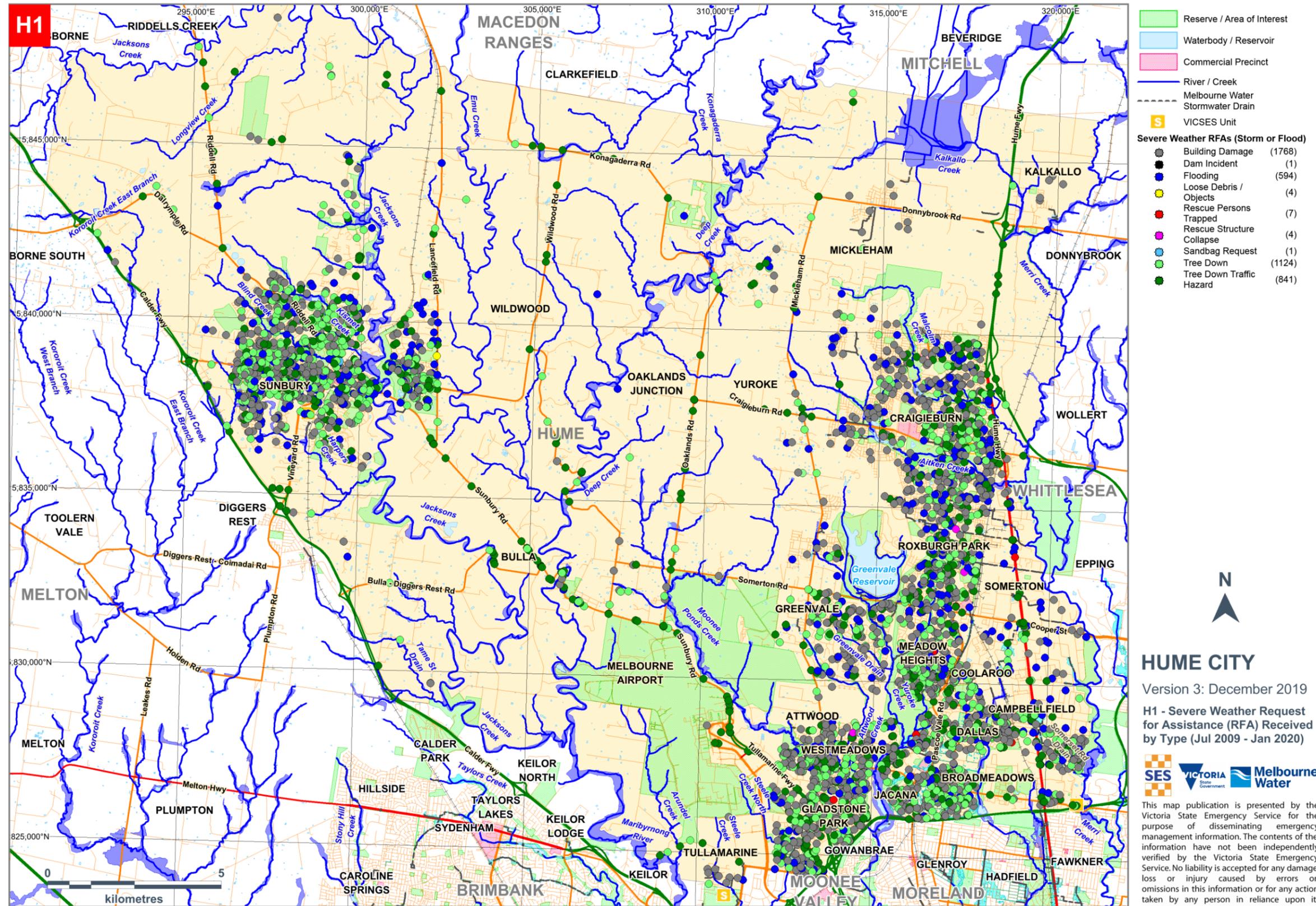


Figure 1 – Breakdown of Severe Weather Requests for Assistance received by VICSES Units Broadmeadows, Craigieburn and Sunbury within Hume by request type

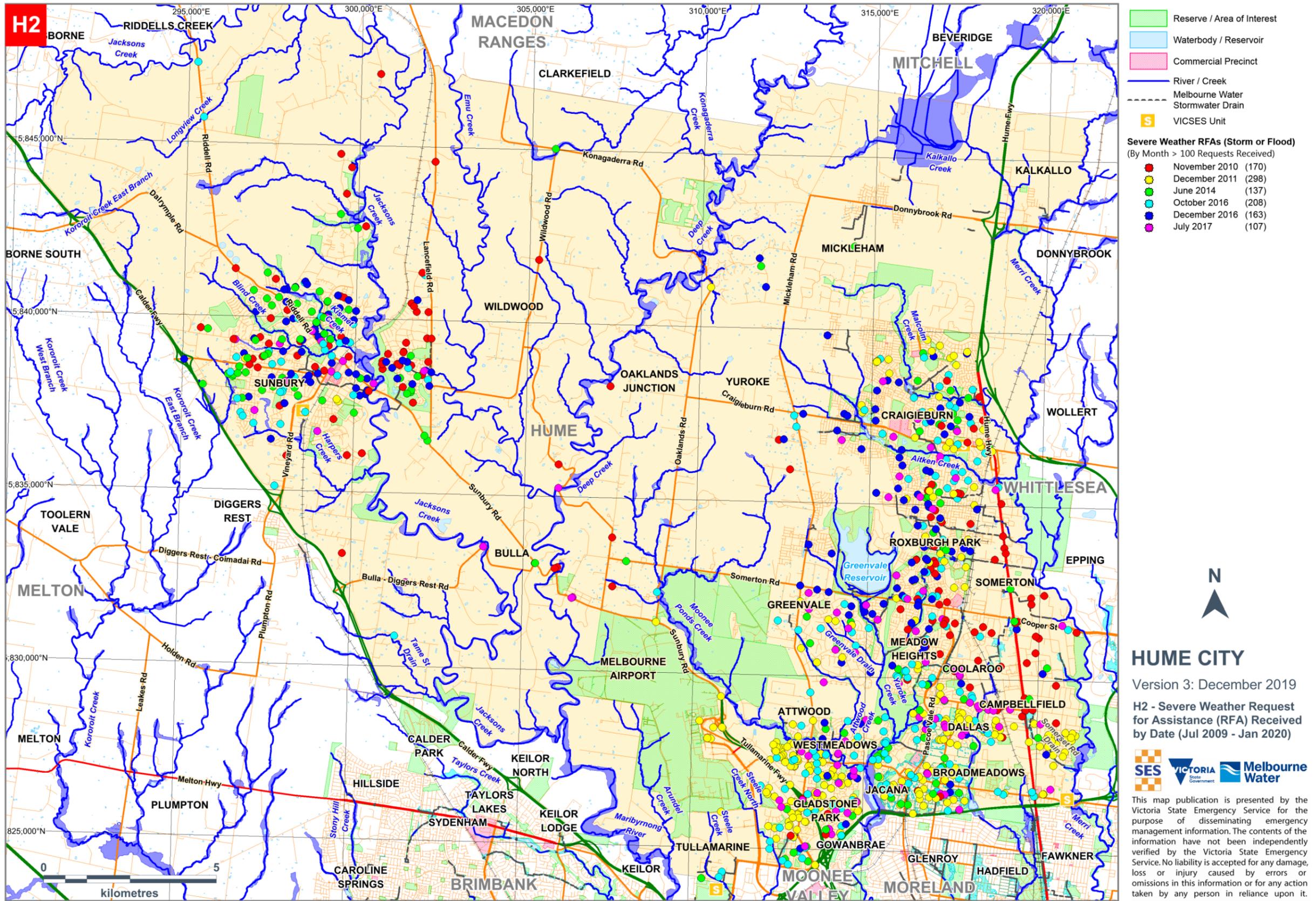


Figure 2 – Breakdown of Severe Weather Requests for Assistance received by VICSES Units Broadmeadows, Craigieburn and Sunbury within Hume by date

## Activation Triggers

Triggers for activation in flood and storm have been identified as follows:

FLOOD READINESS AND ACTIVATION TRIGGER CONSIDERATIONS - V3.0 - SEPTEMBER 2017						
Readiness Level	RL 1 - LOW TO MODERATE	RL 2 - HIGH	RL 3(A) - VERY HIGH	RL 3(B) - VERY HIGH	RL 4 - SEVERE	RL 5 - EXTREME
FDI	0 - 11	12 - 24	25 - 34*	35 - 49*	50 - 74	75 - 99
Fire Behaviour	Fires can be easily controlled	Fires can be controlled, expect short distance spotting	Fires can be difficult to control, crown fires may develop in forest.	Fires can be difficult to control, crown fires may develop in forest.	Fires may be uncontrollable and move quickly. Spot fires may occur up to 4km ahead of the fire.	Fires will be uncontrollable, unpredictable and fast moving. Spot fires up to 6km ahead of the fire.
	Minor		Moderate		High End Moderate to Major	
Flood Prediction	Flood Watch issued and/or Minor Flood warning issued	Minor Flood Warning issued	Low to Mid range Moderate Flood warning issued with low consequences for built environment based on risk	Moderate to High end MODERATE Flood Warning with moderate consequences for built environment based on risk	MAJOR Flood Warning predicted and/or >2 high end MODERATE Flood warnings with risks and consequences for built environment & economic	Two or more MAJOR Flood warning(s) or One with significant consequences / widespread evacuations for built environment, exceeding 1 in 100 year riverine event. Multiple MODERATE Flood Warnings. Large Dam failure considered very likely.
Flood Behaviour	Anticipated continued light rain. Catchments able to absorb predicted rain for consecutive days but may lead to flooding. Nil impacts or consequences predicted unless identified.	Anticipated continued rain. Catchments able to absorb predicted rain for consecutive days with minor flooding occurring. Low-lying areas next to water courses are inundated. Minor roads may be closed and low-level bridges submerged. In urban areas inundation may affect some backyards and buildings below the floor level as well as bicycle and pedestrian paths. In rural areas removal of stock and equipment may be required	Anticipated continued rain. Catchments likely to be saturated and unable to absorb continued rain. Areas of inundation are more substantial in size but consequence low. Main traffic routes may be affected. Unlikely for buildings to be affected above the floor level. Evacuation of flood affected areas may start to be considered. In rural areas removal of stock is required.	Anticipated continued rain. Catchments are saturated and unable to absorb continued rain. Areas of inundation are more substantial. Main traffic routes may be affected. Some buildings may be affected above the floor level. Evacuation of flood affected areas may be planned for. In rural areas removal of stock is required. Impact assessment may be required.	Anticipated continued high rain. Catchments are saturated and unable to absorb continued rain and runoff. Extensive rural areas and/or urban areas are inundated. Many buildings may be affected above the floor level. Properties and towns are likely to be isolated and major rail and traffic routes closed. Evacuation of flood affected areas likely. Utility services likely to be impacted.	Anticipated significant extreme weather event that will lead to rapidly rising river conditions. Catchments are saturated and unable to absorb current or additional runoff. Extensive rural areas and/or urban areas are inundated. Many buildings may be affected above the floor level. Properties and towns are likely to be isolated and major rail and traffic routes closed. Evacuation of flood affected areas are likely. Utility services will be impacted.
Readiness Level (State)	Preparedness WHITE SDO and SAC (monitor)	Preparedness WHITE SDO and SAC (monitor)	Preparedness WHITE SDO and SAC (monitor)	SCC level BLUE or when ICC activated SDO and SAC in place METRO: RCC open, Base RCT in place	SCC level ORANGE. Multiple ICCs activated or multi region SDO and SAC in place Consider day & night	SCC Level RED. Multiple ICCs activated or multi region SDO and SAC in place Day & night
Readiness levels (Regional)	Preparedness WHITE RAC (Monitoring) RDO (monitor and issuing public information)	Preparedness WHITE RAC (Monitoring) RDO (monitor and issuing warnings)	Regional Command (on call/ STBY) RAC (Monitoring) RDO (issuing warnings - overlooking basic response (eg: evac caravan park))	RURAL: Regional Cmd in place, RC notified. METRO: RCC OPEN, base RCT in place RAC and RDO at the RCC FULL RCT on Standby REMT Briefed by RAC	RCC OPEN: RCT in place, some agencies available on immediate recall RAC and RDO at the RCC REMT briefed by RAC and on standby to come in (as required)	RCC OPEN: Full RCT and most REMT in place RAC and RDO at the RCC RCT, RAC and RDO in place at RCC
Readiness levels (Incident)			Base IMT (Rostered STBY)	Base IMT (In Place - Primary ICC)	RURAL - BASE IMT (In Place), CORE (on call/ Stby) METRO - CORE IMT (In Place) Observed activity - CORE IMT (In Place)	RURAL - CORE IMT (In Place), FULL (on call/Stby) METRO - FULL IMT (In Place) Observed activity - FULL IMT (In Place)

**STORM READINESS AND ACTIVATION TRIGGER CONSIDERATIONS - V3.0 - SEPTEMBER 2017**

Readiness Level	RL 1- LOW TO MODERATE	RL 2 - HIGH	RL 3(A) - VERY HIGH	RL 3(B) - VERY HIGH	RL 4 - SEVERE	RL 5 - EXTREME
FDI	0 - 11	12 - 24	25 - 34*	35 - 49*	50 - 74	75 - 99
Fire Behaviour	Fires can be easily controlled	Fires can be controlled, expect short distance spotting	Fires can be difficult to control, crown fires may develop in forest.	Fires can be difficult to control, crown fires may develop in forest.	Fires may be uncontrollable and move quickly. Spot fires may occur up to 4km ahead of the fire.	Fires will be uncontrollable, unpredictable and fast moving. Spot fires up to 6km ahead of the fire.
	THUNDERSTORM FORECAST CHART [TFC] issued daily Oct - Apr			SEVERE WEATHER INTELLIGENCE BRIEFING [SWIB] issued TUE & FRI		
Storm Prediction or Warning READINESS CONSIDERATION	No Thunderstorms No Severe Weather	TFC show THUNDERSTORMS POSSIBLE No SWW	TFC shows SEVERE THUNDERSTORMS POSSIBLE SWW issued for winds and/or possible heavy rainfall STW issued for wind and/or heavy rainfall and/or hail	Severe Weather Intelligence Briefing (SWIB) colored YELLOW TFC shows SEVERE THUNDERSTORM LIKELY SWW issued for wind and/or heavy rainfall STW issued for wind and/or heavy rainfall and/or hail	SWIB colored ORANGE for winds and rainfall, showing TFC shows SEVERE THUNDERSTORMS LIKELY including potential for LARGE Hail, Damaging Winds, Heavy Rainfall leading to flash flooding SWW issued for Damaging Winds and/or Heavy Rainfall STW issued for wind and/or heavy rainfall and/or hail	SWIB colored RED for Damaging to Destructive Winds and Very Heavy Rainfall TFC shows SEVERE THUNDERSTORMS LIKELY including potential for GAIN T Hail, Damaging Winds, Heavy Rainfall leading to flash flooding SWW for damage or destructive winds or heavy rainfall STW - Super Cells possible, Heavy Rain and/or Very Dangerous Thunderstorm warning issued
Storm Behaviour READINESS CONSIDERATIONS	No Thunderstorms No Severe Weather	Wind gusts < 90km/h, rain rates not conducive to flash flooding, small hail (<2cm)	SWIB - 50km/hr+ average winds, gusts reaching 90-100 km/hr for prolonged periods. TFC - Possibility of Thunderstorms, may or may not include small hail <3cm. SWW or STW - Chance of flash flooding and damaging winds considered Possible.	SWIB - 60km/hr+ average winds, gusts reaching over 100km/hr (101-109 km/hr) for 6 or more hour period. TFC - Severe Thunderstorms Possible, high possibility of 3 or 4cm hail, wind gusts over 100km/hr. SWW - Heavy Rainfall leading to flash flooding across Districts considered 'Possible' STW - Localised flash flooding rates of >20mm per 30mins likely.	SWIB - 70km/hr+ average winds, DAMAGING gusts reaching over 110km/hr (110-120 km/hr) for 3 or more hour period. TFC - Severe Thunderstorms LIKELY SWW - Heavy Rainfall leading to flash and/or riverine flooding across Districts considered 'Likely' STW - Possibility of hail of 4-5cm, wind gusts over 110km/hr. POTENTIAL for Super Cell, Squall or Tornado. Localised flash flooding rates of >30mm per 30mins likely.	SWIB - Very unstable weather conditions including 80km/hr+ average winds, DAMAGING (120km/hr to DESTRUCTIVE > 125km/hr for 3 or more hour period CERTAIN. TFC - Severe Thunderstorms more LIKELY. SWW - Heavy Rainfall leading to flash and/or riverine flooding across Districts considered 'Very Likely' STW - Super Cells including Hail > 5cm, wind gusts > 120km/hr. Localised flash flooding rates of >40mm per 30mins. Squalls or likely Tornado.
NOTE: ADD 10km/hr to average winds and/or gusts when considering Alpine District predictions and/or warnings						
Storm Activity ACTIVATION CONSIDERATIONS	Local level unit response with less than 10 RFAs	Local level unit response with less than 10 RFAs	Local Unit level response with local agency support METRO 30+ RFA active at each 8-10 Units RURAL 15+ RFA active at each 4-6 Units	Multi-Unit responses with increasing multi-agency responses METRO 250+ active RFA in the region, where multi Units have more than 30 RFAs, ESTA has activated Critical Incident Response Plan (CIRP) Level 1 RURAL 100+ active RFA across the region, where Units have 15+ RFA at more than 5 Units	Multi-Unit response activity with multi-agency support and high level of multi-agency response activity (eg: Fire Alarms) METRO 400+ RFA active across the region, where Units have more than 30 RFAs or ESTA CIRP Level 2, event creation has increased to 2-4 per minute, < 15 calls waiting RURAL 250+ RFA, where multi Units have more than 30+ RFA each	Multi-Unit response and high level of multi-agency response activity with significant impacts across multi municipalities METRO 1000+ RFA across ICC footprint, where Units have more than 60 RFAs or ESTA CIRP Level 2 event creation has increased to more than 4 per minute, 15+ calls waiting consistently RURAL 500+ RFA across ICC footprint, where multi Units have more than 45+ RFA each
	VICSES - Business as Usual Operations			JSOP 2.03 LINE OF CONTROL		
Readiness (State)	SCC Level White SAC and SDO (monitor)	SCC Level White SAC and SDO (monitor)	SCC Level White/Blue SAC and SDO (actively monitoring)	SCC Level Blue or when ICC activated SDO and SAC in place	SCC Level Orange. Multiple ICCs activated or multi region SDO and SAC in place. Consider day/ night	SCC Level Red. Multiple ICCs activated or multi region SDO and SAC in place day and night
Readiness levels (Regional)	RDO ( monitor)	RAC (monitor)	Regional Command IN PLACE	RURAL: Regional Cmd In Place, RC notified METRO - RCC OPEN: Base RCT in place	RCC OPEN: RCT in place, some agencies available on immediate recall	RCC OPEN: Full RCT/ most REMT in place
	RAC (aware)	RAC (aware)	RAC/RDO attends Regional Office	Rural - RAC & RDO In Place at Regional Office Metro - RC, RAC, RDO at RCC	RC, RAC and RDO In Place at RCC	RCT, RAC and RDO In Place at RCC
Readiness levels (Incident)	RDO ( monitor)	RDO ( monitor)	RDO - RAC IN PLACE Resource Officer (STBY-OnCall) Management Support (STBY)	RURAL - BASE IMT (Rostered) METRO - BASE IMT (In Place) Observed activity - BASE IMT (In Place)	RURAL - BASE IMT (In Place), CORE (Stby) METRO - CORE IMT (In Place) Observed activity - CORE IMT (In Place)	RURAL - CORE IMT (In Place), FULL (Stby) METRO - FULL IMT (In Place) Observed activity - FULL IMT (In Place)

