Maroondah Municipal

Storm and Flood Emergency Plan

A Sub-Plan of the Maroondah Municipal Emergency Management Plan

For Maroondah Municipality
And
VICSES Maroondah Unit

Version 2.0
Reviewed June 2023

Maroondah City Council

VICTORIA State Government

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Distribution List

Copy No.	Issue To: Position	Organisation	Date
Original	Municipal Emergency Management Planning Committee (MEMPC) Executive Officer	Maroondah City Council	
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3	Municipal Emergency Management Officer (MEMO)	Maroondah City Council	
4	Deputy MEMO	Maroondah City Council	
5	Municipal Recovery Manager (MRM)	Maroondah City Council	
6	Municipal Emergency Response Coordinator (MERC)	Victoria Police (VicPol)	
7	Regional Emergency Response Coordinator (RERC)	VicPol	
8	Regional Emergency Management Inspector (REMI)	VicPol	
9	Deputy MERC	VicPol	
10	Operations Officer Emergency Management (OO-EM)	VICSES Eastern Region	
11	VICSES Unit Controller	VICSES Maroondah Unit	
12	Team Leader Hydrology & Flood Warnings	Melbourne Water	
13	Flood Warning Manager	Bureau of Meteorology (Flood Warning)	
14	Regional Emergency Management Officer	Department of Transport and Planning (DTP)	
15	Emergency Management Unit	Ambulance Victoria	
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Document Transmittal Form / Amendment Certificate

This Municipal Storm and Flood Emergency Plan will be amended, maintained and distributed as required by the Victoria State Emergency Service (VICSES) in consultation with the Maroondah Municipal Emergency Management Planning Committee.

Suggestions for amendments to this Plan should be forwarded to:
VICSES Regional Office – Mulgrave
Unit 6, 3-5 Gilda Court, Mulgrave VIC 3170
Email: ust.easternmetro@ses.vic.gov.au
Amendments listed below have been included in this Plan and promulgated to all registered copyholders.

Amendment Number	Date of Amendment	Amendment Entered By	Summary of Amendment
Version 01	09/05/2011	John Chaplain	Population of template
Version 02	15/05/2011	John Chaplain	Population of council data
Version 03	23/05/2011	John Chaplain	Populate Community Education plan
Version 04	03/06/2011	John Chaplain	Populate Comm Ed Plan/Critical Infrastructure
Version 05	14/06/2011	John Chaplain	Populate Critical Infrastructure/distribution list
Version 06	21/02/2012	Diana Ferguson	Populate into the new template
Version 07	17/07/2012	Diana Ferguson	Update the plan with VICSES and Council comments
Version 08	09/08/2012	Diana Ferguson	Update the plan with VICSES and Council comments
Version 09	30/06/2014	Ross Butler	Update Appendix Information and Mapping with addition of Catchment Schematics
Version 1	13/10/2014	Diana Ferguson And Sub Committee	Review and update Template
Version 1.1	29/11/2016	Gerabeth Abbott	Update legislative references, acronyms, inclusion of operational information
Version 1.2	8/12/2016	Maroondah Storm and Flood Subcommittee	Review plan and update affected areas
Version 1.3	14/02/2017	Gerabeth Abbott	Incorporation of Committee feedback
Version 1.4	30/08/2019	Ross Butler & Diana Ferguson	Update Appendix A, B, C, F, G & H Update legislative references, acronyms
Version 1.5	23/09/2019	Diana Ferguson And Sub Committee	Review and update Template
Version 2.0	05/06/2023	Ross Butler & Kristian Hetyey	Update of agency and document references in document body. Update of Appendix A, B, C, F & H with BoM flood modelling. Changes and edits for standardisation and to accommodate the *Emergency Management Legislation Amendment Act 2018* (EMLA Act) that amended the *Emergency Management Act 2013* (EM Act 2013).
Version 2.0	30/11/2023	Kristian Hetyey & MEMPC Sub-Committee	MEMPC Endorsement/Assurance
Version 2.0	19/06/2024	REMPC	REMPC Approval

This Plan will be maintained on the VICSES website (ses.vic.gov.au/plan-and-stay-safe/flood-guides/maroondah-city-council) and referenced on the Maroondah City Council website (www.maroondah.vic.gov.au).

List of Abbreviations & Acronyms

The following abbreviations and acronyms are used in this Plan:

The following abbreviations and acronyms are used in the Plan			
AAR	After Action Review	IC	Incident Controller
AEP	Annual Exceedance Probability	ICC	Incident Control Centre
AHD	Australian Height Datum (the height of a location above mean sea level in metres)	IMS	Incident Management System
AIDR	Australian Institute of Disaster Resilience	IEMT	Incident Emergency Management Team
AIIMS	Australasian Inter-service Incident Management System	IMT	Incident Management Team
AoCC	Area of Operations Control Centre / Command Centre	LSIO	Land Subject to Inundation Overlay
ARI	Average Recurrence Interval	MECC	Municipal Emergency Coordination Centre
AV	Ambulance Victoria	MEMO	Municipal Emergency Management Officer
BoM	Bureau of Meteorology	MEMP	Municipal Emergency Management Plan
CEO	Chief Executive Officer	MEMPC	Municipal Emergency Management Planning Committee
CERA	Community Emergency Risk Assessment	MERC	Municipal Emergency Response Coordinator
CFA	Country Fire Authority	MRM	Municipal Recovery Manager
CMA	Catchment Management Authority	PMF	Probable Maximum Flood
DEECA	Department of Energy, Environment and Climate Action	RAC	Regional Agency Commander
DFFH	Department of Families, Fairness and Housing	RCC	Regional Control Centre
DH	Department of Health	RDO	Regional Duty Officer
DJSIR	Department of Jobs, Skills, Industry and Regions	RERC	Regional Emergency Response Coordinator
DTP	Department of Transport and Planning	RERCC	Regional Emergency Response Coordination Centre
EMLO	Emergency Management Liaison Officer	SBO	Special Building Overlay
EMT	Emergency Management Team	SCC	State Control Centre
EMV	Emergency Management Victoria	SEMP	State Emergency Management Plan
EO	Executive Officer	SERP	State Emergency Response Plan
ERV	Emergency Recovery Victoria	SEWS	Standard Emergency Warning Signal
FO	Floodway Overlay	SHERP	State Health Emergency Response Plan
FRV	Fire Rescue Victoria	SOP	Standard Operating Procedure
FWS	Flood Warning System	VicPol	Victoria Police
FZ	Floodway Zone	VICSES	Victoria State Emergency Service
IA	Impact Assessment		

Glossary

Below are terms defined for the purpose of this Plan:

Term	Definition
Annual Recurrence Interval (ARI)	The average or expected value of the period between exceedances of a given rainfall or flow total accumulated over a given duration.
Annual Exceedance Probability (AEP)	The probability that a given total rainfall or flow is accumulated over a given duration will be exceeded in any one year.
Flash flooding	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.
Flood mapping	The process where the extent of flooding is documented in mapping software based on flood studies and surface elevations.
Floodplain	Area of land adjacent to a creek, river, estuary, lake, dam or artificial channel, which is subject to inundation.
Hot spot	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.
Natural drainage system	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.
Overland flooding	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 10-year ARI in commercial/industrial. For Melbourne Water catchment areas this is for all other ARIs up to the 100-year ARI. Note that not all overland flows cause flooding under the definition in the Maroondah City Service Plan Appendices.
Retarding Basin	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.
Stormwater drainage system	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 Maroondah City Council.
Stormwater Runoff	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 (hereafter referred to as this Plan or MSFEP) has been prepared by the Maroondah Municipal Emergency Management Planning Committee (MEMPC). This Plan is subject to the same preparation, consultation, assurance, approval and publication requirements as the Maroondah Municipal Emergency Management Plan (MEMP), as outlined in Part 6A of the *Emergency Management Act 2013* (EM Act 2013).

This Plan is a sub plan to the Maroondah MEMP. It is consistent with the State Emergency Management Plan (SEMP), State Storm Emergency Plan and State Flood Emergency Plan (sub-plans of the now superseded State Emergency Response Plan and transitioned to be sub-plans of the SEMP).

It is also consistent with the VICSES Eastern Metro Region (formerly Central Region) Storm and Flood Emergency Plans and the Victorian Floodplain Management Strategy and takes into account the outcomes of the Community Emergency Risk Assessment (CERA) process undertaken by the Maroondah MEMPC.

This Plan is a result of the cooperative efforts of the Maroondah MEMPC and its member agencies.

Minor and administrative amendments will be made to this Plan from time to time without re-presenting the Plan to the MEMPC. Any major structural or policy changes will be considered before adoption.

This Plan is endorsed by the Maroondah MEMPC as a sub plan of the Maroondah MEMP.

Endorsement

Chair Date: 30/11/2023

Maroondah Municipal Emergency Management Planning Committee

Assistant Chief Officer Date: 14/11/2023

Unit Support, Emergency Management, Community Engagement

(Nominated Representative of Preparer)

VICSES

Prepared by VICSES on behalf of the Maroondah Municipal Emergency Management Planning Committee.

1.2 Purpose and Scope of this Storm and Flood Emergency Plan

The purpose of this Plan is to detail arrangements agreed for the planning, preparedness/prevention, response and recovery from storm and/or flood incidents within the Maroondah Municipality.

As such, the scope of this Plan is to:

- Identify the storm and flood risk to the Maroondah Municipality.
- Support the implementation of measures to minimise the causes and impacts of storm and flood incidents within the Maroondah Municipality.
- Detail response and recovery arrangements including preparedness, incident management, control and command.
- Identify linkages with Local, Regional and State emergency and wider planning arrangements with specific emphasis on those relevant to storm and flood.

1.3 Municipal Storm and Flood Planning Committee (MSFPC)

The MEMPC may delegate to a Municipal Storm and Flood Planning Committee (MSFPC) or working group to review and update this Plan and provide advice back to the MEMPC accordingly.

Membership of the Maroondah MSFPC will comprise of representatives from the following agencies and organisations:

- VICSES – Unit Controller/delegate and Operations Officer – Emergency Management (Chair)
- Maroondah City Council (emergency management and engineering department representatives)
- Victoria Police (VicPol) – Municipal Emergency Response Coordinator (MERC)
- Catchment Management Authority and Water Authorities as required
- Department of Health (DH) and Department of Families, Fairness and Housing (DFFH) as required
- Department of Energy, Environment and Climate Action (DEECA) as required
- Bureau of Meteorology (BoM) as required
- Other agencies as required

1.4 Responsibility for Planning, Review and Maintenance of this Plan

VICSES through (and on behalf of) the MSFPC, has responsibility for preparing, reviewing, maintaining and distributing this Plan. The MSFPC will meet as required.

This Plan must be maintained in order to remain effective. This Plan should be reviewed at least every three years, with consideration given to earlier revisions as required to ensure this Plan provides for a current, integrated, coordinated, and comprehensive approach to emergencies.

Earlier reviews may be triggered by this Plan being applied following a substantial change to relevant legislation or arrangements and/or:

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

Part 2. BEFORE: PREVENTION / PREPAREDNESS ARRANGEMENTS

2.1 Community Awareness for all Types of Storms and Flooding

This Plan will be published and maintained on the VICSES website. This will occur following any updates and amendments and in accordance with assurance, approval and publishing requirements.

VICSES with the support of Maroondah City Council and Melbourne Water will coordinate community engagement programs for storm and flooding within the council area (e.g., Local Flood Guides and public events). Engagement will include raising awareness about the projected impacts on the frequency and intensity of flood and storm events and what actions can be taken to minimise these impacts.

Community engagement programs to support this Plan may be developed in conjunction with the local VICSES unit. VICSES Maroondah Unit may lead the delivery of programs with support from Maroondah City Council and VICSES Eastern Region.

2.2 Structural Flood Mitigation Measures

Refer to **Appendix C** for detailed information of structural flood mitigation measures.

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 following updates and amendments and/or reviewed after a significant event).

2.3.2 Storm and Flood Warning

Arrangements for severe weather and flood warnings are contained within the State Flood Emergency Plan and State Storm Emergency Plan (ses.vic.gov.au/em-sector/vicses-emergency-plans), the SEMP and on the BoM website (bom.gov.au).

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

2.3.3 Local Knowledge

Field Observers provide local knowledge to VICSES and the Incident Control Centre (ICC) 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 Flood Observers within the Maroondah 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

VICSES may be notified of storm and/or flood incidents through several sources, including but not limited to calls received via 132 500 or Triple Zero (000) (if the emergency is life threatening).

Storm and flood response arrangements may be activated by the VICSES Regional Duty Officer (RDO), Regional Agency Commander (RAC) or Incident Controller (IC).

The VICSES RDO, RAC or IC will activate agencies as required and documented in the VICSES Regional and State Storm and Flood Emergency Plans (ses.vic.gov.au/em-sector/vicses-emergency-plans).

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 and/or flood within the Maroondah Municipality. These agencies will be engaged through the Incident Emergency Management Team (IEMT).

The general roles and responsibilities of supporting agencies are as agreed within the Maroondah MEMP, the SEMP (Roles and Responsibilities), VICSES Eastern Metro Region (formerly Central Region) Storm and Flood Emergency Plans and State Storm and Flood Emergency Plans (ses.vic.gov.au/em-sector/vicses-emergency-plans).

3.1.3 Municipal Emergency Coordination Centre (MECC)

Where activated, the function, location, establishment and operation of the Municipal Emergency Coordination Centre (MECC), or similar coordination centre, will be as detailed in the Maroondah MEMP.

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

In the event that a MECC (or similar) is not operating, the Maroondah City Council Municipal Emergency Management Officer (MEMO) will be contacted.

3.1.4 Escalation

Most storm and/or flood incidents are of local concern and an appropriate response can usually be coordinated using local resources. However, when these resources are exhausted, arrangements provide for further resources to be made available, firstly from neighbouring municipalities (on a Region basis) and then on a State-wide basis. Resourcing and event escalation arrangements are described in the SEMP.

3.2 State Emergency Management Priorities

To provide guidance to the Incident Management Team (IMT) and IEMT, the following State Emergency Management Priorities shall form the basis of incident action planning processes:

- **Protection and preservation of life and relief of suffering is paramount**. This includes:
    a. Safety of emergency response personnel; and
    b. Safety of community members including vulnerable community members and visitors/tourists.
- **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.
- **Protection of critical infrastructure and community assets** that supports community resilience.
- **Protection of residential property as a place of primary residence**.
- **Protection of assets supporting individual livelihoods and economic production** that supports individual and community financial sustainability.
- **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 Response Controller and relevant stakeholders based on sound incident predictions and risk assessments.

3.3 The Six C's

Arrangements in this Plan must be consistent with the Six C's detailed in State and Regional Flood and Storm Emergency Plans. For further information, refer to the SEMP.

- **Control:** Overall direction of response activities in an emergency, operating horizontally across agencies.
- **Command:** Internal direction of personnel and resources of an agency.
- **Coordination:** Bringing together agencies and resources to ensure effective preparation for response and recovery.
- **Consequences:** 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 all communities to support resilience and decision making.

Specific details of arrangements for this Plan are to be provided in **Appendix C**.

3.3.1 Control

Sections 5(1)(b) and 5(1)(c) of the *Victoria State Emergency Service Act 2005* detail the authority for VICSES to plan for and respond to storms and floods.

Table 9 of the SEMP (Roles and Responsibilities) identifies VICSES as the Control Agency for storm and flood. It identifies the Department of Energy, Environment and Climate Action (DEECA) 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 Maroondah Municipality, including those arising from a dam failure or retarding basin/levee bank failure incident, will therefore be under the control of the appointed IC, or his/her delegated representative.

3.3.2 Incident Controller (IC)

An IC will be appointed by the VICSES (as the Control Agency) to command-and-control available resources in response to a storm and/or flood event on the advice of the BoM (or other reliable source) that a storm and/or flood event will occur or is occurring. The IC responsibilities are as defined in the SEMP.

3.3.3 Incident Control Centre (ICC)

As required, the IC will establish an 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).

Pre-determined ICC locations for the Eastern Metro Emergency Management Region are:

- Ferntree Gully ICC
- Dandenong ICC

3.3.4 Divisions and Sectors

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

Divisions and Sectors may be established to assist with the management of storm and flooding within the Municipality.

Pre-determined Divisional Command Point (DCP) locations may include:

- DCP Knox (VICSES Knox Unit)
- Woori Yallock (CFA)

Sector Command locations are allocated on an as needs basis.

3.3.5 Incident Management Team (IMT)

The IC will form an IMT in line with Australasian Inter-service Incident Management System (AIIMS) principles. Refer to the SEMP for guidance on IMTs.

3.3.6 Incident Emergency Management Team (IEMT)

The IC will establish a multi-agency IEMT to assist with the storm and/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 Maroondah 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 the SEMP for guidance on IEMTs.

3.3.7 On Receipt of a Flood Watch / Severe Weather Warning

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

- Review storm and flood intelligence to assess likely storm and flood consequences.
- Monitor weather and flood information (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 the Regional Control Centre (RCC) (if established), State Control Centre (SCC) (if established), Council (as outlined in the Maroondah MEMP), 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/or Flood Warnings

The VICSES RDO (until an IC is appointed) 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 – determine if floodwaters are 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 effects as a consequence of power, gas, water, telecommunications, sewerage, health, transport or emergency service infrastructure interruption.

- The characteristics of the populations at risk.
- What areas may be at risk of building damage.

- 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:
  - The current storm and/or flood situation.
  - Storm and/or flood predictions.
  - What the consequences of predicted activity and 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 storm and/or flood consequence assessment.
- Continue to monitor the storm/flood situation (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 Eastern Metro Region (formerly Central Region) Storm and Flood Emergency Plans and State Storm and 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.
- Variable Message Signs (i.e., road signs).
- Community meetings and connecting to trusted community networks.
- Newspapers.
- Email.
- Newsletters.

- Letter drops.
- Social media and/or social networking sites.

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.

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

Other agencies such as Country Fire Authority (CFA), DEECA and VicPol may be requested to assist VICSES with the communication of community storm and/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 IC may consider the use of the Emergency Alert System and Standard Emergency Warning System (SEWS).

DH 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 VICSES RDO will manage all media communication. Maroondah City Council will work with the IC/VICSES RDO to assist with the dissemination of public messaging and/or warnings to ensure that consistent and timely messaging occurs.

3.6 Impact assessment

Impact Assessment (IA) can be conducted in accordance with State doctrine and Standard Operating Procedures (SOPs) to assess and record the extent and nature of damage caused by storms and/or flooding. This information may then be used to provide the basis for further needs assessment and recovery planning by Maroondah City Council, Emergency Recovery Victoria (ERV) and other applicable recovery agencies.

The control agency is responsible for coordinating the collection, collation and dissemination of IA information on a whole-of government basis during the emergency response. The purpose, function and conduct of IA is outlined in the State Storm and Flood Emergency Plans. All IA should be conducted in accordance with current State impact assessment doctrine and SOPs.

3.7 Preliminary Deployments

When storm and/or flooding impacts are 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 and relief centres (in line with the Maroondah MEMP).

3.8 Response to Flash Flooding

Emergency management response to flash flooding should be consistent with the guideline for the emergency management of flash flooding contained within the VICSES Eastern Metro (formerly Central Region) Storm and Flood Emergency Plans and State Storm and Flood Emergency Plans.

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

1. Determine if there are barriers to evacuation by considering warning time, safe routes and resources available.

2. If evacuation is possible, then evacuation should be the adopted strategy and it must be supported by public information capability and a rescue contingency plan.

3. Where its likely people will become trapped by floodwaters due to limited evacuation options, 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. This advice needs to be provided even when evacuation may be possible, due the likelihood that not all community members will evacuate.

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 MERC and MEMO and Maroondah City Council Municipal Recovery Manager (MRM) at the earliest opportunity to allow relief preparation to commence. The MERC will liaise with the MEMO and MRM about activating an Emergency Relief Centre (ERC) (see Maroondah MEMP).

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

Response arrangements for flood events may be contained in **Appendix C**. Refer to the VicTraffic Website for road closures (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 IC, and where possible the IEMT.

It is the choice of individuals as to how they respond to this recommendation.

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

VicPol (and/or delegate to Australian Red Cross) may take on the responsibility of registering people affected by the emergency (through the 'Register Find Reunite' program) including those who have been evacuated.

Evacuation operations should be consistent with the Joint Standard Operating Procedure on Evacuation (JSOP3.12). Guidelines for best practice for planning evacuations are provided in Australian Institute for Disaster Resilience Handbook 4, available at: knowledge.aidr.org.au/resources/handbook-evacuation-planning/.

If evacuation is determined as appropriate, Maroondah City Council MEMO and MRM should be notified as soon as possible.

There are currently no detailed evacuation arrangements for the Maroondah Municipality. Detail will be populated into **Appendix D** of this Plan if determined.

3.10 Flood Rescue

VicPol as the designated Control Agency for water rescue, 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 VicPol Rescue Coordination Centre 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 storm and/or flood operations including evacuation, resupply, reconnaissance, intelligence gathering and emergency travel.

Air support operations will be conducted under the control of the Incident Controller in line with State Aircraft Unit Policy 01-Air Operations. The IC may request aircraft support through the State Aircraft Desk located at the SCC. The SCC will establish priorities for aircraft deployment.

Suitable airbase facilities are located at:

- Essendon
- Moorabbin

3.12 Resupply

Communities, neighbourhoods or households can become isolated during storms and/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 and/or intelligence indicate 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 and/or other agencies 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 outlined in the Maroondah MEMP.

3.13 Essential Infrastructure and Property Protection

Essential infrastructure and property (e.g., residences, businesses, roads, utilities, telecommunications etc.) may be affected in the event of a storm and/or flood.

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

The IC will determine the priorities related to the use of sandbags, which will be consistent with the State Emergency Management Priorities.

VICSES Maroondah Unit holds a stockpile of sandbags and Maroondah City Council maintains a small stock of sandbags. Back-up supplies are available through the VICSES Region. If time permits, requests for supplementary supply should be carried out in line with Local Response Arrangements contained within the Maroondah MEMP.

If VICSES sandbags are becoming limited in supply, then priority will be given to protection of Essential Infrastructure. Other high priorities may include, for example, the protection of historic buildings.

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 Melbourne Water, Maroondah City Council and VicPol and within appropriate approval frameworks.

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

3.14 Disruption to Services

Disruption to services other than Essential Infrastructure and property, can occur in storm and/or flood events. Refer to **Appendix C** for specific details of likely disruption to services and proposed arrangements to respond to service disruptions in the Maroondah Municipality.

3.15 Levees

Levee owners/operators are responsible for the maintenance, operation and monitoring of their levees. Levee owners/operators must keep the IC informed of levee status' and be prepared to provide expert advice to the IC about the design and construction of their levees. In accordance with the State Emergency Management Priorities, the IC may assist levee owners to coordinate resources, both technical and physical, to provide advice and affect temporary repairs to, or augmentation of, levees.

Levees located alongside Brushy Creek have been identified in **Appendix A.**

3.16 Road Closures

Maroondah City Council, VicPol and the Department of Transport and Planning (DTP) will carry out their formal functions of road closures. This includes the observation and placement of warning signs, and Traffic Management/Control Points to its designated local and regional roads, bridges, walking and bike trails. VicPol may liaise with and advise Maroondah City Council staff and DTP of the need to erect warning signs and/or for closure of roads and bridges under its jurisdiction. DTP are responsible for designated main roads and highways and Maroondah City Council are responsible for the designated local and regional road network.

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

3.17 Dam Failure and Landslide

3.17.1 Dam Failure

DEECA 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.

No public dams, either in or upstream of the Maroondah Municipality are expected to affect the Municipality from flooding. Private dams within the Municipality with the potential to cause structural or community damage have been identified within the Maroondah Flood Management Plan. A strategy is in development through the actions of the Flood Management Plan (FMP).

3.17.2 Landslide

VICSES is the Control Agency for landslide incidents. VICSES is also the Control Agency for any flooding that may result.

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

3.18 Waste Water related Public Health Issues and Critical Sewerage Assets

Maroondah City Council have 149 licences recorded for Onsite Wastewater Management Systems (OWMS) within the Maroondah Municipality. There are also a number of OWMS that have a wastewater flow of over 5000 litres and permits for these are managed by the Environment Protection Authority (EPA). Some of these properties may be impacted by floodwater during flood and storm events.

Inundation of critical sewerage assets, including OWMS and sewerage pump stations, may result in water quality problems within the Municipality.

Where this is likely to occur or has occurred, and assets are privately operated (for example OWMS), there is a responsibility of the operator to advise Maroondah City Council if the system is not functioning properly. Maroondah City Council have a responsibility to report this to the EPA. Maroondah City Council Community Health also have a responsibility to manage communication with the asset operator and ensure reinstatement or repair if the asset is damaged during a flood event.

For all other incidents of inundation to critical sewerage assets, the responsible agency for the critical sewerage asset should undertake the following:

- Advise VICSES and Maroondah City Council MEMO 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 VICSES RDO/IC or established ICC in the event of inundation of critical sewerage assets.

It is the responsibility of the Maroondah Council Environmental Health Team and the EPA to inspect and report on any water quality issues relating to flooding to the Maroondah City Council MEMO and ICC.

General public health information and messages are provided by Maroondah City Council, EPA, DH and DFFH and may contain information that is relevant prior to, during and following an incident. Information may be provided in sub plans to the Maroondah MEMP, specific health notifications and, after discussion within the IEMT, may be included in Flood Bulletins.

3.19 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.

3.20 After Action Review

As the lead agency, VICSES will coordinate the After Action Review (AAR) arrangements for storm/flood operations as soon as practical following an event.

All agencies involved in the storm/flood incident should be represented at the AAR.

Part 4. AFTER: EMERGENCY RELIEF AND RECOVERY ARRANGEMENTS

4.1 General

Arrangements for emergency relief and recovery from a storm/flood incident within the Maroondah Municipality are detailed in the Maroondah MEMP and the Maroondah Municipal Relief and Recovery Plans and Emergency Relief Centre Facility Plans.

4.2 Emergency Relief

The IC determines the need for emergency relief services with advice from the emergency management team (such as the IEMT), including the MRM, in accordance with the SEMP relief arrangements. The IC is responsible for ensuring that relief arrangements have been considered and implemented where required under the State Emergency Relief and Recovery Plan. These should be carried out in line with the Maroondah MEMP (Emergency Relief Centres Sub plan).

The IC should ensure that the MERC, MRM and relevant tier Relief Coordinator are kept informed of arrangements for relief.

The range and type of emergency relief services to be provided in response to a storm and/or flood event will be dependent upon the scale and impact of the incident. Refer to the SEMP for further information.

Maroondah City Council has facilities that are suitable for relief activities. Suitable emergency relief/recovery facilities identified for use during storms and/or floods are detailed in **Appendix D** and the Maroondah MEMP. The MRM will facilitate access to emergency relief/recovery facilities as required. The MEMO will facilitate access to staging areas as required.

Details of the relief arrangements are available in the Maroondah MEMP.

4.3 Animal Welfare

Matters relating to the welfare of livestock (including requests for emergency supply and/or delivery of fodder to stranded livestock or for livestock rescue) are to be referred to DEECA.

Matters relating to companion animals will be shared between Maroondah City Council and RSPCA/ Animal Aid. Council assists, where possible, in the support and temporary rehousing of displaced companion animals.

Matters relating to the welfare of wildlife are to be referred to DEECA and Maroondah City Council.

Refer to Maroondah Animal Welfare Plan for further details relating to livestock and companion animals, and to the State Emergency Animal Welfare Plan and Eastern Metro Councils Animal Welfare Plan for detailed arrangements.

4.4 Transition from Response to Recovery

VICSES, as the Control Agency, is responsible for ensuring effective transition from response to recovery. Transition should occur in consultation with emergency management teams (including the IEMT and MRM). Further information about transition is provided in the SEMP and Maroondah MEMP. Where a MECC has been activated, Maroondah City Council will lead municipal recovery activity as outlined in the Maroondah MEMP.

APPENDIX A - FLOOD THREATS FOR MAROONDAH MUNICIPALITY

General

Three main waterways flow through Maroondah, Brushy Creek along the northeastern boundary, Mullum Mullum Creek in the west and Dandenong Creek along the southern boundary.

The terrain around Maroondah ranges from moderate to steeply sloping valleys to undulating hills and flatter plains. This can lead to swift flows in steeper areas, with slower flows and water pooling in flatter areas. The absence or blockage of overland flow paths by embankments, residential and industrial development and fencing causes most of the flooding and drainage issues within Maroondah.

Suburbs include Bayswater North, Croydon, Croydon Hills, Croydon North, Croydon South, Heathmont, Kilsyth South, Ringwood, Ringwood East, Ringwood North, Warranwood and parts of Vermont and Wonga Park.

The Municipality contains a mix of residential, commercial and light industrial sites, as well as educational, recreational and community facilities. Scattered through the Municipality are some large wetlands and reserves, many of which function as retarding basins to store and slow flows of stormwater, reducing the pressure on the underground stormwater system.

Description of Major Waterways and Drains

The Municipality lies within the Dandenong and Yarra catchments with a stormwater system composed of natural waterways, drains and channels. Stormwater flows are from Maroondah to Port Phillip Bay, the northern waterways, drains and channels via the Yarra River and the southern systems via Dandenong creek and Mordialloc Creek at Mordialloc.

There are three main watercourses running through the Maroondah Municipality:

- Dandenong Creek Upper enters the Municipality downstream of Liverpool Road retarding basin in Boronia and forms the southern boundary of Maroondah, flowing west through Kilsyth South and Bayswater North, receiving tributaries and Old Joes Creek Drainage Scheme (D.S.) before receiving flows from Bungalook Creek in Heathmont. Dandenong Creek continues through Heathmont, Ringwood, where it receives Ringwood South D.S. and Vermont, receiving Heatherdale Creek before exiting the Municipality at Heatherdale Road.
- Mullum Mullum Creek rises in Ringwood and flows southwest through Ringwood, receiving Beaufort Road Drain and Dublin Road Drain. After receiving Ringwood Lake Drain, flow continues west through Ringwood before entering the City of Manningham where it discharges into the Yarra River.
- Brushy Creek begins in Mooroolbark, entering Maroondah at the confluence of Brushy Creek and Five Ways Drain. The creek continues northwest through Mooroolbark and Croydon, forming the northeast boundary of the Municipality and receiving several drains. After crossing under Maroondah Highway, Brushy Creek continues north through Hughes Park, receives Warrien Road Main Drain before entering the City of Manningham near Holloway Road. Flow continues north before discharging into the Yarra River.

Schematics of these river systems can be found in **Appendix F**.

Other waterways and drains within the Maroondah Municipality are listed in the table below.

Waterway / Drain	Waterway / Drain
Andersons Creek	Glenvale Road Drain
Andersons Creek East Branch	Heatherdale creek
Beaufort Road Drain	Jumping Creek
Brushy Creek (Lower)	Kilsyth Main Drain
Brushy Creek (Upper)	Kilsyth Main Drain D.S.
Brushy Park Road Drain	Kilsyth West D.S.
Bungalook Creek	Kubis Drive Drain
Bungalook Creek (Lower)	Lincoln Road Drain
Bungalook Creek (Upper)	Little Bungalook Creek D.S.
Bungalook Creek D.S.	Mullum Mullum Creek (Upper)
Croydon Main Drain	Palmerston Road Drain
Dandenong Creek (Upper)	Ringwood Lake Drain
Dandenong Creek (Upstream Boronia Road)	Ringwood South D.S.
Dublin Road Drain	Warrien Road Main Drain
Garden Street D.S.	

Table A1 – Melbourne Water Drains and Waterways within or bordering the Maroondah Municipality

Historic Storms and Floods

Significant floods (with high flood gauge levels and/or likely flooding consequences to property and infrastructure) that have occurred within the Maroondah Municipality are listed in the table below. To view the locations of these floods, see maps in **Appendix F**. 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 a stream level rise was significant enough to cause flooding along with the associated rainfall. Results in grey indicate a stream level rise was unlikely to contribute to flooding at or around the gauge location. These results have been included to show the relationship between these catchments and others that were recorded to indicate flooding.

Event	Dandenong Creek at The Basin (228373A)		Dandenong Creek at Wantirna (228357A)		Brushy Creek at Mooroolbark (229249A)		Ringwood (586065)	Mullum Mullum Creek at Doncaster East (229648A)
	Rainfall at Gauge	Creek Level	Rainfall at Gauge	Tide Level	Rainfall at Gauge	Creek Level	Rainfall at Gauge	Creek Level
Normal Water Level		1.0m		0.15m		0.17m		0.2m
Minor Flood Class		Spillway – 5.86m		-		-		-
Moderate Flood Class		1% AEP – 6.05m		-		-		-
Major Flood Class		Embankment – 6.66m		-		-		-
18th September 1984	-	-	-	2.61m	-	-	108mm / 43 hours	3.66m
29th July 1987	-	-	-	1.12m	60mm / 27 hours	**3.07m**	58mm / 26 hours	2.87m
9th February 1990	-	2.04m	-	2.25m	26mm / 3 hours	2.50m	21mm / 2 hours	1.59m
12th October 1990	53mm / 33 hours	3.08m	-	1.77m	31mm / 19 hours	2.00m	53mm / 21 hours	1.87m
6th July 1991	-	3.25m	-	2.14m	37mm / 16 hours	2.02m	44mm / 17 hours	2.38m
31st December 1991	17mm / 3 hours	1.16m	-	2.55m	21mm / 3 hours	1.51m	-	2.45m
18th November 1993	-	0.74m	-	1.26m	30mm / 2 hours	2.71m	-	0.93m
30th July 1996	86mm / 36 hours	**4.68m**	53mm / 35 hours	2.08m	49mm / 34 hours	1.40m	-	2.23m
3rd December 2003	20mm / 2 hours	1.15m	49mm / 4 hours	2.32m	7mm / 4 hours	1.19m	-	3.51m
13th November 2004	59mm / 35 hours	3.28m	52mm / 35 hours	2.33m	52mm / 35 hours	0.93m	48mm / 35 hours	2.98m
3rd February 2005	180mm / 25 hours	4.53m	129mm / 26 hours	2.72m	128mm / 25 hours	-	117mm / 25 hours	3.31m
1st December 2010	28mm / 8 hours	1.57m	28mm / 3 hours	2.32m	30mm / 3 hours	2.55m	45mm / 3 hours	2.74m

Event	Dandenong Creek at The Basin (228373A)		Dandenong Creek at Wantirna (228357A)		Brushy Creek at Mooroolbark (229249A)		Ringwood (586065)	Mullum Mullum Creek at Doncaster East (229648A)
	Rainfall at Gauge	Creek Level	Rainfall at Gauge	Tide Level	Rainfall at Gauge	Creek Level	Rainfall at Gauge	Creek Level
Normal Water Level		1.0m		0.15m		0.17m		0.2m
Minor Flood Class		Spillway – 5.86m		-		-		-
Moderate Flood Class		1% AEP – 6.05m		-		-		-
Major Flood Class		Embankment – 6.66m		-		-		-
5th February 2011	122mm / 32 hours	4.01m	121mm / 26 hours	**2.77m**	-	2.87m	121mm / 32 hours	**3.75m**
10th November 2011	75mm / 47 hours	3.01m	48mm / 47 hours	2.46m	29mm / 2 hours	2.85m	70mm / 47 hours	2.83m
27th November 2011	57mm / 25 hours	3.42m	48mm / 22 hours	1.86m	48mm / 23 hours	1.50m	49mm / 22 hours	2.17m
2nd July 2012	63mm / 38 hours	3.69m	23mm / 19 hours	1.92m	36mm / 23 hours	1.73m	28mm / 17 hours	1.49m
1st June 2013	88mm / 14 hours	2.02m	83mm / 14 hours	2.70m	52mm / 11 hours	2.17m	96mm / 11 hours	3.40m
29th December 2016	57mm / 2 hours	1.59m	54mm / 2 hours	2.64m	47mm / 2 hours	2.60m	42mm / 2 hours	2.73m
1st December 2017	18mm / 1 hour	2.27m	21mm / 1 hour	1.79m	13mm / 1 hour	1.88m	20mm / 1 hour	2.29m
22nd March 2019	11mm / 1 hour	1.02m	6mm/ 1 hour	0.80m	26mm / 1 hour	2.42m	16mm / 1 hour	1.24m
5th March 2022	38mm / 3 hours	1.30m	35mm / 3 hours	2.17m	36mm / 3 hours	2.43m	33mm / 3 hours	2.29m
25th October 2022	8mm / 2 hours	1.10m	12mm / 2 hours	1.81m	41mm / 1 hour	3.10m	27mm / 3 hours	2.16m

Table A2 – Selection of Historical Storm and Flood Events along Dandenong Creek, Mullum Mullum Creek and Brushy Creek

Dam Failure

No public dams, either in or upstream of the Maroondah Municipality, are expected to affect the Municipality from flooding. Private dams within the Municipality with the potential to cause structural or community damage have been identified within the Maroondah Flood Management Plan. See Dam Failure in Section 3 of this plan for more information.

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 (e.g., 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	Flood Class	Comments
BRUSHY CREEK				
Mooroolbark	Warrandyte	Between 5 and 9 hours	Minor Flood at Warrandyte	Inflows from Yarra River upstream of the Brushy Creek confluence likely impact on travel time.
Mooroolbark	Warrandyte	Unavailable	Moderate Flood at Warrandyte	
Mooroolbark	Warrandyte	Unavailable	Major Flood at Warrandyte	
DANDENONG CREEK				
The Basin	Wantirna	Between -2 and -15 hours	-	Wantirna likely to peak before The Basin due to the Liverpool Road Retarding Basin at The Basin

Table B1 – Typical Flood Travel Times between gauges on Brushy Creek and Dandenong Creek

Historical Travel Times

Flood Event	Location From (gauge)	Location To (gauge)	Flood Peak Travel Time	Flood Class at
BRUSHY CREEK				**WARRANDYTE**
29th July 1987	Mooroolbark	Warrandyte	7 hours	Minor
5th February 2011	Mooroolbark	Warrandyte	5 hours	Minor
10th November 2011	Mooroolbark	Warrandyte	9 hours	Below Minor
29th December 2016	Mooroolbark	Warrandyte	9 hours	Below Minor
22nd March 2019	Mooroolbark	Warrandyte	15 hours	Below Minor
5th March 2022	Mooroolbark	Warrandyte	9 hours	Below Minor
25th October 2022	Mooroolbark	Warrandyte	6 hours	Below Minor
DANDENONG CREEK				**ROWVILLE**
12th October 1990	The Basin	Wantirna	Wantirna peaked 13 hours before The Basin	Minor
6th July 1991	The Basin	Wantirna	Wantirna peaked 6 hours before The Basin	Moderate
31st December 1991	The Basin	Wantirna	Wantirna peaked 15 hours before The Basin	Minor
30th July 1996	The Basin	Wantirna	Wantirna peaked 8 hours before The Basin	Moderate
13th November 2004	The Basin	Wantirna	Wantirna peaked 4 hours before The Basin	Minor
3rd February 2005	The Basin	Wantirna	Wantirna peaked 2 hours before The Basin	Major
5th February 2011	The Basin	Wantirna	Wantirna peaked 6 hours before The Basin	Moderate
10th November 2011	The Basin	Wantirna	Wantirna peaked 8 hours before The Basin	Below Minor
27th November 2011	The Basin	Wantirna	Wantirna peaked 11 hours before The Basin	Minor
2nd July 2012	The Basin	Wantirna	Wantirna peaked 6 hours before The Basin	Below Minor
1st June 2013	The Basin	Wantirna	Wantirna peaked 6 hours before The Basin	Minor
29th December 2016	The Basin	Wantirna	Wantirna peaked 3 hours before The Basin	Below Minor
MULLUM MULLUM CREEK				**TEMPLESTOWE**
18th September 1984	Doncaster East	Templestowe	5 hours	Minor
3rd December 2003	Doncaster East	Templestowe	1 hour	Below Minor
3rd February 2005	Doncaster East	Templestowe	7 hours	Moderate
5th February 2011	Doncaster East	Templestowe	2 hours	Minor
1st June 2013	Doncaster East	Templestowe	2 hours	Below Minor

Table B2 – Historical Flood Travel Times between gauges on the Brushy, Dandenong and Mullum Mullum Creeks

APPENDIX C1 – BRUSHY 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 accessing this information should make appropriate enquiries to assess the currency of the data.

Summary of Consequences in a 1% AEP (100yr ARI) flood along Brushy Creek and its Stormwater Tributaries					
Property					
Properties	**221**				
Residential	220				
Commercial	0				
Industrial	0				
Public Land	1	Park next to Croydon North Kindergarten			
Rural	0				
Community Infrastructure					
Care Facilities	1	Park Lane Croydon			
Child Care / Kindergartens	1	Croydon North Kindergarten			
Schools / Colleges	1	Village School (Primary)			
Essential Infrastructure					
Bus Routes	1	664			
Levees	1	Lee Ann Crescent, Croydon			
Tourism / Recreation					
Sports Facilities	0				
Government Boundaries					
Local Gov't Areas	1	Maroondah	CMA	1	Port Phillip & Westernport
Adjacent LGAs	2	Manningham and Yarra Ranges	CFA District	0	
SES Unit Area	1	Maroondah	FRV District	1	Eastern

Table C1.1 – Consequence Summary of 1% AEP flood along Brushy Creek in Maroondah Municipality

Brushy Creek forms part of the northeastern boundary of Maroondah, with flows from the Creek and its associated drains passing through Croydon and Croydon North, entering the Yarra River in the City of Manningham. Flows along the Yarra River can have a great impact on the ability of waters from Brushy Creek to enter the Yarra.

Levees alongside Brushy Creek from Maroondah Highway to Barngeong Reserve, Croydon mitigate much of the potential riverine flooding impacts.

High intensity, short duration rainfall events can cause local flash flooding in Croydon and Croydon South, particularly around Lincoln Road Drain and Warrien Road Main Drain affecting residences and public land.

Gauges and Warnings

Neither the BoM nor Melbourne Water currently provides flood forecasts for Brushy Creek. All flood response actions must therefore be driven by rainfall and/or water level observations. Telemetered water level/flood gauges are located at Mooroolbark. See Appendix B for typical flood travel times for Brushy Creek.

Gauge	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge	Melway Reference
Brushy Creek at Mooroolbark	229249A	West side of Creek on Diane Cr, Mooroolbark	✓	✓	37 E11

Table C1.2 – Gauges within the Brushy Creek catchment

These gauges may provide some warning of expected flooding. See the Melbourne Water website for more information on these gauges: melbournewater.com.au/waterdata/rainfallandriverleveldata/Pages/Rainfall-and-river-level-new.aspx. The BoM website also links a number of these gauges at: bom.gov.au/cgi-bin/wrap_fwo.pl?IDV60201.html. It is advised that residents monitor the BoM website bom.gov.au/vic/warnings/index.shtml?ref=hdr and the VicEmergency website emergency.vic.gov.au/ for any thunderstorm, flood or severe weather warnings present for their area.

Area Map of Flood Risk within the Brushy Creek catchment

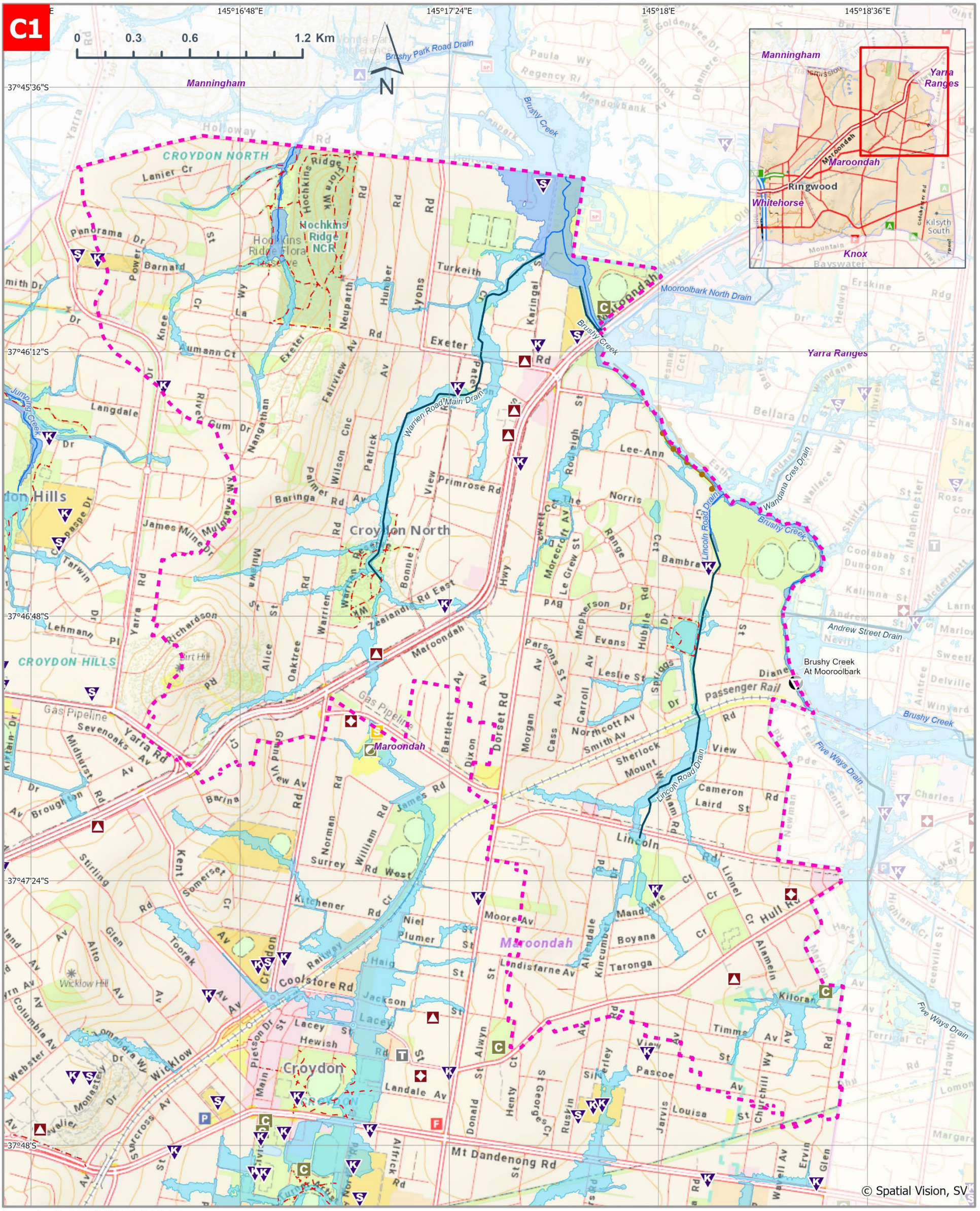


Figure C1 – Areas of flood risk around along Brushy Creek and its stormwater tributaries in the Maroondah Municipality and area covered by this appendix

Properties at Flood Risk

Properties listed in the table below are at risk from flooding along Brushy Creek and its stormwater tributaries. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Maroondah Flood Mapping (Engeny, February 2019) 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 identified as subject to flooding are based upon Melbourne Water and Maroondah City Council's best available flood mapping at the time of publication. Council's flood mapping and properties identified may be subject to change due to a number of factors, including but not limited to; completion of mitigation works, updates to technical specifications etc. For the most up to date properties at flood risk information, it is recommended to contact Maroondah City Council's Engineering Services Team on 1300 882 233 (during business hours).

Properties at risk from Flooding within the Brushy Creek catchment (where flooding at building likely and flood depth in yard > 30cm)

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				
		✓	18 ALLENDALE ROAD	CROYDON	Local Drainage	Flash
		✓	20 ALLENDALE ROAD	CROYDON	Local Drainage	Flash
		✓	22 ALLENDALE ROAD	CROYDON	Local Drainage	Flash
		✓	24 ALLENDALE ROAD	CROYDON	Local Drainage	Flash
		✓	12 ARKARRA COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	14 ARKARRA COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	16-18 ARKARRA COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	20-22 ARKARRA COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	3 ARKARRA COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	5 ARKARRA COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	7 ARKARRA COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	19 AUMANN COURT	CROYDON NORTH	Local Drainage	Flash
		✓	99 BELLARA DRIVE	CROYDON	Local Drainage	Flash
		✓	1/101 BONNIE VIEW ROAD	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	103 BONNIE VIEW ROAD	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	2/101 BONNIE VIEW ROAD	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	4 BONNIE VIEW ROAD	CROYDON NORTH	Local Drainage	Flash
	✓	✓	88 BONNIE VIEW ROAD	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	90 BONNIE VIEW ROAD	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	99 BONNIE VIEW ROAD	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	17 BOROLA COURT	CROYDON NORTH	Local Drainage	Flash
		✓	22 BOROLA COURT	CROYDON NORTH	Local Drainage	Flash
		✓	29 BOYANA CRESCENT	CROYDON	Local Drainage	Flash
		✓	1/41 CAMERON ROAD	CROYDON	Lincoln Road Main Drain	Flash

Properties at risk from Flooding within the Brushy Creek catchment (where flooding at building likely and flood depth in yard > 30cm)						
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				
		✓	1/43 CAMERON ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	1/45-47 CAMERON ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	2/41 CAMERON ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	2/43 CAMERON ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	2/45-47 CAMERON ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	3/43 CAMERON ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	3/45-47 CAMERON ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	4/45-47 CAMERON ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	5/45-47 CAMERON ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	6/45-47 CAMERON ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	3 CHEESEMAN STREET	CROYDON	Local Drainage	Flash
		✓	2 DORNOCH COURT	CROYDON	Lincoln Road Main Drain	Flash
		✓	6 DORNOCH COURT	CROYDON	Lincoln Road Main Drain	Flash
		✓	2/59 ERVIN ROAD	CROYDON	Local Drainage	Flash
		✓	1/51 EXETER ROAD	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	2/51 EXETER ROAD	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	4/55-59 EXETER ROAD	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	42 EXETER ROAD	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	44 EXETER ROAD	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	46 EXETER ROAD	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	47 EXETER ROAD	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	49 EXETER ROAD	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	53 EXETER ROAD	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	1/6-8 FAULL CLOSE	CROYDON NORTH	Local Drainage	Flash
		✓	10 GERARD COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	7 GERARD COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
✓	✓	✓	8 GERARD COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	9 GERARD COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	11 GLENVIEW COURT	CROYDON NORTH	Local Drainage	Flash
		✓	1/15 HOLLOWAY ROAD	CROYDON NORTH	Brushy Creek	Flash
	✓	✓	1/17 HOLLOWAY ROAD	CROYDON NORTH	Brushy Creek	Flash
		✓	10/15 HOLLOWAY ROAD	CROYDON NORTH	Brushy Creek	Flash
		✓	2/15 HOLLOWAY ROAD	CROYDON NORTH	Brushy Creek	Flash
	✓	✓	21 HOLLOWAY ROAD	CROYDON NORTH	Brushy Creek	Flash
		✓	3/15 HOLLOWAY ROAD	CROYDON NORTH	Brushy Creek	Flash
		✓	3/17 HOLLOWAY ROAD	CROYDON NORTH	Brushy Creek	Flash
		✓	4/17 HOLLOWAY ROAD	CROYDON NORTH	Brushy Creek	Flash
		✓	5/17 HOLLOWAY ROAD	CROYDON NORTH	Brushy Creek	Flash
		✓	6/17 HOLLOWAY ROAD	CROYDON NORTH	Brushy Creek	Flash
	✓	✓	7/17 HOLLOWAY ROAD	CROYDON NORTH	Brushy Creek	Flash
✓	✓	✓	8/17 HOLLOWAY ROAD	CROYDON NORTH	Brushy Creek	Flash
✓	✓	✓	9 HOLLOWAY ROAD	CROYDON NORTH	Brushy Creek	Flash

Properties at risk from Flooding within the Brushy Creek catchment (where flooding at building likely and flood depth in yard > 30cm)						
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				
		✓	9/15 HOLLOWAY ROAD	CROYDON NORTH	Brushy Creek	Flash
		✓	3A HURST COURT	CROYDON NORTH	Local Drainage	Flash
		✓	3B HURST COURT	CROYDON NORTH	Local Drainage	Flash
		✓	12 JEREMIC COURT	CROYDON NORTH	Local Drainage	Flash
		✓	14 JEREMIC COURT	CROYDON NORTH	Local Drainage	Flash
		✓	2/10 JEREMIC COURT	CROYDON NORTH	Local Drainage	Flash
		✓	4/31 KARINGAL STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	4/39 KARINGAL STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	5/31 KARINGAL STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	5/33-37 KARINGAL STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	6/33-37 KARINGAL STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	6/39 KARINGAL STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	6/40 KARINGAL STREET	CROYDON NORTH	Local Drainage	Flash
		✓	7/29 KARINGAL STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	7/33-37 KARINGAL STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	7/39 KARINGAL STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	8/29 KARINGAL STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	29 KINCUMBER DRIVE	CROYDON	Local Drainage	Flash
		✓	31 KINCUMBER DRIVE	CROYDON	Local Drainage	Flash
		✓	33 KINCUMBER DRIVE	CROYDON	Local Drainage	Flash
		✓	35 KINCUMBER DRIVE	CROYDON	Local Drainage	Flash
		✓	37 KINCUMBER DRIVE	CROYDON	Local Drainage	Flash
		✓	50 KINCUMBER DRIVE	CROYDON	Local Drainage	Flash
		✓	52 KINCUMBER DRIVE	CROYDON	Local Drainage	Flash
		✓	54 KINCUMBER DRIVE	CROYDON	Local Drainage	Flash
		✓	10 KINTA COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	9 KINTA COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	25 LAIRD STREET	CROYDON	Lincoln Road Main Drain	Flash
		✓	50 LEE-ANN CRESCENT	CROYDON	Local Drainage	Flash
		✓	121 LINCOLN ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	2/123 LINCOLN ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	3/123 LINCOLN ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	10 MALCOLM COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	4 MALCOLM COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	5 MALCOLM COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	9 MALCOLM COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	13 MANDOWIE CRESCENT	CROYDON	Local Drainage	Flash
		✓	20 MANDOWIE CRESCENT	CROYDON	Local Drainage	Flash
		✓	36-38 MARION AVENUE	CROYDON	Local Drainage	Flash
		✓	1/321 MAROONDAH HIGHWAY	CROYDON NORTH	Local Drainage	Flash
		✓	245 MAROONDAH HIGHWAY	CROYDON NORTH	Local Drainage	Flash

Properties at risk from Flooding within the Brushy Creek catchment (where flooding at building likely and flood depth in yard > 30cm)						
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				
		✓	251-253 MAROONDAH HIGHWAY	CROYDON NORTH	Local Drainage	Flash
		✓	257-259 MAROONDAH HIGHWAY	CROYDON NORTH	Local Drainage	Flash
		✓	277A MAROONDAH HIGHWAY	CROYDON NORTH	Local Drainage	Flash
		✓	281A MAROONDAH HIGHWAY	CROYDON NORTH	Local Drainage	Flash
		✓	285A MAROONDAH HIGHWAY	CROYDON NORTH	Local Drainage	Flash
		✓	295-299 MAROONDAH HIGHWAY	CROYDON NORTH	Local Drainage	Flash
		✓	323 MAROONDAH HIGHWAY	CROYDON NORTH	Local Drainage	Flash
		✓	325 MAROONDAH HIGHWAY	CROYDON NORTH	Local Drainage	Flash
		✓	327 MAROONDAH HIGHWAY	CROYDON NORTH	Local Drainage	Flash
		✓	1/85 MOUNT VIEW PARADE	CROYDON	Lincoln Road Main Drain	Flash
		✓	2/85 MOUNT VIEW PARADE	CROYDON	Lincoln Road Main Drain	Flash
		✓	3/85 MOUNT VIEW PARADE	CROYDON	Lincoln Road Main Drain	Flash
		✓	72 MOUNT VIEW PARADE	CROYDON	Lincoln Road Main Drain	Flash
		✓	74 MOUNT VIEW PARADE	CROYDON	Lincoln Road Main Drain	Flash
		✓	81 MOUNT VIEW PARADE	CROYDON	Lincoln Road Main Drain	Flash
		✓	83 MOUNT VIEW PARADE	CROYDON	Lincoln Road Main Drain	Flash
		✓	87-89 MOUNT VIEW PARADE	CROYDON	Lincoln Road Main Drain	Flash
		✓	91A MOUNT VIEW PARADE	CROYDON	Lincoln Road Main Drain	Flash
		✓	24 MULAWA STREET	CROYDON NORTH	Local Drainage	Flash
		✓	54 OAKTREE ROAD	CROYDON NORTH	Local Drainage	Flash
		✓	61 OAKTREE ROAD	CROYDON NORTH	Local Drainage	Flash
		✓	1/14 PATERSON STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	12 PATERSON STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	2/13 PATERSON STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	2/14 PATERSON STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	2/16 PATERSON STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	3/14 PATERSON STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	3/16 PATERSON STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	8-10 PATERSON STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	9 PATERSON STREET	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	1/30-32 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	1/6 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	10/14 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	11/14 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	2 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	2/14 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash

Properties at risk from Flooding within the Brushy Creek catchment (where flooding at building likely and flood depth in yard > 30cm)						
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				
		✓	2/30-32 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	2/6 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	3/14 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	3/26 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	3/30-32 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	3/34 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	3/6 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	4/14 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	4/26 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	4/30-32 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	4/34 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	5/14 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	5/30-32 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	5/42 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	6/30-32 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	7/30-32 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	7/6 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	8/30-32 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	8/6 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	9/14 PATRICK AVENUE	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	10 PENROSE COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	12 PENROSE COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	6 PENROSE COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	8 PENROSE COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	5 POWELL STREET	CROYDON	Lincoln Road Main Drain	Flash
		✓	17 ROBERT COURT	CROYDON	Local Drainage	Flash
		✓	1/66 SHERLOCK ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	1/68 SHERLOCK ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	2/66 SHERLOCK ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	2/68 SHERLOCK ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	3/68 SHERLOCK ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	60 SHERLOCK ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	62 SHERLOCK ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	64 SHERLOCK ROAD	CROYDON	Lincoln Road Main Drain	Flash
	✓	✓	1 SUSANS COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	2 SUSANS COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	3 SUSANS COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	4 SUSANS COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	2/12 TATIARA AVENUE	CROYDON NORTH	Local Drainage	Flash
		✓	2A TATIARA AVENUE	CROYDON NORTH	Local Drainage	Flash
		✓	1 TERRUNG COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
	✓	✓	2 TERRUNG COURT	CROYDON NORTH	Warrien Road Main Drain	Flash

Properties at risk from Flooding within the Brushy Creek catchment (where flooding at building likely and flood depth in yard > 30cm)						
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				
		✓	3 TERRUNG COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	4 TERRUNG COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	5 TERRUNG COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	6 TERRUNG COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	7 TERRUNG COURT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	19 TURKEITH CRESCENT	CROYDON NORTH	Warrien Road Main Drain	Flash
		✓	1 WARRIEN ROAD	CROYDON NORTH	Local Drainage	Flash
		✓	1/51 WARRIEN ROAD	CROYDON NORTH	Local Drainage	Flash
		✓	2/51 WARRIEN ROAD	CROYDON NORTH	Local Drainage	Flash
		✓	55 WARRIEN ROAD	CROYDON NORTH	Local Drainage	Flash
		✓	1/16 WICKHAM ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	14 WICKHAM ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	2/16 WICKHAM ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	7 WICKHAM ROAD	CROYDON	Lincoln Road Main Drain	Flash
		✓	9 WICKHAM ROAD	CROYDON	Lincoln Road Main Drain	Flash
✓	✓	✓	1 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
	✓	✓	10 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
		✓	11 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
		✓	12 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
		✓	13 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
	✓	✓	14 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
	✓	✓	15 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
	✓	✓	16 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
	✓	✓	17 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
✓	✓	✓	18 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
✓	✓	✓	19 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
✓	✓	✓	2 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
✓	✓	✓	3 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
	✓	✓	4 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
	✓	✓	5 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
✓	✓	✓	6 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
✓	✓	✓	7 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
✓	✓	✓	8 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
	✓	✓	9 WOODVIEW COURT	CROYDON NORTH	Brushy Creek	Flash
		✓	22 ZEALANDIA ROAD E	CROYDON NORTH	Local Drainage	Flash
		✓	27 ZEALANDIA ROAD E	CROYDON NORTH	Local Drainage	Flash
Totals						
11	50	221				

Table C1.3 – Properties at risk of flooding within the Brushy Creek catchment in the Maroondah Municipality where flooding at building is likely and depth in yard is greater than 30cm

Isolation

No major isolation risks exist for areas around Croydon and Croydon North. 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 at ptv.vic.gov.au/live-travel-updates/. A map of public transport routes within the Maroondah Municipality is available via the website at: ptv.vic.gov.au/assets/default-site/more/maps/Local-area-maps/Metropolitan/351fea4fb3/29_Maroondah_LAM.pdf.

Apart from the roads outlined below, all other essential infrastructure and services areas around Croydon and Croydon North are expected to remain predominantly dry during an intense rainfall event.

Road Closures

The following roads are subject to closure during flooding around Croydon and Croydon North. Check the VicRoads website for more details: traffic.vicroads.vic.gov.au/.

Department of Transport (VicRoads) Roads likely flooded in a 1% AEP (100yr ARI) event
• Nil

Table C1.4 – DTP (VicRoads) Possible Road Closures during a flooding event

Maroondah City Council Roads likely flooded in a 1% AEP (100yr ARI) event		
CROYDON	• Sherlock Road	• Holloway Road
• Bellara Drive	• Wickham Road	• Paterson Street
• Cameron Road	**CROYDON NORTH**	• Power Street
• Lee - Ann Crescent	• Arkarra Court	• Susans Court
• Mandowie Crescent	• Bonnie View Road	• Terrung Court
• Mount View Parade	• Exeter Road	• Woodview Court

Table C1.5 – Maroondah City Council Possible flooded roads due to flash flooding over 30cm depth

Flood Mitigation

Retarding Basins

There is a Retarding Basin in Hochkins Ridge Flora Reserve, Croydon North.

Levees

Melbourne Water Levee	Reach	Side	Levee Height	Levee Length	Expected Level of Protection	ANCOLD Hazard Rating	Houses at risk behind Levee	Melway Reference
Brushy Creek	Maroondah Highway to Moana Drive	East	1.0m (77.0m AHD)	695m	100yr ARI flood level	Low	2.5	37 D9
Brushy Creek	Maroondah Highway to Barngeong Reserve	West	1.0m (77.0m AHD)	889m	100yr ARI flood level	Very Low	0	37 D9

Table C1.6 – Melbourne Water Levees in the Brushy Creek Catchment in or bordering the Maroondah Municipality

Sewerage Infrastructure

There is no sewerage infrastructure expected to impact or be impacted by floodwaters during severe flood events within the Brushy Creek catchment in Maroondah.

Control, Command and Coordination

VICSES will assume overall control of the response to flood incidents. Control and coordination of a flood incident shall be carried out at the lowest effective level and in accordance with the SEMP. 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 Brushy Creek and its stormwater tributaries at various creek heights or rain totals within Maroondah. 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:

- Brushy Creek at Mooroolbark
- Brushy Creek's Stormwater Tributaries at Croydon and Croydon North

FLOOD INTELLIGENCE CARD – MOOROOLBARK GAUGE, BRUSHY CREEK

Version 4 – May 2023

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. ***Scan the QR code for the current levels for this gauge.***

LOCATION:	**West side of Creek on Diane Crescent, Mooroolbark**
CURRENT LEVEL:	**https://www.melbournewater.com.au/water-and-environment/water-management/rainfall-and-river-levels#/reader/229249A**
STREAM:	**Brushy Creek**
GAUGE NUMBER:	**229249A**
GAUGE ZERO:	**79.95m AHD**
GAUGE TYPE:	**Stream Level and Rain**

MINOR:	**Not Established**
MODERATE:	**Not Established**
MAJOR	**Not Established**
LEVEE HEIGHT:	**3.40m**
MELWAY REFERENCE:	**37 E11**
HIGHEST RECORDED FLOOD:	**3.07m (29th July 1987)**

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Consideration
2.34m	20% AEP (5yr ARI) Flood Level	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** • Properties on Woodview Court, Croydon North **Community Infrastructure Likely Flooded** • Village School (Primary), Holloway Road, Croydon North (flooding to grounds and driveway) **Water Over Road (over 30cm depth)** • Holloway Road, Croydon North • Woodview Court, Croydon North	
2.50m	5% AEP (20yr ARI) Flood Level	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** • Properties on Holloway Road and Woodview Court, Croydon North **Community Infrastructure Likely Flooded** • Village School (Primary), Holloway Road, Croydon North (flooding to grounds and driveway) **Water Over Road (over 30cm depth)** • Holloway Road, Croydon North • Woodview Court, Croydon North	

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Consideration
2.93m	1% AEP (100yr ARI) Flood Level	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** • Properties on Holloway Road and Woodview Court, Croydon North **Community Infrastructure Likely Flooded** • Village School (Primary), Holloway Road, Croydon North (flooding to grounds and driveway) **Essential Infrastructure Likely Impacted** • Levee height adjacent to Lee Ann Crescent, Croydon reached **Water Over Road (over 30cm depth)** **Brushy Creek** • Holloway Road, Croydon North • Woodview Court, Croydon North	VICSES to respond to Requests for Assistance (RFAs) on a request-by-request basis. Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.

Table C1.7 – Breakdown of likely consequences at various Mooroolbark gauge level heights along Brushy Creek in Maroondah with operational considerations

FLOOD INTELLIGENCE CARD – BRUSHY CREEK'S STORMWATER TRIBUTARIES (UNGAUGED)

Version 4 – May 2023

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. ***Scan the QR code for the current levels for this gauge.***

CLOSEST RAIN GAUGE:	**Brushy Creek at Mooroolbark**
LOCATION:	**West side of Creek on Diane Crescent, Mooroolbark**
RECENT RAINFALL:	**https://www.melbournewater.com.au/water-and-environment/water-management/rainfall-and-river-levels#/reader/229249A**

GAUGE NUMBER:	**229249A**
GAUGE TYPE:	**Rain**
MELWAY REF:	**37 E11**

Design Rainfall Depths (mm) – *Indication of Possible Flooding*	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
11mm in 10 mins; 18mm in 30 mins; 23mm in 1 hour; 29mm in 2 hours; 33mm in 3 hours; or 42mm in 6 hours 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.	20% AEP (5 year ARI)	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **1 Property in Total** **Warrien Road Main Drain** • A property on Gerard Court, Croydon North	VICSES will provide warnings using the VicEmergency website and application as required based on the predictions provided by BoM regarding flood levels and the risk of flash flooding. The VICSES RDO, in conjunction with the VICSES RAC, will maintain operational awareness and form an appropriate response arrangement to suit the level of incident.
15mm in 10 mins; 25mm in 30 mins; 31mm in 1 hour; 38mm in 2 hours; 43mm in 3 hours; or 56mm in 6 hours	5% AEP (20 year ARI)	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **29 Properties in Total** **Local Drainage** • A property on Karingal Street **Warrien Road Main Drain** • Properties on Arkarra Court, Bonnie View Road, Exeter Road, Gerard Court, Karingal Street, Paterson Street, Patrick Avenue, Susans Court and Terrung Court in Croydon North	VICSES will provide warnings using the VicEmergency website and application as required based on the predictions provided by BoM regarding flood levels and the risk of flash flooding. The VICSES RDO, in conjunction with the VICSES RAC, will maintain

Design Rainfall Depths (mm) – *Indication of Possible Flooding*	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
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.		**Community Infrastructure Likely Flooded** **Warrien Road Main Drain** • Croydon North Kindergarten, 90 Bonnie View Road, Croydon North **Water Over Road (over 30cm depth)** **Lincoln Road Drain** • Mount View Parade, Croydon • Sherlock Road, Croydon **Warrien Road Main Drain** • Arkarra Court, Croydon North • Exeter Road, Croydon North • Paterson Street, Croydon North • Susans Court, Croydon North • Terrung Court, Croydon North	operational awareness and form an appropriate response arrangement to suit the level of incident.
21mm in 10 mins; 33mm in 30 mins; 40mm in 1 hour; 49mm in 2 hours; 56mm in 3 hours; or 74mm in 6 hours 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.	1% AEP (100 year ARI)	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **188 Properties in Total** **Lincoln Road Main Drain** • Properties on Cameron Road, Dornoch Court, Laird Street, Lincoln Road, Mount View Parade, Powell Street, Sherlock Road and Wickham Road **Local Drainage** • Properties on Allendale Road, Aumann Court, Bellara Drie, Bonnie View Road, Borola Court, Boyana Crescent, Cheeseman Street, Ervin Road, Faull Close, Glenview Court, Hurst Court, Jeremic Court, Karingal Street, Kincumber Drive, Lee-Ann Crescent, Mandowie Crescent, Marion Avenue, Maroondah Highway, Mulawa Street, Oaktree Road, Robert Court, Tatiara Avenue, Warrien Road and Zealandia Road **Warrien Road Main Drain** • Properties on Arkarra Court, Bonnie View Road, Exeter Road, Gerard Court, Karingal Street, Kinta Court, Malcolm Court, Paterson Street, Patrick Avenue, Penrose Court, Susans Court, Terrung Court and Turkeith Crescent **Community Infrastructure Likely Flooded** **Warrien Road Main Drain** • Croydon North Kindergarten, 90 Bonnie View Road, Croydon North • Park Lane Croydon Aged Care, 295 Maroondah Highway, Croydon **Water Over Road (over 30cm depth)** **Lincoln Road Drain** • Cameron Road, Croydon • Mandowie Crescent, Croydon • Mount View Parade, Croydon • Sherlock Road, Croydon • Wickham Road, Croydon **Local Drainage** • Bellara Drive, Croydon	VICSES to respond to RFAs on a request-by-request basis. Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.

Design Rainfall Depths (mm) – *Indication of Possible Flooding*	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		• Lee Ann Crescent, Croydon (localised flooding likely not from flows down Brushy Creek but from stormwater backing up around levees.) • Power Street, Croydon North **Warrien Road Main Drain** • Arkarra Court, Croydon North • Bonnie View Road, Croydon North • Exeter Road, Croydon North • Paterson Street, Croydon North • Susans Court, Croydon North • Terrung Court, Croydon North	

Table C1.8 – Breakdown of possible consequences at various rainfall intensities around Brushy Creek's stormwater tributaries with operational considerations

APPENDIX C2 – MULLUM MULLUM 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 accessing 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 Mullum Mullum Creek catchment in Maroondah					
Property					
Properties	**122**				
Residential	113				
Commercial	9				
Industrial	0				
Public Land	0				
Rural	0				
Community Infrastructure					
Child Care / Kindergartens	1	Discovery Childcare & Education			
Retirement Villages	1	Cherrytree Grove			
Essential Infrastructure					
Major Roads	1	Maroondah Hwy at 3 separate locations			
Bus Routes	2	670 & 684 along Maroondah Hwy in Croydon			
Sewerage Facilities	2	1 Pumping Station; & 1 Emergency Relief Point			
Tourism / Recreation					
Recreation Facilities	1	Mullum Mullum Creek Trail			
Government Boundaries					
Local Gov't Areas	1	Maroondah	CMA	1	Port Phillip & Westernport
Adjacent LGAs	1	Manningham	CFA District	0	
SES Unit Area	1	Maroondah	FRV District	1	Eastern

Table C2.1 – Consequence Summary of 1% AEP flood along Mullum Mullum Creek and its stormwater Tributaries in Maroondah

Mullum Mullum Creek passes through the central west of Maroondah, with the creek and its associated drains passing through Croydon, Ringwood and Ringwood East before entering the City of Manningham and joining the Yarra River.

High intensity, short duration rainfall events can cause flash flooding in Croydon, Ringwood and Ringwood East, affecting roads and properties in the flow path. Prolonged rainfall may cause Mullum Mullum Creek to flood.

Gauges and Warnings

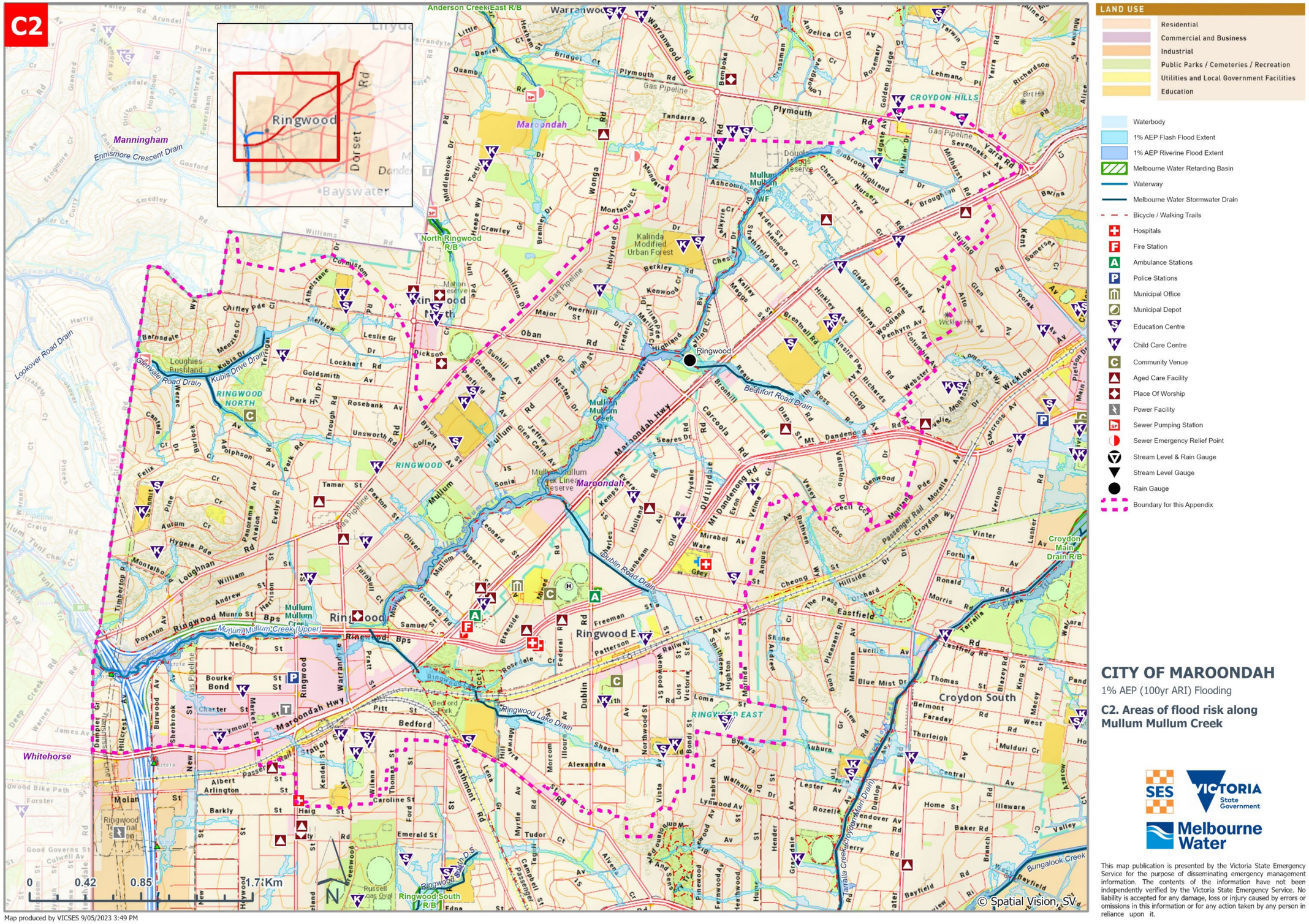
Whilst there are hydrographic/telemetry stations (river gauges) on other waterways within the Municipality, there are none on Mullum Mullum Creek within Maroondah, though a rain gauge is present in Ringwood at Burnt Bridge Tennis Club. Melbourne Water does not provide any flood warning service at this point, due to the generally short warning times available.

Gauge	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge	Melway Reference
Mullum Mullum Creek at Doncaster East	229648A	Eastern side of the Heidelberg-Warrandyte Road bridge, Doncaster East	✓		34 F3
Ringwood	586065	Burnt Bridge Tennis Club, Ringwood		✓	50 C3

Table C2.2 – Hydrographic Monitoring Stations within the Mullum Mullum Creek catchment

These gauges may provide some warning of expected flooding. See the Melbourne Water website for more information on these gauges: melbournewater.com.au/waterdata/rainfallandriverleveldata/Pages/Rainfall-and-river-level-new.aspx. The BoM website also links a number of these gauges at: bom.gov.au/cgi-bin/wrap_fwo.pl?IDV60201.html. It is advised that residents monitor the BoM website bom.gov.au/vic/warnings/index.shtml?ref=hdr and the VicEmergency website emergency.vic.gov.au/ for any thunderstorm, flood or severe weather warnings present for their area.

Area Map of Flood Risk within the Mullum Mullum Creek catchment



Map produced by VICSES 9/05/2023 3:49 PM

CITY OF MAROONDAH

1% AEP (100yr ARI) Flooding

C2. Areas of flood risk along Mullum Mullum Creek

SES VICTORIA State Government

Melbourne Water

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Figure C2 – Areas of flood risk within the Mullum Mullum Creek catchment in Maroondah and area covered by this appendix

Properties at Flood Risk

Properties listed in the table below are at risk from flooding along Brushy Creek and its stormwater tributaries. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Maroondah Flood Mapping (Engeny, February 2019) and the Maroondah Municipal Flood Modelling (Engeny, October 2013) 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 identified as subject to flooding are based upon Melbourne Water and Maroondah City Council's best available flood mapping at the time of publication. Council's flood mapping and properties identified may be subject to change due to a number of factors, including but not limited to; completion of mitigation works, updates to technical specifications etc. For the most up to date properties at flood risk information, it is recommended to contact Maroondah City Council's Engineering Services Team on 1300 882 233 (during business hours).

Properties at risk from Flooding within the Mullum Mullum Creek catchment (where flooding at building likely and flood depth in yard > 30cm)

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				
✓	✓	✓	1 Abbey Court	Ringwood	Local Drainage	Flash
□	□	✓	1 Adele Court	Ringwood	Local Drainage	Flash
□	□	✓	2 Adele Court	Ringwood	Local Drainage	Flash
□	□	✓	27 Alexandra Road	Ringwood East	Local Drainage	Flash
□	□	✓	29 Alexandra Road	Ringwood East	Local Drainage	Flash
□	□	✓	23B Alexandra Road	Ringwood East	Local Drainage	Flash
□	□	✓	27A Alexandra Road	Ringwood East	Local Drainage	Flash
□	□	✓	16 Bardia Street	Ringwood	Ringwood Lake Drain	Flash
□	□	✓	1/21-23 Bardia Street	Ringwood	Ringwood Lake Drain	Flash
□	□	✓	46 Binbrook Drive	Croydon	Mullum Mullum Creek	Flash
□	□	✓	48 Binbrook Drive	Croydon	Mullum Mullum Creek	Flash
□	□	✓	50 Binbrook Drive	Croydon	Mullum Mullum Creek	Flash
□	□	✓	52 Binbrook Drive	Croydon	Mullum Mullum Creek	Flash
□	□	✓	54 Binbrook Drive	Croydon	Mullum Mullum Creek	Flash
□	□	✓	59 Binbrook Drive	Croydon	Mullum Mullum Creek	Flash
□	✓	✓	61 Binbrook Drive	Croydon	Mullum Mullum Creek	Flash
□	✓	✓	63 Binbrook Drive	Croydon	Mullum Mullum Creek	Flash
✓	✓	✓	3 Bona Street	Ringwood East	Local Drainage	Flash
✓	✓	✓	1/1 Bona Street	Ringwood East	Local Drainage	Flash
✓	✓	✓	2/1 Bona Street	Ringwood East	Local Drainage	Flash
□	□	✓	1 Clegg Avenue	Croydon	Local Drainage	Flash
□	□	✓	3 Clegg Avenue	Croydon	Local Drainage	Flash
□	□	✓	4 Clegg Avenue	Croydon	Local Drainage	Flash
□	□	✓	2A Clegg Avenue	Croydon	Local Drainage	Flash
□	✓	✓	5-7 Cutts Avenue	Croydon	Beaufort Road Drain	Flash

Properties at risk from Flooding within the Mullum Mullum Creek catchment (where flooding at building likely and flood depth in yard > 30cm)						
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				
☐	✓	✓	8 Dublin Road	Ringwood East	Dublin Road Drain	Flash
✓	✓	✓	10 Dublin Road	Ringwood East	Dublin Road Drain	Flash
☐	✓	✓	5/4 Dublin Road	Ringwood East	Dublin Road Drain	Flash
☐	✓	✓	6/4 Dublin Road	Ringwood East	Dublin Road Drain	Flash
☐	☐	✓	3/6 Dublin Road	Ringwood East	Dublin Road Drain	Flash
☐	✓	✓	4/6 Dublin Road	Ringwood East	Dublin Road Drain	Flash
☐	✓	✓	5/6 Dublin Road	Ringwood East	Dublin Road Drain	Flash
✓	✓	✓	1/12 Dublin Road	Ringwood East	Dublin Road Drain	Flash
✓	✓	✓	2/12 Dublin Road	Ringwood East	Dublin Road Drain	Flash
✓	✓	✓	1/26 Dublin Road	Ringwood East	Dublin Road Drain	Flash
✓	✓	✓	1/14-18 Dublin Road	Ringwood East	Dublin Road Drain	Flash
✓	✓	✓	1/20-24 Dublin Road	Ringwood East	Dublin Road Drain	Flash
✓	✓	✓	10/14-18 Dublin Road	Ringwood East	Dublin Road Drain	Flash
✓	✓	✓	10/20-24 Dublin Road	Ringwood East	Dublin Road Drain	Flash
✓	✓	✓	6 Eastfield Road	Ringwood East	Local Drainage	Flash
☐	☐	✓	8 Eastfield Road	Ringwood East	Local Drainage	Flash
☐	☐	✓	10 Eastfield Road	Ringwood East	Local Drainage	Flash
☐	✓	✓	9 Edith Avenue	Croydon	Local Drainage	Flash
☐	✓	✓	20 Edith Avenue	Croydon	Local Drainage	Flash
☐	☐	✓	1/7 Edith Avenue	Croydon	Local Drainage	Flash
☐	✓	✓	2/7 Edith Avenue	Croydon	Local Drainage	Flash
☐	✓	✓	25-29 Edith Avenue	Croydon	Beaufort Road Drain	Flash
☐	✓	✓	3A Edith Avenue	Croydon	Local Drainage	Flash
☐	☐	✓	35 Illoura Avenue	Ringwood East	Local Drainage	Flash
☐	☐	✓	1/35 Illoura Avenue	Ringwood East	Local Drainage	Flash
☐	☐	✓	2/35 Illoura Avenue	Ringwood East	Local Drainage	Flash
☐	☐	✓	13 Larissa Avenue	Ringwood	Ringwood Lake Drain	Flash
☐	✓	✓	27 Leonard Street	Ringwood	Mullum Mullum Creek	Flash
☐	☐	✓	30 Leonard Street	Ringwood	Mullum Mullum Creek	Flash
☐	☐	✓	1A Luton Court	Croydon	Mullum Mullum Creek	Flash
☐	☐	✓	1 Marilyn Crescent	Ringwood	Mullum Mullum Creek	Flash
☐	✓	✓	2 Marilyn Crescent	Ringwood	Mullum Mullum Creek	Flash
☐	☐	✓	4 Marilyn Crescent	Ringwood	Mullum Mullum Creek	Flash
☐	✓	✓	5 Marilyn Crescent	Ringwood	Local Drainage	Flash
✓	✓	✓	7 Marilyn Crescent	Ringwood	Local Drainage	Flash
☐	✓	✓	15 Marilyn Crescent	Ringwood	Local Drainage	Flash
☐	☐	✓	384 Maroondah Highway	Ringwood	Local Drainage	Flash
☐	✓	✓	1/475-477 Maroondah Highway	Ringwood	Local Drainage	Flash
☐	☐	✓	16/434 Maroondah Highway	Croydon	Beaufort Road Drain	Flash
☐	☐	✓	183/67-81 Maroondah Highway	Croydon	Local Drainage	Flash
☐	☐	✓	184/67-81 Maroondah Highway	Croydon	Local Drainage	Flash
☐	☐	✓	185/67-81 Maroondah Highway	Croydon	Local Drainage	Flash
☐	☐	✓	213/67-81 Maroondah Highway	Croydon	Local Drainage	Flash
☐	☐	✓	214/67-81 Maroondah Highway	Croydon	Local Drainage	Flash

Properties at risk from Flooding within the Mullum Mullum Creek catchment (where flooding at building likely and flood depth in yard > 30cm)						
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				
□	□	✓	215/67-81 Maroondah Highway	Croydon	Local Drainage	Flash
□	□	✓	216/67-81 Maroondah Highway	Croydon	Local Drainage	Flash
□	□	✓	221/67-81 Maroondah Highway	Croydon	Local Drainage	Flash
□	□	✓	222/67-81 Maroondah Highway	Croydon	Local Drainage	Flash
□	□	✓	292/67-81 Maroondah Highway	Croydon	Local Drainage	Flash
□	□	✓	293/67-81 Maroondah Highway	Croydon	Local Drainage	Flash
□	□	✓	321/67-81 Maroondah Highway	Croydon	Local Drainage	Flash
□	□	✓	333/67-81 Maroondah Highway	Croydon	Local Drainage	Flash
□	□	✓	334/67-81 Maroondah Highway	Croydon	Local Drainage	Flash
□	✓	✓	335/67-81 Maroondah Highway	Croydon	Local Drainage	Flash
□	□	✓	336/67-81 Maroondah Highway	Croydon	Local Drainage	Flash
□	□	✓	344/67-81 Maroondah Highway	Croydon	Local Drainage	Flash
□	✓	✓	48-50 Maroondah Highway	Croydon	Local Drainage	Flash
□	✓	✓	2 Miller Grove	Ringwood East	Local Drainage	Flash
□	✓	✓	4 Miller Grove	Ringwood East	Local Drainage	Flash
□	□	✓	2/30 Morcom Avenue	Ringwood East	Local Drainage	Flash
□	□	✓	3/30 Morcom Avenue	Ringwood East	Local Drainage	Flash
□	✓	✓	54 Mt Dandenong Road	Croydon	Local Drainage	Flash
✓	✓	✓	56 Mt Dandenong Road	Croydon	Local Drainage	Flash
□	✓	✓	1/102 Mt Dandenong Road	Ringwood East	Dublin Road Drain	Flash
□	□	✓	1/50-52 Mt Dandenong Road	Croydon	Local Drainage	Flash
□	✓	✓	1/51A Mt Dandenong Road	Croydon	Local Drainage	Flash
□	✓	✓	2/51A Mt Dandenong Road	Croydon	Local Drainage	Flash
□	□	✓	3/51A Mt Dandenong Road	Croydon	Local Drainage	Flash
✓	✓	✓	7/50-52 Mt Dandenong Road	Croydon	Local Drainage	Flash
□	□	✓	96 Mullum Mullum Road	Ringwood	Local Drainage	Flash
□	□	✓	24 Oban Road	Ringwood	Mullum Mullum Creek	Flash
□	□	✓	3-4 Odette Court	Ringwood East	Ringwood Lake Drain	Flash
□	□	✓	45 Old Lilydale Road	Ringwood East	Local Drainage	Flash
□	✓	✓	47 Old Lilydale Road	Ringwood East	Local Drainage	Flash
✓	✓	✓	32 Oliver Street	Ringwood	Mullum Mullum Creek	Flash
□	✓	✓	2/46 Panfield Avenue	Ringwood	Local Drainage	Flash
□	✓	✓	89 Patterson Street	Ringwood East	Local Drainage	Flash
□	□	✓	19 Pratt Street	Ringwood	Ringwood Lake Drain	Flash
□	□	✓	21 Pratt Street	Ringwood	Ringwood Lake Drain	Flash
□	□	✓	136 Railway Avenue	Ringwood East	Local Drainage	Flash
□	□	✓	18 Rosedale Crescent	Ringwood East	Local Drainage	Flash
□	□	✓	27 Ross Road	Croydon	Local Drainage	Flash
□	□	✓	29 Ross Road	Croydon	Local Drainage	Flash
□	✓	✓	2-4 Ross Road	Croydon	Local Drainage	Flash
□	□	✓	26 Rupert Street	Ringwood	Mullum Mullum Creek	Flash
□	✓	✓	2 Seares Drive	Ringwood	Local Drainage	Flash
□	□	✓	4 Seares Drive	Ringwood East	Local Drainage	Flash
□	□	✓	24 Seares Drive	Ringwood East	Local Drainage	Flash

Properties at risk from Flooding within the Mullum Mullum Creek catchment (where flooding at building likely and flood depth in yard > 30cm)						
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				
□	□	✓	26 Seares Drive	Ringwood East	Local Drainage	Flash
□	□	✓	3/10-12 Sherwood Avenue	Ringwood East	Ringwood Lake Drain	Flash
□	□	✓	4/8 Sherwood Avenue	Ringwood East	Ringwood Lake Drain	Flash
□	□	✓	65 Sunbeam Avenue	Ringwood East	Dublin Road Drain	Flash
□	□	✓	27 Towerhill Drive	Ringwood	Local Drainage	Flash
□	□	✓	29 Towerhill Drive	Ringwood	Local Drainage	Flash
□	□	✓	1 Victoria Street	Ringwood East	Local Drainage	Flash
□	□	✓	3 Victoria Street	Ringwood East	Local Drainage	Flash
□	□	✓	20-24 Warrandyte Road	Ringwood	Ringwood Lake Drain	Flash
Totals						
17	48	122				

Table C2.3 – Properties at risk of flooding within the Mullum Mullum Creek catchment in the Maroondah Municipality where flooding at the building likely and depth in yard is 30cm or greater

Isolation

No major isolation risks exist for areas around Croydon, Ringwood and Ringwood East. 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 at ptv.vic.gov.au/live-travel-updates/. A map of public transport routes within the Maroondah Municipality is available via the website at ptv.vic.gov.au/assets/default-site/more/maps/Local-area-maps/Metropolitan/351fea4fb3/29_Maroondah_LAM.pdf.

Apart from the roads outlined below, all other essential infrastructure and services areas around Ringwood are expected to remain predominantly dry during an intense rainfall event.

Road Closures

The following roads are subject to closure during flooding around Croydon, Ringwood and Ringwood East. Check the VicRoads website for more details: traffic.vicroads.vic.gov.au/.

DTP (VicRoads) Roads likely flooded in a 1% AEP event
• Maroondah Highway, Croydon westbound lanes at Burnt Bridge Shopping Centre
• Maroondah Highway, Croydon westbound lanes at Gladys Grove
• Maroondah Highway, Ringwood westbound and eastbound lanes at Car City

Table C2.4 – VicRoads Possible Road Closures during a flooding event

Maroondah City Council Roads likely flooded in a 1% AEP (100yr ARI) event		
CROYDON	**RINGWOOD**	• Seares Drive
• Beaufort Road	• Abbey Court	**RINGWOOD EAST**
• Binbrook Drive	• Frederic Drive	• Purser Avenue
• Cutts Avenue	• Highland Boulevard	• Railway Avenue
• Edith Avenue	• Marilyn Crescent	

• Ross Road	• Mullum Mullum Road	

Table C2.5 – Maroondah City Council Possible flooded roads due to flash flooding over 30cm depth

Flood Mitigation

Retarding Basins

There are Retarding Basins at Canterbury Road near Colchester Road, Kilsyth, Croydon Hills Drive, Croydon Hills and at the corner of Great Ryrie Street and Reilly Street, Ringwood. Ringwood Lake (located on Ringwood Lake Drain, Ringwood) may act as a Retarding Basin for flows along Ringwood Lake Drain, and into Mullum Mullum Creek.

Levees

There is a pumping station at Civic Square, Croydon behind Aquahub.

Sewerage Infrastructure

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

Sewer Pumping Stations

Sewerage Pumping Station	On Drain / Waterway	Bank / Side of Waterway	Operator	Location	Melway Reference
Glenvale Road Drain	Glenvale Road	-	Yarra Valley Water	Glenvale Road, Ringwood North	49 E3

Table C2.6 – Sewer Pumping Stations within the Mullum Mullum Creek Catchment in the Maroondah Municipality

Sewer Emergency Relief Points

There are Sewer Emergency Relief Points within the Mullum Mullum Creek catchment 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
Glenvale Road Drain	-	Yarra Valley Water	Glenvale Road, Ringwood North	49 E3

Table C2.7 – Sewer Emergency Relief Points in the Mullum Mullum Creek Catchment in the Maroondah Municipality

Control, Command and Coordination

VICSES will assume overall control of the response to flood incidents. Control and coordination of a flood incident shall be carried out at the lowest effective level and in accordance with the SEMP. 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 Mullum Mullum Creek and its stormwater tributaries at various creek heights or rain totals within Maroondah. 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:

- Mullum Mullum Creek, Doncaster East
- Mullum Mullum Creek's stormwater tributaries, Ringwood

FLOOD INTELLIGENCE CARD – DONCASTER EAST GAUGE, MULLUM MULLUM CREEK

Version 4 – May 2023

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	**Eastern side of the Heidelberg-Warrandyte Road bridge, Doncaster East**
CURRENT LEVEL:	**https://www.melbournewater.com.au/water-and-environment/water-management/rainfall-and-river-levels#/reader/229648A**
STREAM:	**Mullum Mullum Creek**
GAUGE NUMBER:	**229648A**
GAUGE ZERO:	**28.6m AHD**
GAUGE TYPE	**Stream Level**

MINOR:	**Not Established**
MODERATE:	**Not Established**
MAJOR	**Not Established**
LEVEE HEIGHT:	**N/A**
MELWAY REFERENCE:	**34 F3**
HIGHEST RECORDED FLOOD:	**3.75m (5th February 2011)**

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
5.25m	20% AEP (5yr ARI) Flood Level	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **1 Property in Total** • A property on Oliver Street in Ringwood **Community Infrastructure Likely Flooded** • Mullum Mullum Creek trail at various locations **Water Over Road (over 30cm depth)** • Marilyn Crescent, Ringwood	VICSES to respond to RFAs on a request-by-request basis. Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.
5.75m	5% AEP (20yr ARI) Flood Level	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **5 Properties in Total** • Properties on Binbrook Drive in Croydon and Marilyn Crescent and Oliver Street in Ringwood **Community Infrastructure Likely Flooded** • Mullum Mullum Creek trail at various locations **Water Over Road (over 30cm depth)** • Marilyn Crescent, Ringwood	VICSES to respond to RFAs on a request-by-request basis. Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.
6.11m	1% AEP (100yr ARI) Flood Level	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **17 Properties in Total**	VICSES to respond to RFAs 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
		• Properties on Brinbook Drive, Leonard Street, Luton Court, Marilyn Crescent, Oban Road, Oliver Street and Rupert Street in Croydon and Ringwood **Community Infrastructure Likely Flooded** • Mullum Mullum Creek trail at various locations **Water Over Road (over 30cm depth)** • Binbrook Drive, Croydon • Marilyn Crescent, Ringwood	

Table C2.6 – Breakdown of likely consequences at various Doncaster East gauge level heights along Mullum Mullum Creek in Maroondah with operational considerations

FLOOD INTELLIGENCE CARD – MULLUM MULLUM CREEK'S STORMWATER TRIBUTARIES (UNGAUGED)

Version 4 – May 2023

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:	**Ringwood**
LOCATION:	**Burnt Bridge Tennis Club, Maroondah Highway Ringwood**
RECENT RAINFALL:	**https://www.melbournewater.com.au/water-and-environment/water-management/rainfall-and-river-levels#/reader/586065**

GAUGE NUMBER:	**586065**
GAUGE TYPE:	**Rain**
MELWAY REF:	**50 C3**

Design Rainfall Depths (mm) – *Indication of Possible Flooding*	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
11mm in 10 mins; 18mm in 30 mins; 23mm in 1 hour; 29mm in 2 hours; 33mm in 3 hours; or 43mm in 6 hours 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.	20% AEP (5 year ARI)	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **17 Properties in Total** **Dublin Road Drain** • Properties on Dublin Road in Ringwood East **Local Drainage** • Properties on Abbey Court and Marilyn Crescent in Ringwood • Properties on Bona Street and Eastfield Road in Ringwood East • Properties on Mt Dandenong Road in Croydon **Community Infrastructure Likely Flooded** **Local Drainage** • Discovery Childcare and Education, 50 Maroondah Highway, Croydon **Water Over Road (over 30cm depth)** **Beaufort Road Drain** • Beaufort Road, Croydon **Local Drainage** • Abbey Court, Ringwood • Frederic Drive, Ringwood • Maroondah Highway, Croydon near Croydon Hotel and also Car City • Seares Drive, Ringwood	VICSES to respond to RFAs on a request-by-request basis. Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.
15mm in 10 mins; 25mm in 30 mins;	5% AEP (20 year ARI)	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **48 Properties in Total** **Beaufort Road Drain**	VICSES to respond to RFAs on a request-by-request basis.

Design Rainfall Depths (mm) – *Indication of Possible Flooding*	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
31mm in 1 hour; 39mm in 2 hours; 44mm in 3 hours; or 57mm in 6 hours 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.		• Properties on Cutts Avenue and Edith Avenue in Croydon **Dublin Road Drain** • Properties on Dublin Road and Mt Dandenong Road in Ringwood East **Local Drainage** • Properties on Abbey Court, Marilyn Crescent, Maroondah Highway, Panfield Avenue and Seares Drive in Ringwood • Properties on Bona Street, Eastfield Road, Miller Grove, Old Lilydale Road and Patterson Street in Ringwood East • Properties on Edith Avenue, Maroondah Highway, Mt Dandenong Road and Ross Road in Croydon **Community Infrastructure Likely Flooded** **Local Drainage** • Cherrytree Grove Retirement Village, 67-87 Maroondah Highway, Croydon • Discovery Childcare and Education, 50 Maroondah Highway, Croydon **Water Over Road (over 30cm depth)** **Beaufort Road Drain** • Beaufort Road, Croydon • Cutts Avenue, Croydon **Dublin Road Drain** • Purser Avenue, Ringwood East **Local Drainage** • Abbey Court, Ringwood • Frederic Drive, Ringwood • Highland Boulevard, Ringwood • Maroondah Highway, Croydon near Croydon Hotel and also Car City • Mullum Mullum Road, Ringwood • Railway Avenue, Ringwood East • Ross Road, Croydon • Seares Drive, Ringwood	Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.
21mm in 10 mins; 34mm in 30 mins; 42mm in 1 hour; 51mm in 2 hours; 58mm in 3 hours; or 76mm in 6 hours 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.	1% AEP (100 year ARI)	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **96 Properties in Total** **Beaufort Road Drain** • Properties on Cutts Avenue, Edith Avenue and Maroondah highway in Croydon **Dublin Road Drain** • Properties on Dublin Road, Mt Dandenong Road and Sumbeam Avenue in Ringwood East **Local Drainage** • Properties on Abbey Court, Marilyn Crescent, Maroondah Highway, Mullum Mullum Road, Panfield Avenue, Seares Drive and Towerhill Drive in Ringwood • Properties on Alexandra Road, Bona Street, Eastfield Road, Illoura Avenue, Miller Grove, Morcom Avenue, Old Lilydale Road, Patterson Street, Railway Avenue, Rosedale Crescent, Seares Drive and Victoria Street in Ringwood East	VICSES will provide warnings using the VicEmergency website and application as required based on the predictions provided by BoM regarding flood levels and the risk of flash flooding. The VICSES RDO, in conjunction with the VICSES RAC, will maintain operational awareness and form an appropriate response arrangement to suit the level of incident. VICSES to respond to RFAs on a request-by-request basis.

Design Rainfall Depths (mm) – *Indication of Possible Flooding*	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		• Properties on Clegg Avenue, Edith Avenue, Maroondah Highway, Mt Dandenong Road and Ross Road in Croydon **Ringwood Lake Drain** • Properties on Bardia Street, Larissa Avenue, Pratt Street and Warrandyte Road in Ringwood • Properties on Odette Court and Sherwood Avenue in Ringwood East **Community Infrastructure Likely Flooded** **Local Drainage** • Cherrytree Grove Retirement Village, 67-87 Maroondah Highway, Croydon • Discovery Childcare and Education, 50 Maroondah Highway, Croydon **Essential Infrastructure Likely Impacted** • Bus Routes 670 & 684 along Maroondah Highway in Croydon **Water Over Road (over 30cm depth)** **Beaufort Road Drain** • Beaufort Road, Croydon • Cutts Avenue, Croydon • Edith Avenue, Croydon • Maroondah Highway, Croydon at Burnt Bridge Shopping Centre **Dublin Road Drain** • Purser Avenue, Ringwood East **Local Drainage** • Abbey Court, Ringwood • Frederic Drive, Ringwood • Highland Boulevard, Ringwood • Maroondah Highway, Croydon near Croydon Hotel and also Car City • Mullum Mullum Road, Ringwood • Railway Avenue, Ringwood East • Ross Road, Croydon • Seares Drive, Ringwood	Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.

Table C2.7 – Breakdown of possible consequences at various rainfall intensities around Mullum Mullum Creek's stormwater tributaries in Maroondah with operational considerations

APPENDIX C3 – DANDENONG CREEK & BUNGALOOK 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 accessing 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 Dandenong and Bungalook Creeks in Maroondah					
Property (Over-Floor)					
Properties	**33**				
Residential	28				
Commercial	0				
Industrial	5				
Public Land	0				
Rural	0				
Community Infrastructure					
Schools / Colleges	1	Heathmont College			
Essential Infrastructure					
Major Roads	2	Bayswater Road; & Canterbury Road			
Bus Routes	1	664			
Sewerage Facilities	1	Emergency Relief Point			
Drainage Facilities	7	Retarding Basins			
Tourism / Recreation					
Sports Facilities	1	Ringwood Public Golf Course			
Recreation Facilities	1	Dandenong Creek Trail			
Government Boundaries					
Local Gov't Areas	1	Maroondah	CMA	1	Port Phillip & Westernport
Adjacent LGAs	3	Knox; Whitehorse ; & Yarra Ranges	CFA District	1	District 13
SES Unit Area	1	Maroondah	FRV District	1	Eastern

Table C3.1 – Consequence Summary of 1% AEP flood along the Dandenong and Bungalook Creeks in Maroondah

Kilsyth, Kilsyth South, Bayswater North, Bayswater, Croydon South, Heathmont, Ringwood South and Ringwood are among the southern Suburbs of Maroondah.

Bungalook Creek enters the Maroondah Municipality from Yarra Ranges Shire at Glasgow Road, Kilsyth and flows east through Kilsyth South, Colchester and Canterbury Road Retarding Basins, Kilsyth, Bayswater North and Heathmont, where it discharges into Dandenong Creek.

Dandenong Creek enters the Municipality downstream of Liverpool Road Retarding Basin in Boronia and forms the southern boundary of Maroondah, flowing west through Kilsyth South, Bayswater North, Heathmont and Ringwood, before exiting Maroondah at Heatherdale Road.

High intensity, short duration rainfall events can cause flash flooding in Bayswater North, Bayswater, Croydon South, Heathmont, Kilsyth, Kilsyth South, Ringwood South and Ringwood, while prolonged rainfall events may cause Dandenong Creek and Bungalook Creek to flood.

Gauges and Warnings

Neither the BoM nor Melbourne Water currently provides flood forecasts for the upper reaches of Dandenong Creek. All flood response actions must therefore be driven by rainfall and/or water level observations. Telemetered water level/flood gauges are located at Montrose, The Basin and Wantirna. Warnings are available for flooding expected along Dandenong Creek downstream at Rowville. Flood class levels for the Rowville gauge are detailed in table C3.3 and are used in the issuing of a flood warning for Dandenong Creek. See Appendix B for typical flood travel times for Dandenong Creek.

Gauge	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge	Melway Reference
Bungalook Creek at Fussell Road Retarding Basin, Montrose	228369A	North bank of the creek, 50m east of R/B embankment	✓	✓	52 A11
Dandenong Creek at Liverpool Road Retarding Basin	228373A	At the Liverpool Road R/B outlet off Liverpool Road, The Basin	✓	✓	65 F4
Dandenong Creek at Wantirna Road, Wantirna	228357A	South side of the creek 150m east of Wantirna Road, Wantirna	✓	✓	63 H3
Dandenong Creek at Police Rd Retarding Basin, Rowville	228368A	North side of embankment. Access via Illawarra Avenue and through gate to the north.	✓	✓	81 E6

Table C3.2 – Gauges within the Dandenong Creek catchment

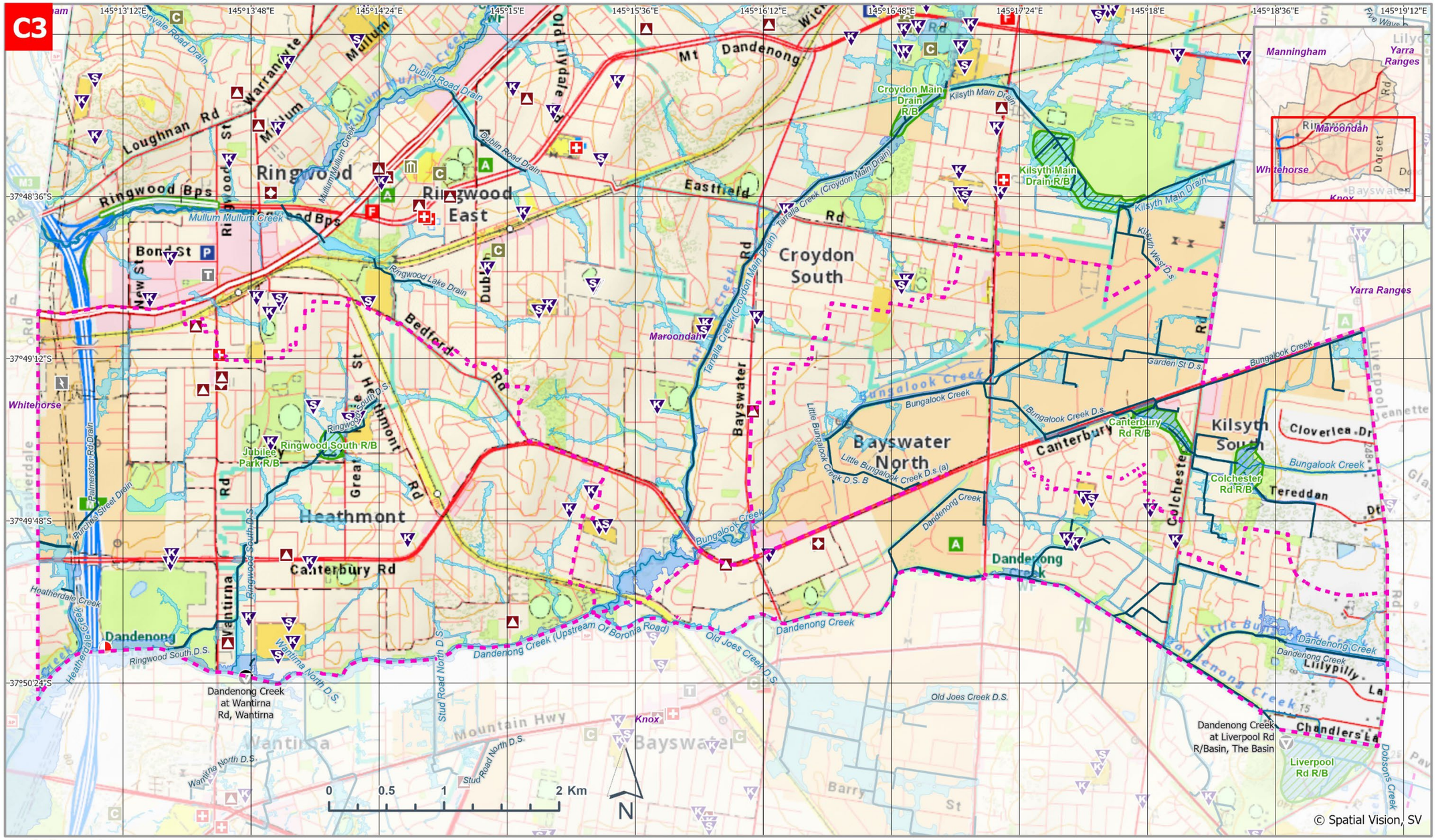
These gauges may provide some warning of expected flooding. See the Melbourne Water website for more information on these gauges: melbournewater.com.au/waterdata/rainfallandriverleveldata/Pages/Rainfall-and-river-level-new.aspx. The BoM website also links a number of these gauges at: bom.gov.au/cgi-bin/wrap_fwo.pl?IDV60201.html. It is advised that residents monitor the BoM website bom.gov.au/vic/warnings/index.shtml?ref=hdr and the VicEmergency website emergency.vic.gov.au/ for any thunderstorm, flood or severe weather warnings present for their area.

Gauge	River / Creek Flood Class Level		
	Minor	Moderate	Major
Dandenong Creek at Police Rd Retarding Basin, Rowville	4.6m	5.0m	5.5m

Table C3.3 – Gauges with established Flood Class Levels for Dandenong Creek

At these sites on the Dandenong Creek, the BoM, in consultation with Melbourne Water, will issue flood warnings if levels reach those classified above. This warning will be placed on the BoM website (bom.gov.au/vic/warnings/index.shtml) and the VicEmergency website emergency.vic.gov.au/. While the Maroondah Municipality monitors these warnings in times of high rainfall, there are no specific guidelines to advise how these situations should be responded to.

Area Map of Flood Risk within the Dandenong Creek catchment



Map produced by VICSES 10/05/2023 1:35 PM

CITY OF MAROONDAH

1% AEP (100yr ARI) Flooding

C3. Areas of flood risk along Dandenong and Bungakook Creeks

- Waterbody
- 1% AEP Flash Flood Extent
- 1% AEP Riverine Flood Extent
- Melbourne Water Retarding Basin
- Boundary for this Appendix
- Melbourne Water Stormwater Drain
- Waterway
- Aged Care Facility
- Ambulance Stations
- Child Care Centre
- Community Venue
- Education Centre
- Fire Station
- Hospitals
- Police Stations
- Municipal Office
- Municipal Depot
- Power Facility
- Telephone Exchange
- Stream Level & Rain Gauge
- Stream Level Gauge
- Rain Gauge
- Sewer Emergency Relief Point

LAND USE

- Residential
- Commercial and Business
- Industrial
- Public Parks / Cemeteries / Recreation
- Utilities and Local Government Facilities
- Education

Figure C3 – Areas of flood risk along Dandenong Creek and Bungalook Creek in the Maroondah Municipality and boundary for this appendix

Properties at Flood Risk

Properties listed in the table below are at risk from flooding along Dandenong Creek's stormwater tributaries. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Maroondah Flood Mapping (Engeny, February 2019) 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 identified as subject to flooding are based upon Melbourne Water and Maroondah City Council's best available flood mapping at the time of publication. Council's flood mapping and properties identified may be subject to change due to a number of factors, including but not limited to; completion of mitigation works, updates to technical specifications etc. For the most up to date properties at flood risk information, it is recommended to contact Maroondah City Council's Engineering Services Team on 1300 882 233 (during business hours).

Properties at risk from flooding within the Dandenong and Bungalook Creeks catchments (where flooding at building likely and flood depth in yard > 30cm)

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				
	✓	✓	32A Balfour Avenue	Heathmont	Local Drainage	Flash
	✓	✓	9 Bangor Court	Heathmont	Local Drainage	Flash
		✓	16/51 Bayfield Road W	Bayswater North	Bungalook Creek	Flash
		✓	21/51 Bayfield Road W	Bayswater North	Bungalook Creek	Flash
	✓	✓	22/51 Bayfield Road W	Bayswater North	Bungalook Creek	Flash
		✓	2 Blossom Walk	Croydon South	Bungalook Creek	Flash
		✓	4 Briar Rose Walk	Croydon South	Bungalook Creek	Flash
✓	✓	✓	1/88-100 Bungalook Road E	Bayswater North	Bungalook Creek	Flash
	✓	✓	46A Campbell Street	Heathmont	Local Drainage	Flash
	✓	✓	1/112-120 Canterbury Road	Bayswater North	Bungalook Creek	Flash
	✓	✓	2/112-120 Canterbury Road	Bayswater North	Bungalook Creek	Flash
	✓	✓	3/112-120 Canterbury Road	Bayswater North	Bungalook Creek	Flash
	✓	✓	4/112-120 Canterbury Road	Bayswater North	Bungalook Creek	Flash
		✓	122-124 Canterbury Road	Bayswater North	Bungalook Creek	Flash
		✓	20/320 Canterbury Road	Bayswater North	Bungalook Creek	Flash
		✓	25/320 Canterbury Road	Bayswater North	Bungalook Creek	Flash
		✓	12 Danielle Crescent	Heathmont	Bungalook Creek	Flash
	✓	✓	25 Edna Street	Heathmont	Local Drainage	Flash
	✓	✓	29 Edna Street	Heathmont	Local Drainage	Flash
	✓	✓	46 Great Ryrie Street	Ringwood	Local Drainage	Flash
	✓	✓	59A Great Ryrie Street	Heathmont	Local Drainage	Flash
		✓	2A Hardy Crescent	Heathmont	Local Drainage	Flash
	✓	✓	1 Huntingdon Avenue	Bayswater North	Local Drainage	Flash

Properties at risk from flooding within the Dandenong and Bungalook Creeks catchments (where flooding at building likely and flood depth in yard > 30cm)						
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				
		✓	4/10 Lena Grove	Ringwood	Local Drainage	Flash
	✓	✓	31A Myrtle Avenue	Heathmont	Local Drainage	Flash
	✓	✓	34A Myrtle Avenue	Heathmont	Local Drainage	Flash
	✓	✓	2/40 Myrtle Avenue	Heathmont	Local Drainage	Flash
	✓	✓	2/4 Tudor Court	Heathmont	Local Drainage	Flash
		✓	8-50 Waters Grove	Heathmont	Local Drainage	Flash
✓	✓	✓	10 Wayne Court	Heathmont	Bungalook Creek	Flash
✓	✓	✓	11 Wayne Court	Heathmont	Bungalook Creek	Flash
✓	✓	✓	12 Wayne Court	Heathmont	Bungalook Creek	Flash
✓	✓	✓	13 Wayne Court	Heathmont	Bungalook Creek	Flash
	✓	✓	32A Balfour Avenue	Heathmont	Local Drainage	Flash
	✓	✓	9 Bangor Court	Heathmont	Local Drainage	Flash
		✓	16/51 Bayfield Road W	Bayswater North	Bungalook Creek	Flash
		✓	21/51 Bayfield Road W	Bayswater North	Bungalook Creek	Flash
	✓	✓	22/51 Bayfield Road W	Bayswater North	Bungalook Creek	Flash
		✓	2 Blossom Walk	Croydon South	Bungalook Creek	Flash
		✓	4 Briar Rose Walk	Croydon South	Bungalook Creek	Flash
✓	✓	✓	1/88-100 Bungalook Road E	Bayswater North	Bungalook Creek	Flash
	✓	✓	46A Campbell Street	Heathmont	Local Drainage	Flash
Totals						
5	22	33				

Table C3.3 – Properties at risk of flooding along Dandenong Creek and Bungalook Creek's stormwater tributaries in the Maroondah Municipality where flooding at building is likely and depth in yard is > 30cm

Isolation

No major isolation risks exist for areas around Kilsyth, Kilsyth South, Bayswater North, Bayswater, Croydon South, Heathmont, Ringwood South and Ringwood. 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 at: ptv.vic.gov.au/live-travel-updates/. A map of Public Transport routes within the Maroondah Municipality is available via the website at: ptv.vic.gov.au/assets/default-site/more/maps/Local-area-maps/Metropolitan/351fea4fb3/29_Maroondah_LAM.pdf.

Apart from a sewer emergency relief structure and the roads outlined below, all other essential infrastructure and services areas around Kilsyth, Kilsyth South, Bayswater North, Bayswater, Croydon South, Heathmont, Ringwood South and Ringwood are expected to remain predominantly dry during an intense rainfall event.

Road Closures

The following roads are subject to closure during flooding around Kilsyth, Kilsyth South, Bayswater North, Bayswater, Croydon South, Heathmont, Ringwood South and Ringwood. Check the VicRoads website for more details: [traffic.vicroads.vic.gov.au/.](traffic.vicroads.vic.gov.au/)

Department of Transport (VicRoads) Roads likely flooded in a 1% AEP (100yr ARI) event
• Bayswater Road, Bayswater North at Bungalook Creek crossing

Table C3.4 – Department of Transport (VicRoads) Possible Road Closures during a flooding event

Maroondah City Council Roads likely flooded in a 1% AEP (100yr ARI) event		
BAYSWATER NORTH	**CROYDON SOUTH**	• Miller Road
• Allambanan Drive	• Briar Rose Walk	• Scott Street
• Bayfield Road East	• Mountain Heath Walk	• Waters Grove
• Burgess Road	• Research Drive	**KILSYTH SOUTH**
• Dorset Road South Bound Service Lane at Huntingdon Ave	• The Gateway	• Calmsden Street
• Elsum Avenue	• Valley Court	• Ormond Place
• Gatwick Road	• Wildwood Walk	**RINGWOOD**
• Halbert Road	**HEATHMONT**	• Great Ryrie Street
• Huntingdon Avenue	Barrow Drive	
• Kelvin Road	Danielle Crescent	
• Turbo Drive	Marlborough Road	

Table C3.5 – Maroondah 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 Height (Level)	ANCOLD Hazard Rating	Population at Risk (dam breach)	Melway Reference
Canterbury Road	Bungalook Creek (Upper)	5.30 ha	97ML	113.5m AHD	113.5m AHD	3m (113.7m AHD)	High A	Unavailable	51 D11
Colchester Road	Bungalook Creek (Upper)	4.74 ha	72.4ML (at Spillway Level)	117.4m AHD	118.1m AHD	4.0m (119m AHD)	High A	877	51 E12 F11
Fussell Road	Bungalook Creek	11.5 ha	302.0ML	151.4m AHD	151.9m AHD	8.5m 152.2m AHD	High A	37	52 A11
Jubilee Park	Ringwood South D.S.	2.69 ha	4ML	N/A	98.5m AHD	98.5m AHD	High A	Unavailable	49 H11
Liverpool Road	Dandenong Creek (Upper) Dobsons Creek	18.9 ha	467ML	137m AHD	Unavailable	7.3m (137.8m AHD)	Extreme	6,5	65 G4
Kilsyth Main Drain	Kilsyth Main Drain	13.89 ha	176.4ML	105m AHD	105.8m AHD	2.6m (105.8m AHD)	High A	Unavailable	51 B6
Ringwood South	Ringwood South D.S.	2.69 ha	25ML	99.5m AHD	100m AHD	2.4m (100.1m AHD)	Medium	500	49 K11

Table C3.6 – Melbourne Water Retarding Basins within the Dandenong Creek and Bungalook Creek catchments with impact in the Maroondah Municipality

No formal Pumping Stations or Levees exist around Maroondah.

Sewerage Infrastructure

Sewerage Infrastructure of note during a severe flood event located around the Dandenong and Bungalook Creeks is contained within the following table.

Sewer Emergency Relief Points

There is a Sewer Emergency Relief Point along Dandenong Creek 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
Dandenong Creek	North	Melbourne Water	Ringwood Public Golf Course, Heathmont	63 E3

Table C3.7 – Sewer Emergency Relief Points in the Dandenong Creek Catchment impacting the Maroondah Municipality

Control, Command and Coordination

VICSES will assume overall control of the response to flood incidents. Control and coordination of a flood incident shall be carried out at the lowest effective level and in accordance with the SEMP. 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 Dandenong and Bungalook Creeks and their stormwater drains at various creek heights or rain totals within the Maroondah Municipality. 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:

- Dandenong Creek at Liverpool Road Retarding Basin, The Basin
- Dandenong Creek at Wantirna
- Bungalook Creek
- Dandenong Creek's stormwater Tributaries, Kilsyth South to Heathmont

FLOOD INTELLIGENCE CARD – THE BASIN GAUGE, DANDENONG CREEK

Version 2 – May 2023

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	**At the Liverpool Road Retarding Basin outlet off Liverpool Road, The Basin**
CURRENT LEVEL:	**https://www.melbournewater.com.au/water-and-environment/water-management/rainfall-and-river-levels#/reader/228373A**
STREAM:	**Dandenong Creek**
GAUGE NUMBER:	**228373A**
GAUGE ZERO:	**131.14m AHD**
GAUGE TYPE	**Stream Level and Rain**

MINOR:	**Not Established**
MODERATE:	**Not Established**
MAJOR	**Not Established**
EMBANKMENT HEIGHT:	**6.66m**
MELWAY REFERENCE:	**65 F4**
HIGHEST RECORDED FLOOD:	**4.68m (30th July 1996)**

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
2.06m	20% AEP (5yr ARI) Flood Level	• Nil impact expected in from Liverpool Road Retarding Basin to Bungalook Creek confluence in Maroondah Municipality	
3.10m	10% AEP (10yr ARI) Flood Level	• Nil impact expected in from Liverpool Road Retarding Basin to Bungalook Creek confluence in Maroondah Municipality	
4.21m	5% AEP (20yr ARI) Flood Level	**Tourism / Recreation Likely Impacted** • Dandenong Creek Trail likely flooded in parts between Liverpool Road retarding basin and Bungalook Creek confluence	
5.36m	2% AEP (50yr ARI) Flood Level		
5.86m		• Spillway of Liverpool Road Retarding Basin in operation	
6.05m	1% AEP (100yr ARI) Flood Level		
6.66m		• Embankment level of Liverpool Road Retarding Basin	

Table C3.8 – Breakdown of likely consequences at various The Basin gauge level heights along Dandenong Creek with operational considerations

FLOOD INTELLIGENCE CARD – WANTIRNA GAUGE, DANDENONG CREEK

Version 4 – May 2023

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 150m east of Wantirna Road, Wantirna**
CURRENT LEVEL:	**https://www.melbournewater.com.au/water-and-environment/water-management/rainfall-and-river-levels#/reader/228357A**
STREAM:	**Dandenong Creek**
GAUGE NUMBER:	**228357A**
GAUGE ZERO:	**79.3m AHD**
GAUGE TYPE:	**Stream Level and Rain**

MINOR:	**Not Established**
MODERATE:	**Not Established**
MAJOR:	**Not Established**
LEVEE HEIGHT:	**N/A**
MELWAY REFERENCE:	**63 H3**
HIGHEST RECORDED FLOOD:	**2.77m (5th February 2011)**

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
2.77m	20% AEP (5yr ARI) Flood Level	**Essential Infrastructure Likely Impacted** • Sewer Emergency Relief Point upstream of Dandenong Creek/ Heatherdale Creek junction within floodwaters **Tourism / Recreation Likely Impacted** • Dandenong Creek Trail likely flooded in parts Bungalook Creek confluence and Heatherdale Creek **Water Over Road (over 30cm depth)** • Marlborough Road, Heathmont • Scott Street, Heathmont • Waters Grove, Heathmont	Maroondah Council Environmental Health team/ EPA to monitor quality of floodwater where appropriate.
2.93m	10% AEP (10yr ARI) Flood Level	**Tourism / Recreation Likely Impacted** • Ringwood Public Golf Course likely flooded in parts in areas adjacent to Dandenong Creek	
3.06m	5% AEP (20yr ARI) Flood Level		
3.16m	2% AEP (50yr ARI) Flood Level		
3.25m	1% AEP (100yr ARI) Flood Level		

Table C3.9 – Breakdown of likely consequences at various Wantirna gauge level heights along Dandenong Creek with operational considerations

FLOOD INTELLIGENCE CARD – BUNGALOOK CREEK (UNGAUGED)

Version 4 – May 2023

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:	**Bungalook Creek at Fussell Road Retarding Basin, Montrose**
LOCATION:	**North bank of Bungalook Creek, 50m east of the Retarding Basin embankment**
RECENT RAINFALL:	**https://www.melbournewater.com.au/water-and-environment/water-management/rainfall-and-river-levels#/reader/228369A**

GAUGE NUMBER	**228369**
GAUGE TYPE	**Stream Level & Rain**
MELWAY REF:	**52 A11**

Design Rainfall Depths (mm) – *Indication of Possible Flooding*	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
11mm in 10 mins; 18mm in 30 mins; 23mm in 1 hour; 29mm in 2 hours; 33mm in 3 hours; or 43mm in 6 hours 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.	20% AEP (5 year ARI)	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **5 Properties in Total** **Bungalook Creek** • A Property on Bungalook Road East in Bayswater North • Properties on Wayne Court in Heathmont **Water Over Road (over 30cm depth)** **Bungalook Creek Drainage System** • Bayfield Road East, Bayswater North • Burgess Road, Bayswater North • Gatwick Road, Bayswater North • Huntingdon Avenue, Bayswater North • Kelvin Road, Bayswater North • Miller Road, Heathmont • Ormond Place, Kilsyth South • Research Drive, Croydon South • Turbo Drive, Bayswater North	VICSES to respond to RFAs on a request-by-request basis. Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.
15mm in 10 mins; 25mm in 30 mins; 31mm in 1 hour; 39mm in 2 hours; 44mm in 3 hours; or	5% AEP (20 year ARI)	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **11 Properties in Total** **Bungalook Creek** • Properties on Bayfield Road West, Bungalook Road East, Canterbury Road and Huntingdon Avenue in Bayswater North • Properties on Wayne Court in Heathmont	VICSES to respond to RFAs on a request-by-request basis. Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.

Design Rainfall Depths (mm) – *Indication of Possible Flooding*	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
57mm in 6 hours 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.		**Water Over Road (over 30cm depth)** **Bungalook Creek Drainage System** • Ampney Court, Kilsyth South • Bayfield Road East, Bayswater North • Briar Rose Walk, Croydon South • Burgess Road, Bayswater North • Calmsden Street, Kilsyth South • Gatwick Road, Bayswater North • Halbert Road, Bayswater North • Huntingdon Avenue, Bayswater North • Kelvin Road, Bayswater North • Miller Road, Heathmont • Mountain Heath Walk, Croydon South • Ormond Place, Kilsyth South • Research Drive, Croydon South • The Gateway, Croydon South • Turbo Drive, Bayswater North • Valley Court, Croydon South	
21mm in 10 mins; 34mm in 30 mins; 42mm in 1 hour; 51mm in 2 hours; 58mm in 3 hours; or 75mm in 6 hours 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.	1% AEP (100 year ARI)	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **19 Properties in Total** **Bungalook Creek** • Properties on Bayfield Road West, Bungalook Road East, Canterbury Road and Huntingdon Avenue in Bayswater North • Properties on Blossom Walk and Briar Rose Walk in Croydon South • Properties on Danielle Crescent and Wayne Court in Heathmont **Essential Infrastructure Likely Impacted** • Bus Route 664 along Bayswater Road, Bayswater North at Bungalook Creek **Water Over Road (over 30cm depth)** **Bungalook Creek Drainage System** • Ampney Court, Kilsyth South • Bayfield Road East, Bayswater North • Bayswater Road, Bayswater North at Bungalook Creek crossing • Burgess Road, Bayswater North • Calmsden Street, Kilsyth South • Elsum Avenue, Bayswater North • Gatwick Road, Bayswater North • Halbert Road, Bayswater North • Huntingdon Avenue, Bayswater North • Kelvin Road, Bayswater North • Miller Road, Heathmont • Mountain Heath Walk, Croydon South	VICSES to respond to RFAs on a request-by-request basis. Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.

Design Rainfall Depths (mm) – *Indication of Possible Flooding*	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		• Ormond Place, Kilsyth South • Research Drive, Croydon South • The Gateway, Croydon South • Turbo Drive, Bayswater North • Valley Court, Croydon South • Wildwood Walk, Croydon South	

Table C3.10 – Breakdown of possible consequences at various rainfall intensities within the Bungalook Creek catchment in Maroondah with operational considerations

FLOOD INTELLIGENCE CARD – **DANDENONG CREEK'S STORMWATER TRIBUTARIES (UNGAUGED)**

Version 4 – May 2023

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:	**Dandenong Creek at Wantirna Road, Wantirna**
LOCATION:	**South side of the creek 150m east of Wantirna Road, Wantirna**
RECENT RAINFALL:	**https://www.melbournewater.com.au/water-and-environment/water-management/rainfall-and-river-levels#/reader/228357A**

GAUGE NUMBER	**228357**
GAUGE TYPE	**Stream Level & Rain**
MELWAY REF:	**63 H3**

Design Rainfall Depths (mm) – *Indication of Possible Flooding*	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
11mm in 10 mins; 18mm in 30 mins; 23mm in 1 hour; 29mm in 2 hours; 33mm in 3 hours; or 43mm in 6 hours 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.	20% AEP (5 year ARI)	**Water Over Road (over 300mm depth)** **Local Drainage** • Allambanan Drive, Bayswater North	VICSES will provide warnings using the VicEmergency website and application as required based on the predictions provided by BoM regarding flood levels and the risk of flash flooding. The VICSES RDO, in conjunction with the VICSES RAC, will maintain operational awareness and form an appropriate response arrangement to suit the level of incident. VICSES to respond to RFAs on a request-by-request basis. Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements,
15mm in 10 mins; 25mm in 30 mins; 31mm in 1 hour; 39mm in 2 hours; 44mm in 3 hours; or 57mm in 6 hours	5% AEP (20 year ARI)	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **11 Properties in Total** **Local Drainage** • Properties on Balfour Avenue, Bangor Court, Campbell Street, Edna Street, Great Ryrie Street, Myrtle Avenue and Tudor Court in Heathmont • A property on Great Ryrie Street in Ringwood **Water Over Road (over 30cm depth)** **Local Drainage**	VICSES will provide warnings using the VicEmergency website and application as required based on the predictions provided by BoM regarding flood levels and the risk of flash flooding. The VICSES RDO, in conjunction with the VICSES RAC will maintain

Design Rainfall Depths (mm) – *Indication of Possible Flooding*	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
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.		• Allambanan Drive, Bayswater North • Great Ryrie Street, Ringwood • Marlborough Road, Heathmont • Scott Street, Heathmont • Waters Grove, Heathmont	operational awareness and form an appropriate response arrangement to suit the level of incident. VICSES to respond to RFAs on a request-by-request basis Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.
21mm in 10 mins; 34mm in 30 mins; 42mm in 1 hour; 51mm in 2 hours; 58mm in 3 hours; or 75mm in 6 hours 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.	1% AEP (100 year ARI)	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **14 Properties in Total** **Local Drainage** • Properties on Balfour Avenue, Bangor Court, Campbell Street, Edna Street, Great Ryrie Street, Hardy Crescent, Myrtle Avenue, Tudor Court and Waters Grove in Heathmont • Properties on Great Ryrie Street and Lena Grove in Ringwood **Community Infrastructure Likely Flooded** • Heathmont College, Waters Grove, Heathmont **Water Over Road (Over 30cm depth)** **Local Drainage** • Allambanan Drive, Bayswater North • Bangor Court, Heathmont • Danielle Crescent, Heathmont • Dorset Road south bound service lane, Bayswater North • Great Ryrie Street, Ringwood • Marlborough Road, Heathmont • Scott Street, Heathmont • Waters Grove, Heathmont	VICSES will provide warnings using the VicEmergency website and application as required based on the predictions provided by BoM regarding flood levels and the risk of flash flooding. The VICSES RDO, in conjunction with the VICSES RAC will maintain operational awareness and form an appropriate response arrangement to suit the level of incident. VICSES to respond to RFAs on a request-by-request basis. Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.

Table C3.11 – Breakdown of possible consequences at various rainfall intensities around Dandenong Creek's stormwater tributaries in Maroondah with operational considerations

APPENDIX C4 – TARRALLA CREEK (CROYDON MAIN DRAIN) 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 accessing 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 Tarralla Creek (Croydon Main Drain) catchment					
Property					
Properties	**155**				
Residential	103				
Commercial	7				
Industrial	27				
Public Land	18				
Rural	0				
Community Infrastructure					
Community Venues	2	Arndale Civic Shopping Centre; Springfield Hall			
Schools / Colleges	1	Swinburn TAFE Croydon Campus			
Essential Infrastructure					
Major Roads	1	Mount Dandenong Road			
Bus Routes	5	664; 688; 689; 690; 737			
Drainage Facilities	2	Retarding Basins			
Tourism / Recreation					
Recreation Facilities	1	Tarralla Creek Trail			
Government Boundaries					
Local Gov't Areas	1	Maroondah	CMA	1	Port Phillip & Westernport
Adjacent LGAs	1	Yarra Ranges	CFA District	0	
SES Unit Area	1	Maroondah	FRV District	1	Eastern

Table C4.1 – Consequence Summary of 1% AEP flood within the Taralla

Tarralla Creek is fed predominantly by the Kilsyth Main Drain Drainage System which enters Maroondah at Colchester Road and flows west, through Kilsyth, the Kilsyth Main Drain Retarding Basin and Croydon. Tarralla Creek continues through the Croydon Main Drain Retarding Basin, then southwest through Croydon South, Bayswater North and Ringwood East before discharging into Bungalook Creek at Heathmont. Land use in the area is predominantly established residential and light industrial.

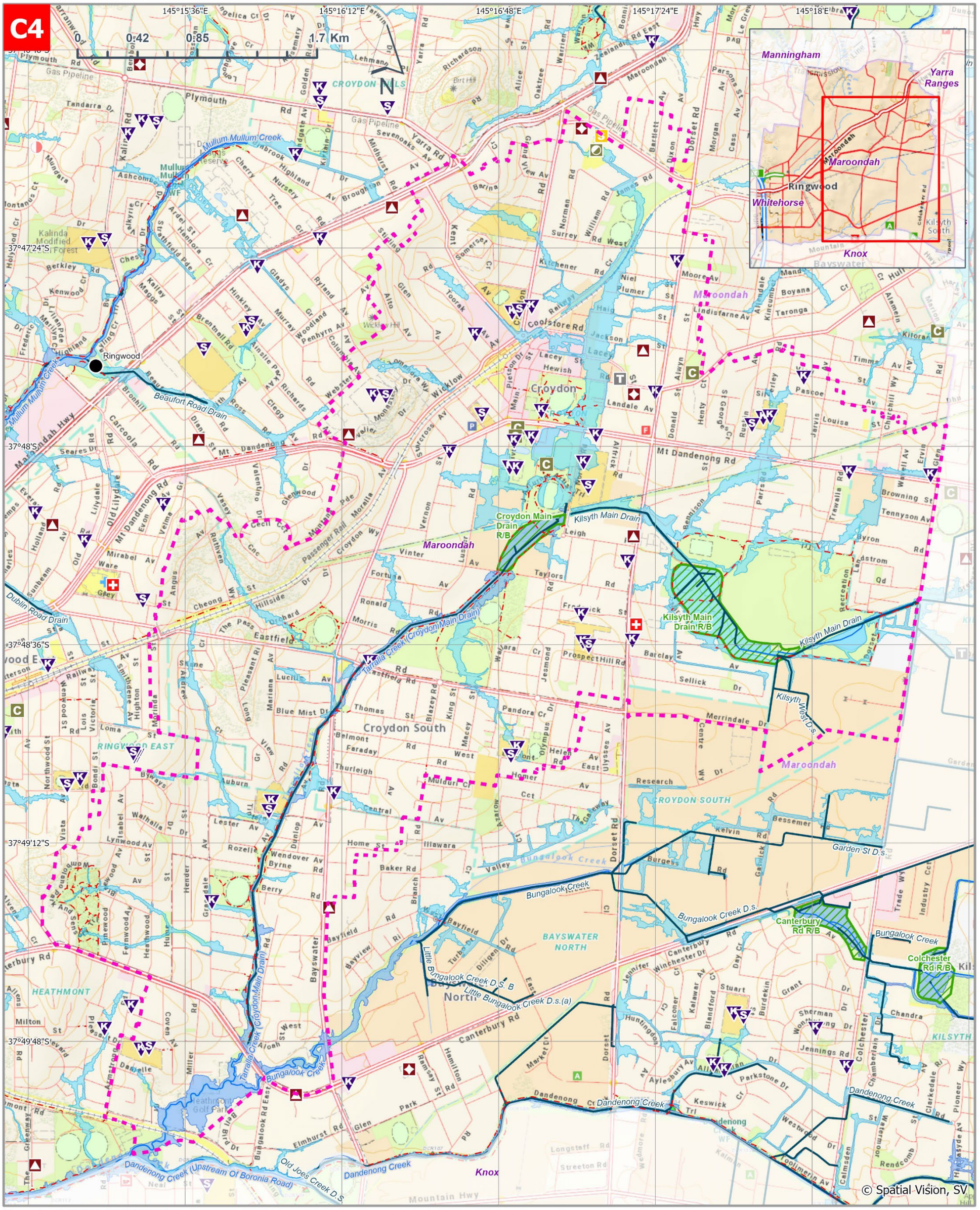
Gauges and Warnings

Whilst there are hydrographic/telemetry stations (stream gauges) within the Municipality, there are none in the Tarralla Creek catchment, therefore Melbourne Water does not provide any flood warning service at this point, due to the generally short warning times available.

Gauge	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge	Melway Reference
Brushy Creek at Mooroolbark	229249A	West side of Creek on Diane Cr, Mooroolbark	✓	✓	37 E11
Bungalook Creek at Fussell Road Retarding Basin, Montrose	228369A	North bank of the creek, 50m east of R/B embankment	✓	✓	52 A11
Ringwood	586065	Burnt Bridge Tennis Club, Ringwood		✓	50 C3

These gauges may provide some warning of expected flooding. See the Melbourne Water website for more information on these gauges: melbournewater.com.au/waterdata/rainfallandriverleveldata/Pages/Rainfall-and-river-level-new.aspx. The BoM website also links a number of these gauges at: bom.gov.au/cgi-bin/wrap_fwo.pl?IDV60201.html. It is advised that residents monitor the BoM website bom.gov.au/vic/warnings/index.shtml?ref=hdr and the VicEmergency website emergency.vic.gov.au/ for any thunderstorm, flood or severe weather warnings present for their area.

Area Map of Flood Risk within the Tarralla Creek (Croydon Main Drain) catchment



Map produced by VICSES: 10/05/2023 2:07 PM

CITY OF MAROONDAH

1% AEP (100yr ARI) Flooding

C4. Areas of flood risk around Tarralla Creek

- Waterbody
- 1% AEP Flash Flood Extent
- 1% AEP Riverine Flood Extent
- Melbourne Water Retarding Basin
- Boundary for this Appendix
- Waterway
- Melbourne Water Stormwater Main
- Bicycle / Walking Trail
- Police Stations
- Child Care Centre
- VICSES Units
- Education Centre
- Fire Station
- Community Venue
- Aged Care Facility
- Municipal Office
- Municipal Depot
- Hospitals
- Place Of Worship
- Telephone Exchange
- Stream Level & Rain Gauge
- Stream Level Gauge
- Rain Gauge

LAND USE

- Residential
- Commercial and Business
- Industrial
- Public Parks / Cemeteries / Recreation
- Utilities and Local Government Facilities
- Education

SES — VICTORIA State Government — Melbourne Water

Figure C4 – Areas of flood risk within the Tarralla Creek catchment in the Maroondah Municipality and boundary for this appendix

Properties at Flood Risk

Properties listed in the table below are at risk from flooding along Tarralla Creek and its stormwater tributaries. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Maroondah Flood Mapping (Engeny, February 2019) 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 identified as subject to flooding are based upon Melbourne Water and Maroondah City Council's best available flood mapping at the time of publication. Council's flood mapping and properties identified may be subject to change due to a number of factors, including but not limited to; completion of mitigation works, updates to technical specifications etc. For the most up to date properties at flood risk information, it is recommended to contact Maroondah City Council's Engineering Services Team on 1300 882 233 (during business hours).

Properties at risk from flooding within the Tarralla Creek catchment (where flooding at building likely and flood depth in yard > 30cm)

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				
	✓	✓	16 Andrew Crescent	Croydon South	Local Drainage	Flash
		✓	59 Andrew Crescent	Croydon South	Local Drainage	Flash
		✓	61 Andrew Crescent	Croydon South	Local Drainage	Flash
		✓	72 Andrew Crescent	Croydon South	Local Drainage	Flash
	✓	✓	5/57 Bayswater Road	Croydon	Local Drainage	Flash
		✓	170 Bayswater Road	Croydon South	Local Drainage	Flash
		✓	173-175 Bayswater Road	Croydon South	Local Drainage	Flash
		✓	4 Birdwood Road	Croydon	Local Drainage	Flash
		✓	5 Birdwood Road	Croydon	Local Drainage	Flash
		✓	6 Birdwood Road	Croydon	Local Drainage	Flash
		✓	44 Byron Road	Kilsyth	Local Drainage	Flash
✓	✓	✓	6 Camelia Court	Croydon South	Local Drainage	Flash
		✓	7 Camelia Court	Croydon South	Local Drainage	Flash
	✓	✓	3 Civic Square	Croydon	Local Drainage	Flash
	✓	✓	5 Civic Square	Croydon	Local Drainage	Flash
	✓	✓	7 Civic Square	Croydon	Local Drainage	Flash
	✓	✓	11 Civic Square	Croydon	Local Drainage	Flash
	✓	✓	13 Civic Square	Croydon	Local Drainage	Flash
		✓	14-16 Civic Square	Croydon	Local Drainage	Flash
	✓	✓	15 Civic Square	Croydon	Local Drainage	Flash
	✓	✓	17 Civic Square	Croydon	Local Drainage	Flash
	✓	✓	18 Civic Square	Croydon	Local Drainage	Flash

Properties at risk from flooding within the Tarralla Creek catchment (where flooding at building likely and flood depth in yard > 30cm)						
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				
	✓	✓	20 Civic Square	Croydon	Local Drainage	Flash
✓	✓	✓	343 Dorset Road	Croydon	Tarralla Creek	Flash
		✓	19 Dunlop Avenue	Bayswater North	Tarralla Creek	Flash
		✓	23 Dunlop Avenue	Bayswater North	Local Drainage	Flash
		✓	25 Dunlop Avenue	Bayswater North	Local Drainage	Flash
		✓	12A Edward Court	Croydon	Local Drainage	Flash
		✓	13 Edward Court	Croydon	Local Drainage	Flash
		✓	14 Edward Court	Croydon	Local Drainage	Flash
		✓	18 Fortuna Avenue	Croydon	Local Drainage	Flash
		✓	7 Gardenia Street	Croydon South	Local Drainage	Flash
		✓	12 Gleneagles Court	Croydon	Local Drainage	Flash
		✓	13 Gleneagles Court	Croydon	Local Drainage	Flash
		✓	14 Gleneagles Court	Croydon	Local Drainage	Flash
	✓	✓	1/31 Haig Street	Croydon	Local Drainage	Flash
		✓	34 Haig Street	Croydon	Local Drainage	Flash
		✓	33-37 Hewish Road	Croydon	Local Drainage	Flash
		✓	39-41 Hewish Road	Croydon	Local Drainage	Flash
		✓	33 Jackson Street	Croydon	Local Drainage	Flash
		✓	3/34 Jackson Street	Croydon	Local Drainage	Flash
	✓	✓	1/35 Jackson Street	Croydon	Local Drainage	Flash
	✓	✓	2/35 Jackson Street	Croydon	Local Drainage	Flash
		✓	3/35 Jackson Street	Croydon	Local Drainage	Flash
		✓	4/35 Jackson Street	Croydon	Local Drainage	Flash
	✓	✓	1/36 Jackson Street	Croydon	Local Drainage	Flash
	✓	✓	2/36 Jackson Street	Croydon	Local Drainage	Flash
✓	✓	✓	3/36 Jackson Street	Croydon	Local Drainage	Flash
✓	✓	✓	4/36 Jackson Street	Croydon	Local Drainage	Flash
✓	✓	✓	5/36 Jackson Street	Croydon	Local Drainage	Flash
	✓	✓	6/36 Jackson Street	Croydon	Local Drainage	Flash
✓	✓	✓	37 Jackson Street	Croydon	Local Drainage	Flash
✓	✓	✓	1/38 Jackson Street	Croydon	Local Drainage	Flash
✓	✓	✓	2/38 Jackson Street	Croydon	Local Drainage	Flash
✓	✓	✓	3/38 Jackson Street	Croydon	Local Drainage	Flash
✓	✓	✓	4/38 Jackson Street	Croydon	Local Drainage	Flash
	✓	✓	5/38 Jackson Street	Croydon	Local Drainage	Flash
	✓	✓	6/38 Jackson Street	Croydon	Local Drainage	Flash
		✓	2 James Road	Croydon	Local Drainage	Flash
		✓	4 James Road	Croydon	Local Drainage	Flash
		✓	1/6-10 James Road	Croydon	Local Drainage	Flash
		✓	2/6-10 James Road	Croydon	Local Drainage	Flash
		✓	3/6-10 James Road	Croydon	Local Drainage	Flash
		✓	4/6-10 James Road	Croydon	Local Drainage	Flash

Properties at risk from flooding within the Tarralla Creek catchment (where flooding at building likely and flood depth in yard > 30cm)						
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				
		✓	5/6-10 James Road	Croydon	Local Drainage	Flash
		✓	1 Kauri Court	Croydon	Local Drainage	Flash
✓	✓	✓	2 Kauri Court	Croydon	Local Drainage	Flash
		✓	3 Kauri Court	Croydon	Local Drainage	Flash
		✓	5/35-43 Kent Avenue	Croydon	Local Drainage	Flash
		✓	6/35-43 Kent Avenue	Croydon	Local Drainage	Flash
		✓	11/35-43 Kent Avenue	Croydon	Local Drainage	Flash
		✓	13/35-43 Kent Avenue	Croydon	Local Drainage	Flash
	✓	✓	33 Lacey Street	Croydon	Local Drainage	Flash
	✓	✓	35 Lacey Street	Croydon	Local Drainage	Flash
		✓	37 Lacey Street	Croydon	Local Drainage	Flash
		✓	1/40-42 Lacey Street	Croydon	Local Drainage	Flash
		✓	2/40-42 Lacey Street	Croydon	Local Drainage	Flash
		✓	3/40-42 Lacey Street	Croydon	Local Drainage	Flash
		✓	4/40-42 Lacey Street	Croydon	Local Drainage	Flash
		✓	5/40-42 Lacey Street	Croydon	Local Drainage	Flash
		✓	40 Lacey Street	Croydon	Local Drainage	Flash
		✓	19 Lester Avenue	Ringwood East	Local Drainage	Flash
	✓	✓	200 Mt Dandenong Road	Croydon	Local Drainage	Flash
	✓	✓	202-210 Mt Dandenong Road	Croydon	Local Drainage	Flash
	✓	✓	213-215 Mt Dandenong Road	Croydon	Local Drainage	Flash
	✓	✓	214 Mt Dandenong Road	Croydon	Local Drainage	Flash
	✓	✓	216 Mt Dandenong Road	Croydon	Local Drainage	Flash
	✓	✓	217-283 Mt Dandenong Road	Croydon	Local Drainage	Flash
	✓	✓	222 Mt Dandenong Road	Croydon	Local Drainage	Flash
	✓	✓	224-238 Mt Dandenong Road	Croydon	Local Drainage	Flash
		✓	244 Mt Dandenong Road	Croydon	Local Drainage	Flash
	✓	✓	254-260 Mt Dandenong Road	Croydon	Local Drainage	Flash
	✓	✓	14/354 Mt Dandenong Road	Croydon	Local Drainage	Flash
	✓	✓	15/354 Mt Dandenong Road	Croydon	Local Drainage	Flash
	✓	✓	16/354 Mt Dandenong Road	Croydon	Local Drainage	Flash
	✓	✓	22/354 Mt Dandenong Road	Croydon	Local Drainage	Flash
	✓	✓	23/354 Mt Dandenong Road	Croydon	Local Drainage	Flash
		✓	370A Mt Dandenong Road	Croydon	Local Drainage	Flash
		✓	370A Mt Dandenong Road	Croydon	Local Drainage	Flash
		✓	374 Mt Dandenong Road	Croydon	Local Drainage	Flash
✓	✓	✓	2/375 Mt Dandenong Road	Croydon	Local Drainage	Flash
		✓	376A Mt Dandenong Road	Croydon	Local Drainage	Flash
	✓	✓	457 Mt Dandenong Road	Kilsyth	Local Drainage	Flash
	✓	✓	1/459 Mt Dandenong Road	Kilsyth	Local Drainage	Flash
	✓	✓	1/461 Mt Dandenong Road	Kilsyth	Local Drainage	Flash
		✓	1/8-10 Norton Road	Croydon	Local Drainage	Flash

Properties at risk from flooding within the Tarralla Creek catchment (where flooding at building likely and flood depth in yard > 30cm)						
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				
		✓	2/8-10 Norton Road	Croydon	Local Drainage	Flash
	✓	✓	11-57 Norton Road	Croydon	Local Drainage	Flash
	✓	✓	12-50 Norton Road	Croydon	Local Drainage	Flash
		✓	32 Pandora Crescent	Croydon South	Local Drainage	Flash
		✓	1 Parrs Road	Croydon	Local Drainage	Flash
	✓	✓	2A Parrs Road	Croydon	Local Drainage	Flash
✓	✓	✓	4 Parrs Road	Croydon	Local Drainage	Flash
		✓	4/6 Parrs Road	Croydon	Local Drainage	Flash
	✓	✓	5/6 Parrs Road	Croydon	Local Drainage	Flash
	✓	✓	2/29 Parrs Road	Croydon	Local Drainage	Flash
✓	✓	✓	3/29 Parrs Road	Croydon	Local Drainage	Flash
✓	✓	✓	4/29 Parrs Road	Croydon	Local Drainage	Flash
	✓	✓	33 Plumer Street	Croydon	Local Drainage	Flash
		✓	35A Plumer Street	Croydon	Local Drainage	Flash
	✓	✓	35 Plumer Street	Croydon	Local Drainage	Flash
	✓	✓	1/21 Ronald Road	Croydon	Local Drainage	Flash
		✓	24 Ronald Road	Croydon	Local Drainage	Flash
	✓	✓	3 Rozelle Avenue	Ringwood East	Local Drainage	Flash
		✓	5 Shane Crescent	Croydon South	Local Drainage	Flash
	✓	✓	8 Shane Crescent	Croydon South	Local Drainage	Flash
		✓	1/2 Shelley Court	Kilsyth	Local Drainage	Flash
	✓	✓	2/2 Shelley Court	Kilsyth	Local Drainage	Flash
		✓	3 Shelley Court	Kilsyth	Local Drainage	Flash
		✓	4/4 Shelley Court	Kilsyth	Local Drainage	Flash
		✓	6 St Andrews Close	Croydon	Local Drainage	Flash
		✓	9 St Andrews Close	Croydon	Local Drainage	Flash
		✓	11 St Andrews Close	Croydon	Local Drainage	Flash
		✓	15 The Mall	Croydon South	Tarralla Creek	Flash
	✓	✓	17 The Mall	Croydon South	Tarralla Creek	Flash
	✓	✓	19 The Mall	Croydon South	Tarralla Creek	Flash
	✓	✓	21 The Mall	Croydon South	Tarralla Creek	Flash
		✓	23-25 The Mall	Croydon South	Tarralla Creek	Flash
		✓	4/36-38 Toorak Avenue	Croydon	Local Drainage	Flash
		✓	5/36-38 Toorak Avenue	Croydon	Local Drainage	Flash
		✓	6 Turner Street	Croydon	Local Drainage	Flash
	✓	✓	10 Windsor Road	Croydon	Local Drainage	Flash
	✓	✓	1/12 Windsor Road	Croydon	Local Drainage	Flash
	✓	✓	2/12 Windsor Road	Croydon	Local Drainage	Flash
	✓	✓	1/14 Windsor Road	Croydon	Local Drainage	Flash
	✓	✓	2/14 Windsor Road	Croydon	Local Drainage	Flash
	✓	✓	1/16-18 Windsor Road	Croydon	Local Drainage	Flash
	✓	✓	2/16-18 Windsor Road	Croydon	Local Drainage	Flash

Properties at risk from flooding within the Tarralla Creek catchment (where flooding at building likely and flood depth in yard > 30cm)						
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				
	✓	✓	4/16-18 Windsor Road	Croydon	Local Drainage	Flash
		✓	20 Windsor Road	Croydon	Local Drainage	Flash
		✓	22 Windsor Road	Croydon	Local Drainage	Flash
		✓	24 Windsor Road	Croydon	Local Drainage	Flash
	✓	✓	26 Windsor Road	Croydon	Local Drainage	Flash
		✓	36 Windsor Road	Croydon	Local Drainage	Flash
		✓	14 Wingate Avenue	Ringwood East	Local Drainage	Flash
Totals						
15	76	155				

Table C4.3 – Properties at risk of flooding within the Tarralla Creek catchment in the Maroondah Municipality where flooding at building is likely and depth in yard is > 30cm

Isolation

The Croydon Civic Centre is at risk of isolation in an intense rain event. No major isolation risks exist for areas around Croydon, Croydon South, Kilsyth, Bayswater North and Ringwood South. 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 at: ptv.vic.gov.au/live-travel-updates/. A map of Public Transport routes within the Maroondah Municipality is available via the website at: ptv.vic.gov.au/assets/default-site/more/maps/Local-area-maps/Metropolitan/351fea4fb3/29_Maroondah_LAM.pdf.

Apart from the roads outlined below, all other essential infrastructure and services areas around Croydon, Croydon South, Kilsyth, Bayswater North and Ringwood South are expected to remain predominantly dry during an intense rainfall event.

Road Closures

The following roads are subject to closure during flooding around Croydon, Croydon South, Kilsyth, Bayswater North and Ringwood South. Check the VicRoads website for more details: traffic.vicroads.vic.gov.au/.

Department of Transport (VicRoads) Roads likely flooded in a 1% AEP (100yr ARI) event
• Mount Dandenong Road, Croydon at Croydon Park

Table C4.4 – DTP (VicRoads) Possible Road Closures during a flooding event

Maroondah City Council Roads likely flooded in a 1% AEP (100yr ARI) event			
BAYSWATER NORTH	• Jackson Street	• Plumer Street	**KILSYTH**
• Dunlop Avenue	• James Road	• Railway Crescent	• Colchester Road
CROYDON	• Jenkins Lane	• Ronald Road	• Grierson Drive
• Bennison Street	• Kauri Court	• St Andrews Close	• Yolanda Court

• Civic Square	• Lacey Street	• Windsor Road	**RINGWOOD EAST**
• Civic Square	• Mt Dandenong Road	**CROYDON SOUTH**	• Wingate Avenue
• Haig Street	• Norton Road	• Andrew Crescent	
• Hewish Road	• Nyanda Court	• The Mall	

Table C4.5 – Maroondah City Council Possible flooded roads due to flash flooding over 30cm depth

Flood Mitigation

Retarding Basins

Melbourne Water Retarding Basin	On Drain/ Waterway	Area	Storage Capacity	Spillway Crest Level	Full Supply Level	Embankment Crest Height (Level)	ANCOLD Hazard Rating	Population at Risk (dam breach)	Melway Reference
Croydon Main Drain	Croydon Main Drain	4.03 ha	65.4ML	N/A	103.3m AHD	2.4m (103.3m AHD)	Very Low	Unavailable	50 K6
Kilsyth Main Drain	Kilsyth Main Drain	13.89 ha	176.4ML	105m AHD	105.8m AHD	2.6m (105.8m AHD)	High A	Unavailable	51 B6

Table C4.6 – Melbourne Water Retarding Basins within the Tarralla Creek catchment in the Maroondah Municipality

No formal Pumping Stations or Levees exist around Croydon, Croydon South, Kilsyth, Bayswater North and Ringwood South in Maroondah.

Sewerage Infrastructure

There is no sewerage infrastructure expected to impact or be impacted by floodwaters during severe flood events within the Tarralla Creek catchment.

Control, Command and Coordination

VICSES will assume overall control of the response to flood incidents. Control and coordination of a flood incident shall be carried out at the lowest effective level and in accordance with the SEMP. 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 within the Tarralla Creek catchment at various rain totals within the Maroondah Municipality. 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:

- Tarralla Creek and Kilsyth Main Drains, Croydon

FLOOD INTELLIGENCE CARD – TARRALLA CREEK & KILSYTH MAIN DRAIN, CROYDON (UNGAUGED)

Version 4 – May 2023

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. ***Scan the QR code for the current levels for this gauge.***

CLOSEST RAIN GAUGE:	**Bungalook Creek at Fussell Road Retarding Basin**
LOCATION:	**North bank of the creek, 50m east of R/B embankment, Glasgow Road, Montrose**
RECENT RAINFALL:	**https://www.melbournewater.com.au/water-and-environment/water-management/rainfall-and-river-levels#/reader/228369A**

GAUGE NUMBER:	**228369A**
GAUGE TYPE:	**Stream Level & Rain**
MELWAY REF:	**51 K11**

Design Rainfall Depths (mm) – *Indication of Possible Flooding*	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
11mm in 10 mins; 18mm in 30 mins; 23mm in 1 hour; 29mm in 2 hours; 33mm in 3 hours; or 43mm in 6 hours 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.	20% AEP (5 year ARI)	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **15 Properties in Total** **Local Drainage** • Properties on Dorset Road, Jackson Street, Kauri Court, Mt Dandenong Road and Parrs Road in Croydon • A property on Camelia Court in Croydon South **Community Infrastructure Likely Flooded** • Tarralla Creek Trail likely flooded in parts between Town Park and Bungalook Creek **Essential Infrastructure Likely Impacted** • Bus Routes 664 and 688 impacted if Lacey Street flooded • Bus Routes 689, 690 and 737 impacted if Mount Dandenong Road flooded **Water Over Road (over 30cm depth)** **Local Drainage** • Andrew Crescent, Croydon South • Haig Street, Croydon • Jackson Street, Croydon • Lacey Street, Croydon • Mount Dandenong Road, Croydon at Croydon Park • Norton Road, Croydon • Plumer Street, Croydon	VICSES to respond to RFAs on a request-by-request basis. Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.
15mm in 10 mins;	5% AEP (20 year ARI)	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **76 Properties in Total**	

Design Rainfall Depths (mm) – *Indication of Possible Flooding*	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
25mm in 30 mins; 31mm in 1 hour; 39mm in 2 hours; 44mm in 3 hours; or 57mm in 6 hours 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.		**Local Drainage** • Properties on Bayswater Road, Civic Square, Dorset Road, Hair Street, Jackson Street, Kauri Court, Lacey Street, Mt Dandenong Road, Norton Road, Parrs Road, Plumer Street, Ronald Road and Windsor Road in Croydon • Properties on Andrew Crescent, Camelia Court, Shane Crescent and The Mall in Croydon South • Properties on Mt Dandenong Road and Shelley Court in Kilsyth • A Property on Rozelle Avenue in Ringwood East **Community Infrastructure Likely Flooded** • Arndale Civic Shopping Centre, 224-238 Mount Dandenong Road, Croydon • Springfield Hall, 217-283 Mt Dandenong Road, Croydon • Swinburn TAFE Croydon Campus 12-50 Norton Road, Croydon likely flooding to carpark and northern areas of premises. • Tarralla Creek Trail likely flooded in parts between Town Park and Bungalook Creek • Town Park including Fred Geale Oval 20 Civic Square, Croydon **Essential Infrastructure Likely Impacted** • Bus Routes 664 and 688 impacted if Lacey Street flooded • Bus Routes 689, 690 and 737 impacted if Mount Dandenong Road flooded **Water Over Road (over 30cm depth)** **Local Drainage** • Andrew Crescent, Croydon South • Colchester Road, Kilsyth at Grierson Drive • Dunlop Avenue, Bayswater North • Grierson Drive, Kilsyth • Haig Street, Croydon • Hewish Road, Croydon at the Croydon Swimming Pool • Jackson Street, Croydon • James Road, Croydon • Kauri Court, Croydon • Lacey Street, Croydon • Mount Dandenong Road, Croydon at Croydon Park • Norton Road, Croydon • Plumer Street, Croydon • Railway Crescent, Croydon • St Andrews Close, Croydon • The Mall, Croydon South • Wingate Avenue, Ringwood East • Yolanda Court, Kilsyth	VICSES to respond to RFAs on a request-by-request basis. Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.
21mm in 10 mins; 34mm in 30 mins;	1% AEP (100 year ARI)	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **155 Properties in Total** **Local Drainage**	VICSES to respond to RFAs on a request-by-request basis.

Design Rainfall Depths (mm) – *Indication of Possible Flooding*	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
42mm in 1 hour; 51mm in 2 hours; 58mm in 3 hours; or 75mm in 6 hours 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.		• Properties on Dunlop Avenue in Bayswater North • Properties on Bayswater Road, Birdwood Road, Civic Square, Dorset Road, Edward Court, Fortuna Avenue, Gleneagles Court, Hair Street, Hewish Road, Jackson Street, James Road, Kauri Court, Kent Avenue, Lacey Street, Mt Dandenong Road, Norton Road, Parrs Road, Plumer Street, Ronald Road, St Andrews Close, Toorak Avenue, Turner Street and Windsor Road in Croydon • Properties on Andrew Crescent, Bayswater Road, Camelia Court, Gardenia Street, Pandora Crescent, Shane Crescent and The Mall in Croydon South • Properties on Byron Road, Mt Dandenong Road and Shelley Court in Kilsyth • Properties on Lester Avenue, Rozelle Avenue and Wingate Avenue in Ringwood East **Community Infrastructure Likely Flooded** • Arndale Civic Shopping Centre, 224-238 Mount Dandenong Road, Croydon • Springfield Hall, 217-283 Mt Dandenong Road, Croydon • Swinburn TAFE Croydon Campus 12-50 Norton Road, Croydon likely flooding to carpark and northern areas of premises. • Tarralla Creek Trail likely flooded in parts between Town Park and Bungalook Creek • Town Park including Fred Geale Oval 20 Civic Square, Croydon **Essential Infrastructure Likely Impacted** • Bus Routes 664 and 688 impacted if Lacey Street flooded • Bus Routes 689, 690 and 737 impacted if Mount Dandenong Road flooded **Water Over Road (over 30cm depth)** **Local Drainage** • Andrew Crescent, Croydon South • Bennison Street, Croydon • Civic Square, Croydon • Colchester Road, Kilsyth at Grierson Drive • Dunlop Avenue, Bayswater North • Grierson Drive, Kilsyth • Haig Street, Croydon • Hewish Road, Croydon at the Croydon Swimming Pool • Jackson Street, Croydon • James Road, Croydon • Jenkins Lane, Croydon • Kauri Court, Croydon • Lacey Street, Croydon • Mount Dandenong Road, Croydon at Croydon Park • Norton Road, Croydon • Nyanda Court, Croydon • Plumer Street, Croydon • Railway Crescent, Croydon • Ronald Road, Croydon • St Andrews Close, Croydon	Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.

Design Rainfall Depths (mm) – *Indication of Possible Flooding*	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		• The Mall, Croydon South • Windsor Road, Croydon • Wingate Avenue, Ringwood East • Yolanda Court, Kilsyth	

Table C4.7 – Breakdown of possible consequences at various rainfall intensities within the Tarralla Creek catchment in Maroondah with operational considerations

APPENDIX C5 – JUMPING CREEK & ANDERSONS 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 accessing this information should make appropriate enquiries to assess the currency of the data.

Summary of Consequences in a 1% AEP (100yr ARI) flood along Jumping and Andersons Creeks in Maroondah					
Property					
Properties	**22**				
Residential	22				
Commercial	0				
Industrial	0				
Public Land	0				
Rural	0				
Community Infrastructure					
Essential Infrastructure					
Sewerage Facilities	8	5 areas of pumping stations; 3 Emergency Relief Points			
Drainage Facilities	2	Retarding Basins			
Tourism / Recreation					
Government Boundaries					
Local Gov't Areas	1	Maroondah	CMA	1	Port Phillip & Westernport
Adjacent LGAs	1	Manningham	CFA District	1	District 13
SES Unit Area	1	Maroondah	FRV District	1	Eastern

Table C5.1 – Consequence Summary of 1% AEP flood along Jumping and Andersons Creeks in Maroondah

Jumping Creek is located in Croydon Hills and Warranwood and flows north, exiting the Municipality near Galtymore Close and entering Manningham. Floodwaters are likely to be fairly shallow, but fast moving due to the hilly terrain. The Jumping Creek catchment responds to short bursts of heavy rainfall, resulting in flash flooding.

Andersons Creek is located in Ringwood North, with only a small length of the creek in the Maroondah Municipality, flowing northwest into Manningham.

Gauges and Warnings

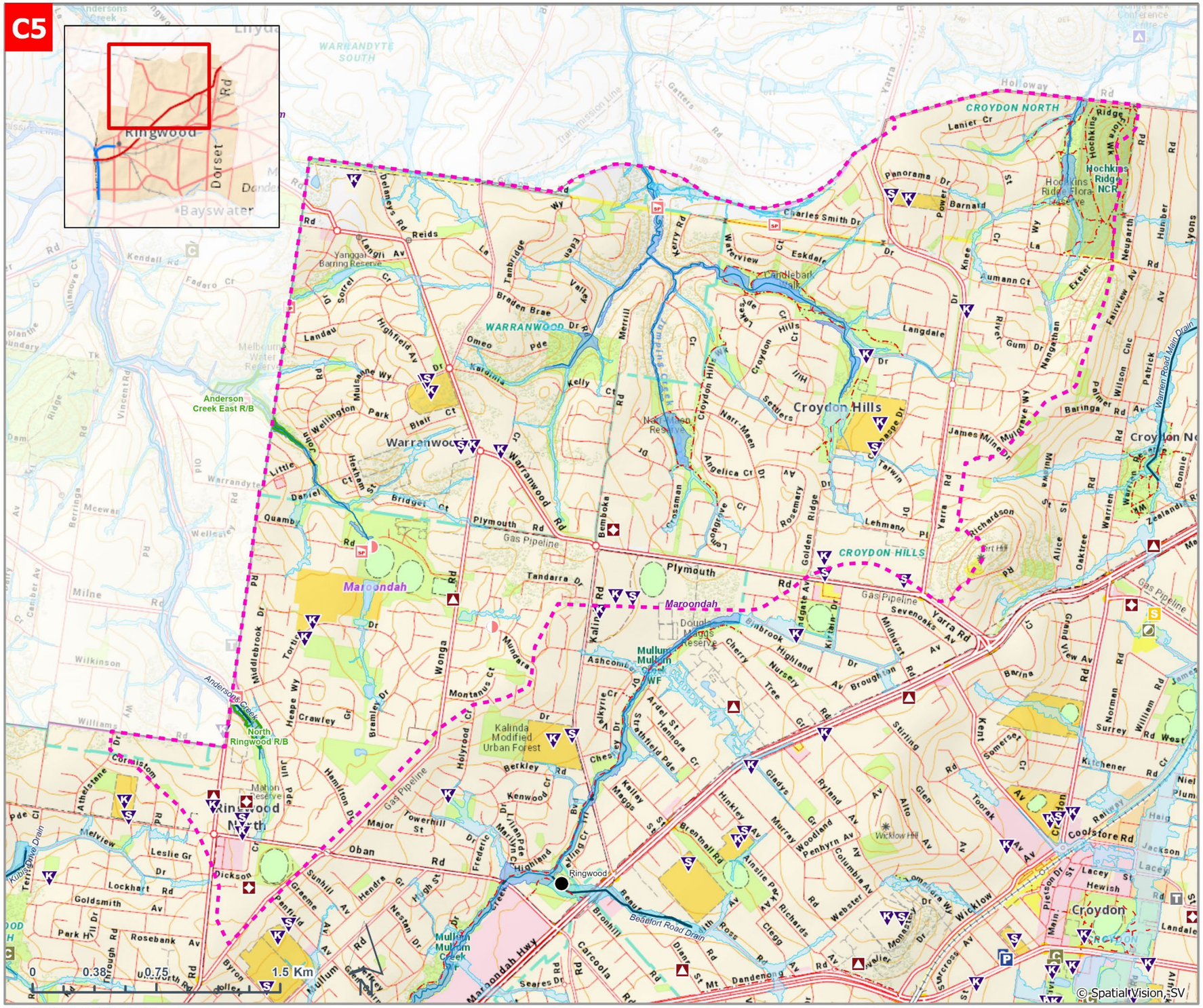
Whilst there are hydrographic/telemetry stations (river gauges) within the Municipality, Melbourne Water does not provide any flood warning service at this point, due to the generally short warning times available.

Gauge	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge	Melway Reference
Ringwood	586065	Burnt Bridge Tennis Club, Ringwood		✓	50 C3

Table C5.2 – Gauge close to the Jumping Creek and Anderson

These gauges may provide some warning of expected flooding. See the Melbourne Water website for more information on these gauges: melbournewater.com.au/waterdata/rainfallandriverleveldata/Pages/Rainfall-and-river-level-new.aspx. The BoM website also links a number of these gauges at: bom.gov.au/cgi-bin/wrap_fwo.pl?IDV60201.html. It is advised that residents monitor the BoM website bom.gov.au/vic/warnings/index.shtml?ref=hdr and the VicEmergency website emergency.vic.gov.au/ for any thunderstorm, flood or severe weather warnings present for their area.

Area Map of Flood Risk within the Jumping Creek and Anderson Creek catchments



Map produced by VICSES 25/05/2023 1:22 PM

CITY OF MAROONDAH

1% AEP (100yr ARI) Flooding

C5. Areas of flood risk along Jumping and Anderson Creeks

SES VICTORIA State Government

Melbourne Water

Figure C5 – Areas of flood risk around Croydon Hills, Warranwood & parts of Ringwood North in the Maroondah Municipality and boundary for this appendix

Properties at Flood Risk

Floor level surveys are not yet available for properties within the Jumping Creek and Andersons Creek catchments, so properties at risk of over-floor flooding is undetermined.

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 identified as subject to flooding are based upon Melbourne Water and Maroondah City Council's best available flood mapping at the time of publication. Council's flood mapping and properties identified may be subject to change due to a number of factors, including but not limited to; completion of mitigation works, updates to technical specifications etc. For the most up to date properties at flood risk information, it is recommended to contact Maroondah City Council's Engineering Services Team on 1300 882 233 (during business hours).

Properties at risk from flooding within the Jumping Creek and Anderson Creek catchments (where flooding at building likely and flood depth in yard > 30cm)						
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				
□	□	✓	25 Bridget Court	Warranwood	Local Drainage	Flash
□	□	✓	39 Campaspe Drive	Croydon Hills	Local Drainage	Flash
□	□	✓	41 Campaspe Drive	Croydon Hills	Local Drainage	Flash
□	□	✓	16 County Terrace	Croydon Hills	Local Drainage	Flash
□	□	✓	17 County Terrace	Croydon Hills	Local Drainage	Flash
□	✓	✓	22 Kubis Drive	Ringwood North	Glenvale Road Drain	Flash
□	✓	✓	50 Melview Drive	Ringwood North	Local Drainage	Flash
□	✓	✓	114 Oban Road	Ringwood North	Andersons Creek	Flash
□	□	✓	161 Oban Road	Ringwood North	Local Drainage	Flash
□	□	✓	2 Park Road	Ringwood North	Local Drainage	Flash
□	✓	✓	2 San Remo Road	Ringwood North	Local Drainage	Flash
□	✓	✓	4 San Remo Road	Ringwood North	Local Drainage	Flash
□	✓	✓	6 San Remo Road	Ringwood North	Local Drainage	Flash
□	✓	✓	10 San Remo Road	Ringwood North	Local Drainage	Flash
□	✓	✓	12 San Remo Road	Ringwood North	Local Drainage	Flash
□	✓	✓	14 San Remo Road	Ringwood North	Local Drainage	Flash
□	✓	✓	2A San Remo Road	Ringwood North	Local Drainage	Flash
□	✓	✓	16 Terrigal Close	Ringwood North	Glenvale Road Drain	Flash
□	✓	✓	18 Terrigal Close	Ringwood North	Glenvale Road Drain	Flash
□	✓	✓	17 Through Road	Ringwood North	Local Drainage	Flash
□	□	✓	12 Wendy Close	Warranwood	Local Drainage	Flash
□	□	✓	13 Wendy Close	Warranwood	Local Drainage	Flash
Totals						
0	13	22				

Table C5.3 – Properties at risk of flooding within the Jumping and Andersons Creeks catchments in the Maroondah Municipality

Isolation

No major isolation risks exist for areas around Croydon Hills, Warranwood and parts of Ringwood North 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 at: ptv.vic.gov.au/live-travel-updates/. A map of Public Transport routes within the Maroondah Municipality is available via the website at: ptv.vic.gov.au/assets/default-site/more/maps/Local-area-maps/Metropolitan/351fea4fb3/29_Maroondah_LAM.pdf.

Apart from the roads outlined below, all other essential infrastructure and services areas around Croydon Hills, Warranwood and parts of Ringwood North 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 Croydon Hills, Warranwood and parts of Ringwood North. Check the VicRoads website for more details: traffic.vicroads.vic.gov.au/.

Department of Transport (VicRoads) Roads likely flooded in a 1% AEP (100yr ARI) event

Table C5.4 – Department of Transport (VicRoads) Possible Road Closures during a flooding event

Maroondah City Council Roads likely flooded in a 1% AEP (100yr ARI) event	
CROYDON HILLS	**RINGWOOD NORTH**
• Campaspe Drive	• Cameron Road
• Country Terrace	• Debbie Place
CROYDON NORTH	• Kubis Drive
• Mitchell Court	• Melview Drive
	• Terrigal Close
	• Through Road

Table C5.5 – Maroondah City Council Possible flooded roads due to flash flooding over 30cm depth

Flood Mitigation

Retarding Basins

Melbourne Water Retarding Basin	On Drain/ Waterway	Area	Storage Capacity	Spillway Crest Level	Full Supply Level	Embankment Crest Height (Level)	ANCOLD Hazard Rating	Population at Risk (dam breach)	Melway Reference
Anderson Creek East	Anderson Creek East Branch	2.42 ha	74ML	95.3m AHD	Unavailable	12m (97m AHD)	Significant	2.3	35 J9
North Ringwood	Andersons Creek	1.01 ha	38.3ML	Stage1-130.5m AHD Stage2-127.8m AHD	Stage 1-130.7m AHD Stage 2-127.9m AHD	Stage 1-131.25m AHD Stage 2-Unavailable	Very Low	Road Itinerants only	49 K1

Table C5.6 – Melbourne Water Retarding Basins within the Jumping Creek and Andersons Creek catchments in or bordering the Maroondah Municipality

No formal Pumping Stations or Levees exist within the Jumping Creek and Andersons Creek catchments in Maroondah.

Sewerage Infrastructure

Sewerage infrastructure of note during a severe flood event located around Croydon Hills, Warranwood and parts of Ringwood North is contained within the following two tables.

Sewer Pumping Stations

Sewerage Pumping Station	On Drain / Waterway	Bank / Side of Waterway	Operator	Location	Melway Reference
Number of unsewered properties around Willaims Road, Ringwood North	Andersons Creek	South	Yarra Valley Water	Williams Road between Athelstane Drive and Warrandyte Road, Ringwood North	49 J2
Jumping Creek	Jumping Creek	West	Yarra Valley Water	Kerry Road, Warranwood	36 E7
Kerry Road Pipe Track	Local Drainage	-	Yarra Valley Water	Pipe Track at extension of Kerry Road, Croydon Hills	36 F7
Lorraine Court	Local Drainage	-	Yarra Valley Water	Easement behind Lorraine Court, Warranwood	35 K8

Quambee Reserve	Anderson Creek East Branch	-	Yarra Valley Water	Quambee Reserve, Ringwood North	36 A11
Warrandyte Road	Andersons Creek	North East	Yarra Valley Water	Warrandyte Road at Anderson Creek Retarding Basin, Ringwood North	49 J1

Table C5.7 – Sewer Pumping Stations within the Jumping Creek and Andersons Creek catchments in the Maroondah Municipality

Sewer Emergency Relief Points

There are Sewer Emergency Relief Points within the Jumping Creek and Andersons Creek catchments 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
Anderson Creek	North East	Yarra Valley Water	Warrandyte Road at Anderson Creek Retarding Basin, Ringwood North	49 J1
Anderson Creek East Branch	-	Yarra Valley Water	Quambee Reserve, Ringwood North	36 A11
Jumping Creek	East	Yarra Valley Water	Kerry Road, Warranwood	36 E7

Table C5.8 – Sewer Emergency Relief Points in the Jumping Creek and Andersons Creek catchments in the Maroondah Municipality

Control, Command and Coordination

VICSES will assume overall control of the response to flood incidents. Control and coordination of a flood incident shall be carried out at the lowest effective level and in accordance with the SEMP. 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 around Jumping Creek and Andersons Creek at various rain totals within the Maroondah Municipality. 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:

- Jumping Creek and Andersons Creek, Croydon Hills & Warranwood

FLOOD INTELLIGENCE CARD – JUMPING CREEK & ANDERSONS CREEK, CROYDON HILLS & WARRANWOOD (UNGAUGED)

Version 4 – May 2023

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. ***Scan the QR code for the current levels for this gauge.***

CLOSEST RAIN GAUGE:	**Ringwood**
LOCATION:	**Burnt Bridge Tennis Club, Maroondah Highway Ringwood**
RECENT RAINFALL:	**https://www.melbournewater.com.au/water-and-environment/water-management/rainfall-and-river-levels#/reader/586065**

GAUGE NUMBER	**586065**
GAUGE TYPE	**Rain**
MELWAY REF:	**50 C3**

Design Rainfall Depths (mm) – *Indication of Possible Flooding*	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
11mm in 10 mins; 18mm in 30 mins; 23mm in 1 hour; 29mm in 2 hours; 33mm in 3 hours; or 43mm in 6 hours 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.	20% AEP (5 year ARI)	**Water Over Road (over 30cm depth)** **Glenvale Road Drain** • Kubis Drive, Ringwood North	
15mm in 10 mins; 25mm in 30 mins; 31mm in 1 hour; 39mm in 2 hours; 44mm in 3 hours; or 57mm in 6 hours	5% AEP (20 year ARI)	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **13 Properties in Total** **Andersons Creek** • A property on Oban Road in Ringwood North **Glenvale Road Drain** • Properties on Kubis Drive and Terrigal Close in Ringwood North **Local Drainage**	

Design Rainfall Depths (mm) – *Indication of Possible Flooding*	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
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.		• Properties on Melview Drive, San Remo Road and Through Road in Ringwood North **Water Over Road (over 30cm depth)** **Glenvale Road Drain** • Kubis Drive, Ringwood North • Melview Drive, Ringwood North • Terrigal Close, Ringwood North **Local Drainage** • Cameron Road, Ringwood North • Through Road, Ringwood North	
21mm in 10 mins; 34mm in 30 mins; 42mm in 1 hour; 51mm in 2 hours; 58mm in 3 hours; or 76mm in 6 hours 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.	1% AEP (100 year ARI)	**Properties at Flood Risk (where flooding at building likely and depth in yard >30cm)** **22 Properties in Total** **Andersons Creek** • A property on Oban Road in Ringwood North **Glenvale Road Drain** • Properties on Kubis Drive and Terrigal Close in Ringwood North **Local Drainage** • Properties on Campaspe Drive and County Terrace in Croydon Hills • Properties on Melview Drive, Oban Road, Park Road, San Remo Road and Through Road in Ringwood North • Properties on Bridget Court and Wendy Close in Warranwood **Water Over Road (over 30cm depth)** **Glenvale Road Drain** • Debbie Place, Ringwood North • Kubis Drive, Ringwood North • Melview Drive, Ringwood North • Terrigal Close, Ringwood North **Jumping Creek** • Campaspe Drive, Croydon Hills • County Terrace, Croydon Hills **Local Drainage** • Cameron Road, Ringwood North • Mitchell Court, Croydon North • Through Road, Ringwood North	

Table C5.9 – Breakdown of possible consequences at various rainfall intensities around Jumping Creek and Andersons Creek in Maroondah with operational considerations

APPENDIX D - FLOOD EVACUATION ARRANGEMENTS

Phase 1 - Decision to Evacuate

The IC 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 services are potentially at risk 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 Emergencies Sub Plan 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 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 VicPol/the MERC, MEMO, MRM, DFFH, Health Commander and other key agencies and expert advice such as the Catchment Management Authority (CMA) 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. There are currently no pre-established triggers for evacuation within the Maroondah Municipality.

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.

Where time permits, evacuation warning messages will be developed and issued by VICSES in consultation with VicPol/the MERC, MEMO, MRM, DFFH and other key agencies and expert advice (such as the CMA and Flood Intelligence specialists).

Phase 3 – Withdrawal

Withdrawal will be managed by VicPol. VICSES may provide advice regarding the 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/DTP 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 at the request of the IC or via the appointed VicPol Evacuation Manager.

Possible evacuation routes to be used will be determined on an event-by-event basis.

Landing zones for aircraft will be determined by the following:

- The IC will determine the requirements for airborne resources.
- The State Aircraft Desk within the SCC will deploy and coordinate air resources.
- The pilot in command will determine the safest location to land.

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 maintained by Maroondah City 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 Maroondah City Council's Emergency Management Coordinator, MEMO, MRM, the MEMP, VicPol and the DFFH Vulnerable People in Emergencies Policy and Guidelines, which can be accessed at: providers.dffh.vic.gov.au/emergency-management.

Phase 4 – Shelter

Relief centres and/or assembly areas which cater for people's basic needs may be established to meet the immediate needs of people affected by storm and/or flooding. The need for relief centres will be determined dependent on location and scale of the event.

VicPol, in consultation with VICSES, will liaise with Local Government and DFFH (where regional relief coordination is required) via the relevant RCC to plan for the opening and operation of relief centres. This can best be achieved through the IEMT.

Pre-determined ERC locations (and/or Assembly Areas) within the Maroondah Municipality are listed in the table below:

Sector	Relief Centre/Assembly Area (include address)	Comments
To be determined dependant on location/size of event	Karralyka Centre Mines Road Ringwood 3134 Melway 49 K6	As per ERC facility plan available through MEMO
To be determined dependant on location/size of event	The Rings 362 Canterbury Road Ringwood 3134 Melway 63 F1	As per ERC facility plan available through MEMO

Animal Shelter

The need for animal shelters will be determined dependent on location and scale of the event. Where required, animal shelter compounds may be established for domestic pets and companion animals of evacuees. These facilities may be provided at locations detailed in the Maroondah MEMP (and/or sub-plans).

Caravans

There are no caravan parks within Maroondah. Where present, caravans may be evacuated. Caravan evacuation will be determined dependent on location and scale of the event.

Phase 5 – Return

Return will be consistent with the Strategic Plan for the Return of the 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 return evacuated people include:

- Current storm/flood 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 storm and/or flood. For example, this may include road closures affecting school bus routes and the broader local road network.

Service	Impact	Trigger Point for action	Strategy/Temporary Measures
School Bus Routes	General road closures across network leading to student pickups being suspended	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 or works crews in conjunction with VicPol. Council works crews to install and monitor detour signage. Council Network Inspectors to monitor road conditions, closure signage and detour signage. Alternate student collection points to be established.
Local Road Network	General road closures across network	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 personnel and VicPol. Council works crews to install and monitor detour signage. Council Network Inspectors to monitor road conditions, closure signage and detour signage.
Refer to Appendix C for further details			

Refer to **Appendix C** for full details of likely disruption to services in the Maroondah Municipality.

Essential Infrastructure and Property Protection

Essential infrastructure and property may be affected in the event of a storm and/or flood. For example, this may include residences, businesses, roads and power supply. Refer to **Appendix C** for further specific details of essential infrastructure and properties that may require protection in the Maroondah Municipality.

Facility	Impact	Trigger Point for action	Strategy/Temporary Measures
Refer to **Appendix C**			

For small scale events, sandbags can be purchased from hardware stores. For larger scale events sandbag collection points and filling points will be determined, with the community being informed of these points depending on the nature and proximity of the event

Rescue

Resources are available within the Maroondah VICSES Unit to assist with rescue operations. Other VICSES units may be called upon where required. Specific details of equipment and resources available can be obtained from the VICSES RDO.

Requests for Maroondah City Council resources to support rescue activities can be forwarded via the VicPol Incident Emergency Response Coordinator (IERC) or MERC to the MEMO, or if an ICC has been established, the MECC or Council EMLO.

The following additional resources may be available within the Maroondah Municipality to assist with rescue operations:

- Aircraft may be available through State Aircraft Desk within the SCC.

- Boats available through VICSES RDO or via the IC (where an ICC established).
- Where time permits, pre-planned VicPol resources may be available via the VicPol MERC or Regional Emergency Response Coordinator (RERC). Time critical requests will be made via the VicPol Rescue Coordination Centre.
- Known high-risk areas/communities (i.e., low-lying islands) where rescues might be required are detailed in **Appendix F** flood maps.

There are no identified communities at risk. The risk base is individual properties in low lying areas.

APPENDIX E – STORM AND FLOOD WARNING SYSTEMS

Public Information and Warnings

Storm and Flood Warning products and Flood Class Levels can be found on the BoM and VicEmergency websites. Storm and Flood Warning Products include Severe Thunderstorm Warnings, Severe Weather Warnings, Flood Watches and Flood Warnings – see example on following page.

VICSES uses Emergency Management Common Operating Picture (EM-COP) Public Publishing to distribute warnings in Victoria. The platform enables automatic publishing to the VicEmergency application, website and hotline (1800 226 226). Communities can also access this information through VICSES social media channels and emergency broadcasters, such as Sky News TV and various radio stations (current list available via the EMV website).

VICSES Regions (or an ICC where established) lead the issuing of warnings for riverine flood events when pre-determined triggers are met (issuing of a BoM Flood Watch or Flood Warning) and share locally tailored information via the standard VICSES communication channels (social media, traditional media, web and face to face). These activities are coordinated by the VICSES RDO and approved by the VICSES RAC, or the Public Information Officer and IC respectively (when an ICC is active).

If verified reports are received of flash flooding posing, or resulting in, a significant threat to life or property, VICSES Regions (or an ICC) will issue a flash-flood warning product via EM-COP (publishing to VicEmergency platforms).

VICSES at the state tier (or SCC Public Information Section) lead the issuing of warnings for severe weather and storm when pre-determined triggers are met and play an important role in sharing riverine and flash flood information via state-based standard communication channels.

During some emergencies, VICSES may alert communities by sounding a local siren, or by using the Emergency Alert (EA) platform to send an SMS to mobile phones or a voice message to landline phones. The use of sirens for higher-end warnings has been pre-determined and mapped to relevant warning templates in EM-COP as per relevant EM-COP Public Publishing Business Rules and Joint Standard Operating Procedure (JSOP) J04.01 (Public Information and Warnings for Class 1 Emergencies).

EM-COP Public Publishing Business Rules are available in the Public Information section of the IMT Toolbox (requires registration/login credentials), providing further guidance on specific triggers, roles and responsibilities. VICSES SOP057 (Use of Emergency Alert and Community Alert Sirens) and JSOP 04.01 also provide further guidance.

Local Flood Warning System Arrangements

No local flood warning system arrangements are in place. Refer to Public Information and Warnings above for further information regarding processes and procedures to be utilised within the Maroondah Municipality.

Moderate Flood Warning Example

Community Notification Sign-off

WARNING - FLOOD

Incident Location:	Glenelg River at Casterton
Incident Name:	GlenelgRiverFloodSept2017
Issued:	Set at publish time
Next Update Expected:	

Map

Message

This **Moderate Flood Warning** is being issued for Glenelg River at Casterton.

- In the 24hrs to 9am Friday up to 50mm of rainfall was recorded in the Glenelg River catchment.
- A further 5mm to 10mm is forecast for the remainder of Friday.
- Glenelg River: Moderate flooding is likely along the Glenelg River.
- The Glenelg River at Dergholm is above the minor flood level (4.0 m) and rising.
- The Glenelg River at Casterton is currently at 4.50 metres (minor flood level 3.8 m) and rising.
- The Glenelg River at Casterton is likely to exceed the moderate flood level (5.20 m) during Friday.

Act now - take actions immediately to protect your life and property.

What you should do:
Decide if you will evacuate if it becomes necessary.

If you choose to leave:
- Remember to take your pets, mobile phone, spare clothes and medications.
- Travel to the home of family or friends who are in a safe location, away from flooding.
- Be aware of any road closures when you leave.

If you are travelling:
- Be aware of road hazards including mud, debris and damaged roads or bridges.
- Floodwater is dangerous - never drive, walk or ride through floodwater.

If you stay or if it is unsafe to leave:
- Make sure you have enough food, drinking water, medications and pet food to survive for 3-5 days in case you become isolated.

You should stay informed by listening to emergency broadcasters and monitoring warnings.

Impacts in your area:
- Flooding above floor level of a single story home is likely to occur in some locations.

This message was issued by State Emergency Service.

The next update is expected by [warning_next_update] **or as the situation changes.**

Flood information:
- For river heights check www.bom.gov.au (http://www.bom.gov.au/vic/flood/rain_river.shtml) or phone 1300 659 217.
- For urgent animal welfare issues call Agriculture Victoria (http://agriculture.vic.gov.au/agriculture/emergencies) on 136 186 or your local vet.

Emergency contacts:
- For life threatening emergencies call Triple Zero (000).
- For flood and storm emergency assistance (http://www.ses.vic.gov.au/about/ShouldIcalltheSES.pdf) from the SES call 132 500.

Stay informed:
- Via www.emergency.vic.gov.au (http://emergency.vic.gov.au/respond/).
- Tune in to ABC Local Radio, commercial and designated community radio stations, or Sky News TV.
- Call the VicEmergency Hotline (https://vicemergency.zendesk.com/hc/en-gb/articles/115001055007-What-is-the-VicEmergency-Hotline-) to talk to someone about this warning on freecall 1800 226 226.
- People who are deaf, hard of hearing, or who have a speech/communication impairment can contact VicEmergency Hotline via the National Relay Service (http://relayservice.gov.au/) on 1800 555 677.

- For help with English, call the Translating and Interpreting Service (https://www.tisnational.gov.au/) on 131 450 (freecall) and ask them to telephone VicEmergency Hotline. If you know someone who cannot speak English, provide them with this number.
- Download the VicEmergency app (https://vicemergency.zendesk.com/hc/en-gb/articles/230492607-What-is-the-VicEmergency-app-) or follow VicEmergency on Twitter (https://twitter.com/vicemergency) (#vicfloods) or Facebook (https://www.facebook.com/vicemergency).

Facebook

WARNING - FLOOD
Incident Location: Glenelg River at Casterton
Incident Name: GlenelgRiverFloodSept2017
Issue Date:
Next Update:

This Moderate Flood Warning is being issued for Glenelg River at Casterton.

- In the 24hrs to 9am Friday up to 50mm of rainfall was recorded in the Glenelg River catchment.
- A further 5mm to 10mm is forecast for the remainder of Friday.
- Glenelg River: Moderate flooding is likely along the Glenelg River.
- The Glenelg River at Dergholm is above the minor flood level (4.0 m) and rising.
- The Glenelg River at Casterton is currently at 4.50 metres (minor flood level 3.8 m) and rising.
- The Glenelg River at Casterton is likely to exceed the moderate flood level (5.20 m) during Friday.

Act now - take actions immediately to protect your life and property.

More details at http://emergency.vic.gov.au/respond/#!/warning/3941/moreinfo

Twitter

Moderate Flood Warning for Glenelg River at Casterton. For more info: http://bit.ly/2tfmm6t #vicfloods

Sign-off

Authorised By:

Authorised Signature:

APPENDIX F – MAPS & SCHEMATICS

Overview

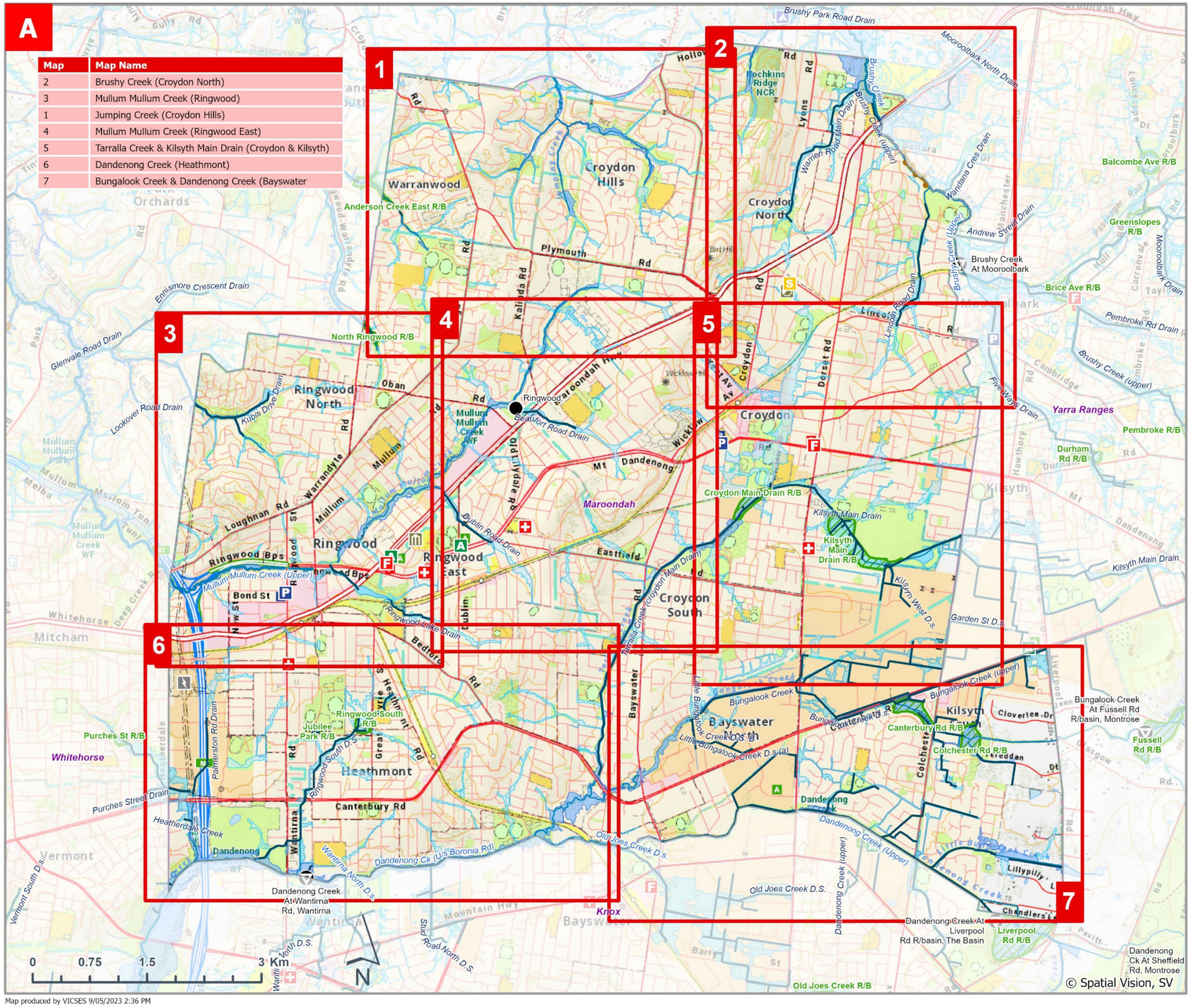
Maps considered useful to flood response are included in this Appendix. They include:

- A map outlining a series of flooding hot spot maps within the Maroondah Municipality.
- A map showing the Municipal boundary together with the open waterways and underground stormwater drainage pipe network within the Maroondah Municipality and the 1% AEP (100-year ARI) flood extents (sourced from Melbourne Water GIS).
- A set of 7 maps showing flooding hot spots within the Maroondah Municipality together with the 1% AEP (100-year ARI) flood extents (sourced from the Melbourne Water GIS).
- Schematics detailing the drainage catchments relevant for this Municipality:
    - 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 and 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 VICSES units and local government and provide a reference link to the corresponding MSFEP.
    - Details within these Catchment Schematics reflect those contained within either other sections of this Plan or refer to another MSFEP. These details have been filtered to contain only key facts. For more information on a gauge, drainage system or town, consult the corresponding MSFEP.

Note that:

- Maps showing the Special Building Overlay and Land Subject to Inundation Overlay are included in the Maroondah 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 Maroondah City Council's main office or online at the Department of Transport and Planning website at: planningschemes.dpcd.vic.gov.au/.
- Maps showing 1 in 100-year ARI (1% AEP) flood extents and floodways (together with volume, height and water quality data) are shown at DEECA's mapshare website at: mapshare.maps.vic.gov.au/MapShareVic/index.html?viewer=MapShareVic.PublicSite&locale=en-AU.

Maroondah Municipal Maps (sourced from Melbourne Water GIS)



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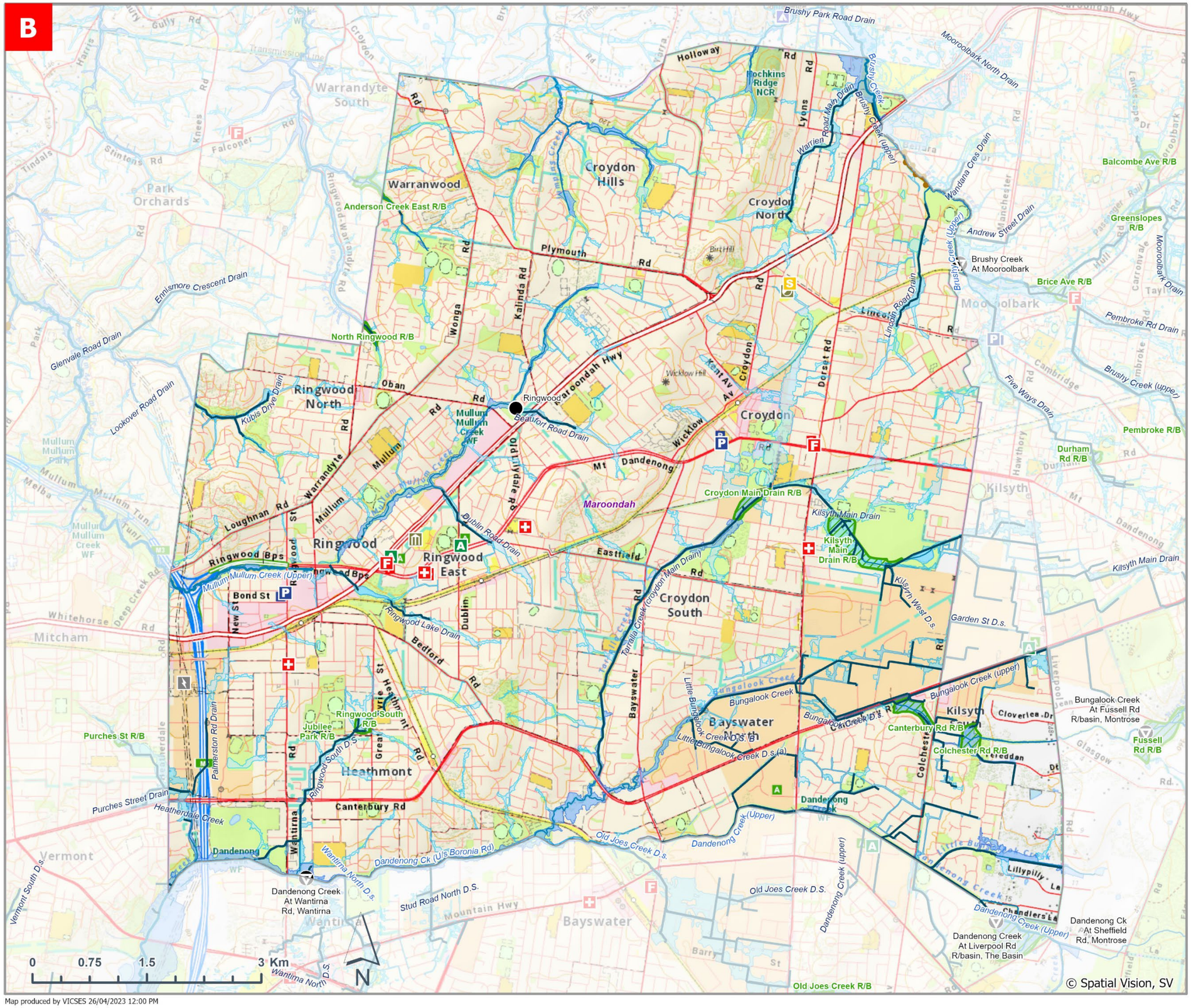
CITY OF MAROONDAH

1% AEP (100yr ARI) Flooding

A. Municipal Index Flood Map (1% AEP (100yr ARI) Extent)

B



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LAND USE

- Residential
- Commercial and Business
- Industrial
- Public Parks / Cemeteries / Recreation
- Utilities and Local Government Facilities
- Education

- Waterbody
- 1% AEP Flash Flood Extent
- 1% AEP Riverine Flood Extent
- Melbourne Water Retarding Basin
- Waterway
- Melbourne Water Stormwater Drain
- Levee
- Hospitals
- Fire Station
- VICSES Units
- Ambulance Stations
- Police Stations
- Municipal Office
- Municipal Depot
- Stream Level & Rain Gauge
- Stream Level Gauge
- Rain Gauge

CITY OF MAROONDAH

1% AEP (100yr ARI) Flooding

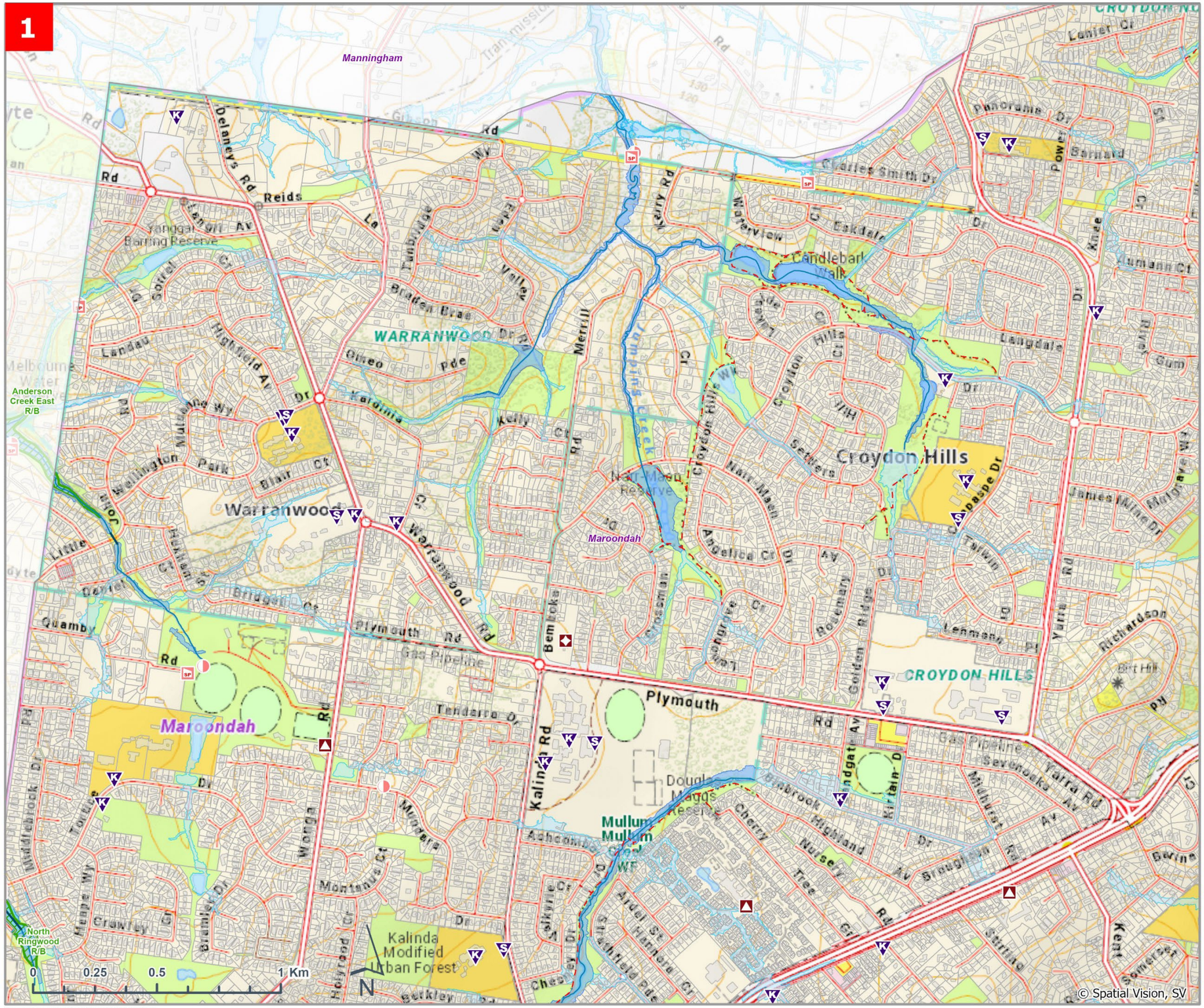
B. Municipal Flood Map (1% AEP (100yr ARI) Extent)

SES VICTORIA State Government

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.

Flood Extent Maps (sourced from Melbourne Water GIS)



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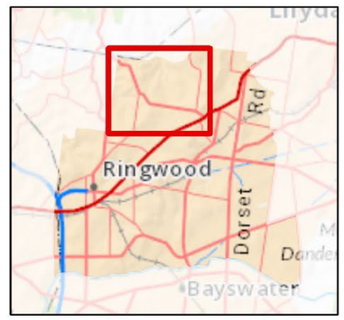
LAND USE

- Residential
- Commercial and Business
- Industrial
- Public Parks / Cemeteries / Recreation
- Utilities and Local Government Facilities
- Education

- Building
- Property
- Waterbody
- 1% AEP Flash Flood Extent
- 1% AEP Riverine Flood Extent
- Melbourne Water Retarding Basin
- Waterway
- Melbourne Water Stormwater Drain
- Bicycle / Walking Trails
- Education Centre
- Child Care Centre
- Aged Care Facility
- Place Of Worship
- Sewer Pumping Station
- Sewer Emergency Relief Point



CITY OF MAROONDAH

1% AEP (100yr ARI) Flooding

1. Jumping Creek (Croydon Hills)

SES VICTORIA State Government

Melbourne Water

2

145°16'48"E 145°17'24"E 145°18'E 145°18'36"E

37°46'12"S 37°46'48"S 37°47'24"S

0 0.25 0.5 1 Km

N

Manningham Yarra Ranges Maroondah Ringwood Whitehorse Kilsyth South Knox Bayswater

Brushy Park Road Drain · Brushy Creek · Hochkins Ridge · Hochkins Ridge Flora Wk · Hochkins Ridge NCR · Mooroolbark North Drain · Warrien Road Main Drain · Lincoln Road Drain · Wandana Cres Drain · Andrew Street Drain · Five Ways Drain · Brushy Creek At Mooroolbark · Croydon North · Maroondah

© Spatial Vision, SV

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CITY OF MAROONDAH

1% AEP (100yr ARI) Flooding

2. Brushy Creek (Croydon North)

- Building
- Property
- Waterbody
- 1% AEP Flash Flood Extent
- 1% AEP Riverine Flood Extent
- Waterway
- Melbourne Water Stormwater Main
- Bicycle / Walking Trail
- Levee

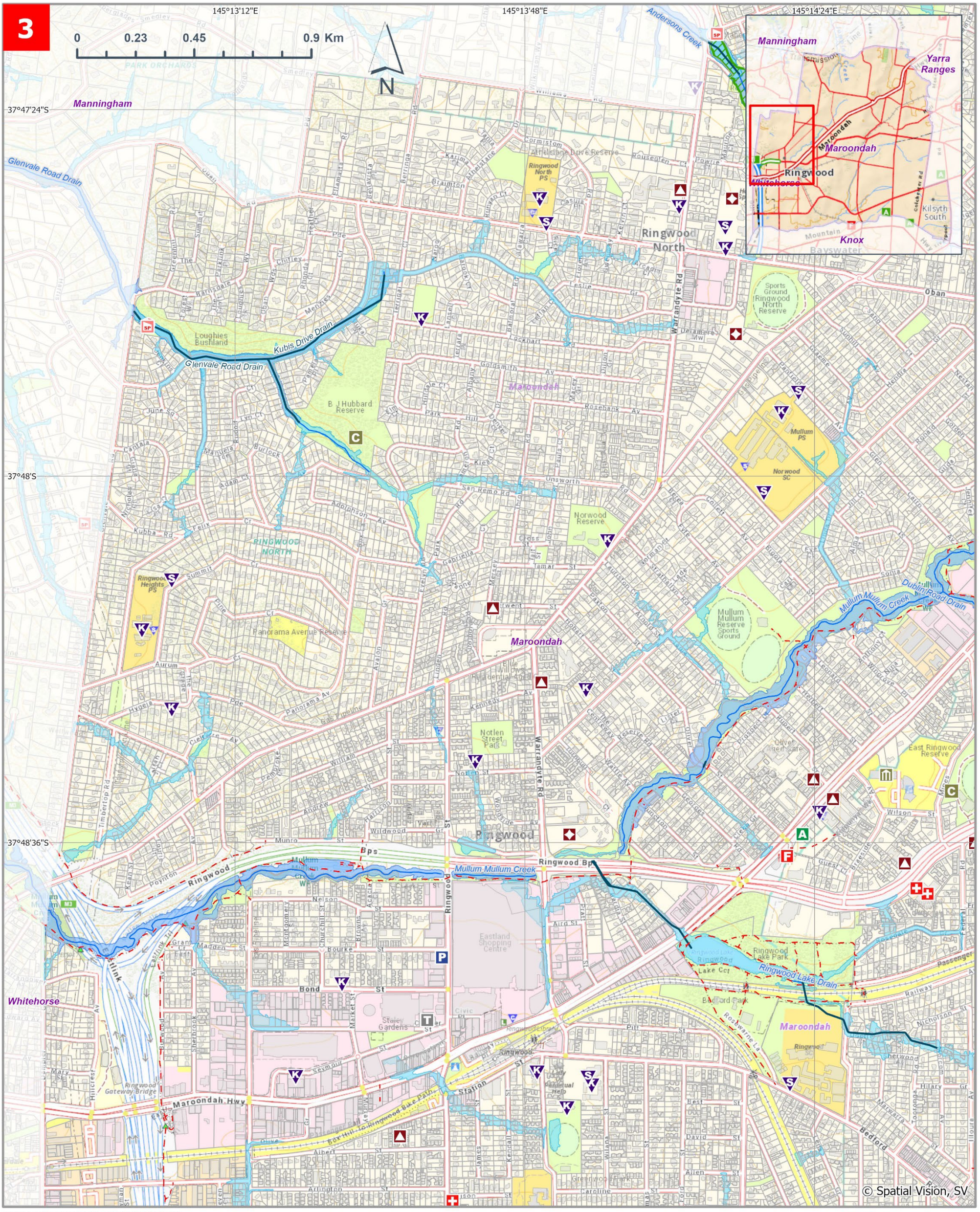
- Police Stations
- VICSES Units
- Education Centre
- Child Care Centre
- Community Venue
- Aged Care Facility
- Municipal Office
- Municipal Depot
- Place Of Worship
- Stream Level & Rain Gauge

- Stream Level Gauge
- Rain Gauge

LAND USE

- Residential
- Commercial and Business
- Industrial
- Public Parks / Cemeteries / Recreation
- Utilities and Local Government Facilities
- Education

SES · VICTORIA State Government · Melbourne Water



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Building
Property
Waterbody
1% AEP Flash Flood Extent
1% AEP Riverine Flood Extent
Waterway
Melbourne Water Stormwater Main
Bicycle / Walking Trail

Police Stations
Ambulance Stations
VICSES Units
Education Centre
Child Care Centre
Fire Station
Community Venue
Aged Care Facility
Hospitals
Place Of Worship

LAND USE
Residential
Commercial and Business
Industrial
Public Parks / Cemeteries / Recreation
Utilities and Local Government Facilities
Education

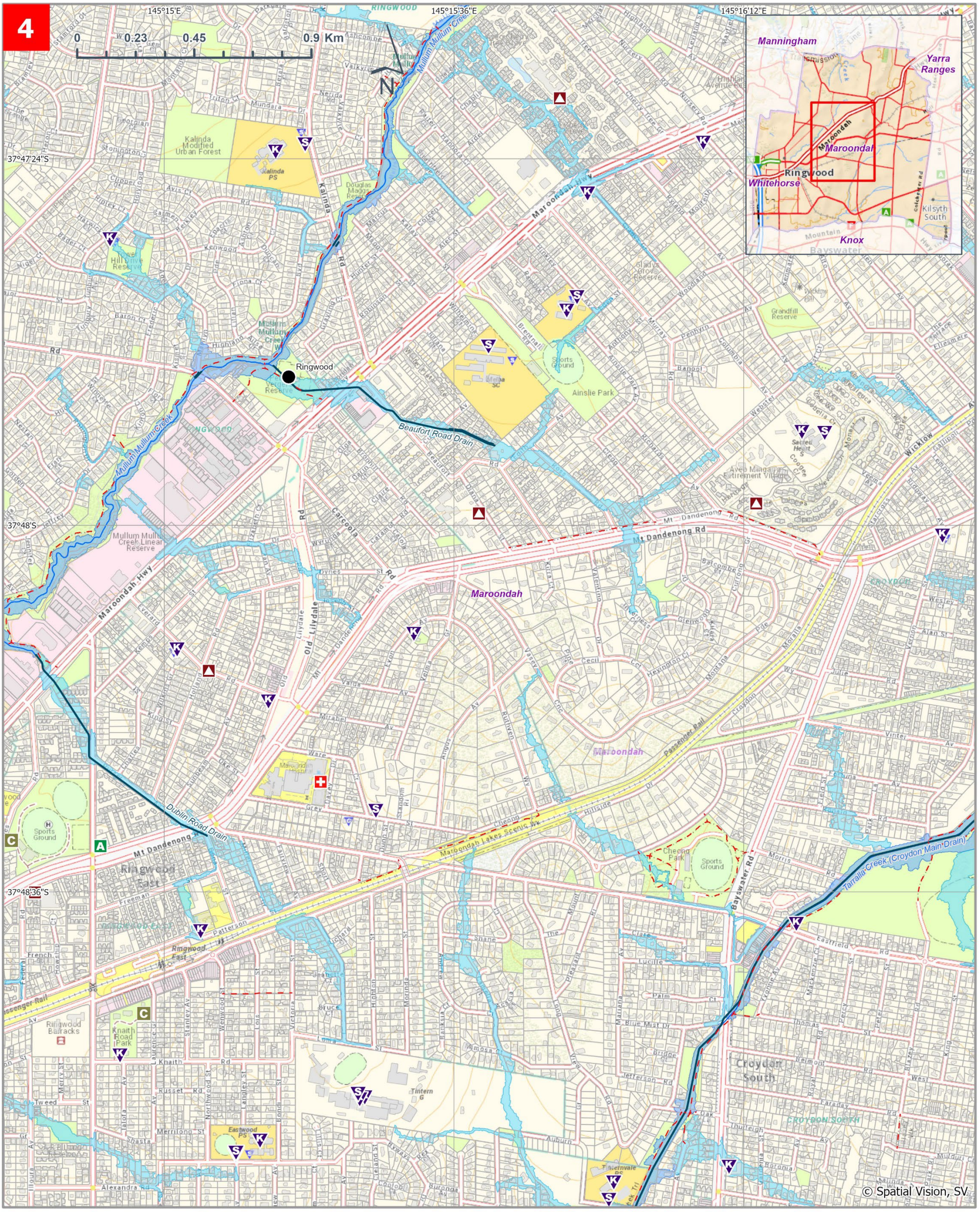
CITY OF MAROONDAH

1% AEP (100yr ARI) Flooding

3. Mullum Mullum Creek (Ringwood)

SES
VICTORIA State Government
Melbourne Water

4



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CITY OF MAROONDAH

1% AEP (100yr ARI) Flooding

4. Mullum Mullum Creek (Ringwood East)

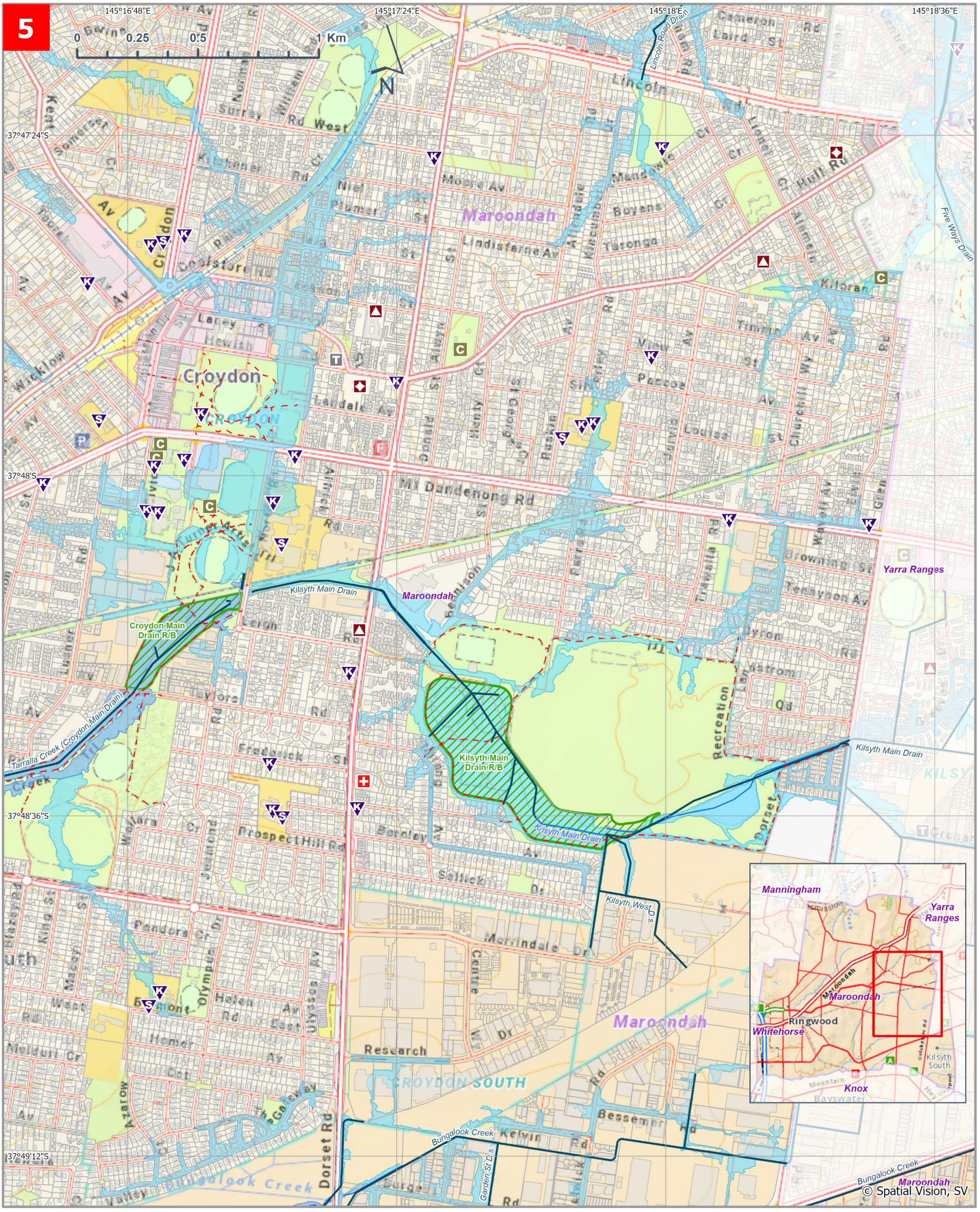
- Building
- Property
- Waterbody
- 1% AEP Flash Flood Extent
- 1% AEP Riverine Flood Extent
- Waterway
- Melbourne Water Stormwater Main
- Bicycle / Walking Trail
- A Ambulance Stations
- Education Centre
- Child Care Centre
- C Community Venue
- Aged Care Facility
- Hospitals
- Place Of Worship
- Stream Level & Rain Gauge
- Stream Level Gauge
- Rain Gauge
- H

LAND USE

- Residential
- Commercial and Business
- Industrial
- Public Parks / Cemeteries / Recreation
- Utilities and Local Government Facilities
- Education

SES · VICTORIA State Government · Melbourne Water

5



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CITY OF MAROONDAH

1% AEP (100yr ARI) Flooding

5. Tarralla Creek & Kilsyth Main Drain (Croydon & Kilsyth)

- Building
- Property
- Waterbody
- 1% AEP Flash Flood Extent
- 1% AEP Riverine Flood Extent
- Melbourne Water Retarding Basin
- Waterway
- Melbourne Water Stormwater Main
- Bicycle / Walking Trail

- Police Stations
- Education Centre
- Child Care Centre
- Fire Station
- Community Venue
- Aged Care Facility
- Hospitals
- Place Of Worship
- Telephone Exchange

LAND USE

- Residential
- Commercial and Business
- Industrial
- Public Parks / Cemeteries / Recreation
- Utilities and Local Government Facilities
- Education

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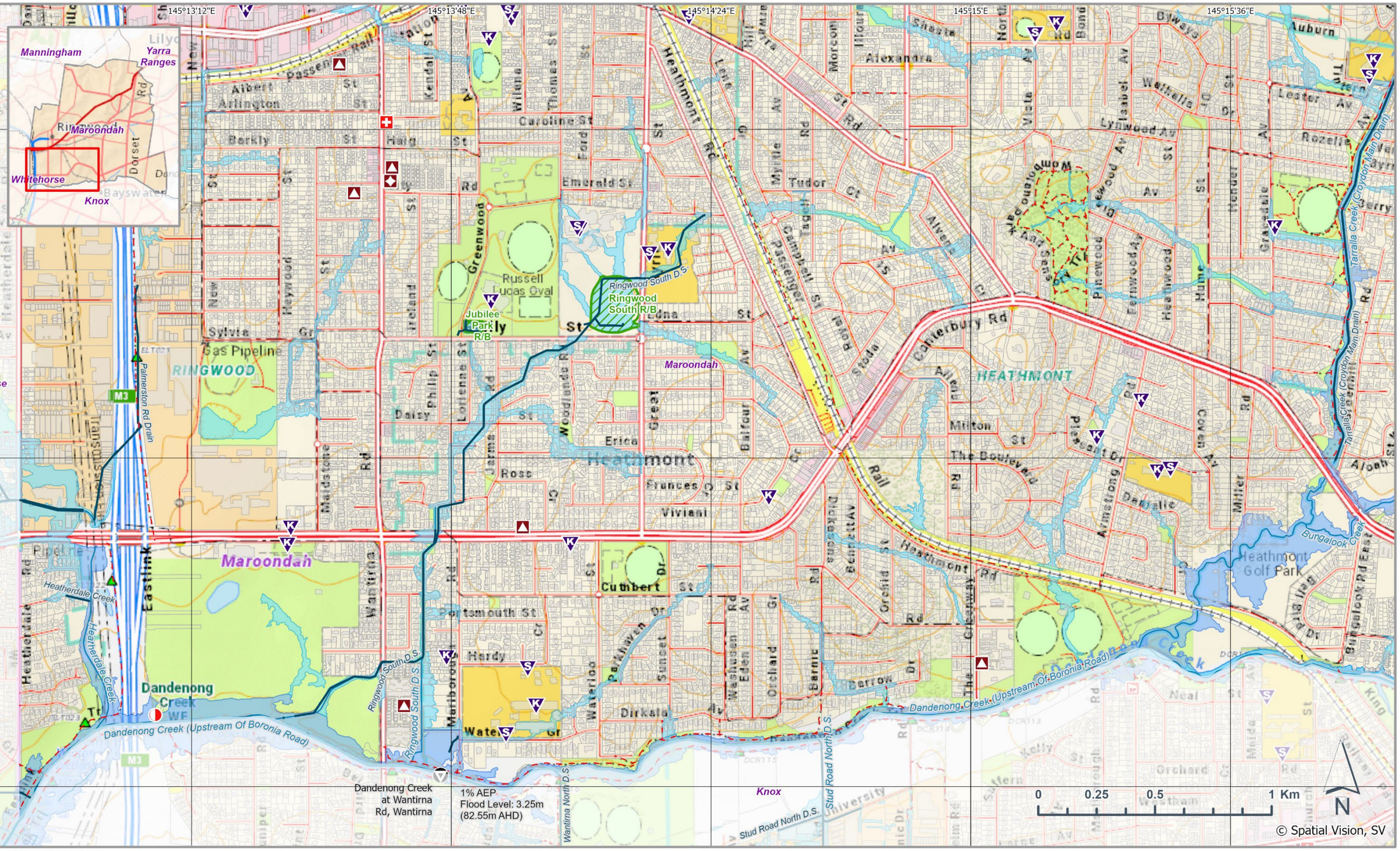
6



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Building
Property
Waterbody
1% AEP Flash Flood Extent
1% AEP Riverine Flood Extent
Melbourne Water Retarding Basin
Melbourne Water Stormwater Drain
Waterway
Bicycle / Walking Trail
Aged Care Facility
Child Care Centre
Community Venue
Education Centre
Hospitals
Place Of Worship
Stream Level & Rain Gauge
Stream Level Gauge
Rain Gauge

LAND USE
Residential
Commercial and Business
Industrial
Public Parks / Cemeteries / Recreation
Utilities and Local Government Facilities
Education

CITY OF MAROONDAH

1% AEP (100yr ARI) Flooding

6. Dandenong Creek (Heathmont)

7

145°16'12"E 145°16'48"E 145°17'24"E 145°18'E 145°18'36"E 145°19'12"E

37°49'12"S

37°49'48"S

37°50'24"S

BAYSWATER NORTH

KILSYTH SOUTH

Kilsyth South

Maroondah

Canterbury Rd R/B

Colchester Rd R/B

Liverpool Rd R/B

Dandenong Creek at Liverpool Rd R/Basin, The Basin

Bungalook Creek

Bungalook Creek D.S.

Little Bungalook Creek D.S.(a)

Little Bungalook Creek D.S.B

Dandenong Creek

Old Joes Creek D.S.

Yarra Ranges

Knox

Manningham

Whitehorse

0 0.25 0.5 1 Km

N

Map produced by VICSES 28/04/2023 3:07 PM

Building
Property
Waterbody
1% AEP Flash Flood Extent
1% AEP Riverine Flood Extent
Melbourne Water Retarding Basin
Melbourne Water Stormwater Drain
Waterway
Bicycle / Walking Trail
Aged Care Facility
Ambulance Stations
Child Care Centre
Education Centre
Place Of Worship
Stream Level & Rain Gauge
Stream Level Gauge
Rain Gauge

LAND USE

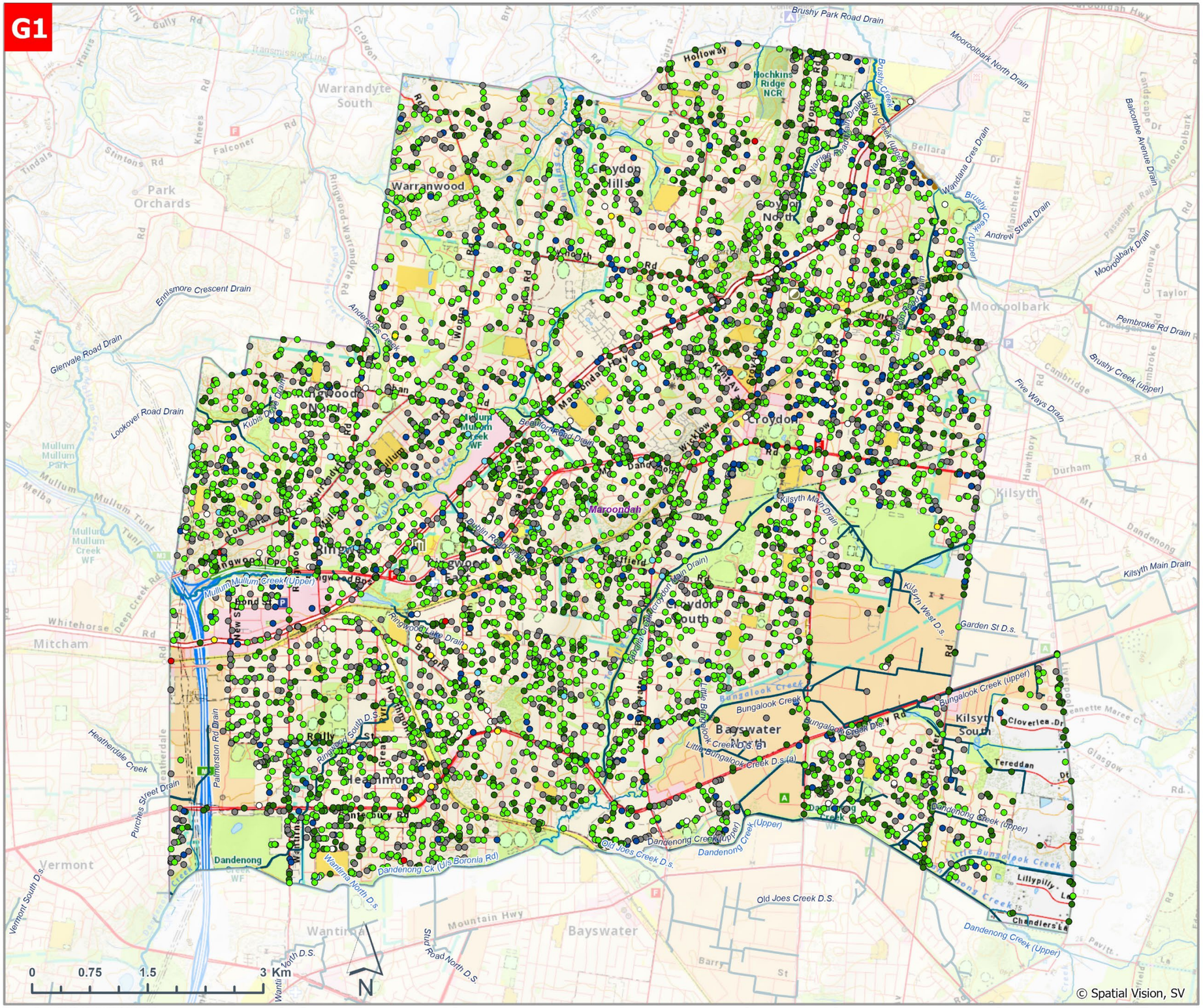
Residential
Commercial and Business
Industrial
Public Parks / Cemeteries / Recreation
Utilities and Local Government Facilities
Education

CITY OF MAROONDAH

1% AEP (100yr ARI) Flooding

7. Bungalook Creek & Dandenong Creek (Bayswater North)

SES Melbourne Water VICTORIA State Government



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LAND USE

- Residential
- Commercial and Business
- Industrial
- Public Parks / Cemeteries / Recreation
- Utilities and Local Government Facilities
- Education

- Waterbody
- Waterway
- Melbourne Water Stormwater Drain
- Levee
- Fire Station
- VICSES Units
- Ambulance Stations
- Police Stations
- Municipal Office
- Municipal Depot

VICSES Severe Weather RFAs (Storm or Flood)

- Assist Other Agency
- Building Damage
- Flooding
- Loose Debris / Object / Fence
- Rescue
- Tree Down
- Tree Down Traffic Hazard
- Other

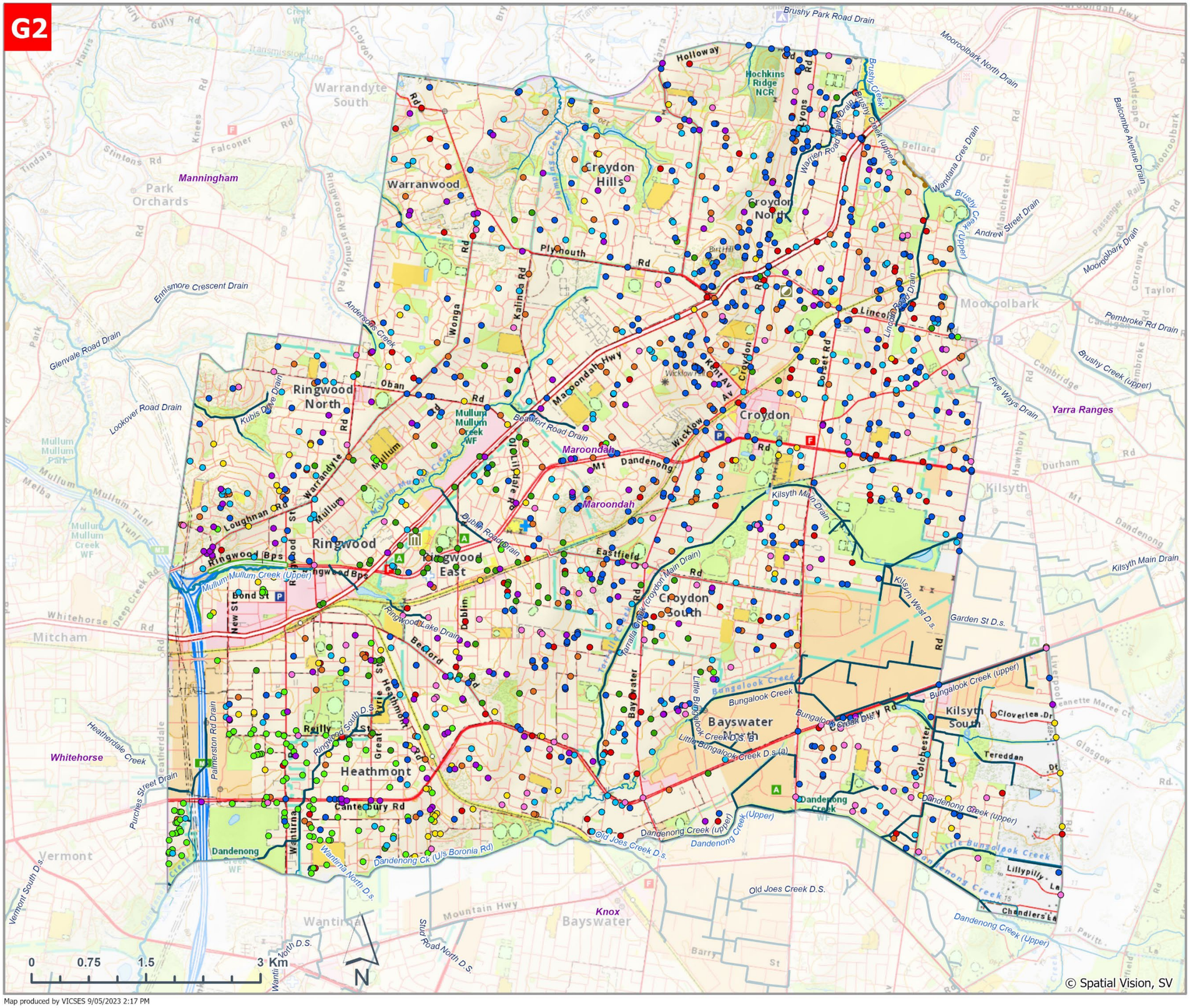
CITY OF MAROONDAH

1% AEP (100yr ARI) Flooding

G1 - Severe Weather Request for Assistance (RFA) Received by Job Type (Jul 2009 - Feb 2023)

SES VICTORIA State Government Melbourne Water

G2



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LAND USE

- Residential
- Commercial and Business
- Industrial
- Public Parks / Cemeteries / Recreation
- Utilities and Local Government Facilities
- Education

- Waterbody
- Waterway
- Melbourne Water Stormwater Drain
- Levee
- Fire Station
- VICSES Units
- Ambulance Stations
- Police Stations
- Municipal Office
- Municipal Depot

VICSES Severe Weather RFAs (Storm or Flood)

(By Event where > 90 requests received)

- 4th-6th February 2011
- 5th-6th February 2012
- 5th-7th September 2012
- 7th-8th January 2015
- 14th-15th February 2020
- 27th-30th August 2020
- 9th-12th June 2021
- 27th-30th October 2021
- 2nd-3rd December 2021

CITY OF MAROONDAH

1% AEP (100yr ARI) Flooding

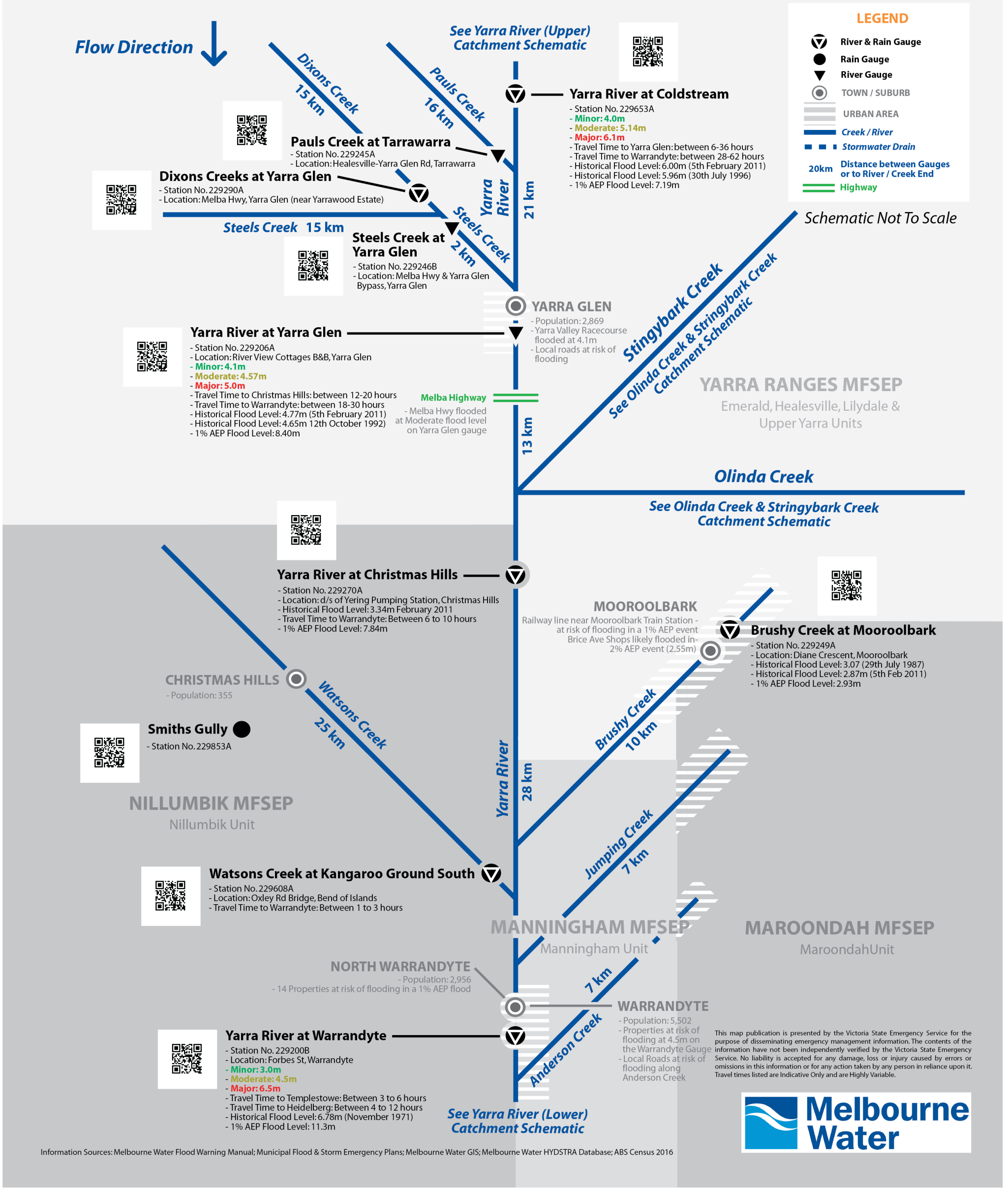
G2 - Severe Weather Request for Assistance (RFA) Received by Event (Jul 2009 - Feb 2023)

SES VICTORIA State Government

Melbourne Water

Yarra River (Middle) Catchment Schematic

Version 6 - September 2020



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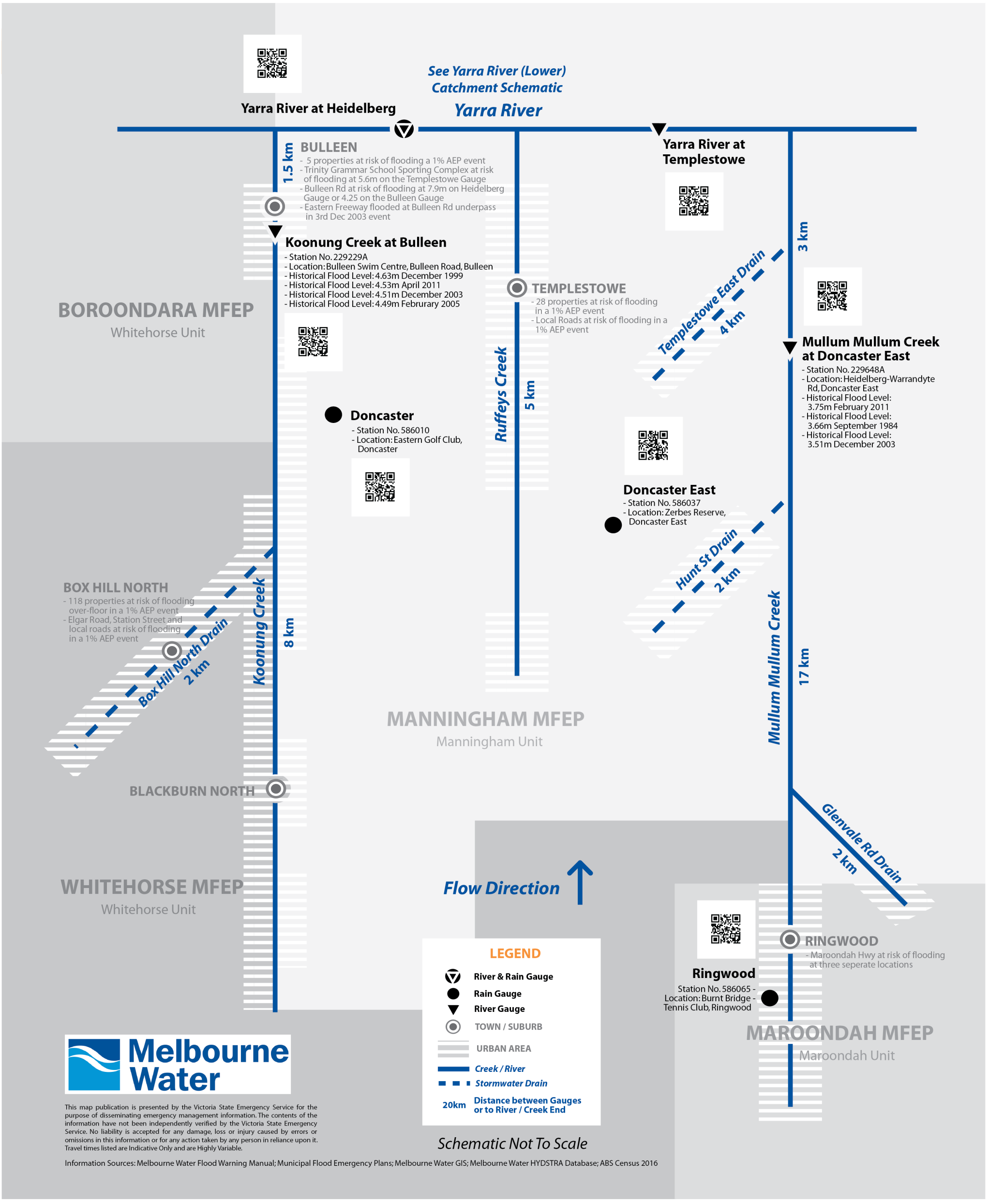
Information Sources: Melbourne Water Flood Warning Manual; Municipal Flood & Storm Emergency Plans; Melbourne Water GIS; Melbourne Water HYDSTRA Database; ABS Census 2016

Koonung, Ruffey & Mullum Mullum Creeks Catchment Schematic

Version 4 - April 2020



Melbourne Water

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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

Dandenong Creek Catchment Schematic

Version 9 - October 2021

YARRA RANGES MSFEP

Emerald, Lilydale, Healesville & Upper Yarra Units

Mount Dandenong
- Station No. 586090
- Location: GTV9 Tower, Mount Dandenong

MONTROSE

Bungalook Creek at Fussel Rd Retarding Basin
- Station No. 228369A
- Location: Fussell Road, Montrose (Melway 51K11)
- Historical Flood Level: 7.23m (18th September 1984)
- Historical Flood Level: 6.19m (30th July 1996)
- Spillway Level: 8.15m
- Embankment Level: 8.4m
- 1% AEP Flood Level: 8.39m

Flow Direction

CROYDON

Tarralla Creek 5 km

Bungalook Creek 7 km

Dobsons Creek 4 km

Dandenong Creek

Dandenong Creek at Liverpool Rd Retarding Basin
- Station No. 228373A
- Location: Liverpool Road, The Basin (Melway 65F4)
- Historical Flood Level: 6.43m (22nd January 1994)
- Spillway Level: 5.4m
- Full Supply Level: 6.0m
- Embankment Level: 6.6m

Old Joes Creek 4 km

8 km

BAYSWATER
- 234 properties at risk of flooding over-floor in a 1% AEP event

1 km

MAROONDAH MSFEP

Maroondah Unit

YARRA RANGES MSFEP

Emerald, Lilydale, Healesville & Upper Yarra Units

FERNTREE GULLY
- 68 properties at risk of flooding over-floor in a 1% AEP event

KNOX MSFEP

Knox Unit

Dandenong Creek at Heathmont
- Station No. 228357A
- Location: Wantirna Road, Wantirna
- Travel Time to Rowville: Between 1-14 hours
- Historical Flood Level: 2.78m (5th February 2011)
- Historical Flood Level: 2.73m (3rd February 2005)
- Significant Level: 2.5m (Spillway at Police Rd Retarding Basin will start operating)
- 1% AEP Flood Level: 4.9m

WANTIRNA
- Boronia Rd flooded at 4.5m on the Wantirna Gauge

Blind Creek 7 km

UPWEY

Blind Creek at Blind Creek Retarding Basin
- Station No. 228366A
- Location: Rear of Knox City Shopping Centre
- Travel Time to Wantirna South: Between 1min - 3hrs
- Historical Flood Level: 5.14m (3rd February 2005)
- Spillway Level: 5.59m
- Embankment Level: 6.29m
- 1% AEP Flood Level: 6.35m

WHITEHORSE MSFEP

Whitehorse Unit

KNOXFIELD

Knox City S.C. Carpark flooding at 4.7m on the Blind Creek RB Gauge - Residential properties and Knox City Shopping Centre at risk of flooding at 6.3m - on the Blind Creek RB Gauge

3 km

Ferny Creek 16 km

UPPER FERNTREE GULLY
- Burwood Hwy near Mount Dandenong Tourist Rd at risk of flooding a 5% AEP event

Blind Creek at Wantirna South
- Station No. 228351B
- Location: High Street Rd, Wantirna South (Melway 72E1)
- Travel Time to Rowville: Between 1-13 hours
- Historical Flood Level: 3.65m (13th December 1993)
- Historical Flood Level: 2.8m (3rd December 2003)

MONASH MSFEP

Monash Unit

Glen Waverley

Station No. 586197 - Location: Mt View Reservoir, - Waverley Rd, Glen Waverley

Dandenong Creek 24 km

3 km

Monbulk Creek 8 km 8 km

Corhanwarrabul Creek at Scoresby
- Station No. 228393A
- Location: Stud Road, Scoresby (Melway 72J9)
- Travel Time to Rowville: Between 2-12 hours
- Historical Flood Level: 2.67m (3rd February 2005)
- Historical Flood Level: 2.36m (5th Feburary 2011)

Monbulk Creek at Lysterfield
- Station No. 228229B
- Location: Monbulk Creek Retarding Basin, Lysterfield (Melway 83J2)
- Historical Flood Level: 8.56m (5th February 2011)
- Spillway Level: 9.33m
- Full Supply Level: 10.83m
- Embankment Level: 11.33m

WHEELERS HILL
- 51 properties at risk of flooding in a 1% AEP event
- Ferntree Gully Rd flooded at 5.0m on the Police Rd Gauge
- Wellington Rd flooded at 5.5m on the Police Rd Gauge

Corhanwarrabul Creek 5 km

See Mile & Yarraman Creeks Catchment Schematic 12 km

GREATER DANDENONG MSFEP

Greater Dandenong Unit

Police Road Retarding Basin

Dandenong Creek at Police Rd Retarding Basin
- Station No. 228368A
- Location: Police Road, Rowville (Melway 81E6)
- Minor: 4.6m; Moderate: 5.0m; Major: 5.5m
- Travel Time to Dandenong: Between 2-9 hours
- Travel Time to Patterson Lakes: Between 2-17 hours
- Historical Flood Level: 5.69m (18th September 1984)
- Historical Flood Level: 5.56m (3rd February 2005)
- Historical Flood Level: 5.45m (5th February 2011)
- Spillway Level: 4.28m
- Levee Height (Crest) at Heatherton Rd: 5.25m
- 1% AEP Flood Level: 5.5m

10 km

Heatherton Road
- Heatherton Rd at risk of flooding at 5.4m on the Police Rd RB Gauge

See Eumemmering Creek Catchment Schematic 23 km

CASEY MSFEP

Narre Warren Unit

Dandenong Creek at Dandenong
- Station No. 228204C
- Location: Hammond Road, Dandenong (Melway 90C9)
- Travel Time to Keysborough: Between 0-2 hours
- Historical Flood Level: 4.84m (3rd February 2005)
- Historical Flood Level: 4.76m (19th Septeber 1984)
- Bank Level: 6.6m (Channel Capacity at Dandenong)
- 1% AEP Flood Level: 5.87m

DANDENONG
- 1 property at risk of flooding a 1% AEP event

4 km

Dandenong Creek at Keysborough
- Station No. 228356B
- Location: Eastlink Crossing, Keysborough (Melway 94H5)
- Historical Flood Level: 3.50m (5th February 2011)
- Levee Height: 5.2m
- 1% AEP Flood Level: 4.5m

GREATER DANDENONG MSFEP

Greater Dandenong Unit

BANGHOLME
- 6 properties at risk of flooding a 1% AEP event
- Pillers, Perry & Bangholme Rds flooded in a 1% AEP event

Patterson River 7 km

See Mordialloc Creek Catchment Schematic 9 km

Patterson River at Patterson Lakes
- Station No. 228383A
- Location: Outside Tidal Gates, Patterson Lakes (Melway 97F6)
- Minor: 0.75m
- Historical Flood Level: 1.26m (3rd February 2005)
- Historical Flood Level: 1.26m (5th February 2011)
- Tidal Gate Closure Level: 0.73mh
- 1% AEP Flood Level: 1.60m

PATTERSON LAKES
- Boats & Jetties may become damaged at 0.8m on the Patterson Lakes Gauge
- Local Flood Guide available for Patterson Lakes

KINGSTON MSFEP

Chelsea & Moorabbin Units

Port Phillip Bay

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

Schematic Not To Scale

Melbourne Water

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

APPENDIX G - SEVERE WEATHER STORM EVENTS

Overview

Storm events Maroondah Municipality may include windstorms, dust storms, hailstorms, heavy rain leading to flash flooding and thunderstorms (including lightning activity). Flash flooding events are a relatively common occurrence with the greatest inconvenience being short term delays on roadways. Greater property damage may occur when flash flooding occurs in conjunction with damaging winds. Maroondah Municipality is susceptible to severe weather events because of a combination of its undulating terrain, high number of mature trees located within the Municipality, substantial parkland areas and its proximity to the Dandenong Ranges.

Severe storm activity could result in injuries and an 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. Financial loss and temporary displacement of Maroondah residents may occur as a result of property damage.

This Appendix uses Requests for Assistance (RFAs) data from VICSES to display areas at risk from severe weather events.

VICSES Requests for Assistance

VICSES records RFAs made by the public during severe weather events. Table 1 below is a breakdown of requests by suburb and damage type during the period July 2009 to February 2023.

Suburb	VICSES Request for Assistance (July 2009 – February 2023)				
	Building Damage	Flooding	Tree Down	Tree Down Traffic Hazard	Other*
Bayswater North	115	54	309	212	12
Croydon	380	252	1032	526	81
Croydon Hills	25	16	93	53	3
Croydon North	108	31	315	136	15
Croydon South	65	14	161	80	7
Heathmont	155	24	382	138	22
Kilsyth	28	12	51	35	4
Kilsyth South	23	7	49	109	4
Ringwood	243	61	504	204	25
Ringwood East	147	39	393	210	29
Ringwood North	127	37	372	98	21
Vermont	26	3	9	5	0
Warranwood	63	13	150	74	4
Wonga Park	5	0	3	5	0

Table G1 – Breakdown of severe weather RFAs received by VICSES Maroondah Unit by suburb

* Advised Event Only, Assist Other Agency, Duress, Fence Down, Incident Other, Loose Debris / Object, Message, Rescue, Sandbag Request

Table 2 is a breakdown of requests for assistance by date (month) and damage type.

Date	VICSES Request for Assistance (July 2009 – February 2023)				
	Building Damage	Flooding	Other*	Tree Down	Tree Down Traffic Hazard
July 2009	1	0	0	2	2
August 2009	27	1	0	52	13
September 2009	4	0	0	6	4
October 2009	1	0	0	1	3
November 2009	14	4	0	20	6
December 2009	2	0	0	6	4
January 2010	5	0	0	21	8
February 2010	4	0	0	10	6
March 2010	21	1	0	15	3
April 2010	3	0	0	4	1
May 2010	2	0	0	4	1
June 2010	30	0	0	33	21
July 2010	1	0	0	7	10
August 2010	14	1	0	37	14
September 2010	13	0	0	42	11
October 2010	18	9	0	19	18
November 2010	12	3	0	17	5
December 2010	36	80	1	43	17
January 2011	17	1	1	40	23
February 2011	50	85	0	56	23
March 2011	4	4	0	16	13
April 2011	2	2	0	6	1
May 2011	3	0	0	13	3
June 2011	11	0	0	19	13
July 2011	5	0	0	5	3
August 2011	4	0	0	3	6
September 2011	9	0	0	15	8
October 2011	1	3	0	6	6
November 2011	21	34	0	21	14
December 2011	12	9	0	11	11
January 2012	11	0	0	43	12
February 2012	48	15	0	141	28
March 2012	5	2	0	26	26
April 2012	11	2	0	13	11
May 2012	6	3	0	5	6
June 2012	6	0	0	4	14
July 2012	3	1	0	3	4
August 2012	5	0	0	13	24
September 2012	19	0	0	69	33
October 2012	0	1	0	5	8
November 2012	2	0	0	5	2
December 2012	8	0	0	21	8
January 2013	4	0	0	11	19
February 2013	20	4	0	12	8
March 2013	9	0	0	27	13
April 3013	0	0	0	3	1
May 2013	1	0	0	5	8
June 2013	10	8	0	5	3
July 2013	5	0	0	12	17
August 2013	36	0	0	61	26
September 2013	14	0	0	45	18
October 2013	22	0	0	77	22
November 2013	1	0	0	7	5
December 2013	9	0	0	14	9
January 2014	11	0	0	49	20
February 2014	4	1	0	17	6
March 2014	2	0	0	4	5
April 2014	10	0	0	10	14
May 2014	1	0	0	6	6
June 2014	18	0	0	35	12
July 2014	18	0	0	35	16

Date	VICSES Request for Assistance (July 2009 – February 2023)				
	Building Damage	Flooding	Other*	Tree Down	Tree Down Traffic Hazard
August 2014	11	0	0	7	3
September 2014	48	6	0	41	11
October 2014	6	0	0	17	7
November 2014	7	0	0	14	12
December 2014	9	0	0	28	10
January 2015	66	2	0	94	30
February 2015	6	0	0	13	18
March 2015	10	0	0	35	9
April 2015	5	0	0	2	1
May 2015	2	2	0	7	5
June 2015	1	0	0	4	3
July 2015	2	1	0	9	16
August 2015	4	0	0	2	5
September 2015	0	1	0	4	4
October 2015	3	0	0	13	10
November 2015	8	1	0	60	22
December 2015	7	0	0	18	30
January 2016	14	2	0	29	15
February 2016	4	0	0	11	11
March 2016	22	0	0	25	22
April 2016	3	0	0	3	2
May 2016	20	0	0	37	30
June 2016	12	1	0	11	6
July 2016	11	0	0	38	17
August 2016	5	1	0	4	8
September 2016	2	5	0	4	1
October 2016	30	72	0	42	1
November 2016	8	0	0	15	6
December 2016	24	17	0	18	15
January 2017	4	0	0	20	11
February 2017	3	0	0	19	11
March 2017	5	1	1	14	13
April 2017	5	0	0	5	7
May 2017	3	0	0	2	1
June 2017	2	0	0	1	2
July 2017	0	0	0	4	3
August 2017	1	0	0	4	3
September 2017	4	0	0	8	10
October 2017	1	0	0	9	3
November 2017	0	0	0	5	3
December 2017	35	10	0	29	26
January 2018	6	0	0	18	7
February 2018	7	0	0	40	22
March 2018	7	0	0	13	11
April 2018	7	0	0	8	11
May 2018	7	0	0	9	2
June 2018	11	0	0	2	4
July 2018	6	0	0	14	15
August 2018	5	0	0	9	4
September 2018	5	0	0	2	4
October 2018	4	0	0	0	3
November 2018	10	1	0	14	14
December 2018	7	1	0	8	5
January 2019	5	24	0	6	1
February 2019	2	13	0	9	1
March 2019	4	2	0	12	8
April 2019	2	0	0	5	3
May 2019	1	1	0	9	4
June 2019	2	1	0	2	5
July 2019	15	1	0	21	17
August 2019	9	1	0	13	9
September 2019	8	0	0	8	14

Date	VICSES Request for Assistance (July 2009 – February 2023)				
	Building Damage	Flooding	Other*	Tree Down	Tree Down Traffic Hazard
October 2019	2	3	1	14	16
November 2019	16	1	2	52	20
December 2019	7	1	2	22	16
January 2020	7	8	2	51	15
February 2020	40	19	11	66	28
March 2020	4	3	3	12	9
April 2020	20	6	3	55	20
May 2020	6	2	1	20	6
June 2020	2	3	1	8	6
July 2020	2	0	1	2	2
August 2020	14	3	10	200	56
September 2020	8	0	5	39	3
October 2020	2	3	5	53	18
November 2020	7	1	4	61	21
December 2020	14	0	5	43	11
January 2021	7	3	3	20	17
February 2021	7	1	2	10	7
March 2021	1	1	3	5	1
April 2021	3	2	1	7	2
May 2021	2	0	0	10	4
June 2021	57	2	26	394	150
July 2021	2	2	3	34	9
August 2021	1	0	6	13	5
September 2021	11	5	1	10	3
October 2021	14	3	1	91	27
November 2021	12	1	4	40	9
December 2021	17	0	4	104	33
January 2022	12	3	3	13	5
February 2022	3	0	2	7	6
March 2022	4	2	4	7	4
April 2022	4	3	0	3	5
May 2022	1	1	0	3	1
June 2022	2	0	0	6	5
July 2022	1	0	1	1	0
August 2022	1	3	0	9	3
September 2022	15	4	2	4	6
October 2022	29	70	21	29	18
November 2022	8	4	7	58	26
December 2022	3	3	0	20	7
January 2023	14	4	2	28	17
February 2023	2	2	0	17	6

Table H2 – Breakdown of severe weather RFAs received by VICSES Maroondah Unit by month

* Advised Event Only, Assist Other Agency, Duress, Fence Down, Incident Other, Loose Debris / Object, Message, Rescue, Sandbag Request

Activation Triggers

Readiness and Activation Triggers provide guidance on the minimum levels of readiness and response to forecast and/or actual events and are available to VICSES members on the VICSES Hub (requires login).