



City of Moreland Storm and Flood Emergency Plan

A Sub-Plan of the Municipal Emergency
Management Plan

for Moreland City Council
and VICSES Broadmeadows Unit
Version 4.2



FloodSafe



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Distribution List

Copy No.	Issue To:		Date
	Name	Organisation	
	MERO	Moreland Council	
	Victorian Head Office (VHO)	VICSES	
	Sunshine ICC	VICSES	
	Broadmeadows Unit	VICSES	
		Others as per MEMP Distribution List	

Electronic Copies of this Plan will be available on Crisisworks as determined by Moreland City Council.

Document Transmittal Form / Amendment Certificate

This Municipal Flood Emergency Plan (MFEP) will be amended, maintained and distributed as required by VICSES in consultation with the Moreland City Council

Suggestions for amendments to this Plan should be forwarded to VICSES Central Region, Unit 6, 3-5 Gilda Court MULGRAVE.

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
Issue date of Flood Emergency Plan Version 1.0 – 21 May 2013			
2	9/06/2016	Ross Butler	Update of Appendix A, B, C & F. Addition of Appendix G.
2.1	21/06/2016	Gerabeth Abbott, Alison Tuxworth	Terminology update, local info Appendix C
3	27/4/2018	Gerabeth Abbott	Update terminology and references (entire plan), additional data Appendix C. Conversion to Storm and Flood plan, addition of Appendix H
4	17/4/2019	Ross Butler	Update of Appendix A, B, C, F, G and H
4.1	6/5/2019	Gerabeth Abbott	Content update – plan body. Incorporation of local knowledge
4.2	25/7/2019	Sub-committee	Appendix C - Inclusion of agency operational considerations

This Plan will be maintained at www.moreland.vic.gov.au and www.ses.vic.gov.au

List of Abbreviations & Acronyms

The following abbreviations and acronyms are used in the Plan:

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

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 10yr ARI in commercial/industrial. For Melbourne Water catchment areas this is for all other ARIs up to the 100yr ARI. Note that not all overland flows cause flooding.
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, flood-ways, waterway improvements, water sensitive urban design, integrated water management systems and environment protection measures. All drainage under 60 ha is maintained and operated by Moreland 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 (MSFEP) has been prepared by the City of Moreland Municipal Emergency Management Planning Committee (MEMPC), pursuant to Section 20 of the Emergency Management Act 1986 (as amended).

The MSFEP is a sub plan of the City of Moreland Municipal Emergency Management Plan (MEMP), is consistent with the Emergency Management Manual Victoria (EMMV), the Victoria Flood Management Strategy, the Regional and State Flood Emergency Plans and the Regional Storm Emergency Plan and takes into account the outcomes of the Community Emergency Risk Assessment (CERA) process undertaken by the Moreland MEMPC.

This MSFEP is a result of the cooperative efforts of the City of Moreland Municipal Storm and Flood Planning Committee and its member agencies.

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

The MSFEP is endorsed by the MEMPC as a sub-plan to the MEMP.

Agency Endorsement

.....
Grant Thorne
Chair - Municipal Emergency Management Planning Committee

.....
Date

.....
Ray Jasper
Regional Manager, VICSES Central Region

.....
Date:

1.2 The Municipality

An outline of the City of Moreland in terms of its location, demography and other general matters is provided in the MEMP. An outline of the flood and storm threat is provided in **Appendix A** and **Appendix H** of this MSFEP.

1.3 Purpose and Scope of this Storm and Flood Emergency Plan

The purpose of this MSFEP is to detail arrangements agreed for the planning, preparedness/prevention, response and recovery from storm and flood incidents within the City of Moreland. As such, the scope of the MSFEP is to:

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

1.4 Municipal Storm and Flood Planning Committee (MSFPC)

Moreland City Council will establish a Municipal Storm and Flood Planning Sub Committee (MSFPC). The suggested representation is:

- VICSES - Regional Officer Emergency Management) (**Chair**),
- Moreland City Council – Municipal Emergency Resource Officer (MERO) and technical staff
- Victoria Police - Municipal Emergency Response Co-ordinator (MERC),
- Catchment Management Authority/ Water authorities as required,
- Other agencies, as required

1.5 Responsibility for Planning, Review & Maintenance of this Plan

This MSFEP must be maintained in order to remain effective.

VICSES through the MSFPC has responsibility for preparing, reviewing, maintaining and distributing this MSFEP.

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

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

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

1.6 Endorsement of the Plan

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

Upon acceptance, the MSFEP will be circulated to the MEMPC for re-endorsement.

Part 2. PREVENTION / PREPAREDNESS ARRANGEMENTS

2.1 Community Awareness for all Types of Storm and Flooding

Details of this MSFEP will be communicated to the community through local media, VICSES Community Education programs and VICSES and Moreland City Council websites.

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

2.2 Structural Flood Mitigation Measures

Structural flood mitigation measures related to levees and retarding basins within the City of Moreland are detailed in **Appendix A** and **Appendix C**.

2.3 Non-structural Flood Mitigation Measures

2.3.1 Exercising the MSFEP

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

2.3.2 Storm and Flood Warning

Arrangements for storm and flood warning are contained within the State Flood Emergency Plan, State Storm Emergency Plan, the EMMV (Part 3) and on the Bureau of Meteorology website.

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

2.3.3 Flood Wardens

Flood Wardens provide a means of gathering information in real time on flood behaviour along a stream system, and a network for the distribution of community information and warnings to the community along the stream system.

There are no flood wardens within the City of Moreland 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. RESPONSE ARRANGEMENTS

3.1 Introduction

3.1.1 Activation of Response

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

The VICSES RDO/ IC will activate agencies as required and documented in the VICSES Central Region and State Flood and Storm 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 or flood within the City of Moreland. These agencies will be engaged through the EMT.

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

3.1.3 Municipal Emergency Coordination Centre (MECC)

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

Liaison with the MECC will be through the VICSE Central Region DO or established ICC.

3.1.4 Escalation

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

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

3.2 State Emergency Management Priorities

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

1. Protection and preservation of life is paramount - this includes:
 - a. Safety of emergency response personnel, and;
 - b. Safety of community members including vulnerable community members and visitors/tourists.
2. Issuing of community information and community warnings detailing incident information that is timely, relevant and tailored to assist community members make informed decisions about their safety.;
3. Protection of critical infrastructure and community assets that supports community resilience;
4. Protection of residential property as a place of primary residence;
5. Protection of assets supporting individual livelihoods and economic production that supports individual and community financial sustainability
6. Protection of environmental and conservation assets that considers the cultural, biodiversity, and social values of the environment;

Circumstances may arise where the Incident Controller 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 Command, Control & Coordination

The Command, Control and Coordination arrangements in this MSFEP must be consistent with those detailed in State and Regional Storm and Flood Emergency Plans. For further information, refer to Part 3 of the EMMV.

3.3.1 Control

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

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

All storm and flood response activities within the City of Moreland 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)

As required the IC will be appointed by VICSES as the Control Agency, to command and control available resources in response to a flood event on the advice of the BoM (or other

reliable source) that a flood event will occur or is occurring. The IC responsibilities are as defined in Part 3 of the EMMV

3.3.3 Incident Control Centre (ICC)

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

Predetermined Incident Control Centres are located at:

- Sunshine ICC
- Burnley ICC
- 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.

Predetermined Divisional Command locations are:

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

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

3.3.5 Incident Management Team (IMT)

The Incident Controller will form an IMT in line with AIMS principles.

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

3.3.6 Incident Emergency Management Team (IEMT)

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

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

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

3.3.7 On Receipt of a Flood Watch / Severe Weather Warning

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

- Review storm and flood intelligence to assess likely flood consequences
- Monitor weather and flood information – www.bom.gov.au
- Assess Command and Control requirements.
- Review local resources and consider needs for further resources regarding personnel, property protection, flood rescue and air support
- Notify and brief appropriate officers. This includes RCC (if established), SCC (if established), Moreland City Council and other emergency services through the EMT.
- Assess ICC readiness (including staffing of IMT and EMT) 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 Flood Warnings

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

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

-
- Who to contact for further information
 - Who to contact for emergency assistance
 - Liaise with relevant asset owners as appropriate (i.e. water and power utilities)
 - Implement response strategies as required based upon flood consequence assessment.
 - Continue to monitor the flood situation – www.bom.gov.au/vic/flood/
 - Continue to conduct reconnaissance of low-lying areas

3.4 Community Information and Warnings

Guidelines for the distribution of community information and warnings are contained in the VICSES Central Region Storm and Flood Emergency Plans and the 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, previously VICSES Flood Storm Information Line;
- Variable Message Signs (i.e. road signs);
- Community meetings;
- Newspapers;
- Email;
- Telephone trees;
- Community Flood Wardens;
- Fax Stream;
- Newsletters;
- Letter drops;
- Social media and/or social networking sites (i.e. twitter and/or facebook).

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

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

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

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

DHHS will coordinate information regarding public health and safety precautions.

3.5 Media Communication

The IC through the Public Information Unit established at the ICC will manage Media communication. If the ICC is not established, the VICSES RDO will manage all media communication. Moreland City Council will work with the IC to assist with the dissemination of public information and warnings.

3.6 Impact assessments (IA)

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

The control agency is responsible for coordinating the collection, collation and dissemination of initial impact assessment information on a whole of Government basis.

3.7 Preliminary Deployments

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

1. Determine if there are barriers to evacuation by considering warning time, safe routes, resources available and etc;
2. Should evacuation be the adopted strategy, it must be supported by public information capability and a rescue contingency plan;
3. Where it is likely people will become trapped by floodwaters, safety advice needs to be provided to people at risk advising them not to attempt to flee by entering floodwater if they become trapped, and that it may be safer to seek the highest point within the building and to telephone 000 if they require rescue.
4. For buildings known to be structurally un-suitable an earlier evacuation trigger will need to be established (return to step 1 of this cycle).

-
5. If an earlier evacuation is not possible then specific preparations must be made to rescue occupants trapped in structurally unsuitable buildings either pre-emptively or as those people call for help.
 6. Contact the Moreland MERC and MERO at the earliest opportunity to allow relief preparation to commence.

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

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

3.9 Evacuation

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

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

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

VicPol and/or Australian Red Cross (under the direction of VicPol) may take on the responsibility of registering people affected by a flood emergency including those who have been evacuated.

Refer to Evacuation Guidelines in Part 8 of the EMMV, Part 3 of the EMMV and the Moreland MEMP for guidance of evacuations for emergencies.

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

3.10 Flood Rescue

VicPol is the designated control agency for water rescue and coordinates rescues undertaken during flood events.

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

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

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

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

3.11 Aircraft Management

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

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

3.12 Resupply

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

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

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

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

3.13 Essential Infrastructure and Property Protection

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

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

The Moreland City Council does not maintain a stock of sandbags. Limited supplies are available through the local VICSES Unit and Regional Headquarters. The IC will determine the priorities related the use of sandbags, which will be consistent with the strategic priorities.

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

Property may be protected by:

- Sandbagging to minimise entry of water into buildings
- Encouraging businesses and households to lift or move contents
- Construction of temporary levees in consultation with Melbourne Water, Moreland 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 required.

3.14 Disruption to Services

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

3.15 Road Closures

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

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

3.16 Dam Failure

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

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

3.17 Levee Management

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 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.

- Several small levees identified in the City of Moreland have been detailed in **Appendix A**.

3.18 Waste Water related Public Health Issues and Critical Sewerage Assets

Inundation of critical sewerage assets including septic tanks and sewerage pump stations may result in water quality problems within the municipality. Where this is likely to occur or has occurred the responsibility agency for the critical sewerage assets (Yarra Valley Water) should undertake the following:

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

It is the responsibility of the Moreland City Council Environmental Health Officer, in consultation with the Environmental Protection Authority, to inspect and report to the MERO on any public health water quality issues relating to flooding.

3.19 After Action Review

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

All agencies involved in the storm/ flood incident should be represented at the after action review.

Part 4. EMERGENCY RELIEF AND RECOVERY ARRANGEMENTS

4.1 General

The arrangements for recovery from a storm/ flood incident within the City of Moreland are detailed in the MEMP.

4.2 Emergency Relief

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

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

Emergency relief arrangements and suitable emergency relief facilities for use during storms and floods are detailed in the MEMP. The Moreland Municipal Recovery Manager (MRM) will facilitate access to emergency relief facilities as required.

4.3 Animal Welfare

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

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

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

Arrangements for the shelter of domestic and companion animals are detailed in **Appendix D**.

4.4 Transition from Response to Recovery

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

APPENDIX A - FLOOD THREATS FOR CITY OF MORELAND

General

The Municipality faces a number of local flood management and drainage challenges. There are over 5,700 properties within Special Building Overlays (SBO) or Land Subject to Inundation Overlays (LSIO) and therefore known to potentially be at risk of flooding during 1% AEP events. Overland flows also impact properties during more frequent, high intensity flood events where existing drainage infrastructure is under capacity. The City of Moreland is bordered by Moonee Ponds Creek to the west, Merri Creek to the east, Park Street to the south and the Western Ring Road to the north.

Merri Creek, Merlynston Creek, Edgars Creek and Moonee Ponds Creek (Yarra Catchment) make up the majority of the waterways within the municipality.

Development within the City of Moreland has occurred over a long period during which community expectations and the design standard of urban areas, in terms of stormwater drainage systems and subdivisional layouts, varied from current standards. As a result, most stormwater drains were originally designed to meet the 20% AEP (5-year ARI) standard and overland flow paths were not required. As a result, many of the municipality's drainage lines lack a continuous and unobstructed overland flow path to cater for flows in excess of capacity of the piped system. Buildings and other infrastructure are at risk of being damaged by flooding. Increases in the density of urban development, and thus increases in runoff volumes, have exacerbated the issue.

Riverine Flooding

Large severe floods within the municipality generally occur as a result of a moist warm airflow from northern Australia bringing moderate to heavy rainfall over a period of 12 hours or more following a prolonged period of general rainfall. The period of general rainfall "wets up" the catchments and (partially) fills both the on-stream dams and the natural floodplain storage. These combine to increase the runoff generated during the subsequent period of heavy rainfall.

Large but less severe floods result from sequences of cold fronts during winter and spring that progressively wet up the catchments and fill the on-stream dams and the natural floodplain storage. Prolonged moderate to heavy rain leads to major flooding.

Flooding on Moonee Ponds Creek tends to rise and fall quickly

Flash Flooding and Overland Flows

Short duration, high intensity rainfall (usually associated with thunderstorms) can also cause localised flooding within the municipality along overland flow paths when the local urban drainage system surcharges. Such events, which are mainly confined to the summer months, do not generally create widespread flooding since they only last for a short time and affect limited areas. Flooding from these storms occurs with little warning and localised damage can be severe.

High intensity rainfall such as associated with thunderstorms giving average rainfall rates of more than 20mm/hour for an hour or more is likely to lead to flash flooding and / or overland flows, across the urbanised parts of the municipality.

Blocked or capacity impaired stormwater drains can also lead to overland flows and associated flooding: the drain surcharges and excess water flows above ground.

DESCRIPTION OF MAJOR WATERWAYS & DRAINS

There are four major waterways running through the City of Moreland:

- **Merri Creek** rises in Melbourne's outer north between Craigieburn and Kalkallo and flows south along the boundaries of the Cities of Hume and Whittlesea receiving several creeks, tributaries and drains before entering the City of Moreland at Mahoneys Road, Fawkner. Merri Creek then forms the eastern boundary of the municipality, flowing through Fawkner and Coburg North where it receives Edgars Creek. Merri Creek continues south through Coburg, Brunswick East and Fitzroy North before exiting the City near St Georges Road. Merri Creek discharges into Yarra River at Yarra Bend Park in Fairfield. See **Appendix G** for a schematic of Merri Creek.
- **Moonee Ponds Creek** forms the western boundary of the municipality. It rises in Oaklands Junction east of Mickleham Road in the City of Hume and enters Moreland at Glenroy and the Jacana Retarding Basin, receiving Chapman Ave Drain, Westbreen Creek and Melville Main Drain as it forms the western boundary of the municipality. Moonee Ponds Creek leaves Moreland south of Brunswick Road in Brunswick West and continues on to flow into the Yarra River in Docklands. See **Appendix G** for a schematic of Moonee Ponds Creek
- **Merlynston Creek** flows through the centre of the City of Moreland, entering the Municipality from Hume at the Western Ring Road and the Comm. Serum Laboratories Retarding Basin. It flows southeast through Northern Memorial Park before receiving Campbellfield Creek at the Fawkner Crematorium & Memorial Park. The Creek is then piped underground where it joins Merri Creek at Coburg North.
- **Edgars Creek** is a tributary of Merri Creek, beginning in two branches in the City of Whittlesea at Wollert before converging and continuing south through Epping, Lalor and Thomastown before entering the City of Darebin and continuing through Reservoir before where it enters the City of Moreland, discharging into Merri Creek north of Murray Road, Coburg.

The creeks, channels & drains that flow through, or form a boundary of the City of Moreland are contained within the table below. Catchment Schematics for the Merri Creek and Moonee Ponds Creek are included within **Appendix G**.

Melbourne Water Drains & Waterways	Suburb/s	Melbourne Water Drains & Waterways	Suburb/s
Acacia St Drain	Glenroy	Lygon St Main Drain Park St Diversion	Brunswick & Brunswick East
Albion St Main Drain	Brunswick & Brunswick West	Lynch Rd Main Drain	Fawkner & Hadfield
Campbellfield Creek	Coburg North, Fawkner, Glenroy & Hadfield	Major Rd Drain	Fawkner & Hadfield
Cardinal Rd Drain	Glenroy	Melville Main Drain	Brunswick West, Coburg, Pascoe Vale & Pascoe Vale South
Chapman Ave Main Drain	Glenroy & Oak Park	Merlynston Creek	Glenroy & Hadfield
Coonans Rd Main Drain	Brunswick West & Pascoe Vale South	Merlynston Main Drain	Coburg North, Hadfield & Pascoe Vale
Edgars Creek	Coburg North	Merri Creek	Coburg, Coburg North, Fawkner & Fitzroy North
Elizabeth St Main Drain	Coburg & Coburg North	Middle St Drain	Hadfield
Fawkner East Drain	Coburg North & Fawkner	Moonee Ponds Creek	Brunswick West, Glenroy, Gowanbrae, Pascoe Vale & Pascoe Vale South
Fawkner North Drain	Fawkner & Glenroy	Royal Park Main Drain	Brunswick West
Gladstone Park Drain	Gowanbrae	South St Drain	Hadfield
Glenlyon Rd Drain	Brunswick East & Fitzroy North	The Avenue Main Drain	Coburg
Harding St Main Drain	Coburg	West St Drain	Glenroy, Hadfield & Pascoe Vale
Hope St Main Drain	Brunswick & Brunswick West	Westbreen Creek	Glenroy & Pascoe Vale

Table A1 – Melbourne Water Drains and Waterways within or bordering the City of Moreland

Flood Mitigation Systems

Flood mitigation has predominantly been developed in the form of 5 Retarding Basins and 1 Levee. These flood mitigation systems are as follows in the tables below. To view their locations and connecting waterway/drainage systems, see map B in **Appendix F**. There are no formal pumping stations built within the City of Moreland.

Retarding Basins

Melbourne Water Retarding Basin	On Drain/ Waterway	Area	Storage Capacity	Spillway Crest Level	Full Supply Level	Embankment Crest Level	ANCOLD Hazard Rating	Houses In Flow Path (dam breach)	Melway Reference
Box Forest Road	Merlynston Creek	3.3 ha	54 ML	First: 77.2mAHD Second: 77.8mAHD	77.8m AHD	4.3m (78.7m AHD)	High C	1	17 E2
Campbellfield Creek	Campbellfield Creek	5.4 ha	132 ML	83.9m AHD	84.8m AHD	4.9m	High C	4	7 F12
Comm Serum Laboratories	Merlynston Creek	16 ha	382 ML	102.2m AHD	103.1m AHD	10.1m (103.7m AHD)	High A	56	7 B11
Jacana	Moonee Ponds Creek	65 ha	2,850 ML	First: 66.6mAHD Second: 68.0m AHD	68.0m AHD	12m (70.2m AHD)	Extreme	40	6 D12
Merri Creek	Merri Creek	1.3 ha	~ 50 ML	N/A	Unknown	2.0m (32.9m AHD)	Very Low	0	30 C8

Table A2 – Melbourne Water Retarding Basins within or adjoining the City of Moreland

Reserve / Park	On Drain / Waterway	Location	Melway Reference
Oak Park Sports Centre	Chapman Avenue Main Drain	Pascoe Vale Road, Oak Park	16H7
Esslemont Reserve	Westbreen Creek	Somerset Street, Pascoe Vale	16J9
Charles Mutton Reserve	Fawkner East Drain	Creedon Street, Fawkner	17J5
Moomba Park	Merri Creek	Somerlayton Crescent, Fawkner	7K11
Tate Reserve	Merri Creek	Cole Crescent, Coburg	30A2
Egan Reserve	Merri Creek	Rennie Street, Coburg	30B3
Sumner Park	Merri Creek	Alister Street, Brunswick East	30C9
Dunstan Reserve	Melville Main Drain	Peacock Street, Brunswick West	29B4

Table A3 – Moreland City Council Reserves & Parks that may hold water during a flood event

Levees

Levee	Reach	Side	Levee Height	Levee Length	Expected Level of Protection	ANCOLD Hazard Rating	Consequences of Failure	Melway Reference
Merri Creek, Fitzroy North	Alister Street	West	1.8m (31.50m AHD)	0.3km	1% AEP Flood (freeboard unknown). 1% AEP Flood Level is: 32.10m AHD. Max Recorded Flood: 30.48m AHD	Significant	11 residential properties at risk of flooding along Alister Street	30 C9

Table A4 – Levees within the City of Moreland

Sewerage Infrastructure

Sewerage Infrastructure of note during a severe flood event located within the City of Moreland is contained within the following table. To view their locations, view mapping in **Appendix F**.

Sewer Emergency Relief Points

Contact the Infrastructure Operator EMLO/ Duty Officer for information on any recent or planned releases at Sewer Emergency Release Points 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
Acacia Street Drain	-	Yarra Valley Water	Nelson Street, Glenroy	16 H2
Campbellfield Creek	West (Hume)	Yarra Valley Water	The Gateway, Broadmeadows	7 F11
Edgars Creek	East	Yarra Valley Water	Jackson Reserve, Outlook Road, Coburg North	17 K10
Harding Street Main Drain	-	Yarra Valley Water	Harding Street at Park Street, Coburg	29 J1
Local Drainage	-	Yarra Valley Water	Albion Street at Peacock St, Brunswick West	29 B5
Melville Main Drain	-	Yarra Valley Water	Cnr Gaffney Street and Derby Street, Pascoe Vale	17 D10
Melville Main Drain	-	Yarra Valley Water	Cnr Sussex Street and Ohea Street, Pascoe Vale South	17 D11
Melville Main Drain	-	Yarra Valley Water	Cramer Street, Coburg	17 E11
Melville Main Drain	-	Yarra Valley Water	Linsey Street, Coburg	17 E12
Melville Main Drain	-	Yarra Valley Water	Haig Avenue, Coburg	29 F4
Melville Main Drain	-	Yarra Valley Water	Lane between Cornwall Street and Shamrock Street, Brunswick West	29 E4
Melville Main Drain	-	Yarra Valley Water	Cnr Hope Street and Percy Street, Brunswick	29 G6

On Drain / Waterway	Bank / Side of Waterway	Operator	Location	Melway Reference
Melville Main Drain	-	Yarra Valley Water	Newman Street at Stranks Avenue, Brunswick West	29 D5
Melville Main Drain	-	Yarra Valley Water	Wales Street, Brunswick West	29 C4
Merlynston Creek	-	Yarra Valley Water	Martin Reserve, Box Forest Road, Hadfield	17 F2
Merlynston Main Drain	-	Yarra Valley Water	Cnr Sussex Street and Kent Road, Pascoe Vale	17 E7
Merlynston Main Drain	-	Yarra Valley Water	Bridges Avenue, Coburg North	17 E7
Merlynston Main Drain	-	Yarra Valley Water	Allenby Street, Coburg North	17 G9
Merri Creek	West (Moreland)	Melbourne Water	De Chene Reserve on Armstead Avenue, Coburg	18 A12
Merri Creek	West (Moreland)	Melbourne Water	Tate Reserve on Grant Street, Coburg	30 B2
Merri Creek	West (Moreland)	Yarra Valley Water	Albion Street, Brunswick East	30 B6
Moonee Ponds Creek	East (Moreland)	City West Water	Pascoe Vale Road, Pascoe Vale	16 J9
Moonee Ponds Creek	East (Moreland)	Yarra Valley Water	Parkside Boulevard, Pascoe Vale South	28 K3
Moonee Ponds Creek	West (Moonee Valley)	Melbourne Water	Cross Keys Reserve, Woodland Street, Strathmore	29 A1
Moonee Ponds Creek (Bent Street Main Drain)	West (Moonee Valley)	Melbourne Water	Fanny Street, Moonee Ponds	29 A6
South Street Drain	-	Yarra Valley Water	Cnr South Street and Fairmont Street, Hadfield	17 E5
West Street Drain	-	Yarra Valley Water	Cnr West Street and Caldwell Street, Hadfield	17 B4

Table A5 – Sewer Emergency Relief Points within or close to the City of Moreland

Flood Warning System

Within the City of Moreland, Melbourne Water has 3 hydrographic monitoring sites along the 3 major waterways in the municipality. These are outlined in the table below. There are also monitors upstream along the Merri and Edgars Creeks; at Craigieburn, Somerton and Reservoir. These gauges can be monitored online through Melbourne Water at: <http://www.melbournewater.com.au/waterdata/rainfallandriverleveldata/Pages/Rainfall-and-river-level-new.aspx> or through the Bureau of Meteorology at: http://www.bom.gov.au/cgi-bin/wrap_fwo.pl?IDV60201.html. To view their locations, see mapping in **Appendix F**.

Melbourne Water Hydrographic Monitoring Station	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge	Melway Reference
Merlynston Creek at Fawcner Cemetery	229402A	Fawcner Cemetery at Sussex St, Hadfield	✓	✓	17 E5
Merri Creek at Bell Street, Coburg	229645A	West side of the Creek at the Bell St Bridge, Coburg	✓	✓	30 A1
Moonee Ponds Creek at Jacana Retarding Basin, Glenroy	229665A	Jacana Retarding Basin near Embankment, Glenroy	✓	✓	6 D12

Table A6 – Hydrographic Monitoring Stations within the City of Moreland

Other gauges located in adjoining Municipalities that may assist in flood warning for the Moonee Ponds, Merri and Edgars Creeks are outlined below. To view their locations, see mapping in **Appendix F**.

Melbourne Water Hydrographic Monitoring Station	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge	Melway Reference
Edgars Creek at Edwardes Lake, Reservoir	229610A	Edwardes Lake at Edwardes Street, Reservoir	✓		18D5
Essendon North	586182	North Essendon Service Reservoirs on Lebanon St, Essendon Fields		✓	16 D7
Essendon Airport AWS	86038	Essendon Airport at Perimeter Rd, Essendon Fields		✓	16 E8
Greenvale Reservoir	586028	Greenvale Reservoir, entrance off Somerton Road, Greenvale		✓	179 E8
Merri Creek at Summerhill Road, Craigieburn North	229627A	West side of the creek 200m south of Summerhill Rd, Craigieburn	✓	✓	387 H3
Merri Creek at Craigieburn Road, Craigieburn	229257A	East side of the creek at Craigieburn Rd bridge, Wollert	✓		387 E10
Merri Creek at Cooper Street, Somerton	229603A	West side of the creek, 200m north of Cooper Street, Somerton	✓	✓	180 J9
Merri Creek at St Georges Road, Northcote	229149A	East side of the creek in Green Reserve at end of Union St, Northcote	✓	✓	30 D10
Moonee Ponds Creek at Flemington	229643A	West side of the channel along the Moonee Ponds Creek Trail near Delhi Ct, Travancore	✓	✓	29 B12

Table A7 – Hydrographic Monitoring Stations within adjacent Municipalities to the City of Moreland

There are currently 3 Melbourne Water flood warning gauges on Merri Creek that could be used to assist with public safety through the issue of flood warnings. These are at Somerton, Coburg & Northcote. Those gauges with flood class levels established are outlined in the table below.

Hydrographic Monitoring Station	River / Creek Flood Class Level		
	Minor	Moderate	Major
Merri Creek at Cooper Street, Somerton	3.4m	3.7m	4.4m
Merri Creek at Bell Street, Coburg	2.9m	3.4m	4.8m
Merri Creek at St Georges Road, Northcote	3.2m	3.8m	5.0m

Table A8 – Hydrographic Monitoring Stations with established Flood Class Levels for the City of Moreland

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

The Bureau does not issue formal flood warnings for Moonee Ponds Creek or Merlynston Creek.

Historic Floods

Significant floods (with high flood gauge levels and likely flooding consequences to property and infrastructure) to have occurred within the City of Moreland are as follows in the table below. Where available, radar loops of the storm can be accessed by clicking on the flood event date.

Event	Moonee Ponds Creek at Jacana R/B (229665A)		Merlynston Creek at Fawkner (229402A)		Edgars Creek at Reservoir (229610A)	Merri Creek at Coburg East (229645A)		Merri Creek at Northcote (229149A)	
	Rainfall at Gauge	Creek Height	Rainfall at Gauge	Creek Height	Creek Height	Rainfall at Gauge	Creek Height	Rainfall at Gauge	Creek Height
Normal Water Level	-	0.3m	-	0.2m	-	-	0.5m	-	0.3m
Minor Flood Class	-	-	-	-	-	-	2.9m	-	3.2m
Moderate Flood Class	-	-	-	-	-	-	3.4m	-	3.8m
Major Flood Class	-	-	-	-	-	-	4.8m	-	5.0m
23 th September 1916	-	-	-	-	-	-	4.51m	-	-
1 st December 1934	-	-	-	-	-	-	4.85m	-	-
20 th October 1937	-	-	-	-	-	-	2.76m	-	-
18 th March 1946	-	-	-	-	-	-	4.36m	-	-
15 th July 1952	-	-	-	2.36m	-	-	4.48m	-	-
10 th November 1954	-	-	-	-	-	-	4.25m	-	-
18 th September 1960	-	1.60m	-	-	-	-	3.97m	-	-
26 th January 1963	-	-	-	2.67m	-	-	-	-	-
13 th July 1963	-	-	-	-	-	-	4.67m	-	-
9 th November 1971	-	-	-	-	-	-	3.51m	-	-
15 th May 1974	-	-	-	-	-	-	4.74m	-	-
7 th April 1977	-	-	-	-	0.69m	-	4.46m	-	4.81m
8 th August 1978	-	-	-	-	0.46m	-	2.55m	-	3.29m
16 th October 1983	-	-	94mm / 40 hrs	-	0.69m	86mm / 34 hrs	3.18m	-	3.64m
30 th July 1987	-	-	65mm / 32 hrs	-	0.57m	59mm / 33 hrs	3.91m	-	3.98m
11 th June 1989	-	-	36mm / 22 hrs	-	0.66m	32mm / 23 hrs	3.98m	-	3.91m
18 th July 1990	-	-	39mm / 7 hrs	-	0.62m	46mm / 7 hrs	3.27m	-	3.34m
28 th December 1993	56mm / 39 hrs	0.22m	130mm / 38 hrs	-	0.57m	125mm / 38 hrs	2.95m	-	3.69m

Event	Moonee Ponds Creek at Jacana R/B (229665A)		Merlynston Creek at Fawkner (229402A)		Edgars Creek at Reservoir (229610A)	Merri Creek at Coburg East (229645A)		Merri Creek at Northcote (229149A)	
	Rainfall at Gauge	Creek Height	Rainfall at Gauge	Creek Height	Creek Height	Rainfall at Gauge	Creek Height	Rainfall at Gauge	Creek Height
Normal Water Level	-	0.3m	-	0.2m	-	-	0.5m	-	0.3m
Minor Flood Class	-	-	-	-	-	-	2.9m	-	3.2m
Moderate Flood Class	-	-	-	-	-	-	3.4m	-	3.8m
Major Flood Class	-	-	-	-	-	-	4.8m	-	5.0m
24 th October 2000	77mm / 49 hrs	6.85m	72mm / 49 hrs	0.78m	0.35m	72mm / 49 hrs	2.52m	82mm / 48 hrs	2.88m
23 rd March 2001	75mm / 38 hrs	7.72m	79mm / 38 hrs	0.85m	0.54m	61mm / 38 hrs	1.86m	58mm / 35 hrs	2.58m
3 rd December 2003	8mm / 8 hrs	3.42m	95mm / 8 hrs	2.61m	-	108mm / 8 hrs	4.13m	86mm / 2 hrs	4.64m
3 rd February 2005	157mm / 28 hrs	12.57m	158mm / 28 hrs	2.45m	1.19m	135mm / 28 hrs	4.28m	133mm / 28 hrs	4.35m
5th February 2011	62mm / 14 hrs	3.79m	71mm / 30 hrs	1.14m	0.95m	71mm / 27 hrs	3.08m	74mm / 15 hrs	3.09m
25th December 2011	40mm / 5 hrs	3.31m	51mm / 5 hrs	2.02m	0.13m	42mm / 5 hrs	3.33m	46mm / 5 hrs	3.68m
1st June 2013	75mm / 14 hrs	5.38m	79mm / 14 hrs	0.99m	1.29m	74mm / 14 hrs	3.85m	79mm / 14 hrs	4.21m
29th December 2016	55mm / 10 hrs	8.25m	58mm / 10 hrs	0.95m	1.63m	62mm / 10 hrs	3.64m	41mm / 10 hrs	3.89m
9th April 2017	37mm / 21 hrs	2.93m	38mm / 21 hrs	1.02m	1.02m	35mm / 15 hrs	1.58m	28mm / 14 hrs	2.00m
3rd December 2017	68mm / 35 hrs	2.44m	71mm / 35 hrs	0.71m	0.58m	97mm / 38 hrs	1.84m	96mm / 38 hrs	2.55m
30th January 2018	37mm / 12 hrs	3.07m	41mm / 11 hrs	0.84m	0.58m	42mm / 11 hrs	1.59m	36mm / 8 hrs	2.09m

Table A12 – Selection of Historical Flood Events along the Moonee Ponds, Merlynston & Merri Creeks

Dam Failure

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

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

Table A13 – Melbourne Water Reservoirs that pose a risk to the City of Moreland from Dam Failure

APPENDIX B - TYPICAL FLOOD PEAK TRAVEL TIMES

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

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

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

Typical Travel Times

Location From (gauge)	Location To (gauge)	Typical Travel Time	Comments
MOONEE PONDS CREEK			
Jacana RB	Flemington	First Peak: Flemington to peak 15 hours to 5 hours before Jacana Second Peak: Flemington to peak 1 hour before Jacana, or 1 to 5 hours afterwards	Two flood peaks occur and are generally experienced downstream earlier than upstream because of the existence of the Retarding Basin at Jacana
MERRI CREEK			
Fawkner	Coburg	Between 2 hours to 3 hours	Minor Flood
Reservoir	Coburg	Between 2 hours to 4 hours	
Coburg	Northcote	Between 1 min to 2 hours	
Fawkner	Coburg	Between 2 hours to 6 hours	Moderate Flood
Reservoir	Coburg	Between 1 hour to 3 hours	
Coburg	Northcote	Between 1 min to 2 hours	
Coburg	Northcote	Between 1 min to 2 hours	Major Flood

Table B1 – Typical Flood Travel Times between gauges on the Moonee Ponds and Merri Creeks

Historical Travel Times

Flood Event	Location From (gauge)	Location To (gauge)	Flood Peak Travel Time	Flood Class at
MOONEE PONDS CREEK				N/A
24 th October 2000	Jacana RB	Flemington	First Peak: Flemington peaked 6 hours before Jacana; Second Peak: 3 hours	-
23 rd March 2001	Jacana RB	Flemington	Flemington peaked 5 hours before Jacana	-
3 rd December 2003	Jacana RB	Flemington	First Peak: Flemington peaked 10 hours before Jacana; Second Peak: Both gauges peaked within an hour of each other	-
3 rd February 2005	Jacana RB	Flemington	First Peak: Flemington peaked 5 hours before Jacana; Second Peak: 1 hour	-

Flood Event	Location From (gauge)	Location To (gauge)	Flood Peak Travel Time	Flood Class at
5 th February 2011	Jacana RB	Flemington	First Peak: Flemington peaked 13 hours before Jacana; Second Peak: Flemington peaked 1 hour before Jacana	-
25 th December 2011	Jacana RB	Flemington	First Peak: Flemington peaked 15 hours before Jacana; Second Peak: Flemington peaked 1 hour before Jacana	-
1 st June 2013	Jacana RB	Flemington	3 hours	-
29 th December 2016	Jacana RB	Flemington	First Peak: 1 hour; Second Peak: 5 hours	-
MERRI CREEK				COBURG
16 th October 1983	Reservoir	Coburg	2 hours	Minor
	Coburg	Northcote	Northcote peaked 1 hour before Coburg	
30 th July 1987	Reservoir	Coburg	2 hours	Moderate
	Coburg	Northcote	2 hours	
11 th June 1989	Reservoir	Coburg	1 hour	Moderate
	Coburg	Northcote	1 hour	
18 th July 1990	Craigieburn	Coburg	4 hours	Minor
	Coburg	Northcote	1 hour	
28 th December 1993	Reservoir	Coburg	4 hours	Minor
	Coburg	Northcote	1 hour	
3 rd December 2003	Fawkner	Coburg	2 hours	Moderate
	Coburg	Northcote	Less than 1 hour	
3 rd February 2005	Fawkner	Coburg	2 hours	Moderate
	Reservoir	Coburg	2 hours	
	Coburg	Northcote	Northcote peaked 2 hours before Coburg	
5 th February 2011	Fawkner	Coburg	3 hours	Minor
	Reservoir	Coburg	1 hour	
	Coburg	Northcote	1 hour	
25 th December 2011	Fawkner	Coburg	2 hours	Minor
	Coburg	Northcote	1 hour	
1 st June 2013	Fawkner	Coburg	6 hours	Moderate
	Reservoir	Coburg	3 hours	
	Coburg	Northcote	Less than 1 hour	
29 th December 2016	Fawkner	Coburg	Coburg peaked 5 hours before Fawkner	Moderate
	Reservoir	Coburg	1 hour	
	Coburg	Northcote	1 hour	

Table B2 – Historical Flood Travel Times between gauges on the Moonee Ponds and Merri Creeks

APPENDIX C1 – MOONEE PONDS CREEK FLOOD EMERGENCY PLAN

Overview of Flooding Consequences

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

Summary of Consequences in a 1% AEP (100yr ARI) flood along Moonee Ponds Creek

Property					
Properties	7				
Residential	7				
Commercial	0				
Industrial	0				
Public Land	0				
Rural	0				
Community Infrastructure					
Health Facilities	0		Child Care / Kindergartens	0	
Care Facilities	0		Community Venues	0	
Retirement Villages	0		Places of Worship	0	
Schools / Colleges	0		Prisons	0	
Essential Infrastructure					
Major Roads	0		Police Stations	0	
Major Rail	0		Government Buildings	0	
Bus Routes	1	490 call on-demand service	Sewerage Facilities	4	Emergency Relief Points
Power Facility	0		Levees	0	
Comms Services	0		Drainage Facilities	1	Jacana Retarding Basin
Emergency Services	0		Airports / Airfields	0	
Tourism / Recreation					
Sports Facilities	0		Caravan Parks	0	
Recreation Facilities	2	Moonee Ponds Creek Trail; & Oak Park Football Club	Camping Grounds	0	
Government Boundaries					
Local Gov't Areas	1	Moreland	CMA	1	Port Phillip & Westernport
Adjacent LGAs	4	Hume; Brimbank; Moonee Valley; and Melbourne	CFA District	0	
SES Unit Area	1	Broadmeadows	MFB District	1	Northern

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

Moonee Ponds Creek in the City of Moreland, and the adjoining suburbs of Gowanbrae, Glenroy, Oak Park, Pascoe Vale, Pascoe Vale South & Brunswick West are located between 4-12km north of Melbourne in an established residential area. Moonee Ponds Creek is the prominent watercourse that forms the western border to the City of Moreland, flowing south from the City of Hume.

From Strathmore to Flemington, Moonee Ponds Creek takes the form of an open concreted stormwater drain, aside from a section in Brunswick West between Acacia Grove and Donald Avenue. Water levels can rise and fall very quickly along Moonee Ponds Creek, with the Moonee Ponds Creek Trail subject to flooding in low lying sections. High Intensity, short duration rainfall events can cause flash flooding in and around the stormwater drains that feed Moonee Ponds Creek, while prolonged rainfall may see the creek flood. See mapping in **Appendix F** for more insight into flooding in the area.

Warning Times

Neither the BoM nor Melbourne Water currently provides flood forecasts for the Moonee Ponds Creek. All flood response actions must therefore be driven by rainfall and / or river level observations. Telemetered water level / flood gauges are located at Jacana and Flemington within the Moonee Ponds Creek catchment. See **Appendix B** for typical flood travel times for Moonee Ponds Creek.

Melbourne Water Hydrographic Monitoring Station	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge	Melway Reference
Moonee Ponds Creek at Jacana Retarding Basin, Glenroy	229665A	Jacana Retarding Basin near Embankment, Glenroy	✓	✓	6 D12
Moonee Ponds Creek at Flemington	229643A	West side of the channel along the Moonee Ponds Creek Trail near Delhi Ct, Travancore	✓	✓	29 B12
Essendon North	586182	North Essendon Service Reservoirs on Lebanon St, Essendon Fields		✓	16 D7
Essendon Airport AWS	86038	Essendon Airport at Perimeter Rd, Essendon Fields		✓	16 E8
Greenvale Reservoir	586028	Greenvale Reservoir, entrance off Somerton Road, Greenvale		✓	179 E8

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

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

Areas of Flood Risk

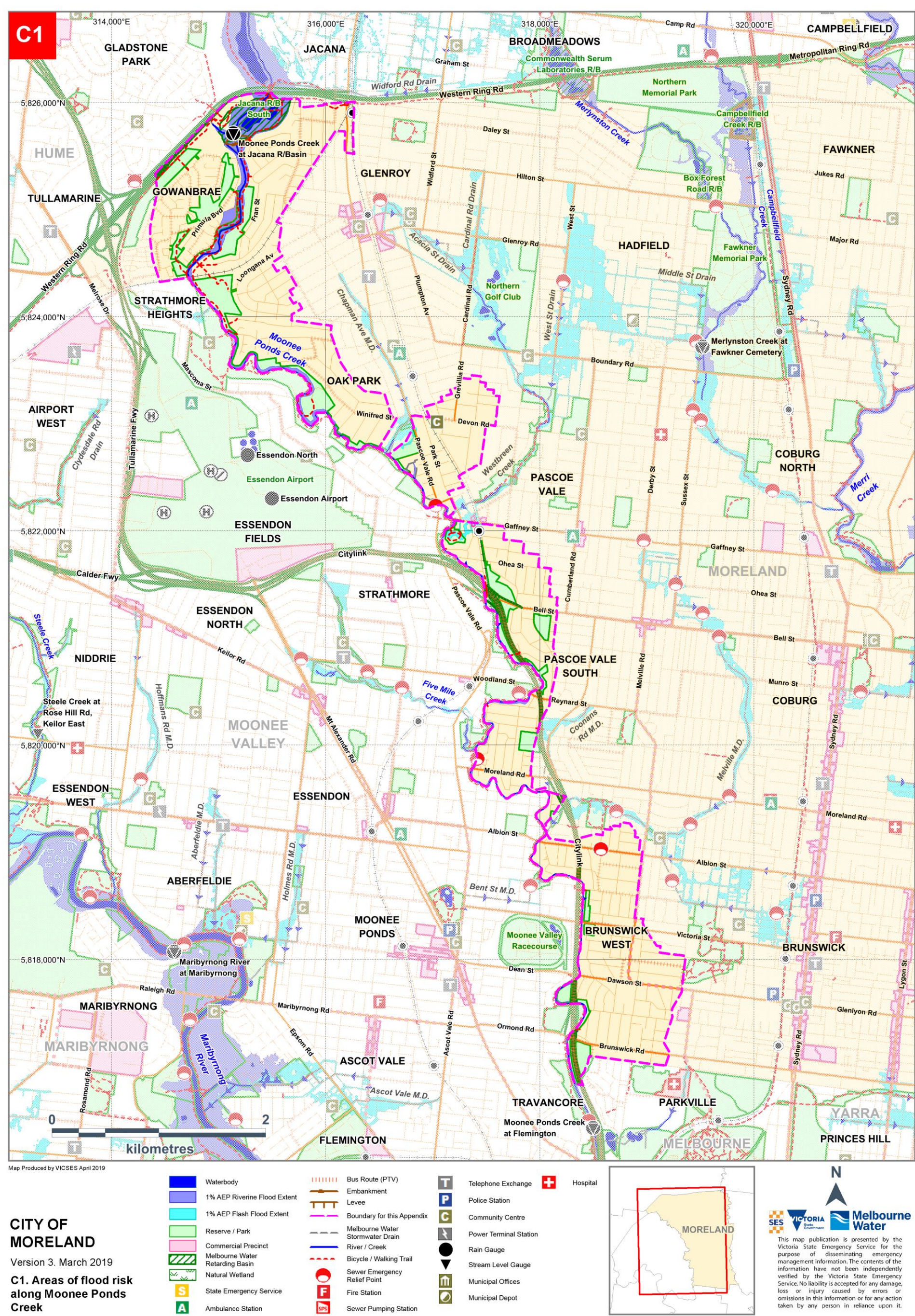


Figure C1 – Areas of flood risk along Moonee Ponds Creek in the City of Moreland

Moreland Storm and Flood Emergency Plan – A Sub-Plan of the MEMPlan

Properties at Flood Risk

Properties listed in the table below are at risk from flooding along Moonee Ponds Creek during a 1% AEP flood event. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Moonee Ponds Creek (Melbourne Water, January 1996) flood mapping and risk assessment program.

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

Properties at risk from Flooding along Moonee Ponds Creek during a 1% AEP event				
Residential	Commercial	Industrial	Rural	Public Use
Street No. at Risk	Street	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
2/1A	John Street	Oak Park	Moonee Ponds Creek	Riverine
3/1A	John Street	Oak Park	Moonee Ponds Creek	Riverine
4/1A	John Street	Oak Park	Moonee Ponds Creek	Riverine
1/2A	John Street	Oak Park	Moonee Ponds Creek	Riverine
3/2	Sylvester Street	Oak Park	Moonee Ponds Creek	Riverine
4/2	Sylvester Street	Oak Park	Moonee Ponds Creek	Riverine
5/2	Sylvester Street	Oak Park	Moonee Ponds Creek	Riverine
Total				
7				

Table C1.3 – Properties at risk of flooding along the Moonee Ponds Creek catchment in the City of Moreland

Isolation

No major isolation risks exist for areas around Glenroy, Gowanbrae, Oak Park, Pascoe Vale, Pascoe Vale South or Brunswick West during a 1% AEP (100yr ARI) event. Some localised short-duration isolation may occur due to flash flooding.

Essential Infrastructure

There are several sewer emergency relief points adjacent to Moonee Ponds Creek that may be discharged during intense rainfall events.

During an event, see the Public Transport Victoria's Website for details on delays or alterations to services. <http://ptv.vic.gov.au/live-travel-updates/>. A map of Public Transport routes within Moreland is available via the website at: https://static.ptv.vic.gov.au/siteassets/Maps/Localities/PDFs/37_Moreland_LAM.pdf

Apart from the roads outlined below, all other essential infrastructure and services areas around Moonee Ponds Creek 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 along Moonee Ponds Creek. Check the VicRoads website for more details: <https://traffic.vicroads.vic.gov.au/>

VicRoads Roads flooded in a 1% AEP (100yr ARI) event
<ul style="list-style-type: none"> Nil expected in City of Moreland

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

Moreland City Council Roads flooded in a 1% AEP (100yr ARI) event
GOWANBRAE
<ul style="list-style-type: none"> Adelaide Boulevard

Table C1.5 – Moreland City Council Possible Road Closures during a flooding event

Flood Mitigation

Retarding Basins

Melbourne Water Retarding Basin	On Drain/ Waterway	Area	Storage Capacity	Spillway Crest Level	Full Supply Level	Embankment Crest Level	ANCOLD Hazard Rating	Houses In Flow Path (dam breach)	Melway Reference
Jacana	Moonee Ponds Creek	65 ha	2,850 ML	First: 66.6mAHD Second: 68.0 AHD	68.0m AHD	11.6m (69.6m AHD)	Extreme	40	6 D12

Table C1.6 – Melbourne Water Retarding Basins within the Moonee Ponds Creek catchment in the City of Moreland

A number of reserves and parklands along Moonee Ponds Creek may hold a large amount of stormwater during an event. These include:

Reserve / Park	On Drain / Waterway	Location	Melway Reference
Oak Park Sports Centre	Chapman Avenue Main Drain	Pascoe Vale Road, Oak Park	16H7

Table C1.7 – Parks and Reserves along Moonee Ponds Creek in the City of Moreland that will likely flood during a 1% AEP event

Sewerage Infrastructure

Sewerage Infrastructure of note during a severe flood event located along Moonee Ponds Creek is contained within the following table.

Sewer Emergency Relief Points

There are Sewer Emergency Relief Points along Moonee Ponds 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
Acacia Street Drain	-	Yarra Valley Water	Nelson Street, Glenroy	16 H2
Local Drainage	-	Yarra Valley Water	Albion Street at Peacock St, Brunswick West	29 B5
Melville Main Drain	-	Yarra Valley Water	Cnr Gaffney Street and Derby Street, Pascoe Vale	17 D10
Melville Main Drain	-	Yarra Valley Water	Cnr Sussex Street and Ohea Street, Pascoe Vale South	17 D11
Melville Main Drain	-	Yarra Valley Water	Cramer Street, Coburg	17 E11
Melville Main Drain	-	Yarra Valley Water	Linsey Street, Coburg	17 E12
Melville Main Drain	-	Yarra Valley Water	Haig Avenue, Coburg	29 F4
Melville Main Drain	-	Yarra Valley Water	Lane between Cornwall Street and Shamrock Street, Brunswick West	29 E4
Melville Main Drain	-	Yarra Valley Water	Cnr Hope Street and Percy Street, Brunswick	29 G6
Melville Main Drain	-	Yarra Valley Water	Newman Street at Stranks Avenue, Brunswick West	29 D5
Melville Main Drain	-	Yarra Valley Water	Wales Street, Brunswick West	29 C4
Moonee Ponds Creek	East (Moreland)	City West Water	Pascoe Vale Road, Pascoe Vale	16 J9
Moonee Ponds Creek	East (Moreland)	Yarra Valley Water	Parkside Boulevard, Pascoe Vale South	28 K3
Moonee Ponds Creek	West (Moonee Valley)	Melbourne Water	Cross Keys Reserve, Woodland Street, Strathmore	29 A1
Moonee Ponds Creek (Bent Street Main Drain)	West (Moonee Valley)	Melbourne Water	Fanny Street, Moonee Ponds	29 A6
South Street Drain	-	Yarra Valley Water	Cnr South Street and Fairmont Street, Hadfield	17 E5
West Street Drain	-	Yarra Valley Water	Cnr West Street and Caldwell Street, Hadfield	17 B4

Table C1.8 – Sewer Emergency Relief Points in the Moonee Ponds Creek Catchment in the City of Moreland

Command, Control and Coordination

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

Flood Impacts & Operational Considerations (Intelligence Cards)

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

Intelligence Cards have been included for the following locations:

- Moonee Ponds Creek at Jacana Retarding Basin, Glenroy
- Moonee Ponds Creek at Flemington

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

Version 3 – April 2019



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

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

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
12.0m		<ul style="list-style-type: none"> Glory hole (intake structure) spillway level reached. Flows expected to increase downstream of the retarding basin. 	
12.52m		<ul style="list-style-type: none"> Secondary spillway (outlet structure) level reached. (Spillway level lowered 0.9m from 13.42m in May 2016) 	Flows will continue to increase downstream of the retarding basin.
12.57m	February 2005 Flood Level Peak		
15.62m		<ul style="list-style-type: none"> Top of Embankment reached. (Embankment was raised 0.5m from 15.12m in August 2016) 	
15.9m	1% AEP (100yr ARI) Flood Level	<ul style="list-style-type: none"> Note: It is not known at what level infrastructure contained below starts being flooded <p>Properties at Flood Risk</p> <p>7 Properties in Total</p> <ul style="list-style-type: none"> Units 3-5/2 Sylvester Street, Oak Park Units 2-4/1A & 1/2A John Street, Oak Park <p>Community Infrastructure Flooded</p> <ul style="list-style-type: none"> Moonee Ponds Creek Bicycle Trail flooded at various locations The Pedestrian Bridge over Moonee Ponds Creek along Adelaide Boulevard near Wonga Place may be flooded Oak Park Football Club, John Pascoe Fawkner Reserve, Oak Park 	<p>VICSES will provide warnings using EM-COP and VicEmergency to Moreland Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident.</p> <p>MCC EHOs to have awareness of potential public and environmental health impacts of outfalls from Sewer Emergency Relief Structures within floodwaters.</p>

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		Essential Infrastructure Likely Impacted <ul style="list-style-type: none"> Bus Route 490 call on-demand service through Gowanbrae if Adelaide Boulevard flooded Sewer Emergency Relief Points located at Pascoe Vale Road, Pascoe Vale; Parkside Boulevard, Pascoe Vale South; Cross Keys Reserve at Woodland Street, Strathmore; and Fanny Street, Moonee Ponds. Water Over Road <ul style="list-style-type: none"> Adelaide Boulevard, Gowanbrae 	<p>VICSES to respond on a request by request basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.</p>

Table C1.9 – Breakdown of likely consequences at various Jacana Retarding Basin gauge level heights along Moonee Ponds Creek in Moreland with operational considerations

FLOOD INTELLIGENCE CARD – FLEMINGTON GAUGE, MOONEE PONDS CREEK

Version 3 – April 2019



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

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LOCATION	West side of the channel along the Moonee Ponds Creek Trail near Delhi Ct, Travancore
MELWAY REFERENCE:	29 B12
STREAM:	Moonee Ponds Creek
GAUGE NUMBER:	229643A
GAUGE ZERO:	2.37m AHD
GAUGE TYPE	Stream Level & Rain

MINOR:	Not Established
MODERATE:	Not Established
MAJOR	Not Established
LEVEE HEIGHT:	3.45m (in City of Melbourne)
TELEMETRIC/MANUAL	Telemetric
HIGHEST RECORDED FLOOD:	3.13m (1 st June 2013)

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
2.94m	1% AEP (100yr ARI) Flood Level	<ul style="list-style-type: none"> Nil expected in City of Moreland 	<p>VICSES will provide warnings using EM-COP and VicEmergency to Moreland Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident.</p> <p>MCC EHOs to have awareness of potential public and environmental health impacts of outfalls from Sewer Emergency Relief Structures within floodwaters</p> <p>VICSES to respond on a request by request basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.</p>
3.13m	1 st June 2013 Flood Level Peak		
3.45m		<ul style="list-style-type: none"> Approximate Height of Levee Banks downstream of Gauging Station (in City of Melbourne) 	Potential for flooding of properties within City of Melbourne

Table C1.10 – Breakdown of likely consequences at various Flemington gauge level heights along Moonee Ponds Creek in Moreland with operational considerations

APPENDIX C2 – MERRI CREEK & EDGARS CREEK FLOOD EMERGENCY PLAN

Overview of Flooding Consequences

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Summary of Consequences in a 1% AEP (100yr ARI) flood along Merri Creek

Property					
Properties	81				
Residential	75				
Commercial	0				
Industrial	1				
Public Land	5				
Rural	0				
Community Infrastructure					
Health Facilities	0		Child Care / Kindergartens	0	
Care Facilities	0		Community Venues	0	
Retirement Villages	0		Places of Worship	1	Russian Orthodox Church
Schools / Colleges	0		Prisons	0	
Essential Infrastructure					
Major Roads	0		Police Stations	0	
Major Rail	0		Government Buildings	0	
Bus Routes	0		Sewerage Facilities	4	Emergency Relief Points
Power Facility	0		Levees	1	Alister Street, Fitzroy North
Comms Services	0		Drainage Facilities	1	Merri Creek Retarding Basin
Emergency Services	0		Airports / Airfields	0	
Tourism / Recreation					
Sports Facilities	0		Caravan Parks	0	
Recreation Facilities	5	Coburg Lake Reserve; Jones Park; Merri Creek Trail; Moomba Park; & Sumner Park	Camping Grounds	0	
Government Boundaries					
Local Gov't Areas	1	Moreland	CMA	1	Port Phillip & Westernport
Adjacent LGAs	4	Hume; Whittlesea; Darebin; & Yarra	CFA District	0	
SES Unit Area	1	Broadmeadows	MFB District	1	Northern

Table C2.1 – Consequence Summary of 1% AEP flood along Merri Creek within the City of Moreland

Merri Creek and the adjoining suburbs of Fawkner, Coburg North, Coburg, Brunswick East & Fitzroy North are located between 5-14km north of Melbourne in an established residential area. Merri Creek is the prominent watercourse in the area, flowing from the north along the borders of Hume

and Whittlesea Councils. A number of tributaries join Merri Creek in the City of Moreland including Merlynston Creek and Edgars Creek. Within the bounds of the City of Moreland, Merri Creek retains the characteristic of a natural open waterway, though has undergone modifications over time to realign flows or stabilise banks.

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

Warning Times

Warnings are available for flooding expected along Merri Creek at Somerton and Coburg. For flood peak travel times in the City of Moreland, see **Appendix B**.

Melbourne Water Hydrographic Monitoring Station	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge	Melway Reference
Merri Creek at Summerhill Road, Craigieburn North	229627A	West side of the creek 200m south of Summerhill Rd, Craigieburn	✓	✓	387 H3
Merri Creek at Craigieburn Road, Craigieburn	229257A	East side of the creek at Craigieburn Rd bridge, Wollert	✓		387 E10
Merri Creek at Cooper Street, Somerton	229603A	West side of the creek, 200m north of Cooper Street, Somerton	✓	✓	180 J9
Merri Creek at Bell Street, Coburg	229645A	West side of the Creek at the Bell St Bridge, Coburg	✓	✓	30 A1
Merri Creek at St Georges Road, Northcote	229149A	East side of the creek in Green Reserve at end of Union St, Northcote	✓	✓	30 D10
Merlynston Creek at Fawkner Cemetery	229402A	Fawkner Cemetery at Sussex St, Hadfield	✓	✓	17 E5
Edgars Creek at Edwardes Lake, Reservoir	229610A	Edwardes Lake at Edwardes Street, Reservoir	✓		18D5

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

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

Areas of Flood Risk

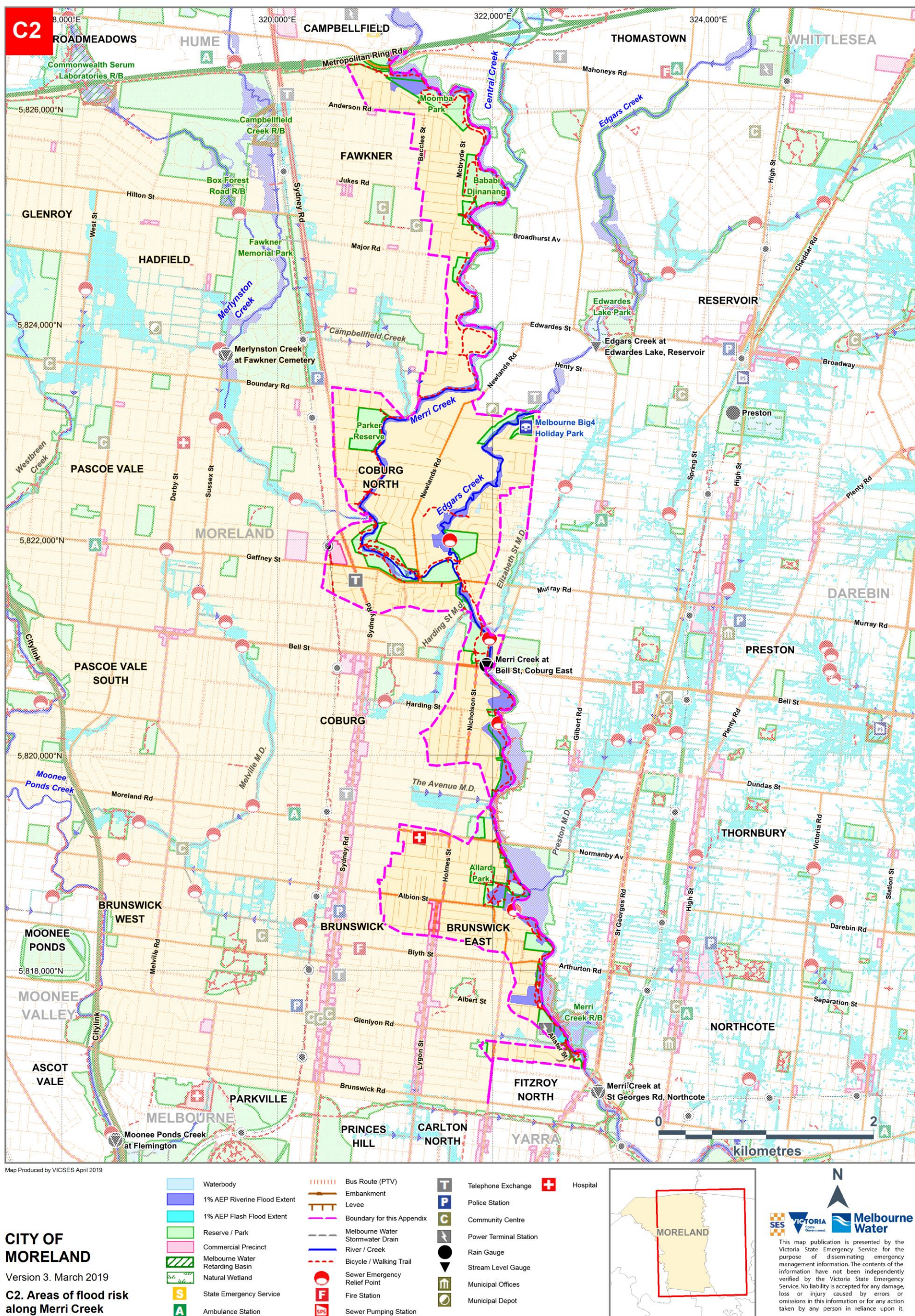


Figure C2 – Areas of flood risk along Merri Creek and Edgars Creek in the City of Moreland

Properties at Flood Risk

Properties listed in the table below are at risk from flooding along Merri and Edgars Creeks within the City of Moreland. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Merri Creek (Melbourne Water) and the Edgars Creek (AECOM, July 2014) flood mapping and risk assessment programs. *This Property Flood Risk Table is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The contents of the information have not been independently verified by the Victoria State Emergency Service. No liability is accepted for any damage, loss or injury caused by errors or omissions in this information or for any action taken by any person in reliance upon it.*

Properties at risk from Flooding along Merri and Edgars Creeks in Moreland during a 1% AEP event				
Residential	Commercial	Industrial	Rural	Public Use
Street No. at Risk	Street	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
1/2	Albion Street	Brunswick East	Merri Creek	Riverine
2/2	Albion Street	Brunswick East	Merri Creek	Riverine
3/2	Albion Street	Brunswick East	Merri Creek	Riverine
4/2	Albion Street	Brunswick East	Merri Creek	Riverine
3-7	Albion Street	Brunswick East	Merri Creek	Riverine
4	Albion Street	Brunswick East	Merri Creek	Riverine
6	Albion Street	Brunswick East	Merri Creek	Riverine
8	Albion Street	Brunswick East	Merri Creek	Riverine
8A	Albion Street	Brunswick East	Merri Creek	Riverine
9-23	Albion Street	Brunswick East	Merri Creek	Riverine
20	Alec Crescent	Fawkner	Merri Creek	Riverine
22	Alec Crescent	Fawkner	Merri Creek	Riverine
24	Alec Crescent	Fawkner	Merri Creek	Riverine
26	Alec Crescent	Fawkner	Merri Creek	Riverine
28	Alec Crescent	Fawkner	Merri Creek	Riverine
3	Alister Street	Brunswick East	Merri Creek	Riverine
14	Cole Crescent	Coburg	Merri Creek	Riverine
16	Cole Crescent	Coburg	Merri Creek	Riverine
18	Cole Crescent	Coburg	Merri Creek	Riverine
20	Cole Crescent	Coburg	Merri Creek	Riverine
22	Cole Crescent	Coburg	Merri Creek	Riverine
24	Cole Crescent	Coburg	Merri Creek	Riverine
26	Cole Crescent	Coburg	Merri Creek	Riverine
30	Cole Crescent	Coburg	Merri Creek	Riverine
32	Cole Crescent	Coburg	Merri Creek	Riverine
1/34	Cole Crescent	Coburg	Merri Creek	Riverine
2/34	Cole Crescent	Coburg	Merri Creek	Riverine
3/34	Cole Crescent	Coburg	Merri Creek	Riverine
1A/34	Cole Crescent	Coburg	Merri Creek	Riverine
2A/34	Cole Crescent	Coburg	Merri Creek	Riverine
36	Cole Crescent	Coburg	Merri Creek	Riverine
38	Cole Crescent	Coburg	Merri Creek	Riverine
40	Cole Crescent	Coburg	Merri Creek	Riverine
4	Danny Street	Coburg	Merri Creek	Riverine

Properties at risk from Flooding along Merri and Edgars Creeks in Moreland during a 1% AEP event				
Residential	Commercial	Industrial	Rural	Public Use
Street No. at Risk	Street	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
6	Danny Street	Coburg	Merri Creek	Riverine
8	Danny Street	Coburg	Merri Creek	Riverine
10	Danny Street	Coburg	Merri Creek	Riverine
16	Edna Grove	Coburg	Merri Creek	Riverine
16A	Edna Grove	Coburg	Merri Creek	Riverine
18	Edna Grove	Coburg	Merri Creek	Riverine
20	Edna Grove	Coburg	Merri Creek	Riverine
22	Edna Grove	Coburg	Merri Creek	Riverine
24	Edna Grove	Coburg	Merri Creek	Riverine
26	Edna Grove	Coburg	Merri Creek	Riverine
28	Edna Grove	Coburg	Merri Creek	Riverine
30	Edna Grove	Coburg	Merri Creek	Riverine
32	Edna Grove	Coburg	Merri Creek	Riverine
2A	Gaffney Street	Coburg North	Merri Creek	Riverine
11/129	Harding Street	Coburg	Merri Creek	Riverine
12/129	Harding Street	Coburg	Merri Creek	Riverine
13/129	Harding Street	Coburg	Merri Creek	Riverine
14/129	Harding Street	Coburg	Merri Creek	Riverine
17/129	Harding Street	Coburg	Merri Creek	Riverine
18/129	Harding Street	Coburg	Merri Creek	Riverine
19/129	Harding Street	Coburg	Merri Creek	Riverine
22	Harrison Street	Brunswick East	Merri Creek	Riverine
38	Harrison Street	Brunswick East	Merri Creek	Riverine
42-44	Harrison Street	Brunswick East	Merri Creek	Riverine
50-72	Harrison Street	Brunswick East	Merri Creek	Riverine
6-32	Kirkdale Street	Brunswick East	Merri Creek	Riverine
55	Livingston Street	Coburg North	Edgars Creek	Riverine
60	Livingston Street	Coburg North	Edgars Creek	Riverine
62	Livingston Street	Coburg North	Edgars Creek	Riverine
64	Livingston Street	Coburg North	Edgars Creek	Riverine
13	Merribell Avenue	Coburg	Merri Creek	Riverine
15	Merribell Avenue	Coburg	Merri Creek	Riverine
17	Merribell Avenue	Coburg	Merri Creek	Riverine
19	Merribell Avenue	Coburg	Merri Creek	Riverine
21	Merribell Avenue	Coburg	Merri Creek	Riverine
23	Merribell Avenue	Coburg	Merri Creek	Riverine
25	Merribell Avenue	Coburg	Merri Creek	Riverine
27	Merribell Avenue	Coburg	Merri Creek	Riverine
29	Merribell Avenue	Coburg	Merri Creek	Riverine
31	Merribell Avenue	Coburg	Merri Creek	Riverine
33	Merribell Avenue	Coburg	Merri Creek	Riverine
35	Merribell Avenue	Coburg	Merri Creek	Riverine
26A	Somerlayton Crescent	Fawkner	Merri Creek	Riverine
2/54	Somerlayton Crescent	Fawkner	Merri Creek	Riverine

Properties at risk from Flooding along Merri and Edgars Creeks in Moreland during a 1% AEP event				
Residential	Commercial	Industrial	Rural	Public Use
Street No. at Risk	Street	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
52	Somerlayton Crescent	Fawkner	Merri Creek	Riverine
50	Somerlayton Crescent	Fawkner	Merri Creek	Riverine
2/197	The Avenue	Coburg	Merri Creek	Riverine
Total				
81				

Table C2.3 – Properties at risk of flooding along the Merri and Edgars Creeks in the City of Moreland

Isolation

No major isolation risks exist for areas around Fawkner, Coburg North, Coburg & Brunswick East during a 1% AEP (100yr ARI) event. Some localised short-duration isolation may occur due to flash flooding.

Essential Infrastructure

There are several sewer emergency relief points adjacent to Merri Creek that may be discharged during intense rainfall events.

During an event, see the Public Transport Victoria's Website for details on delays or alterations to services. <http://ptv.vic.gov.au/live-travel-updates/>. A map of Public Transport routes within Moreland is available via the website at: https://static.ptv.vic.gov.au/siteassets/Maps/Localities/PDFs/37_Moreland_LAM.pdf

Apart from the roads outlined below, all other essential infrastructure and services areas along Merri Creek in Fawkner, Coburg North, Coburg & Brunswick East are expected to remain unaffected by flooding during a 1% AEP (100yr ARI) event. This includes the SP AusNet Brunswick Terminal Station on King Street, Brunswick East.

Road Closures

The following roads are subject to closure during flooding along Merri Creek in Fawkner, Coburg North, Coburg & Brunswick East. Check the VicRoads website for more details: <https://traffic.vicroads.vic.gov.au/>

VicRoads Roads flooded in a 1% AEP (100yr ARI) event	
<ul style="list-style-type: none"> Nil expected in City of Moreland 	

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

Moreland City Council Roads flooded in a 1% AEP (100yr ARI) event		
BRUNSWICK EAST	COBURG	FAWKNER
<ul style="list-style-type: none"> Albion Street 	<ul style="list-style-type: none"> Edna Grove 	<ul style="list-style-type: none"> Alec Crescent
<ul style="list-style-type: none"> Harrison Street 	<ul style="list-style-type: none"> Grant Street 	
<ul style="list-style-type: none"> Weigall Street 		

Table C2.5 – Moreland City Council Possible Road Closures during a flooding event

Flood Mitigation

Retarding Basins

Melbourne Water Retarding Basin	On Drain/ Waterway	Area	Storage Capacity	Spillway Crest Level	Full Supply Level	Embankment Crest Level	ANCOLD Hazard Rating	Houses In Flow Path (dam breach)	Melway Reference
Merri Creek	Merri Creek	1.3 ha	~ 50 ML	N/A	Unknown	2.0m (32.9m AHD)	Very Low	0	30 C8

Table C2.6 – Melbourne Water Retarding Basins within the Merri Creek catchment in the City of Moreland

A number of reserves and parklands along Merri Creek may hold a large amount of stormwater during an event. These include:

Reserve / Park	On Drain / Waterway	Location	Melway Reference
Moomba Park	Merri Creek	Somerlayton Crescent, Fawkner	7K11
Tate Reserve	Merri Creek	Cole Crescent, Coburg	30A2
Egan Reserve	Merri Creek	Rennie Street, Coburg	30B3
Sumner Park	Merri Creek	Alister Street, Brunswick East	30C9

Table C2.7 – Parks and Reserves along the Merri Creek in the City of Moreland

Levees

Levee	Reach	Side	Levee Height	Levee Length	Expected Level of Protection	ANCOLD Hazard Rating	Consequences of Failure	Melway Reference
Merri Creek, Fitzroy North	Alister Street	West	1.8m (31.50m AHD)	0.3km	11% AEP Flood (freeboard unknown). 1% AEP Flood Level is: 32.10m AHD. Max Recorded Flood: 30.48m AHD	Significant	11 residential properties at risk of flooding along Alister Street	30 C9

Table C2.8 – Melbourne Water Levees in the Merri Creek Catchment in the City of Moreland

Sewerage Infrastructure

Sewerage Infrastructure of note during a severe flood event located along Merri Creek is contained within the following table.

Sewer Emergency Relief Points

There are Sewer Emergency Relief Points along Merri Creek and Edgars 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
Campbellfield Creek	West (Hume)	Yarra Valley Water	The Gateway, Broadmeadows	7 F11
Edgars Creek	East	Yarra Valley Water	Jackson Reserve on Outlook Road, Coburg North	17 K10
Harding Street Main Drain	-	Yarra Valley Water	Harding Street at Park Street, Coburg	29 J1
Merlynston Creek	-	Yarra Valley Water	Martin Reserve, Box Forest Road, Hadfield	17 F2
Merlynston Main Drain	-	Yarra Valley Water	Cnr Sussex Street and Kent Road, Pascoe Vale	17 E7
Merlynston Main Drain	-	Yarra Valley Water	Bridges Avenue, Coburg North	17 E7
Merlynston Main Drain	-	Yarra Valley Water	Allenby Street, Coburg North	17 G9
Merri Creek	West (Moreland)	Melbourne Water	De Chene Reserve on Armstead Avenue, Coburg	18 A12
Merri Creek	West (Moreland)	Melbourne Water	Tate Reserve on Grant Street, Coburg	30 B2
Merri Creek	West (Moreland)	Yarra Valley Water	Albion Street, Brunswick East	30 B6
South Street Drain	-	Yarra Valley Water	Cnr South Street and Fairmont Street, Hadfield	17 E5

Table C2.9 – Sewer Emergency Relief Points in the Merri Creek Catchment in the City of Moreland

Command, Control and Coordination

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

Flood Impacts & Operational Considerations (Intelligence Cards)

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

Intelligence Cards have been included for the following locations:

- Merri Creek at Somerton
- Merri Creek at Coburg
- Merri Creek at Northcote
- Edgars Creek at Reservoir

FLOOD INTELLIGENCE CARD – SOMERTON GAUGE, MERRI CREEK

Version 3 – April 2019



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

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

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

Creek Height	Flood Class or Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
3.3m		<ul style="list-style-type: none"> Bank Full at Gauging Location 	
3.4m	MINOR FLOOD LEVEL		
3.7m	MODERATE FLOOD LEVEL		
4.4m	MAJOR FLOOD LEVEL		
4.97m	15 th May 1974 Flood Level Peak		
5.2m	1% AEP (100yr ARI) Flood Level (Major)	<ul style="list-style-type: none"> Note: It is not known at what level property and infrastructure contained below starts being flooded Properties at Flood Risk 10 Properties in Total 20, 22, 24, 26 & 28 Alec Crescent, Fawkner 2A Gaffney Street, Coburg North 26A, 2/54, 52 & 50 Somerlayton Crescent, Fawkner 	VICSES will provide warnings using EM-COP and VicEmergency to Moreland Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident.

Creek Height	Flood Class or Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		Community Infrastructure Flooded <ul style="list-style-type: none"> Coburg Lake Reserve on Gaffney Street (Murray Road), Coburg North Merri Creek Trail flooded at various locations Moomba Park, Somerlayton Crescent, Fawkner Floodwaters may become level with Pedestrian Bridges over Merri Creek at Moomba Park, Fawkner; at B.T. Connor Reserve, Reservoir; & at the end of Lynch Road, Fawkner Water Over Road <ul style="list-style-type: none"> Alec Crescent, Fawkner 	<p>MCC EHOs to have awareness of potential public and environmental health impacts of outfalls from Sewer Emergency Relief Structures within floodwaters</p> <p>VICSES to respond on a request by request basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.</p>
5.3m		Essential Infrastructure Affected <ul style="list-style-type: none"> Approximate height of Levee Banks at Alister Street, Fitzroy North 	11 residential properties at risk of flooding along Alister Street if levee breached.

Table C1.10 – Breakdown of likely consequences at various Somerton gauge level heights along Merri Creek within the City of Moreland with operational considerations

FLOOD INTELLIGENCE CARD – COBURG GAUGE, MERRI CREEK

Version 3 – April 2019



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

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LOCATION	West side of the Creek at the Bell St Bridge, Coburg
MELWAY REFERENCE:	30 A1
STREAM:	Merri Creek
GAUGE NUMBER:	229645A
GAUGE ZERO:	33.73m AHD
GAUGE TYPE	Stream Level & Rain

MINOR:	2.9m
MODERATE:	3.4m
MAJOR	4.8m
LEVEE HEIGHT:	Unknown
TELEMETRIC/MANUAL	Telemetric
HIGHEST RECORDED FLOOD:	4.85m (1 st December 1934)

Creek Height	Flood Class or Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
2.9m	MINOR FLOOD LEVEL	<ul style="list-style-type: none"> Bank Full at The Grove, Coburg 	
3.1m	10% AEP (10yr ARI) Flood Level	<ul style="list-style-type: none"> Bank Full at Moreland Road, Coburg 	
3.4m	MODERATE FLOOD LEVEL		VICSES may provide warnings using EM-COP and VicEmergency as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding.
4.28m	3 rd February 2005 Flood Level peak		
4.8m	MAJOR FLOOD LEVEL	Properties at Flood Risk 1 Properties in Total <ul style="list-style-type: none"> 30 Edna Grove, Coburg 	VICSES to respond on a request by request basis.
5.51m	1% AEP (100yr ARI) Flood Level (Major)	<ul style="list-style-type: none"> Note: It is not known at what level property and infrastructure contained below starts being flooded Properties at Flood Risk 50 New at Level; 51 Properties in Total	VICSES will provide warnings using EM-COP and VicEmergency to Moreland Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer

Creek Height	Flood Class or Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> 14, 16, 18, 20, 22, 24, 26, 30, 32, Units 1-3/34, 1A/34, 2A/34, 36, 38 & 40 Cole Crescent, Coburg 4, 6, 8 & 10 Danny Street, Coburg 16, 16A, 18, 20, 22, 24, 26, 28 & 32 Edna Grove, Coburg Units 11-14/129 & Units 17-19/129 Harding Street, Coburg 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33 & 35 Merribell Avenue, Coburg 2/197 The Avenue, Coburg <p>Community Infrastructure Flooded</p> <ul style="list-style-type: none"> Merri Creek Trail flooded at various locations Pedestrian bridge over Merri Creek at De Chene Reserve (works recently completed so bridge now above 1% level) Pedestrian bridge over Merri Creek at end of Harding Street, Coburg <p>Essential Infrastructure Likely Impacted</p> <ul style="list-style-type: none"> Sewer Emergency Relief Points located at Jackson Reserve on Oulook Road, Coburg North; De Chene Reserve on Armstead Avenue, Coburg; and Tate Reserve on Grant Street, Coburg <p>Water Over Road</p> <ul style="list-style-type: none"> Edna Grove, Coburg Grant Street, Coburg 	<p>in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident.</p> <p>MCC EHOs to have awareness of potential public and environmental health impacts of outfalls from Sewer Emergency Relief Structures within floodwaters</p> <p>VICSES to respond on a request by request basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.</p> <p>Merri Edgars wetlands at confluence of Edgars and Merri Creeks likely to require additional attention in relief activities- sewer relief points upstream. Potential place of gathering of community members</p>

Table C1.11 – Breakdown of likely consequences at various Coburg gauge level heights along Merri Creek within the City of Moreland with operational considerations

FLOOD INTELLIGENCE CARD – NORTHCOTE GAUGE, MERRI CREEK

Version 3 – April 2019



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	East side of the creek in Green Reserve at end of Union St, Northcote
MELWAY REFERENCE:	30 D10
STREAM:	Merri Creek
GAUGE NUMBER:	229149A
GAUGE ZERO:	23.97m AHD
GAUGE TYPE	Stream Level & Rain

MINOR:	3.2m
MODERATE:	3.8m
MAJOR	5.0m
LEVEE HEIGHT:	6.8m (requires verification)
TELEMETRIC/MANUAL	Telemetric
HIGHEST RECORDED FLOOD:	4.81m (8 th April 1977)

Creek Height	Flood Class or Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
3.2m	MINOR FLOOD LEVEL	<ul style="list-style-type: none"> Bank Full at Gauging Location 	
3.8m	MODERATE FLOOD LEVEL		VICSES to respond on a request by request basis.
4.64m	3 rd December 2003 Flood Level peak		
4.81m	8 th April 1977 Flood Level peak		
5.0m	MAJOR FLOOD LEVEL		
6.13m	1% AEP (100yr ARI) Flood Level (Major)	<ul style="list-style-type: none"> Note: It is not known at what level property and infrastructure contained below starts being flooded Properties at Flood Risk 16 Properties in Total Units 1-4/2, 3-7, 4, 6, 8, 8A & 9-23 Albion Street, Brunswick East 3 Alister Street, Brunswick East 22, 38, 42-44 & 50-72 Harrison Street, Brunswick East 	VICSES will provide warnings using EM-COP and VicEmergency to Moreland Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident.

Creek Height	Flood Class or Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> 6-32 Kirkdale Street, Brunswick East Community Infrastructure Flooded <ul style="list-style-type: none"> Jones Park on Albion Street, Brunswick East Merri Creek Trail flooded at various locations Russian Orthodox Church on Albion Street, Brunswick East Sumner Park on Alister Street, Brunswick East Essential Infrastructure Likely Impacted <ul style="list-style-type: none"> Sewer Emergency Relief Point located on Albion Street, Brunswick East Water Over Road <ul style="list-style-type: none"> Harrison Street, Brunswick East Albion Street, Brunswick East Weigall Street, Brunswick East 	<p>MCC EHOs to have awareness of potential public and environmental health impacts of outfalls from Sewer Emergency Relief Structures within floodwaters</p> <p>VICSES to respond on a request by request basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements.</p>
6.8m		Essential Infrastructure Affected <ul style="list-style-type: none"> Approximate height of Levee Bank at Alister Street, Fitzroy North may overtop. 	<p>11 residential properties along Alister St at risk of flooding if levee breached.</p>

Table C1.12 – Breakdown of likely consequences at various Northcote gauge level heights along Merri Creek within the City of Moreland with operational considerations

FLOOD INTELLIGENCE CARD – RESERVOIR GAUGE, EDGARS CREEK

Version 3 – April 2019



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	Edwardes Lake at Edwardes Street, Reservoir
MELWAY REFERENCE:	18 D5
STREAM:	Edgars Creek
GAUGE NUMBER:	229610A
GAUGE ZERO:	69.16m AHD
GAUGE TYPE	Stream Level

MINOR:	Not Established
MODERATE:	Not Established
MAJOR	Not Established
LEVEE HEIGHT:	1.38m
TELEMETRIC/MANUAL	Telemetric
HIGHEST RECORDED FLOOD:	1.30m (1 st June 2013)

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
1.19m	3 rd February 2005 Flood Level peak		
1.38m		<ul style="list-style-type: none"> Top of Reservoir Wall 	
1.70m	1% AEP (100yr ARI) Flood Level	<ul style="list-style-type: none"> Note: It is not known at what level property and infrastructure contained below starts being flooded Properties at Flood Risk 4 Properties in Total 55, 60, 62 & 64 Livingstone Street, Coburg North Community Infrastructure Flooded Flood water level with pedestrian bridge over Edgars Creek at Ronald Street, Coburg North. New bridge in works, structure and approaches will be above 1% Essential Infrastructure Likely Impacted Sewer Emergency Relief Point located at Jackson Reserve on Outlook Road, Coburg North 	<p>VICSES will provide warnings using EM-COP and VicEmergency to Moreland Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident.</p> <p>MCC EHOs to have awareness of potential public and environmental health impacts of outfalls from Sewer Emergency Relief Structures within floodwaters</p> <p>VICSES to respond on a request by request basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p>

Table C1.13 – Breakdown of likely consequences at various Reservoir gauge level heights along Edgars Creek within the City of Moreland with operational considerations

APPENDIX C3 – MERLYNSTON & CAMPBELLFIELD CREEKS FLOOD EMERGENCY PLAN

Overview of Flooding Consequences

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

Summary of Consequences in a 1% AEP (100yr ARI) flood along the Merlynston & Campbellfield Creeks

Property					
Properties	171				
Residential	92				
Commercial	22				
Industrial	56				
Public Land	1				
Rural	0				
Community Infrastructure					
Health Facilities	0		Child Care / Kindergartens	2	Joybelle Child Care Centre; & Matrix Early Learning Fawkner
Care Facilities	0		Community Venues	0	
Retirement Villages	1	Federation Village	Places of Worship	0	
Schools / Colleges	0		Cemeteries	2	Northern Memorial Park; & Fawkner Cemetery
Essential Infrastructure					
Major Roads	1	Boundary Road	Police Stations	0	
Major Rail	0		Government Buildings	0	
Bus Routes	1	534	Sewerage Facilities	6	Emergency Relief Points
Power Facility	0		Levees	0	
Comms Services	0		Drainage Facilities	3	Retarding Basins
Emergency Services	0		Airports / Airfields	0	
Tourism / Recreation					
Sports Facilities	0		Caravan Parks	0	
Recreation Facilities	1	Western Ring Road Path	Camping Grounds	0	
Government Boundaries					
Local Gov't Areas	1	Moreland	CMA	1	Port Phillip & Westernport
Adjacent LGAs	1	Hume	CFA District	0	
SES Unit Area	1	Broadmeadows	MFB District	1	Northern

Table C3.1 – Consequence Summary of 1% AEP flood along the Merlynston and Campbellfield Creeks in Moreland

The Merlynston & Campbellfield Creeks and the surrounding suburbs of Glenroy, Hadfield, Fawkner, Pascoe Vale & Coburg North are located approximately 12km north of Melbourne in a mixed residential and industrial area.

Formed with a combination of both concrete channel and modified and natural river bed, the Merlynston and Campbellfield Creeks are part of a small catchment that feeds into Merri Creek to the south-east via Merlynston Main Drain. High Intensity, short duration rainfall events are likely to cause flash flooding in and around the two creeks and stormwater drains in the area, while prolonged rainfall may see Merri Creek flood. See mapping in **Appendix F** for more insight into flooding in the area.

Warning Times

Neither the Bureau of Meteorology nor Melbourne Water currently provides flood forecasts for the Merlynston or Campbellfield Creeks. All flood response actions must therefore be driven by rainfall and / or river level observations. A telemetered water level / flood gauges is located at Fawkner Cemetery, Hadfield.

Melbourne Water Hydrographic Monitoring Station	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge	Melway Reference
Merlynston Creek at Fawkner Cemetery	229402A	Fawkner Cemetery at Sussex St, Hadfield	✓	✓	17 E5

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

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

Areas of Flood Risk

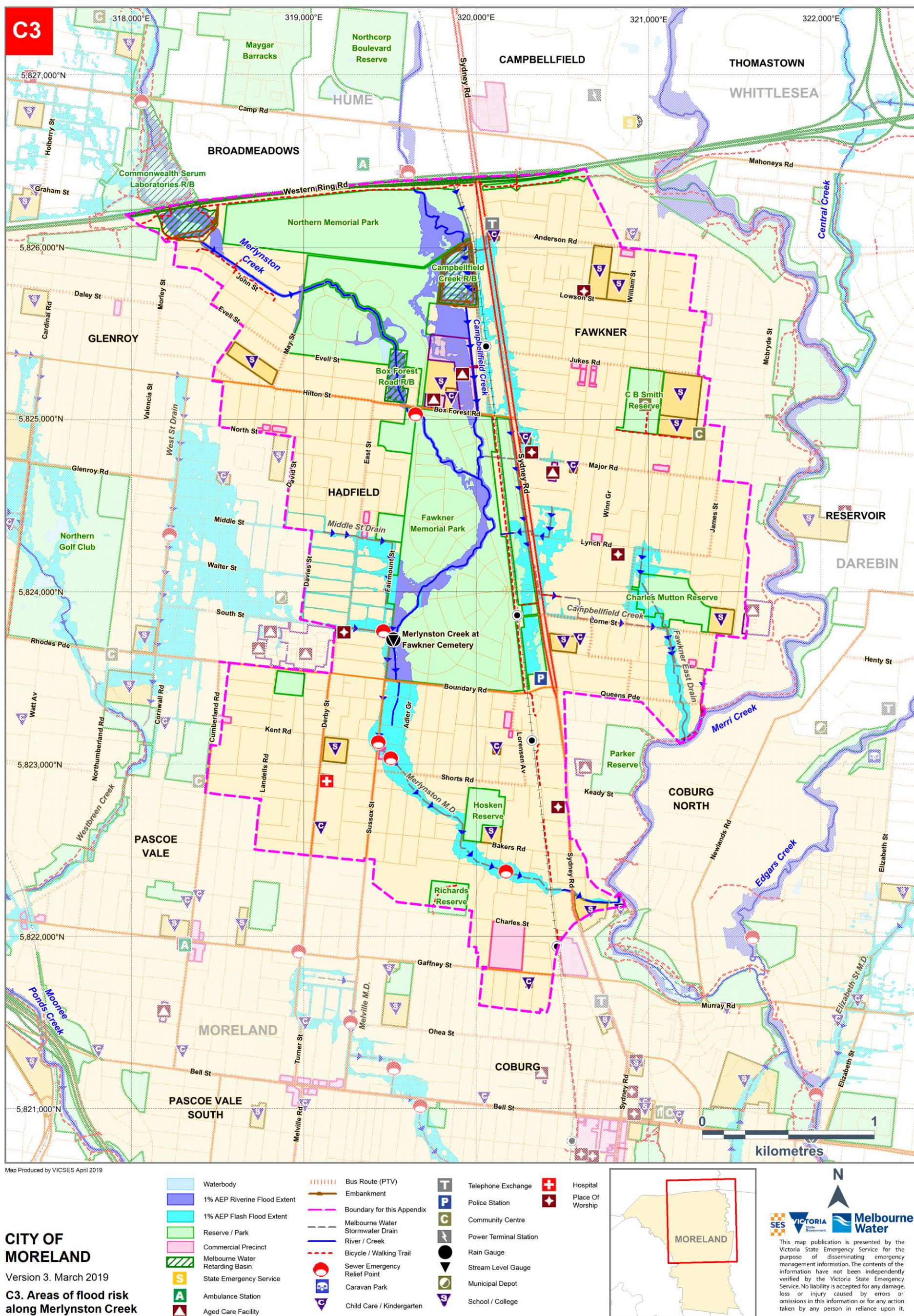


Figure C3 – Areas of flood risk around the Merlynston & Campbellfield Creeks in the City of Moreland

Properties at Flood Risk

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

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

Properties at risk from Flooding over-floor along the Merlynston and Campbellfield Creeks in Moreland						
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 Adler Grove	Coburg North	Merlynston Main Drain	Flash
		✓	3 Adler Grove	Coburg North	Merlynston Main Drain	Flash
		✓	5 Adler Grove	Coburg North	Merlynston Main Drain	Flash
		✓	7 Adler Grove	Coburg North	Merlynston Main Drain	Flash
		✓	9 Adler Grove	Coburg North	Merlynston Main Drain	Flash
		✓	11 Adler Grove	Coburg North	Merlynston Main Drain	Flash
		✓	12 Adler Grove	Coburg North	Merlynston Main Drain	Flash
		✓	13 Adler Grove	Coburg North	Merlynston Main Drain	Flash
		✓	15 Adler Grove	Coburg North	Merlynston Main Drain	Flash
	✓	✓	16 Adler Grove	Coburg North	Merlynston Main Drain	Flash
		✓	17 Adler Grove	Coburg North	Merlynston Main Drain	Flash
		✓	18 Adler Grove	Coburg North	Merlynston Main Drain	Flash
		✓	20 Adler Grove	Coburg North	Merlynston Main Drain	Flash
		✓	21 Adler Grove	Coburg North	Merlynston Main Drain	Flash
	✓	✓	22 Adler Grove	Coburg North	Merlynston Main Drain	Flash
		✓	24 Adler Grove	Coburg North	Merlynston Main Drain	Flash
		✓	8 Allenby Street	Coburg North	Merlynston Main Drain	Flash
	✓	✓	10-16 Allenby Street	Coburg North	Merlynston Main Drain	Flash
		✓	13 Allenby Street	Coburg North	Merlynston Main Drain	Flash
		✓	15 Allenby Street	Coburg North	Merlynston Main Drain	Flash
		✓	17 Allenby Street	Coburg North	Merlynston Main Drain	Flash
	✓	✓	29 Argyle Street	Fawkner	Fawkner East Drain	Flash
		✓	62 Bakers Road	Coburg North	Merlynston Main Drain	Flash
		✓	101-105 Bakers Road	Coburg North	Merlynston Main Drain	Flash
✓	✓	✓	1/107-111 Bakers Road	Coburg North	Merlynston Main Drain	Flash
✓	✓	✓	2/107-111 Bakers Road	Coburg North	Merlynston Main Drain	Flash
✓	✓	✓	3/107-111 Bakers Road	Coburg North	Merlynston Main Drain	Flash
✓	✓	✓	113-115 Bakers Road	Coburg North	Merlynston Main Drain	Flash
		✓	6 Borang Street	Coburg North	Fawkner East Drain	Flash

Properties at risk from Flooding over-floor along the Merlynston and Campbellfield Creeks in Moreland						
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				
		✓	97 Boundary Road	Hadfield	Merlynston Main Drain	Flash
		✓	100 Boundary Road	Coburg North	Merlynston Main Drain	Flash
		✓	107 Boundary Road	Coburg North	Merlynston Main Drain	Flash
	✓	✓	16-24 Box Forest Road	Glenroy	Campbellfield Creek	Riverine
		✓	16-24 Box Forest Road	Glenroy	Campbellfield Creek	Riverine
		✓	2 Bridges Avenue	Coburg North	Merlynston Main Drain	Flash
		✓	4 Bridges Avenue	Coburg North	Merlynston Main Drain	Flash
		✓	6 Bridges Avenue	Coburg North	Merlynston Main Drain	Flash
	✓	✓	8 Bridges Avenue	Coburg North	Merlynston Main Drain	Flash
	✓	✓	10 Bridges Avenue	Coburg North	Merlynston Main Drain	Flash
		✓	12 Bridges Avenue	Coburg North	Merlynston Main Drain	Flash
		✓	14 Bridges Avenue	Coburg North	Merlynston Main Drain	Flash
	✓	✓	16 Bridges Avenue	Coburg North	Merlynston Main Drain	Flash
	✓	✓	1/18 Bridges Avenue	Coburg North	Merlynston Main Drain	Flash
	✓	✓	2/18 Bridges Avenue	Coburg North	Merlynston Main Drain	Flash
	✓	✓	20 Bridges Avenue	Coburg North	Merlynston Main Drain	Flash
		✓	2/1 Catherine Street	Coburg North	Merlynston Main Drain	Flash
	✓	✓	1/7-9 Catherine Street	Coburg North	Merlynston Main Drain	Flash
	✓	✓	2/7-9 Catherine Street	Coburg North	Merlynston Main Drain	Flash
		✓	8 Catherine Street	Coburg North	Merlynston Main Drain	Flash
	✓	✓	12 Catherine Street	Coburg North	Merlynston Main Drain	Flash
		✓	33 Dawson Street	Coburg North	Merlynston Main Drain	Flash
		✓	35 Dawson Street	Coburg North	Merlynston Main Drain	Flash
		✓	37 Dawson Street	Coburg North	Merlynston Main Drain	Flash
	✓	✓	39 Dawson Street	Coburg North	Merlynston Main Drain	Flash
		✓	41 Dawson Street	Coburg North	Merlynston Main Drain	Flash
		✓	43 Dawson Street	Coburg North	Merlynston Main Drain	Flash
		✓	72 Dawson Street	Coburg North	Merlynston Main Drain	Flash
✓	✓	✓	10 Elliott Street	Coburg North	Merlynston Main Drain	Flash
	✓	✓	2B Hocking Street	Coburg North	Merlynston Main Drain	Flash
	✓	✓	2A Hocking Street	Coburg North	Merlynston Main Drain	Flash
	✓	✓	2 Hocking Street	Coburg North	Merlynston Main Drain	Flash
		✓	35 Irene Avenue	Coburg North	Merlynston Main Drain	Flash
		✓	2A Kent Road	Pascoe Vale	Merlynston Main Drain	Flash
	✓	✓	8 Lily Street	Coburg North	Merlynston Main Drain	Flash
		✓	10 Lily Street	Coburg North	Merlynston Main Drain	Flash
		✓	145 Lynch Road	Fawkner	Lynch Street Drain	Flash
✓	✓	✓	149 Lynch Road	Fawkner	Lynch Street Drain	Flash
✓	✓	✓	151 Lynch Road	Fawkner	Lynch Street Drain	Flash
✓	✓	✓	153 Lynch Road	Fawkner	Lynch Street Drain	Flash
✓	✓	✓	155 Lynch Road	Fawkner	Lynch Street Drain	Flash
✓	✓	✓	157 Lynch Road	Fawkner	Lynch Street Drain	Flash
✓	✓	✓	2/159 Lynch Road	Fawkner	Lynch Street Drain	Flash

Properties at risk from Flooding over-floor along the Merlynston and Campbellfield Creeks in Moreland						
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				
	✓	✓	161 Lynch Road	Fawkner	Lynch Street Drain	Flash
		✓	28 Marlborough Street	Fawkner	Fawkner East Drain	Flash
	✓	✓	30 Marlborough Street	Fawkner	Fawkner East Drain	Flash
	✓	✓	80 Mathieson Street	Coburg North	Fawkner East Drain	Flash
		✓	1C Pallett Street	Coburg North	Merlynston Main Drain	Flash
		✓	1B Pallett Street	Coburg North	Merlynston Main Drain	Flash
		✓	5 Pallett Street	Coburg North	Merlynston Main Drain	Flash
	✓	✓	7 Pallett Street	Coburg North	Merlynston Main Drain	Flash
		✓	8 Pallett Street	Coburg North	Merlynston Main Drain	Flash
	✓	✓	9 Pallett Street	Coburg North	Merlynston Main Drain	Flash
		✓	10 Pallett Street	Coburg North	Merlynston Main Drain	Flash
✓	✓	✓	12 Pallett Street	Coburg North	Merlynston Main Drain	Flash
✓	✓	✓	14 Pallett Street	Coburg North	Merlynston Main Drain	Flash
	✓	✓	10 Queens Parade	Fawkner	Fawkner East Drain	Flash
	✓	✓	13A Queens Parade	Fawkner	Fawkner East Drain	Flash
		✓	8 Rollo Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	12 Rollo Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	15 Rollo Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	17 Rollo Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	21 Rollo Street	Coburg North	Merlynston Main Drain	Flash
		✓	23 Rollo Street	Coburg North	Merlynston Main Drain	Flash
		✓	31 Rollo Street	Coburg North	Merlynston Main Drain	Flash
	✓	✓	37 Rollo Street	Coburg North	Merlynston Main Drain	Flash
	✓	✓	39 Rollo Street	Coburg North	Merlynston Main Drain	Flash
	✓	✓	41 Rollo Street	Coburg North	Merlynston Main Drain	Flash
	✓	✓	43 Rollo Street	Coburg North	Merlynston Main Drain	Flash
✓	✓	✓	49 Sages Road	Glenroy	Campbellfield Creek	Riverine
✓	✓	✓	49A Sages Road	Glenroy	Campbellfield Creek	Riverine
	✓	✓	1 Shaw Court	Coburg North	Merlynston Main Drain	Flash
		✓	6 Shaw Court	Coburg North	Merlynston Main Drain	Flash
		✓	7 Shaw Court	Coburg North	Merlynston Main Drain	Flash
		✓	70 Shorts Road	Coburg North	Merlynston Main Drain	Flash
		✓	72 Shorts Road	Coburg North	Merlynston Main Drain	Flash
	✓	✓	78 Shorts Road	Coburg North	Merlynston Main Drain	Flash
		✓	80 Shorts Road	Coburg North	Merlynston Main Drain	Flash
		✓	82 Shorts Road	Coburg North	Merlynston Main Drain	Flash
		✓	84 Shorts Road	Coburg North	Merlynston Main Drain	Flash
		✓	86 Shorts Road	Coburg North	Merlynston Main Drain	Flash
	✓	✓	95 Shorts Road	Coburg North	Merlynston Main Drain	Flash
		✓	99 Shorts Road	Coburg North	Merlynston Main Drain	Flash
		✓	101 Shorts Road	Coburg North	Merlynston Main Drain	Flash
		✓	103 Shorts Road	Coburg North	Merlynston Main Drain	Flash
		✓	217 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash

Properties at risk from Flooding over-floor along the Merlynston and Campbellfield Creeks in Moreland						
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				
	✓	✓	219 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
	✓	✓	221 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	223 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	227 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	229 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	231 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	233 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	235-237 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	1/238 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	246 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	248 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	250 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
	✓	✓	258 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
	✓	✓	260 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
	✓	✓	266 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	268 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
	✓	✓	270 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	272 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
	✓	✓	274 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
	✓	✓	276 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	278 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	282 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	1/292 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	2/292 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	294 Sussex Street	Pascoe Vale	Merlynston Main Drain	Flash
		✓	1116 Sydney Road	Fawkner	Fawkner North Drain	Flash
		✓	1224 Sydney Road	Fawkner	Fawkner North Drain	Flash
		✓	1239-1243 Sydney Road	Fawkner	Fawkner North Drain	Flash
	✓	✓	1252 Sydney Road	Fawkner	Fawkner North Drain	Flash
		✓	1253-1255 Sydney Road	Fawkner	Fawkner North Drain	Flash
		✓	1299 Sydney Road	Fawkner	Fawkner North Drain	Flash
		✓	1323 Sydney Road	Fawkner	Fawkner North Drain	Flash
	✓	✓	1/1325 Sydney Road	Fawkner	Fawkner North Drain	Flash
	✓	✓	2/1325 Sydney Road	Fawkner	Fawkner North Drain	Flash
		✓	1342 Sydney Road	Fawkner	Fawkner North Drain	Flash
		✓	1355 Sydney Road	Fawkner	Lynch Street Drain	Flash
		✓	1357 Sydney Road	Fawkner	Fawkner North Drain	Flash
		✓	1359 Sydney Road	Fawkner	Fawkner North Drain	Flash
		✓	1363 Sydney Road	Fawkner	Fawkner North Drain	Flash
		✓	1367 Sydney Road	Fawkner	Fawkner North Drain	Flash
		✓	19 Tonkin Avenue	Coburg North	Merlynston Main Drain	Flash
		✓	21 Tonkin Avenue	Coburg North	Merlynston Main Drain	Flash
		✓	23 Tonkin Avenue	Coburg North	Merlynston Main Drain	Flash

Properties at risk from Flooding over-floor along the Merlynston and Campbellfield Creeks in Moreland						
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				
		✓	24 Tonkin Avenue	Coburg North	Merlynston Main Drain	Flash
	✓	✓	26 Tonkin Avenue	Coburg North	Merlynston Main Drain	Flash
		✓	27A Tonkin Avenue	Coburg North	Merlynston Main Drain	Flash
		✓	28 Tonkin Avenue	Coburg North	Merlynston Main Drain	Flash
	✓	✓	30 Tonkin Avenue	Coburg North	Merlynston Main Drain	Flash
	✓	✓	30A Tonkin Avenue	Coburg North	Merlynston Main Drain	Flash
	✓	✓	20 Williams Road	Coburg North	Merlynston Main Drain	Flash
	✓	✓	22 Williams Road	Coburg North	Merlynston Main Drain	Flash
		✓	24 Williams Road	Coburg North	Merlynston Main Drain	Flash
		✓	45 Williams Road	Coburg North	Merlynston Main Drain	Flash
		✓	49 Williams Road	Coburg North	Merlynston Main Drain	Flash
		✓	51 Williams Road	Coburg North	Merlynston Main Drain	Flash
	✓	✓	31 Wurruk Street	Fawkner	Fawkner East Drain	Flash
Totals						
15	65	171				

Table C3.3 – Properties at risk of flooding along the Merlynston and Campbellfield Creeks in the City of Moreland

Isolation

No major isolation risks exist for areas around Merlynston & Campbellfield Creeks in Glenroy, Hadfield & Coburg 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. <http://ptv.vic.gov.au/live-travel-updates/>. A map of Public Transport routes within Moreland is available via the website at: https://static.ptv.vic.gov.au/siteassets/Maps/Localities/PDFs/37_Moreland_LAM.pdf

Apart from the roads outlined below, all other essential infrastructure and services areas around the Merlynston & Campbellfield Creeks 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 the Merlynston & Campbellfield Creeks. Check the VicRoads website for more details: <https://traffic.vicroads.vic.gov.au/>

VicRoads Roads flooded in a 1% AEP (100yr ARI) event	
<ul style="list-style-type: none"> Boundary Road, Coburg North near Sussex Street 	

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

Moreland City Council Roads flooded in a 1% AEP (100yr ARI) event			
COBURG NORTH	<ul style="list-style-type: none"> Ulm Street 	FAWKNER	<ul style="list-style-type: none"> Mathieson Street
<ul style="list-style-type: none"> Adler Grove 	<ul style="list-style-type: none"> Pallett Street 	<ul style="list-style-type: none"> Clara Street 	GLENROY
<ul style="list-style-type: none"> Shaw Court 	<ul style="list-style-type: none"> Bakers Road 	<ul style="list-style-type: none"> Lynch Road 	<ul style="list-style-type: none"> May Street
<ul style="list-style-type: none"> Tonkin Avenue 	<ul style="list-style-type: none"> Catherine Street 	<ul style="list-style-type: none"> Mutton Road 	<ul style="list-style-type: none"> Box Forest Road
<ul style="list-style-type: none"> Rollo Street 	<ul style="list-style-type: none"> Dawson Street 	<ul style="list-style-type: none"> Wurruk Street 	HADFIELD
<ul style="list-style-type: none"> Bridges Avenue 	<ul style="list-style-type: none"> Allenby Street 	<ul style="list-style-type: none"> Kiddle Street 	<ul style="list-style-type: none"> Middle Street
<ul style="list-style-type: none"> Shorts Road 	<ul style="list-style-type: none"> Williams Road 	<ul style="list-style-type: none"> Argyle Street 	<ul style="list-style-type: none"> Fairmount Street
<ul style="list-style-type: none"> Lily Street 	<ul style="list-style-type: none"> Elliott Street 	<ul style="list-style-type: none"> Marlborough Street 	PASCOE VALE
<ul style="list-style-type: none"> Guilfoyle Avenue 	<ul style="list-style-type: none"> Renown Street 	<ul style="list-style-type: none"> Queens Parade 	<ul style="list-style-type: none"> Sussex Street

Table C3.5 – Moreland City Council Possible Road Closures during a flooding event

Flood Mitigation

Retarding Basins

Melbourne Water Retarding Basin	On Drain/ Waterway	Area	Storage Capacity	Spillway Crest Level	Full Supply Level	Embankment Crest Level	ANCOLD Hazard Rating	Houses In Flow Path (dam breach)	Melway Reference
Box Forest Road	Merlynston Creek	3.3 ha	54 ML	First: 77.2mAHD Second: 77.8mAHD	77.8m AHD	4.3m (78.7m AHD)	High C	1	17 E2
Campbellfield Creek	Campbellfield Creek	5.4 ha	132 ML	83.9m AHD	84.8m AHD	4.9m	High C	4	7 F12
Comm Serum Laboratories	Merlynston Creek	16 ha	382 ML	102.2m AHD	103.1m AHD	10.1m (103.7m AHD)	High A	56	7 B11

Table C3.6 – Melbourne Water Retarding Basins within the Merlynston and Campbellfield Creek catchment in the City of Moreland

Sewerage Infrastructure

Sewerage Infrastructure of note during a severe flood event located around the Merlynston and Campbellfield Creek is contained within the following table.

Sewer Emergency Relief Points

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

On Drain / Waterway	Bank / Side of Waterway	Operator	Location	Melway Reference
Campbellfield Creek	West (Hume)	Yarra Valley Water	The Gateway, Broadmeadows	7 F11
Merlynston Creek	-	Yarra Valley Water	Martin Reserve, Box Forest Road, Hadfield	17 F2
Merlynston Main Drain	-	Yarra Valley Water	Cnr Sussex Street and Kent Road, Pascoe Vale	17 E7
Merlynston Main Drain	-	Yarra Valley Water	Bridges Avenue, Coburg North	17 E7
Merlynston Main Drain	-	Yarra Valley Water	Allenby Street, Coburg North	17 G9
South Street Drain	-	Yarra Valley Water	Cnr South Street and Fairmont Street, Hadfield	17 E5

Table C3.7 – Sewer Emergency Relief Points along the Merlynston and Campbellfield creeks in the City of Moreland

Command, Control and Coordination

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

Flood Impacts & Operational Considerations (Intelligence Cards)

The table on the following pages provide a breakdown of the possible consequences of flooding along the Merlynston and Campbellfield creeks at various drain heights within the City of Moreland. This table is to be used only as a guide as no two floods at a location will have identical impacts.

Intelligence Cards have been included for the following locations:

- Merlynston Creek at Fawkner

FLOOD INTELLIGENCE CARD – FAWKNER GAUGE, MERLYNSTON CREEK

Version 3 – April 2019



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

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

LOCATION	Fawkner Cemetery at Sussex St, Hadfield
MELWAY REFERENCE:	17 E5
STREAM:	Merlynston Creek
GAUGE NUMBER:	229402A
GAUGE ZERO:	64.61m AHD
GAUGE TYPE	Stream Level & Rain

MINOR:	Not Established
MODERATE:	Not Established
MAJOR	Not Established
LEVEE HEIGHT:	N/A
TELEMETRIC/MANUAL	Telemetric
HIGHEST RECORDED FLOOD:	2.67m (26th January 1963)

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
1.89m		<ul style="list-style-type: none"> Bank full at gauging location 	
2.26m	20% AEP (5yr ARI) Flood Level	<p>Properties at Flood Risk (Over-Floor)</p> <p>15 Properties in Total Merlynston Creek</p> <ul style="list-style-type: none"> Factories 1-3/107-111 & 113-115 Bakers Road, Coburg North 10 Elliott Street, Coburg North 12 & 14 Pallett Street, Coburg North <p>Campbellfield Creek</p> <ul style="list-style-type: none"> 149, 151, 153, 155, 157 & 2/159 Lynch Road, Fawkner 49 & 49A Sages Road, Glenroy <p>Community Infrastructure Likely Flooded Merlynston Creek</p> <p>The Western Ring Bicycle / Walking Path at the Commonwealth Serum Laboratories Retarding Basin wetland underneath the Western Ring Road, Glenroy</p> <p>Essential Infrastructure Likely Impacted</p> <ul style="list-style-type: none"> Campbellfield Creek Retarding Basin spillway in operation <p>Water Over Road (above 300mm depth) Merlynston Creek</p>	<p>VICSES may provide warnings using EM-COP and VicEmergency to Moreland Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident.</p> <p>VICSES to respond on a request by request basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p>

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> Pallett Street, Coburg North at Bakers Road Allenby Street, Coburg North Campbellfield Creek <ul style="list-style-type: none"> Lynch Road, Fawkner 	
2.56m	10% AEP (10yr ARI) Flood Level	<p>Properties at Flood Risk (Over-Floor) 28 Properties in Total Merlynston Creek</p> <ul style="list-style-type: none"> 10-16 Allenby Street, Coburg North Factories 1-3/107-111 & 113-115 Bakers Road, Coburg North 39 Dawson Street, Coburg North 10 Elliott Street, Coburg North 7, 9, 12 & 14 Pallett Street, Coburg North 37, 39, 41 & 43 Rollo Street, Coburg North 95 Shorts Road, Coburg North 260 & 266 Sussex Street, Pascoe Vale <p>Campbellfield Creek</p> <ul style="list-style-type: none"> 149, 151, 153, 155, 157, 2/159 & 161 Lynch Road, Fawkner 80 Mathieson Street, Coburg North 49 & 49A Sages Road, Glenroy <p>Community Infrastructure Likely Flooded Merlynston Creek</p> <p>The Western Ring Bicycle / Walking Path at the Commonwealth Serum Laboratories Retarding Basin wetland underneath the Western Ring Road, Glenroy</p> <p>Essential Infrastructure Likely Impacted</p> <ul style="list-style-type: none"> Campbellfield Creek Retarding Basin spillway in operation Sewer Emergency Relief Points located at The Gateway, Broadmeadows; Martin Reserve on Box Forest Road, Hadfield; the corner of Sussex St and Kent Rd, Pascoe Vale; Bridges Ave, Coburg North; Allenby St, Coburg North; and the corner of South St and Fairmont St, Hadfield <p>Water Over Road (above 300mm depth) Merlynston Creek</p> <ul style="list-style-type: none"> Tonkin Avenue, Coburg North Rollo Street, Coburg North Bridges Avenue, Coburg North Ulm Street, Coburg North Pallett Street, Coburg North Allenby Street, Coburg North <p>Campbellfield Creek</p> <ul style="list-style-type: none"> Lynch Road, Fawkner Kiddle Street, Fawkner Argyle Street, Fawkner 	<p>VICSES may provide warnings using EM-COP and VicEmergency to Moreland Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident.</p> <p>VICSES to respond on a request by request basis.</p> <p>MCC EHOs to have awareness of potential public and environmental health impacts of outfalls from Sewer Emergency Relief Structures within floodwaters</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p>

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> Mathieson Street, Coburg North 	
2.61m	3 rd December 2003 Flood Level peak		
2.79m	5% AEP (20yr ARI) Flood Level	<p>Properties at Flood Risk (Over-Floor) 65 Properties in Total Merlynston Creek</p> <ul style="list-style-type: none"> 16 & 22 Adler Grove, Coburg North 10-16 Allenby Street, Coburg North Factories 1-3/107-111 & 113-115 Bakers Road, Coburg North 8, 10, 16, Units 1-2/18 & 20 Bridges Avenue, Coburg North Factories 1-2/7-9 & 12 Catherine Street, Coburg North 39 Dawson Street, Coburg North 10 Elliott Street, Coburg North 2, 2A, 2B Hocking Street, Coburg North 8 Lily Street, Coburg North 7, 9, 12 & 14 Pallett Street, Coburg North 37, 39, 41 & 43 Rollo Street, Coburg North 1 Shaw Court, Coburg North 78 & 95 Shorts Road, Coburg North 219, 221, 258, 260, 266, 270, 274 & 276 Sussex Street, Pascoe Vale 26, 30 & 30A Tonkin Avenue, Coburg North 20 & 22 Williams Road, Coburg North <p>Campbellfield Creek</p> <ul style="list-style-type: none"> 29 Argyle Street, Fawkner Reception Building of 16-24 Box Forest Road, Glenroy (Federation Residential Village) 149, 151, 153, 155, 157, 2/159 & 161 Lynch Road, Fawkner 30 Marlborough Street, Fawkner 80 Mathieson Street, Coburg North 10 & 13A Queens Parade, Fawkner 49 & 49A Sages Road, Glenroy 1252, 1/1325 & 2/1325 Sydney Road, Fawkner 31 Wurruk Street, Fawkner <p>Community Infrastructure Likely Flooded Merlynston Creek</p> <ul style="list-style-type: none"> The Western Ring Bicycle / Walking Path at the Commonwealth Serum Laboratories Retarding Basin wetland underneath the Western Ring Road, Glenroy <p>Campbellfield Creek</p> <ul style="list-style-type: none"> Federation Village Retirement Village on Box Forest Road, Glenroy <p>Essential Infrastructure Likely Impacted</p>	<p>VICSES may provide warnings using EM-COP and VicEmergency to Moreland Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident.</p> <p>VICSES to respond on a request by request basis. Local unit will likely require additional support from surrounding units due to high RFA numbers</p> <p>MCC EHOs to have awareness of potential public and environmental health impacts of outfalls from Sewer Emergency Relief Structures within floodwaters</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p>

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> Campbellfield Creek Retarding Basin at Full Supply Level with the spillway in operation Floodwaters at Box Forest Road Retarding Basin at First Spillway Level Bus Route 534 along Boundary Road and Sussex Street, Coburg North Sewer Emergency Relief Points located at The Gateway, Broadmeadows; Martin Reserve on Box Forest Road, Hadfield; the corner of Sussex St and Kent Rd, Pascoe Vale; Bridges Ave, Coburg North; Allenby St, Coburg North; and the corner of South St and Fairmont St, Hadfield <p>Water Over Road (above 300mm depth)</p> <p>Merlynston Creek</p> <ul style="list-style-type: none"> Fairmount Street, Hadfield at Sherwood Street Sussex Street, Pascoe Vale between South Street and Kent Road Boundary Road, Coburg North near Sussex Street Adler Grove, Coburg North Shaw Court, Coburg North Tonkin Avenue, Coburg North Rollo Street, Coburg North Bridges Avenue, Coburg North Shorts Road, Coburg North Lily Street, Coburg North Ulm Street, Coburg North Pallett Street, Coburg North between Ulm Street and Hocking Street Bakers Road, Coburg North at Pallett Street Catherine Street, Coburg North Dawson Street, Coburg North Allenby Street, Coburg North Williams Road, Coburg North <p>Campbellfield Creek</p> <ul style="list-style-type: none"> Clara Street, Fawkner Lynch Road, Fawkner Wurruk Street, Fawkner Kiddle Street, Fawkner Argyle Street, Fawkner Marlborough Street, Fawkner Queens Parade, Fawkner Mathieson Street, Coburg North 	
2.98m	2% AEP (50yr ARI) Flood Level	<p>Properties at Flood Risk (Over-Floor)</p> <p>124 Properties in Total</p> <p>Merlynston Creek</p> <ul style="list-style-type: none"> 3, 9, 11, 13, 15, 16, 17, 18, 22 & 24 Adler Grove, Coburg North 10-16 & 15 Allenby Street, Coburg North 	

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> 62, Factories 1-3/107-111 & 113-115 Bakers Road, Coburg North 2, 4, 6, 8, 10, 12, 14, 16, Units1-2/18 & 20 Bridges Avenue, Coburg North Factories 1-2/7-9 & 12 Catherine Street, Coburg North 35, 37, 39, 41 & 72 Dawson Street, Coburg North 10 Elliott Street, Coburg North 2, 2A, 2B Hocking Street, Coburg North 35 Irene Avenue, Coburg North 2A Kent Road, Pascoe Vale 8 Lily Street, Coburg North 1B, 1C, 5, 7, 9, 10, 12 & 14 Pallett Street, Coburg North 31, 37, 39, 41 & 43 Rollo Street, Coburg North 1 & 7 Shaw Court, Coburg North 70, 78, 80, 82, 84, 95, 99, 101 & 103 Shorts Road, Coburg North 219, 221, 223, 229, 231, 235-237, 248, 250, 258, 260, 262, 266, 268, 270, 272, 274, 276, 278 & 294 Sussex Street, Pascoe Vale 21, 24, 26, 28, 30 & 30A Tonkin Avenue, Coburg North 20, 22 & 49 Williams Road, Coburg North <p>Campbellfield Creek</p> <ul style="list-style-type: none"> 29 Argyle Street, Fawkner 6 Borang Street, Coburg North Reception Building of 16-24 Box Forest Road, Glenroy (Federation Residential Village) 145, 149, 151, 153, 155, 157, 2/159 & 161 Lynch Road, Fawkner 28 & 30 Marlborough Street, Fawkner 80 Mathieson Street, Coburg North 10 & 13A Queens Parade, Fawkner 49 & 49A Sages Road, Glenroy 1224, 1239-1243, 1252, 1299, 1323, 1/1325, 2/1325, 1342, 1355, 1357 & 1359 Sydney Road, Fawkner 31 Wurruk Street, Fawkner <p>Community Infrastructure Likely Flooded</p> <p>Merlynston Creek</p> <ul style="list-style-type: none"> Parts of the Northern Memorial Park Cemetery on Evell Street, Glenroy Parts of the Fawkner Cemetery on Sydney Road, Hadfield The Western Ring Bicycle / Walking Path at the Commonwealth Serum Laboratories Retarding Basin wetland underneath the Western Ring Road, Glenroy <p>Campbellfield Creek</p> <ul style="list-style-type: none"> Federation Village Retirement Village on Box Forest Road, Glenroy with possible access restrictions also via internal drive ways Matrix Early Learning Fawkner, 1218 Sydney Road, Fawkner <p>Essential Infrastructure Likely Impacted</p> <ul style="list-style-type: none"> Campbellfield Creek Retarding Basin exceeded Full Supply Level. Expect greater 	<p>VICSES will provide warnings using EM-COP and VicEmergency to Moreland Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident.</p> <p>VICSES to respond on a request by request basis. Local unit will likely require additional support from surrounding units due to high RFA numbers</p> <p>MCC EHOs to have awareness of potential public and environmental health impacts of outfalls from Sewer Emergency Relief Structures within floodwaters</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p> <p>Increased flooding around Federation Village Retirement Village expected When Campbellfield Creek RB exceeds full supply level (FSL)</p>

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<p>flooding around Federation Village Retirement Village as a result.</p> <ul style="list-style-type: none"> Box Forest Road Retarding Basin First Spillway in operation Bus Route 534 along Boundary Road and Sussex Street, Coburg North Sewer Emergency Relief Points located at The Gateway, Broadmeadows; Martin Reserve on Box Forest Road, Hadfield; the corner of Sussex St and Kent Rd, Pascoe Vale; Bridges Ave, Coburg North; Allenby St, Coburg North; and the corner of South St and Fairmont St, Hadfield <p>Water Over Road (above 300mm depth)</p> <p>Merlynston Creek</p> <ul style="list-style-type: none"> May Street, Glenroy Middle Street, Hadfield around East Street Fairmount Street, Hadfield Sussex Street, Pascoe Vale between South Street and Kent Road Boundary Road, Coburg North near Sussex Street Adler Grove, Coburg North Shaw Court, Coburg North Tonkin Avenue, Coburg North Rollo Street, Coburg North Bridges Avenue, Coburg North Shorts Road, Coburg North at Irene Street Lily Street, Coburg North Guilfoyle Avenue, Coburg North Ulm Street, Coburg North Pallett Street, Coburg North between Ulm Street and Hocking Street Bakers Road, Coburg North at Pallett Street Catherine Street, Coburg North Dawson Street, Coburg North Allenby Street, Coburg North Williams Road, Coburg North <p>Campbellfield Creek</p> <ul style="list-style-type: none"> Clara Street, Fawkner Lynch Road, Fawkner Mutton Road, Fawkner Wurruk Street, Fawkner Kiddle Street, Fawkner Argyle Street, Fawkner Marlborough Street, Fawkner Queens Parade, Fawkner Mathieson Street, Coburg North 	

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
3.13m	1% AEP (100yr ARI) Flood Level	<p>Properties at Flood Risk (Over-Floor)</p> <p>171 Properties in Total</p> <p>Merlynston Creek</p> <ul style="list-style-type: none"> 1, 3, 5, 7, 9, 11, 12, 13, 15, 16, 17, 18, 20, 21, 22 & 24 Adler Grove, Coburg North 8, 10-16, 13, 15 & 17 Allenby Street, Coburg North 62, 101-105, Factories 1-3/107-111 & 113-115 Bakers Road, Coburg North 97, 100 & 107 Boundary Road, Coburg North 2, 4, 6, 8, 10, 12, 14, 16, Units 1-2/18 & 20 Bridges Avenue, Coburg North 2/1, Factories 1-2/7-9, 8 & 12 Catherine Street, Coburg North 33, 35, 37, 39, 41, 43 & 72 Dawson Street, Coburg North 10 Elliott Street, Coburg North 2, 2A, 2B Hocking Street, Coburg North 35 Irene Avenue, Coburg North 2A Kent Road, Pascoe Vale 8 & 10 Lily Street, Coburg North 1B, 1C, 5, 7, 8, 9, 10, 12 & 14 Pallett Street, Coburg North 8, 12, 15, 17, 21, 23, 31, 37, 39, 41 & 43 Rollo Street, Coburg North 1, 6 & 7 Shaw Court, Coburg North 70, 72, 78, 80, 82, 84, 86, 95, 99, 101 & 103 Shorts Road, Coburg North 217, 219, 221, 223, 227, 229, 231, 233, 235-237, 1/238, 246, 248, 250, 258, 260, 266, 268, 270, 272, 274, 276, 278, 282, Units 1-2/292 & 294 Sussex Street, Pascoe Vale 19, 21, 23, 24, 26, 27A, 28, 30 & 30A Tonkin Avenue, Coburg North 20, 22, 24, 45, 49 & 51 Williams Road, Coburg North <p>Campbellfield Creek</p> <ul style="list-style-type: none"> 29 Argyle Street, Fawkner 6 Borang Street, Coburg North Reception Building and Boat Shed of 16-24 Box Forest Road, Glenroy (Federation Residential Village) 145, 149, 151, 153, 155, 157, 2/159 & 161 Lynch Road, Fawkner 28 & 30 Marlborough Street, Fawkner 80 Mathieson Street, Coburg North 10 & 13A Queens Parade, Fawkner 49 & 49A Sages Road, Glenroy 1116, 1224, 1239-1243, 1252, 1253-1255, 1299, 1323, 1/1325, 2/1325, 1342, 1355, 1357, 1359, 1363 & 1367 Sydney Road, Fawkner 31 Wurruk Street, Fawkner <p>Community Infrastructure Likely Flooded</p> <p>Merlynston Creek</p> <ul style="list-style-type: none"> Parts of the Northern Memorial Park Cemetery on Evell Street, Glenroy flooded Parts of the Fawkner Cemetery on Sydney Road, Hadfield flooded 	<p>VICSES will provide warnings using EM-COP and VicEmergency to Moreland Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident.</p> <p>MCC EHOs to have awareness of potential public and environmental health impacts of outfalls from Sewer Emergency Relief Structures within floodwaters</p> <p>VICSES to respond on a request by request basis. Local unit will likely require additional support from surrounding units due to high RFA numbers</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p>

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> The Western Ring Bicycle / Walking Path at the Commonwealth Serum Laboratories Retarding Basin wetland underneath the Western Ring Road, Glenroy <p>Campbellfield Creek</p> <ul style="list-style-type: none"> Joybelle Child Care Centre on Sydney Road, Fawkner Federation Village Retirement Village on Box Forest Road, Glenroy Matrix Early Learning Fawkner, 1218 Sydney Road, Fawkner <p>Essential Infrastructure Likely Impacted</p> <ul style="list-style-type: none"> Campbellfield Creek Retarding Basin exceeded Full Supply Level. Expect greater flooding around Federation Village Retirement Village as a result. Box Forest Road Retarding Basin First Spillway in operation Bus Route 534 along Boundary Road and Sussex Street, Coburg North Sewer Emergency Relief Points located at The Gateway, Broadmeadows; Martin Reserve on Box Forest Road, Hadfield; the corner of Sussex St and Kent Rd, Pascoe Vale; Bridges Ave, Coburg North; Allenby St, Coburg North; and the corner of South St and Fairmont St, Hadfield <p>Water Over Road (above 300mm depth)</p> <p>Merlynston Creek</p> <ul style="list-style-type: none"> May Street, Glenroy Box Forest Road, Glenroy east of East Street Middle Street, Hadfield around East Street Fairmount Street, Hadfield Sussex Street, Pascoe Vale between South Street and Kent Road Boundary Road, Coburg North near Sussex Street Adler Grove, Coburg North Shaw Court, Coburg North Tonkin Avenue, Coburg North Rollo Street, Coburg North Bridges Avenue, Coburg North Shorts Road, Coburg North at Irene Street Lily Street, Coburg North Guilfoyle Avenue, Coburg North Ulm Street, Coburg North Pallett Street, Coburg North between Ulm Street and Hocking Street Bakers Road, Coburg North at Pallett Street Catherine Street, Coburg North Dawson Street, Coburg North Allenby Street, Coburg North Williams Road, Coburg North Elliott Street, Coburg North Renown Street, Coburg North <p>Campbellfield Creek</p>	

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> • Clara Street, Fawkner • Lynch Road, Fawkner • Mutton Road, Fawkner • Wurruk Street, Fawkner • Kiddle Street, Fawkner • Argyle Street, Fawkner • Marlborough Street, Fawkner • Queens Parade, Fawkner • Mathieson Street, Coburg North 	

Table C1.8 – Breakdown of likely consequences at various Fawkner gauge level heights along the Merlynston and Campbellfield creeks within the City of Moreland with operational considerations

APPENDIX C4 – WESTBREEN CREEK FLOOD EMERGENCY PLAN

Overview of Flooding Consequences

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

Summary of Consequences in a 1% AEP (100yr ARI) flood within the Westbreen Creek catchment

Property					
Properties	97				
Residential	60				
Commercial	37	Glenroy Shopping Strip on Wheatsheaf Rd; & West Street Shopping Strip, Hadfield			
Industrial	0				
Public Land	0				
Rural	0				
Community Infrastructure					
Health Facilities	0		Child Care / Kindergartens	2	Glenroy Memorial Kinder; & Pearl Street Child Care Centre
Care Facilities	0		Community Venues	0	
Retirement Villages	0		Places of Worship	0	
Schools / Colleges	2	Westbreen Primary School; & Pascoe Vale Girls Secondary College	Prisons	0	
Essential Infrastructure					
Major Roads	4	Boundary Rd; Gaffney St; Park St; & Pascoe St	Police Stations	0	
Major Rail	1	Craigieburn Line at Pascoe Vale	Government Buildings	0	
Bus Routes	5	513, 534, 536, 542 & 951	Sewerage Facilities	3	Emergency Relief Points
Power Facility	0		Levees	0	
Comms Services	0		Drainage Facilities	0	
Emergency Services	0		Airports / Airfields	0	
Tourism / Recreation					
Sports Facilities	1	Northern Golf Club	Caravan Parks	0	
Recreation Facilities	1	Westbreen Creek Trail	Camping Grounds	0	
Government Boundaries					
Local Gov't Areas	1	Moreland	CMA	1	Port Phillip & Westernport
Adjacent LGAs	0		CFA District	0	
SES Unit Area	1	Broadmeadows	MFB District	1	Northern

Table C4.1 – Consequence Summary of 1% AEP flood within the Westbreen Creek catchment

Westbreen Creek and the surrounding suburbs of Glenroy, Hadfield & Pascoe Vale are located approximately 10km north of Melbourne in an established residential area. Westbreen Creek is a part of a small catchment that feeds into Moonee Ponds Creek in Pascoe Vale.

A seasonal waterway, Westbreen Creek takes the form of natural depressions with some piped sections. High Intensity, short duration rainfall events are likely to cause flash flooding in and around Westbreen Creek and the three main stormwater drains that connect to it: the Acacia Street, Cardinal Road and West Street Drains, while prolonged rainfall may see Moonee Ponds Creek flood.

Just before Westbreen Creek joins Moonee Ponds Creek, the Craigieburn Railway Line crosses the creek near the bottom of Gaffney Street, Pascoe Vale. At this location in a 1% AEP event, the railway may become inundated. See mapping in **Appendix F** for more insight into flooding in the area.

Warning Times

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

Melbourne Water Hydrographic Monitoring Station	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge	Melway Reference
Moonee Ponds Creek at Jacana Retarding Basin, Glenroy	229665A	Jacana Retarding Basin near Embankment, Glenroy	✓	✓	6 D12
Merlynston Creek at Fawkner Cemetery	229402A	Fawkner Cemetery at Sussex St, Hadfield	✓	✓	17 E5
Essendon North	586182	North Essendon Service Reservoirs on Lebanon St, Essendon Fields		✓	16 D7
Essendon Airport AWS	86038	Essendon Airport at Perimeter Rd, Essendon Fields		✓	16 E8

Table C4.1 – Hydrographic Monitoring Stations within the Moonee Ponds Creek and Merlynston Creek catchments.

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

Areas of Flood Risk

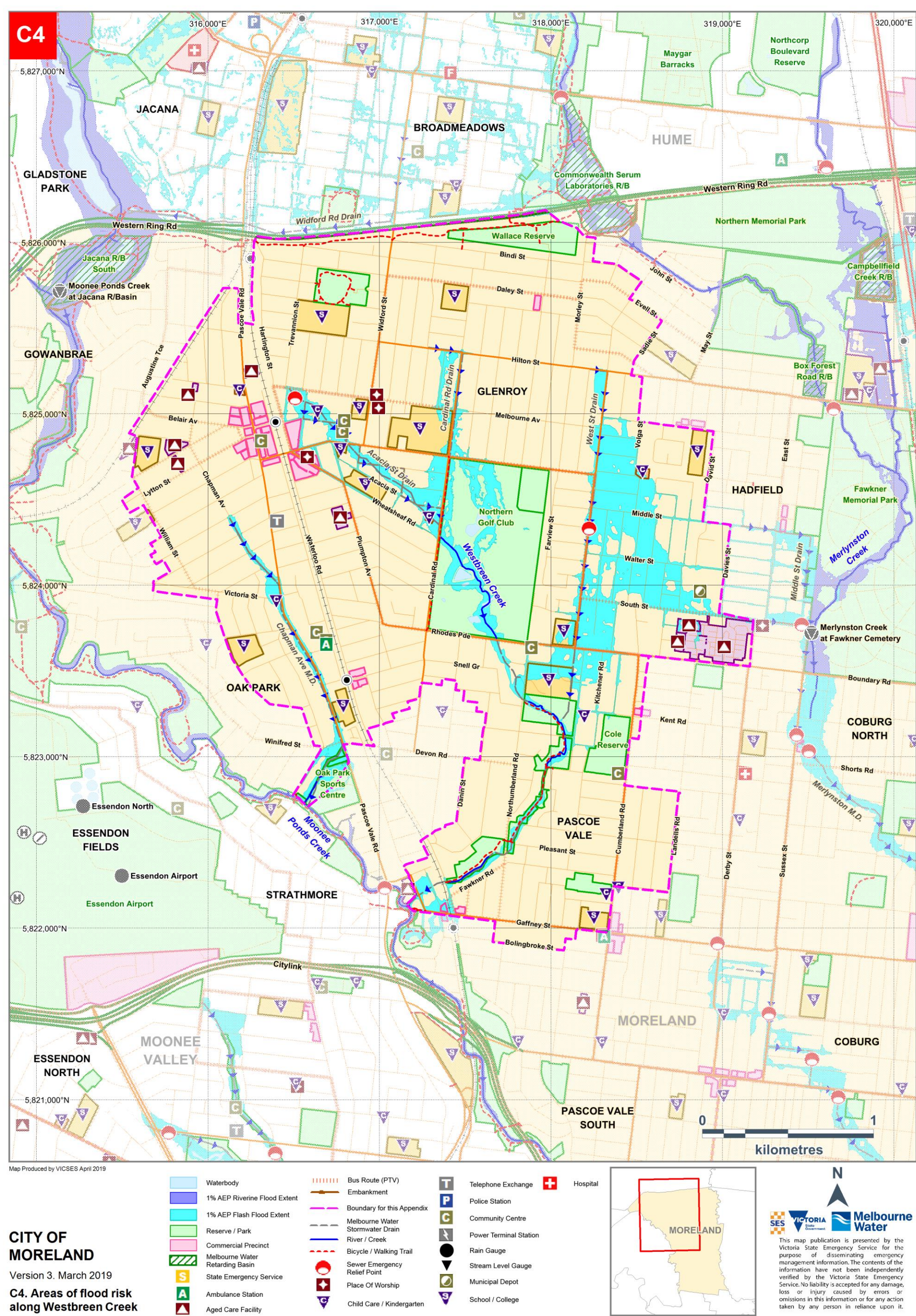


Figure C4 – Areas of flood risk around Westbreen Creek in the City of Moreland

Moreland Storm and Flood Emergency Plan – A Sub-Plan of the MEMPlan

Properties at Flood Risk

Properties listed in the table below are at risk from flooding over-floor within the Westbreen Creek catchment. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Acacia Street Drain (Water Technology, October 2012) and the West Street Drain (Lawson&Treloar, December 2000) flood mapping and risk assessment programs. Note that any multi-lot properties situated above ground floor likely impacted by isolation only with flooding on ground floor impacting access to common areas and/or carpark and storage facilities. Information on above ground-floor properties is not available in this list.

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

Properties at risk from Flooding over-floor within the Westbreen Creek catchment						
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				
	✓	✓	2/2 Acacia Street	Glenroy	Cardinal Road Drain	Flash
✓	✓	✓	1/5 Acacia Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	2/5 Acacia Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	7 Acacia Street	Glenroy	Acacia Street Drain	Flash
		✓	8A Acacia Street	Glenroy	Cardinal Road Drain	Flash
✓	✓	✓	14 Acacia Street	Glenroy	Acacia Street Drain	Flash
		✓	16 Acacia Street	Glenroy	Acacia Street Drain	Flash
		✓	1/18 Acacia Street	Glenroy	Acacia Street Drain	Flash
		✓	2/18 Acacia Street	Glenroy	Acacia Street Drain	Flash
		✓	3/18 Acacia Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	2/20 Acacia Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	3/20 Acacia Street	Glenroy	Acacia Street Drain	Flash
		✓	3/24 Acacia Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	4/24 Acacia Street	Glenroy	Acacia Street Drain	Flash
	✓	✓	1/28 Acacia Street	Glenroy	Acacia Street Drain	Flash
	✓	✓	2/28 Acacia Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	3/28 Acacia Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	4/28 Acacia Street	Glenroy	Acacia Street Drain	Flash
		✓	9 Apsley Street	Glenroy	Cardinal Road Drain	Flash
✓	✓	✓	19 Apsley Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	23 Apsley Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	25 Apsley Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	13-17 Blenheim Street	Glenroy	Acacia Street Drain	Flash
		✓	59 Cardinal Road	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	77 Cardinal Road	Glenroy	Cardinal Road Drain	Flash
	✓	✓	9/1 Cromwell Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	10/1 Cromwell Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	10-20 Geum Street	Hadfield	West Street Drain	Flash
✓	✓	✓	47-97 Glenroy Road	Glenroy	Cardinal Road Drain	Flash

Properties at risk from Flooding over-floor within the Westbreen Creek catchment						
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				
	✓	✓	99 Glenroy Road	Glenroy	Cardinal Road Drain	Flash
✓	✓	✓	99A Glenroy Road	Glenroy	Cardinal Road Drain	Flash
		✓	8/164 Glenroy Road	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	166A Glenroy Road	Glenroy	Acacia Street Drain	Flash
		✓	8 Harold Street	Glenroy	Cardinal Road Drain	Flash
✓	✓	✓	1/31 Harold Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	2/31 Harold Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	3/31 Harold Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	4/31 Harold Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	5/31 Harold Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	6/31 Harold Street	Glenroy	Acacia Street Drain	Flash
	✓	✓	1/33 Harold Street	Glenroy	Acacia Street Drain	Flash
	✓	✓	2/33 Harold Street	Glenroy	Acacia Street Drain	Flash
	✓	✓	3/33 Harold Street	Glenroy	Acacia Street Drain	Flash
	✓	✓	4/33 Harold Street	Glenroy	Acacia Street Drain	Flash
	✓	✓	5/33 Harold Street	Glenroy	Acacia Street Drain	Flash
	✓	✓	6/33 Harold Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	1/42 Harold Street	Glenroy	Acacia Street Drain	Flash
	✓	✓	3 Lindsay Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	6 Lindsay Street	Glenroy	Acacia Street Drain	Flash
		✓	8 Lindsay Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	2 Marlborough Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	4-6 Marlborough Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	1/8 Marlborough Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	3/8 Marlborough Street	Glenroy	Acacia Street Drain	Flash
		✓	163 Melbourne Avenue	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	146 Middle Street	Hadfield	West Street Drain	Flash
✓	✓	✓	146A Middle Street	Hadfield	West Street Drain	Flash
✓	✓	✓	1/146 Middle Street	Hadfield	West Street Drain	Flash
✓	✓	✓	2/146 Middle Street	Hadfield	West Street Drain	Flash
✓	✓	✓	148 Middle Street	Hadfield	West Street Drain	Flash
		✓	1 Murray Street	Glenroy	Acacia Street Drain	Flash
		✓	10 Murrell Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	2 Pearl Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	3/6 Pearl Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	4/6 Pearl Street	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	102 West Street	Hadfield	West Street Drain	Flash
✓	✓	✓	104 West Street	Hadfield	West Street Drain	Flash
✓	✓	✓	106 West Street	Hadfield	West Street Drain	Flash
✓	✓	✓	108A West Street	Hadfield	West Street Drain	Flash
✓	✓	✓	110 West Street	Hadfield	West Street Drain	Flash
✓	✓	✓	112 West Street	Hadfield	West Street Drain	Flash
		✓	114 West Street	Hadfield	West Street Drain	Flash

Properties at risk from Flooding over-floor within the Westbreen Creek catchment						
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				
	✓	✓	1/2-4 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
	✓	✓	2/2-4 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
	✓	✓	3/2-4 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
	✓	✓	4/2-4 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	6 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	1/8 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
		✓	96 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
		✓	98 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
	✓	✓	100 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
		✓	102 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
	✓	✓	106 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	110 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
✓	✓	✓	112-114 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
		✓	119 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
	✓	✓	125 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
		✓	127 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
	✓	✓	129 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
		✓	131 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
	✓	✓	135 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
	✓	✓	139 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
	✓	✓	143 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
	✓	✓	145 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
	✓	✓	145A Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
	✓	✓	147 Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
	✓	✓	147A Wheatsheaf Road	Glenroy	Acacia Street Drain	Flash
Totals						
49	76	97				

Table C4.3 – Properties at risk of flooding over-floor within the Westbreen Creek catchment in the City of Moreland

Isolation

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

Essential Infrastructure

- The **Craigieburn Railway Line at Pascoe Vale Station** and the Gaffney Street crossing may be overtopped during a 1% AEP Rainfall Event

During an event, see the Public Transport Victoria's Website for details on delays or alterations to services. <http://ptv.vic.gov.au/live-travel-updates/>. A map of Public Transport routes within Moreland is available via the website at: https://static.ptv.vic.gov.au/siteassets/Maps/Localities/PDFs/37_Moreland_LAM.pdf

Apart from the roads outlined below, all other essential infrastructure and services areas around Glenroy, Hadfield & Pascoe Vale 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 Glenroy, Hadfield & Pascoe Vale. Check the VicRoads website for more details: <https://traffic.vicroads.vic.gov.au/>

VicRoads Roads flooded in a 1% AEP (100yr ARI) event	
•	Boundary Road at Bristol Road, Pascoe Vale
•	Gaffney Street, Pascoe Vale around the Pascoe Vale Railway Station crossing
•	Park Street, Pascoe Vale between Stewart Street & Gaffney Street
•	Pascoe Street at West Street, Pascoe Vale

Table C4.4 – VicRoads possible road closures during a flooding event

Moreland City Council Roads flooded in a 1% AEP (100yr ARI) event			
GLENROY		HADFIELD	PASCOE VALE
• Glenroy Road	• Harold Street	• Donald Street	• Lake Avenue
• Acacia Street	• Lindsay Street	• Middle Street	• Peachey Court
• Apsley Street	• Murray Street	• South Street	• West Street
• Blenheim Street	• Murrell Street	• Tassell Street	
• Cardinal Road	• Pearl Street	• Volga Street	
• Connell Street			

Table C4.5 – Moreland City Council possible road closures during a flooding event

Flood Mitigation

There are no formal retarding basins, levees or Pumping Stations around Westbreen Creek. A number of reserves and parklands along Westbreen Creek may hold a large amount of stormwater during an event. These include:

Reserve / Park	On Drain / Waterway	Location	Melway Reference
Esslemont Reserve	Westbreen Creek	Somerset Street, Pascoe Vale	16J9

Table C4.6 – Parks and Reserves along Westbreen Creek in the City of Moreland

Sewerage Infrastructure

Sewerage Infrastructure of note during a severe flood event located within the Westbreen Creek catchment is contained within the following table.

Sewer Emergency Relief Points

There are Sewer Emergency Relief Points within the Westbreen 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
Acacia Street Drain	-	Yarra Valley Water	Nelson Street, Glenroy	16 H2
South Street Drain	-	Yarra Valley Water	Cnr South Street and Fairmont Street, Hadfield	17 E5
West Street Drain	-	Yarra Valley Water	Cnr West Street and Caldwell Street, Hadfield	17 B4

Table C4.7 – Sewer Emergency Relief Points in the Westbreen Creek Catchment in the City of Moreland

Command, Control and Coordination

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

Flood Impacts & Operational Considerations (Intelligence Cards)

The tables on the following pages provide a breakdown of the possible consequences of flooding within the Westbreen Creek catchment at various rain totals within Moreland. 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:

- Westbreen Creek, Pascoe Vale

FLOOD INTELLIGENCE CARD – WESTBREEN CREEK, PASCOE VALE (UNGAUGED)

Version 3 – April 2019



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

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

CLOSEST RAIN GAUGE	Essendon North
LOCATION	North Essendon Service Reservoirs on Lebanon St, Essendon Fields
MELWAY REF:	16 D7

GAUGE NUMBER	586182
GAUGE TYPE	Rain
TELEMETRIC/MANUAL	Telemetric

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
11mm in 10 mins; 19mm in 30 mins; 24mm 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 (Over-Floor) 24 Properties in Total Acacia Street Drain <ul style="list-style-type: none"> 7, Units 2-3/20 & 4/24 Acacia Street, Glenroy 19, 23 & 25 Apsley Street, Glenroy 13-17 Blenheim Street, Glenroy 166A Glenroy Road, Glenroy Units 1-6/31 & 1/42 Harold Street, Glenroy 4-6, 1/8 & 3/8 Marlborough Street, Glenroy 2 Pearl Street, Glenroy 6, 110 & 112-114 Wheatsheaf Road, Glenroy Cardinal Road Drain <ul style="list-style-type: none"> 47-97 & 99A Glenroy Road, Glenroy Community Infrastructure Flooded Acacia Street Drain <ul style="list-style-type: none"> Glenroy Memorial Kindergarten on Murrell Street, Glenroy Pearl Street Child Care Centre on Pearl Street, Glenroy Westbreen Creek <ul style="list-style-type: none"> Northern Golf Club flooded in parts Westbreen Creek Trail flooded at various locations Water Over Road (over 300mm depth)	VICSES may provide warnings using EM-COP and VicEmergency as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. VICSES to respond on a request by request basis. Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements

Design Rainfall Depths (mm) – <i>Indication of Possible Flooding</i>	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		Acacia Street Drain <ul style="list-style-type: none"> Glenroy Road, Glenroy Lindsay Street, Glenroy Harold Street, Glenroy Acacia Street, Glenroy Murray Street, Glenroy Pearl Street, Glenroy Cardinal Road Drain <ul style="list-style-type: none"> Cardinal Road, Glenroy between Hilton Street and Wheatsheaf Road Connell Street, Glenroy 	
14mm in 10 mins; 22mm in 30 mins; 28mm in 1 hour; 35mm in 2 hours; 40mm in 3 hours; or 51mm 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.	10% AEP (10 year ARI)	Properties at Flood Risk (Over-Floor) 34 Properties in Total Acacia Street Drain <ul style="list-style-type: none"> Units 1-2/5, 7, 14, Units 2-3/20, 4/24 & 4/28 Acacia Street, Glenroy 19, 23 & 25 Apsley Street, Glenroy 13-17 Blenheim Street, Glenroy 166A Glenroy Road, Glenroy Units 1-6/31 & 1/42 Harold Street, Glenroy 6 Lindsay Street, Glenroy 2, 4-6, 1/8 & 3/8 Marlborough Street, Glenroy 2 & Units 3-4/6 Pearl Street, Glenroy 6, 110 & 112-114 Wheatsheaf Road, Glenroy Cardinal Road Drain <ul style="list-style-type: none"> 77 Cardinal Road, Glenroy 47-97 & 99A Glenroy Road, Glenroy Community Infrastructure Flooded Acacia Street Drain <ul style="list-style-type: none"> Glenroy Memorial Kindergarten on Murrell Street, Glenroy Pearl Street Child Care Centre on Pearl Street, Glenroy Westbreen Creek <ul style="list-style-type: none"> Northern Golf Club flooded in parts Westbreen Creek Trail flooded at various locations Essential Infrastructure Possibly Impacted Sewer Emergency Relief Points located at Nelson Street, Glenroy; Cnr South St and Fairmont St, Hadfield; and Cnr West St and Caldwell St, Hadfield Water Over Road (over 300mm depth) Acacia Street Drain <ul style="list-style-type: none"> Glenroy Road, Glenroy Lindsay Street, Glenroy 	VICSES may provide warnings using EM-COP and VicEmergency as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. VICSES to respond on a request by request basis. MCC EHOs to have awareness of potential public and environmental health impacts of outfalls from Sewer Emergency Relief Structures within floodwaters 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
		<ul style="list-style-type: none"> Harold Street, Glenroy Acacia Street, Glenroy Murray Street, Glenroy Pearl Street, Glenroy Cardinal Road Drain <ul style="list-style-type: none"> Cardinal Road, Glenroy between Hilton Street and Wheatsheaf Road Connell Street, Glenroy 	
<p>16mm in 10 mins; 27mm in 30 mins; 34mm in 1 hour; 42mm in 2 hours; 47mm in 3 hours; or 61mm in 6 hours</p> <p>Note: rainfall depths are a very rough method of estimating flood events and have been used due to the ungagged nature of the catchment. This should be used as a guide only.</p>	5% AEP (20 year ARI)	<p>Properties at Flood Risk (Over-Floor)</p> <p>49 Properties in Total</p> <p>Acacia Street Drain</p> <ul style="list-style-type: none"> Units 1-2/5, 7, 14, Units 2-3/20, 4/24 & Units 3-4/28 Acacia Street, Glenroy 19, 23 & 25 Apsley Street, Glenroy 13-17 Blenheim Street, Glenroy 10/1 Cromwell Street, Glenroy 166A Glenroy Road, Glenroy Units 1-6/31 & 1/42 Harold Street, Glenroy 6 Lindsay Street, Glenroy 2, 4-6, 1/8 & 3/8 Marlborough Street, Glenroy 2 & Units 3-4/6 Pearl Street, Glenroy 6, 1/8, 110 & 112-114 Wheatsheaf Road, Glenroy <p>Cardinal Road Drain</p> <ul style="list-style-type: none"> 77 Cardinal Road, Glenroy 47-97 & 99A Glenroy Road, Glenroy <p>West Street Drain</p> <ul style="list-style-type: none"> 10-20 Geum Street, Hadfield 146, 146A, 1/146, 2/146 & 148 Middle Street, Hadfield 102, 104, 106, 108A, 110 & 112 West Street, Hadfield <p>Community Infrastructure Flooded</p> <p>Acacia Street Drain</p> <ul style="list-style-type: none"> Glenroy Memorial Kindergarten on Murrell Street, Glenroy Pearl Street Child Care Centre on Pearl Street, Glenroy <p>Westbreen Creek</p> <ul style="list-style-type: none"> Northern Golf Club flooded in parts Westbreen Creek Trail flooded at various locations <p>Essential Infrastructure Possibly Impacted</p> <p>Sewer Emergency Relief Points located at Nelson Street, Glenroy; Cnr South St and Fairmont St, Hadfield; and Cnr West St and Caldwell St, Hadfield</p> <p>Water Over Road (over 300mm depth)</p> <p>Acacia Street Drain</p>	<p>VICSES may provide warnings using EM-COP and VicEmergency to Moreland Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident.</p> <p>MCC EHOs to have awareness of potential public and environmental health impacts of outfalls from Sewer Emergency Relief Structures within floodwaters</p> <p>VICSES to respond on a request by request basis. Local unit will likely require additional support from surrounding units due to high RFA numbers</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p>

Design Rainfall Depths (mm) – <i>Indication of Possible Flooding</i>	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> Glenroy Road, Glenroy Lindsay Street, Glenroy Harold Street, Glenroy Acacia Street, Glenroy Murray Street, Glenroy Pearl Street, Glenroy Cardinal Road Drain <ul style="list-style-type: none"> Cardinal Road, Glenroy between Hilton Street and Wheatsheaf Road Connell Street, Glenroy Westbreen Creek <ul style="list-style-type: none"> Gaffney Street, Pascoe Vale around Railway crossing 	
20mm in 10 mins; 33mm in 30 mins; 42mm in 1 hour; 52mm in 2 hours; 59mm 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.	2% AEP (50 year ARI)	Properties at Flood Risk (Over-Floor) 76 Properties in Total Acacia Street Drain <ul style="list-style-type: none"> 2/2, Units 1-2/5, 7, 14, Units 2-3/20, 4/24 & Units 1-4/28 Acacia Street, Glenroy 19, 23 & 25 Apsley Street, Glenroy 13-17 Blenheim Street, Glenroy 59 Cardinal Road, Glenroy Units 9-10/1 Cromwell Street, Glenroy 166A Glenroy Road, Glenroy Units 1-6/31, Units 1-6/33 & 1/42 Harold Street, Glenroy 3 & 6 Lindsay Street, Glenroy 2, 4-6, 1/8 & 3/8 Marlborough Street, Glenroy 2 & Units 3-4/6 Pearl Street, Glenroy Units 1-4/2-4, 6, 1/8, 100, 106, 110, 112-114, 125, 129, 135, 139, 143, 145, 145A, 147 & 147A Wheatsheaf Road, Glenroy Cardinal Road Drain <ul style="list-style-type: none"> 77 Cardinal Road, Glenroy 47-97, 99 & 99A Glenroy Road, Glenroy West Street Drain <ul style="list-style-type: none"> 10-20 Geum Street, Hadfield 146, 146A, 1/146, 2/146 & 148 Middle Street, Hadfield 102, 104, 106, 108A, 110 & 112 West Street, Hadfield Community Infrastructure Flooded Acacia Street Drain <ul style="list-style-type: none"> Glenroy Memorial Kindergarten on Murrell Street, Glenroy Pearl Street Child Care Centre on Pearl Street, Glenroy Westbreen Creek <ul style="list-style-type: none"> Northern Golf Club flooded in parts 	<p>VICSES will provide warnings using EM-COP and VicEmergency to Moreland Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident.</p> <p>MCC EHOs to have awareness of potential public and environmental health impacts of outfalls from Sewer Emergency Relief Structures within floodwaters</p> <p>VICSES to respond on a request by request basis. Local unit will likely require additional support from surrounding units due to high RFA numbers</p> <p>Council and VicRoads (as appropriate) to provide road</p>

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> Westbreen Creek Trail flooded at various locations Essential Infrastructure Possibly Impacted <ul style="list-style-type: none"> Sewer Emergency Relief Points located at Nelson Street, Glenroy; Cnr South St and Fairmont St, Hadfield; and Cnr West St and Caldwell St, Hadfield Water Over Road (over 300mm depth) Acacia Street Drain <ul style="list-style-type: none"> Blenheim Street, Glenroy Murrell Street, Glenroy Glenroy Road, Glenroy Lindsay Street, Glenroy Harold Street, Glenroy Acacia Street, Glenroy Murray Street, Glenroy Pearl Street, Glenroy Cardinal Road Drain <ul style="list-style-type: none"> Cardinal Road, Glenroy between Hilton Street and Wheatsheaf Road Connell Street, Glenroy Westbreen Creek <ul style="list-style-type: none"> Park Street, Pascoe Vale between Stewart Street and Gaffney Street Gaffney Street, Pascoe Vale around Railway crossing 	closure signage under predetermined arrangements
24mm in 10 mins; 39mm in 30 mins; 49mm in 1 hour; 61mm in 2 hours; 69mm in 3 hours; or 87mm 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 (Over-Floor) 84 Properties in Total Acacia Street Drain <ul style="list-style-type: none"> 2/2, Units 1-2/5, 7, 8A, 14, 16, Units 1-3/18, Units 2-3/20, Units 3-4/24 & Units 1-4/28 Acacia Street, Glenroy 19, 23 & 25 Apsley Street, Glenroy 13-17 Blenheim Street, Glenroy 59 Cardinal Road, Glenroy Units 9-10/1 Cromwell Street, Glenroy 8/164 & 166A Glenroy Road, Glenroy Units 1-6/31, Units 1-6/33 & 1/42 Harold Street, Glenroy 3, 6 & 8 Lindsay Street, Glenroy 2, 4-6, 1/8 & 3/8 Marlborough Street, Glenroy 163 Melbourne Avenue, Glenroy 1 Murray Street, Glenroy 2 & Units 3-4/6 Pearl Street, Glenroy Units 1-4/2-4, 6, 1/8, 96, 98, 100, 102, 106, 110, 112-114, 119, 125, 127, 129, 131, 135, 139, 143, 145, 145A, 147 & 147A Wheatsheaf Road, Glenroy Cardinal Road Drain	VICSES will provide warnings using EM-COP and VicEmergency to Moreland Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident. MCC EHOs to have awareness of potential public and environmental health impacts of outfalls from Sewer Emergency Relief Structures within floodwaters

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> 9 Apsley Street, Glenroy 77 Cardinal Road, Glenroy 47-97, 99 & 99A Glenroy Road, Glenroy 8 Harold Street, Glenroy <p>West Street Drain</p> <ul style="list-style-type: none"> 10-20 Geum Street, Hadfield 146, 146A, 1/146, 2/146 & 148 Middle Street, Hadfield 102, 104, 106, 108A, 110, 112 & 114 West Street, Hadfield <p>Community Infrastructure Flooded</p> <p>Acacia Street Drain</p> <ul style="list-style-type: none"> Glenroy Memorial Kindergarten on Murrell Street, Glenroy Pearl Street Child Care Centre on Pearl Street, Glenroy likely flooded over-floor <p>West Street Drain</p> <ul style="list-style-type: none"> Westbreen Primary School, Pascoe Street, Pascoe Vale Pascoe Vale Girls Secondary College, Lake Avenue, Pascoe Vale <p>Westbreen Creek</p> <ul style="list-style-type: none"> Northern Golf Club flooded in parts Westbreen Creek Trail flooded at various locations <p>Essential Infrastructure Impacted</p> <ul style="list-style-type: none"> The Craigieburn Railway Line at Pascoe Vale Station may be overtopped Bus Routes 513, 534, 536, 542 & 951 Sewer Emergency Relief Points located at Nelson Street, Glenroy; Cnr South St and Fairmont St, Hadfield; and Cnr West St and Caldwell St, Hadfield <p>Water Over Road (over 300mm depth)</p> <p>Acacia Street Drain</p> <ul style="list-style-type: none"> Blenheim Street, Glenroy Murrell Street, Glenroy Glenroy Road, Glenroy Lindsay Street, Glenroy Harold Street, Glenroy Acacia Street, Glenroy Murray Street, Glenroy Apsley Street, Glenroy Pearl Street, Glenroy <p>Cardinal Road Drain</p> <ul style="list-style-type: none"> Cardinal Road, Glenroy between Hilton Street and Wheatsheaf Road Connell Street, Glenroy <p>West Street Drain</p> <ul style="list-style-type: none"> Donald Street, Hadfield 	<p>VICSES to respond on a request by request basis. Local unit will likely require additional support from surrounding units due to high RFA numbers.</p> <p>Coordinated sandbagging operations may be required for property and infrastructure protection.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p>

Design Rainfall Depths (mm) – <i>Indication of Possible Flooding</i>	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> • Lake Avenue, Pascoe Vale • Middle Street, Hadfield • Peachey Court, Pascoe Vale • South Street, Hadfield • Tassell Street, Hadfield • Volga Street, Hadfield • West Street, Hadfield between Melbourne Avenue and Boundary Road <p>Westbreen Creek</p> <ul style="list-style-type: none"> • Park Street, Pascoe Vale between Stewart Street and Gaffney Street • Gaffney Street, Pascoe Vale around Railway crossing 	

Table C4.7 – Breakdown of possible consequences at various rainfall intensities around Glenroy, Hadfield and Pascoe Vale with operational considerations

APPENDIX C5 – COBURG, BRUNSWICK, BRUNSWICK EAST & PASCOE VALE SOUTH FLASH FLOOD EMERGENCY PLAN

Overview of Flooding Consequences

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

Summary of Consequences in a 1% AEP (100yr ARI) flood around Coburg, Brunswick, Brunswick East & Pascoe Vale South

Property					
Properties	440				
Residential	364				
Commercial	68				
Industrial	5				
Public Land	3				
Rural	0				
Community Infrastructure					
Health Facilities	0		Child Care / Kindergartens	2	Barry Beckett Children's Centre; & Moreland Community Child Care Co-op
Care Facilities	0		Community Venues	2	Coburg West Bowling Club; & Jacobs Reserve Scout Hall
Retirement Villages	0		Places of Worship	0	
Schools / Colleges	1	Coburg High School	Prisons	0	
Essential Infrastructure					
Major Roads	2	Bell Street; & Sydney Road	Police Stations	0	
Tram Routes	1	19 along Sydney Road	Government Buildings	0	
Bus Routes	5	509; 512; 513; 561; & 903	Sewerage Facilities	11	Emergency Relief Points
Power Facility	0		Levees	1	Alister Street, Fitzroy North
Comms Services	0		Drainage Facilities	0	
Emergency Services	0		Airports / Airfields	0	
Tourism / Recreation					
Sports Facilities	0		Caravan Parks	0	
Recreation Facilities	0		Camping Grounds	0	
Government Boundaries					
Local Gov't Areas	1	Moreland	CMA	1	Port Phillip & Westernport
Adjacent LGAs	0		CFA District	0	
SES Unit Area	1	Broadmeadows	MFB District	1	Northern

Table C5.1 – Consequence Summary of 1% AEP flash flood around Coburg, Brunswick, Brunswick East and Pascoe Vale South

The city suburbs of Coburg, Pascoe Vale South, Brunswick West, Brunswick and Brunswick East are located approximately 8km north of Melbourne in a predominantly residential zone. Seven main stormwater drains run through the area: The Melville, Albion Street, Hope Street, Harding Street, Elizabeth Street, The Avenue and Glenlyon Road Main Drains. The Melville, Albion and Hope Street drains converge in Brunswick West before discharging into Moonee Ponds Creek on the western border of the Municipality, the Harding Street, Elizabeth Street, The Avenue and Glenlyon Road drains discharge into Merri Creek in Coburg and Brunswick East.

Flash flooding is the main concern for the area with high Intensity, short duration rainfall likely to cause this. A number of houses exist in overland flow paths, with some of these properties at risk from flooding above floor level. See mapping in **Appendix F** for more insight into flooding in the area.

Warning Times

Neither the Bureau of Meteorology nor Melbourne Water currently provides flood forecasts for the stormwater drains around Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South. All flood response actions must therefore be driven by rainfall and / or river level observations. Telemetered water level / flood gauges are located at Flemington along Moonee Ponds Creek catchment and Coburg on the Merri Creek.

Melbourne Water Hydrographic Monitoring Station	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge	Melway Reference
Essendon North	586182	North Essendon Service Reservoirs on Lebanon St, Essendon Fields		✓	16 D7
Essendon Airport AWS	86038	Essendon Airport at Perimeter Rd, Essendon Fields		✓	16 E8
Merri Creek at Bell Street, Coburg	229645A	West side of the Creek at the Bell St Bridge, Coburg	✓	✓	30 A1
Moonee Ponds Creek at Flemington	229643A	West side of the channel along the Moonee Ponds Creek Trail near Delhi Ct, Travancore	✓	✓	29 B12

Table C5.2 – Hydrographic Monitoring Stations close to Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South

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

Areas of Flood Risk

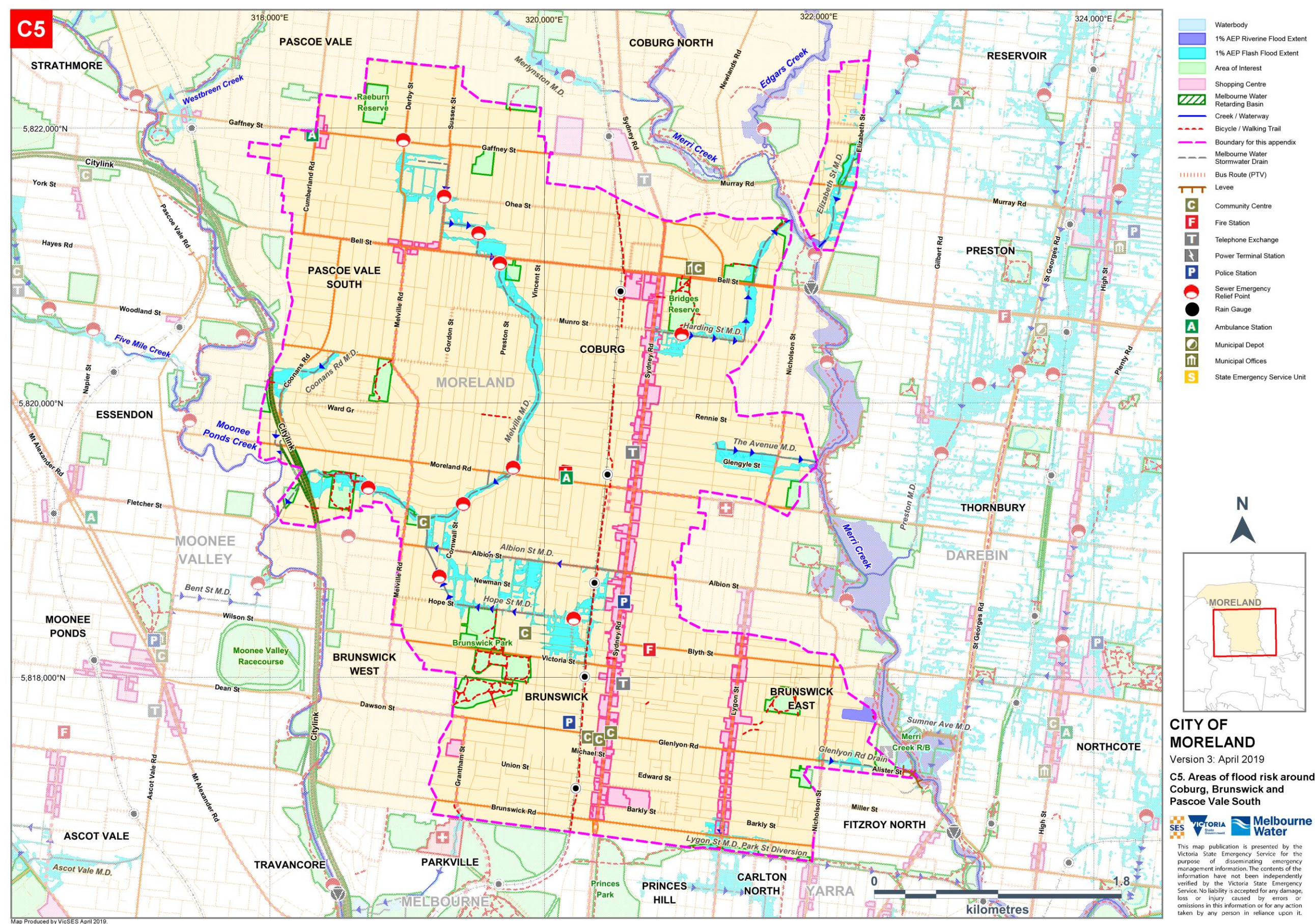


Figure C5 – Areas of flood risk around Coburg, Brunswick, Brunswick East and Pascoe Vale South in the City of Moreland
Moreland Storm and Flood Emergency Plan – A Sub-Plan of the MEMPlan
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Properties at Flood Risk

Properties listed in the table below are at risk from flash flooding over-floor around Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Melville Main Drain (URS, January 2010), the Harding Street Main Drain (Cardno, June 2016), the Avenue Main Drain (CMPS&F, April 1998) and Glenlyon Road Main Drain (CMPS&F, 1997) flood mapping and risk assessment programs. Note that any multi-lot properties situated above ground floor likely impacted by isolation only with flooding on ground floor impacting access to common areas and/or carpark and storage facilities. Information on above ground-floor properties is not available in this list.

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

Properties at risk from flash flooding over-floor in Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South						
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				
		✓	183 Albion Street	Brunswick	Albion Street Main Drain	Flash
		✓	1/185 Albion Street	Brunswick	Albion Street Main Drain	Flash
		✓	2/185 Albion Street	Brunswick	Albion Street Main Drain	Flash
	✓	✓	1/200 Albion Street	Brunswick	Albion Street Main Drain	Flash
	✓	✓	2/200 Albion Street	Brunswick	Albion Street Main Drain	Flash
	✓	✓	3/200 Albion Street	Brunswick	Albion Street Main Drain	Flash
	✓	✓	4/200 Albion Street	Brunswick	Albion Street Main Drain	Flash
	✓	✓	5/200 Albion Street	Brunswick	Albion Street Main Drain	Flash
	✓	✓	6/200 Albion Street	Brunswick	Albion Street Main Drain	Flash
	✓	✓	7/200 Albion Street	Brunswick	Albion Street Main Drain	Flash
	✓	✓	46 Anketell Street	Coburg	Melville Main Drain	Flash
	✓	✓	47 Anketell Street	Coburg	Melville Main Drain	Flash
		✓	3 Bateman Court	Coburg	Elizabeth Street Main Drain	Flash
		✓	5 Bateman Court	Coburg	Elizabeth Street Main Drain	Flash
	✓	✓	32 Bateman Court	Coburg	Elizabeth Street Main Drain	Flash
	✓	✓	36 Bateman Court	Coburg	Elizabeth Street Main Drain	Flash
	✓	✓	40 Bateman Court	Coburg	Elizabeth Street Main Drain	Flash
	✓	✓	44 Bateman Court	Coburg	Elizabeth Street Main Drain	Flash
	✓	✓	48 Bateman Court	Coburg	Elizabeth Street Main Drain	Flash
	✓	✓	52 Bateman Court	Coburg	Elizabeth Street Main Drain	Flash
		✓	237A Bell Street	Coburg	Melville Main Drain	Flash
		✓	239 Bell Street	Coburg	Melville Main Drain	Flash
	✓	✓	241 Bell Street	Coburg	Melville Main Drain	Flash
	✓	✓	278-280 Bell Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	280A Bell Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	282A Bell Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	282 Bell Street	Coburg	Melville Main Drain	Flash

Properties at risk from flash flooding over-floor in Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South

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				
✓	✓	✓	284 Bell Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	286 Bell Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	288 Bell Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	290 Bell Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	292 Bell Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	294 Bell Street	Coburg	Melville Main Drain	Flash
	✓	✓	1/296 Bell Street	Coburg	Melville Main Drain	Flash
		✓	298 Bell Street	Coburg	Melville Main Drain	Flash
		✓	300 Bell Street	Coburg	Melville Main Drain	Flash
		✓	302 Bell Street	Coburg	Melville Main Drain	Flash
		✓	304 Bell Street	Coburg	Melville Main Drain	Flash
		✓	306 Bell Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	308 Bell Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	6-8 Bellevue Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	10 Bellevue Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	12 Bellevue Street	Coburg	Melville Main Drain	Flash
	✓	✓	14 Bellevue Street	Coburg	Melville Main Drain	Flash
		✓	16 Bellevue Street	Coburg	Melville Main Drain	Flash
	✓	✓	53 Berry Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	55 Berry Street	Coburg	Melville Main Drain	Flash
	✓	✓	57 Berry Street	Coburg	Melville Main Drain	Flash
	✓	✓	74 Berry Street	Coburg	Melville Main Drain	Flash
	✓	✓	15 Breese Street	Brunswick	Hope Street Main Drain	Flash
		✓	6 Brentwood Avenue	Pascoe Vale South	Coonans Road Main Drain	Flash
		✓	8 Brentwood Avenue	Pascoe Vale South	Coonans Road Main Drain	Flash
✓	✓	✓	6 Bryant Street	Brunswick	Hope Street Main Drain	Flash
✓	✓	✓	10 Bryant Street	Brunswick	Hope Street Main Drain	Flash
	✓	✓	2 Budds Street	Coburg	Harding Street Main Drain	Flash
	✓	✓	4 Budds Street	Coburg	Harding Street Main Drain	Flash
		✓	27 Cadman Street	Brunswick West	Melville Main Drain	Flash
		✓	29 Cadman Street	Brunswick West	Melville Main Drain	Flash
		✓	30 Cadman Street	Brunswick West	Melville Main Drain	Flash
✓	✓	✓	32 Cadman Street	Brunswick West	Melville Main Drain	Flash
✓	✓	✓	37 Chambers Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	39 Chambers Street	Coburg	Harding Street Main Drain	Flash
		✓	2 Cliff Street	Brunswick	Hope Street Main Drain	Flash
		✓	4 Cliff Street	Brunswick	Hope Street Main Drain	Flash
		✓	6 Cliff Street	Brunswick	Hope Street Main Drain	Flash
	✓	✓	8 Cliff Street	Brunswick	Hope Street Main Drain	Flash
	✓	✓	10 Cliff Street	Brunswick	Hope Street Main Drain	Flash
	✓	✓	12 Connolly Avenue	Coburg	Elizabeth Street Main Drain	Flash
		✓	58 Coonans Road	Pascoe Vale South	Coonans Road Main Drain	Flash

Properties at risk from flash flooding over-floor in Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South

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				
		✓	61 Coonans Road	Pascoe Vale South	Coonans Road Main Drain	Flash
		✓	1/61 Coonans Road	Pascoe Vale South	Coonans Road Main Drain	Flash
		✓	2/61 Coonans Road	Pascoe Vale South	Coonans Road Main Drain	Flash
	✓	✓	63 Coonans Road	Pascoe Vale South	Coonans Road Main Drain	Flash
	✓	✓	65 Coonans Road	Pascoe Vale South	Coonans Road Main Drain	Flash
	✓	✓	67 Coonans Road	Pascoe Vale South	Coonans Road Main Drain	Flash
✓	✓	✓	69 Coonans Road	Pascoe Vale South	Coonans Road Main Drain	Flash
✓	✓	✓	71 Coonans Road	Pascoe Vale South	Coonans Road Main Drain	Flash
✓	✓	✓	75 Coonans Road	Pascoe Vale South	Coonans Road Main Drain	Flash
	✓	✓	44 Cornwall Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	48 Cornwall Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	2 Culloden Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	3 Deakin Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	5 Deakin Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	5A Deakin Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	7 Deakin Street	Coburg	Melville Main Drain	Flash
	✓	✓	9 Deakin Street	Coburg	Melville Main Drain	Flash
	✓	✓	11 Deakin Street	Coburg	Melville Main Drain	Flash
		✓	22 Dickens Street	Pascoe Vale South	Coonans Road Main Drain	Flash
		✓	24 Dickens Street	Pascoe Vale South	Coonans Road Main Drain	Flash
✓	✓	✓	33 Elizabeth Street	Coburg	Elizabeth Street Main Drain	Flash
		✓	2/35 Elizabeth Street	Coburg	Elizabeth Street Main Drain	Flash
✓	✓	✓	3/35 Elizabeth Street	Coburg	Elizabeth Street Main Drain	Flash
✓	✓	✓	45 Elizabeth Street	Coburg	Elizabeth Street Main Drain	Flash
		✓	49 Elizabeth Street	Coburg	Elizabeth Street Main Drain	Flash
✓	✓	✓	51 Elizabeth Street	Coburg	Elizabeth Street Main Drain	Flash
✓	✓	✓	1/93 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	2/93 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	3/93 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	4/93 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	5/93 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	6/93 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	7/93 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	8/93 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	9/93 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	10/93 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	11/93 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	12/93 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	13/93 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	14/93 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	15/93 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	95 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash

Properties at risk from flash flooding over-floor in Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South

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				
✓	✓	✓	97 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	99 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	101 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	103 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	105 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	107 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	109 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	111 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	113 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	115 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	117 Elizabeth Street	Coburg North	Elizabeth Street Main Drain	Flash
		✓	52 Ellenvale Avenue	Pascoe Vale South	Coonans Road Main Drain	Flash
✓	✓	✓	49-55 Everett Street	Brunswick West	Melville Main Drain	Flash
✓	✓	✓	54 Everett Street	Brunswick West	Melville Main Drain	Flash
✓	✓	✓	56 Everett Street	Brunswick West	Melville Main Drain	Flash
		✓	5 Florence Street	Brunswick	Albion Street Main Drain	Flash
		✓	27 Francis Street	Coburg	Melville Main Drain	Flash
		✓	2 Frederick Street	Brunswick	Hope Street Main Drain	Flash
		✓	24 Glengyle Street	Coburg	The Avenue Main Drain	Flash
		✓	24 Glengyle Street	Coburg	The Avenue Main Drain	Flash
		✓	56 Glengyle Street	Coburg	The Avenue Main Drain	Flash
		✓	267 Glenlyon Road	Fitzroy North	Glenlyon Road Main Drain	Flash
		✓	269 Glenlyon Road	Fitzroy North	Glenlyon Road Main Drain	Flash
	✓	✓	2 Goff Street	Coburg	Elizabeth Street Main Drain	Flash
✓	✓	✓	1 Grafton Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	2 Grafton Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	3 Grafton Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	4 Grafton Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	1 Harding Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	3 Harding Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	5 Harding Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	7 Harding Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	28 Harding Street	Coburg	Harding Street Main Drain	Flash
	✓	✓	30 Harding Street	Coburg	Harding Street Main Drain	Flash
		✓	32 Harding Street	Coburg	Harding Street Main Drain	Flash
		✓	37 Harding Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	1/41-43 Harding Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	2/41-43 Harding Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	3/41-43 Harding Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	4/41-43 Harding Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	5/41-43 Harding Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	6/41-43 Harding Street	Coburg	Harding Street Main Drain	Flash

Properties at risk from flash flooding over-floor in Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South

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				
✓	✓	✓	7/41-43 Harding Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	8/41-43 Harding Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	9/41-43 Harding Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	10/41-43 Harding Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	11/41-43 Harding Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	12/41-43 Harding Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	13/41-43 Harding Street	Coburg	Harding Street Main Drain	Flash
		✓	42 Henkel Street	Brunswick	Hope Street Main Drain	Flash
		✓	44 Henkel Street	Brunswick	Hope Street Main Drain	Flash
		✓	46 Henkel Street	Brunswick	Hope Street Main Drain	Flash
		✓	50 Henkel Street	Brunswick	Hope Street Main Drain	Flash
		✓	1/17-19 Hope Street	Brunswick	Hope Street Main Drain	Flash
		✓	36 Hope Street	Brunswick	Hope Street Main Drain	Flash
		✓	50 Hope Street	Brunswick	Hope Street Main Drain	Flash
		✓	1/4 Jolley Street	Brunswick West	Hope Street Main Drain	Flash
		✓	2/4 Jolley Street	Brunswick West	Hope Street Main Drain	Flash
		✓	3/4 Jolley Street	Brunswick West	Hope Street Main Drain	Flash
✓	✓	✓	1 Kelson Street	Coburg	Melville Main Drain	Flash
		✓	2A Kelson Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	4 Kelson Street	Coburg	Melville Main Drain	Flash
	✓	✓	6 Kelson Street	Coburg	Melville Main Drain	Flash
		✓	89 Linda Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	1/40 Linsey Street	Coburg	Melville Main Drain	Flash
	✓	✓	44 Linsey Street	Coburg	Melville Main Drain	Flash
	✓	✓	50 Linsey Street	Coburg	Melville Main Drain	Flash
	✓	✓	53 Linsey Street	Coburg	Melville Main Drain	Flash
	✓	✓	55 Linsey Street	Coburg	Melville Main Drain	Flash
	✓	✓	57 Linsey Street	Coburg	Melville Main Drain	Flash
		✓	13 Mclean Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	15 Mclean Street	Brunswick West	Melville Main Drain	Flash
✓	✓	✓	17 Mclean Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	1/19 Mclean Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	2/19 Mclean Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	3/19 Mclean Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	4/19 Mclean Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	21 Mclean Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	21A Mclean Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	21B Mclean Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	21C Mclean Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	21D Mclean Street	Brunswick West	Melville Main Drain	Flash
		✓	1/22 Mclean Street	Brunswick West	Melville Main Drain	Flash
		✓	2/22 Mclean Street	Brunswick West	Melville Main Drain	Flash

Properties at risk from flash flooding over-floor in Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South

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				
		✓	3/22 Mclean Street	Brunswick West	Melville Main Drain	Flash
		✓	4/22 Mclean Street	Brunswick West	Melville Main Drain	Flash
		✓	23 Mclean Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	1/26 Mclean Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	2/26 Mclean Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	3/26 Mclean Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	4/26 Mclean Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	5/26 Mclean Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	6/26 Mclean Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	7/26 Mclean Street	Brunswick West	Melville Main Drain	Flash
		✓	1/28 Mclean Street	Brunswick West	Melville Main Drain	Flash
		✓	2/28 Mclean Street	Brunswick West	Melville Main Drain	Flash
		✓	3/28 Mclean Street	Brunswick West	Melville Main Drain	Flash
		✓	4/28 Mclean Street	Brunswick West	Melville Main Drain	Flash
		✓	5/28 Mclean Street	Brunswick West	Melville Main Drain	Flash
		✓	6/28 Mclean Street	Brunswick West	Melville Main Drain	Flash
		✓	7/28 Mclean Street	Brunswick West	Melville Main Drain	Flash
		✓	8 Meadow Street	Coburg	Elizabeth Street Main Drain	Flash
		✓	9 Meadow Street	Coburg	Elizabeth Street Main Drain	Flash
✓	✓	✓	11 Meadow Street	Coburg	Elizabeth Street Main Drain	Flash
		✓	11 Mehegan Avenue	Coburg North	Elizabeth Street Main Drain	Flash
		✓	11 Merrifield Street	Brunswick	Hope Street Main Drain	Flash
		✓	11A Merrifield Street	Brunswick	Hope Street Main Drain	Flash
		✓	11B Merrifield Street	Brunswick	Hope Street Main Drain	Flash
		✓	13 Merrifield Street	Brunswick	Hope Street Main Drain	Flash
		✓	13A Merrifield Street	Brunswick	Hope Street Main Drain	Flash
		✓	13B Merrifield Street	Brunswick	Hope Street Main Drain	Flash
		✓	13C Merrifield Street	Brunswick	Hope Street Main Drain	Flash
		✓	15 Merrifield Street	Brunswick	Hope Street Main Drain	Flash
✓	✓	✓	1 Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	1A Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	1B Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	1D Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	101/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	102/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	103/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	104/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	105/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	106/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	107/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	108/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	109/1C Michael Street	Brunswick	Local Drainage	Flash

Properties at risk from flash flooding over-floor in Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South

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				
✓	✓	✓	110/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	201/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	202/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	203/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	204/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	205/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	206/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	207/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	208/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	209/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	210/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	301/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	302/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	303/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	304/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	305/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	306/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	307/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	308/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	309/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	310/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	401/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	402/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	403/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	404/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	405/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	406/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	407/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	408/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	409/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	410/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	501/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	502/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	503/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	504/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	505/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	506/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	507/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	508/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	601/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	602/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	603/1C Michael Street	Brunswick	Local Drainage	Flash

Properties at risk from flash flooding over-floor in Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South

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				
✓	✓	✓	604/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	605/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	606/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	607/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	608/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	701/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	702/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	703/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	704/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	705/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	706/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	707/1C Michael Street	Brunswick	Local Drainage	Flash
✓	✓	✓	708/1C Michael Street	Brunswick	Local Drainage	Flash
	✓	✓	327A Moreland Road	Coburg	Melville Main Drain	Flash
	✓	✓	329 Moreland Road	Coburg	Melville Main Drain	Flash
		✓	331 Moreland Road	Coburg	Melville Main Drain	Flash
		✓	333 Moreland Road	Coburg	Melville Main Drain	Flash
	✓	✓	1/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	2/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	3/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	4/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	5/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	6/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	7/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	8/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	9/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	10/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	11/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	12/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	13/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	14/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	15/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	16/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	17/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	18/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	19/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	20/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	21/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	22/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	23/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	24/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	25/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash

Properties at risk from flash flooding over-floor in Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South

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				
	✓	✓	26/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	27/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
	✓	✓	28/508-510 Moreland Road	Brunswick West	Melville Main Drain	Flash
		✓	110 Munro Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	118 Munro Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	118A Munro Street	Coburg	Melville Main Drain	Flash
	✓	✓	119 Munro Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	121 Munro Street	Coburg	Melville Main Drain	Flash
	✓	✓	123 Munro Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	2 Murray Road	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	4 Murray Road	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	6 Murray Road	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	8 Murray Road	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	10 Murray Road	Coburg North	Elizabeth Street Main Drain	Flash
✓	✓	✓	12 Murray Road	Coburg North	Elizabeth Street Main Drain	Flash
	✓	✓	49-53 Murray Road	Coburg	Elizabeth Street Main Drain	Flash
		✓	120 Murray Street	Coburg	Melville Main Drain	Flash
		✓	122 Murray Street	Coburg	Melville Main Drain	Flash
		✓	124 Murray Street	Coburg	Melville Main Drain	Flash
		✓	126 Murray Street	Coburg	Melville Main Drain	Flash
		✓	128 Murray Street	Coburg	Melville Main Drain	Flash
		✓	130 Murray Street	Coburg	Melville Main Drain	Flash
		✓	132 Murray Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	41 Nicholson Street	Coburg	The Avenue Main Drain	Flash
✓	✓	✓	53 Nicholson Street	Coburg	The Avenue Main Drain	Flash
✓	✓	✓	53 Nicholson Street	Coburg	The Avenue Main Drain	Flash
	✓	✓	9 Park Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	12 Park Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	15 Park Street	Coburg	Harding Street Main Drain	Flash
	✓	✓	16 Park Street	Coburg	Harding Street Main Drain	Flash
		✓	1 Parkstone Avenue	Pascoe Vale South	Coonans Road Main Drain	Flash
		✓	7 Parkstone Avenue	Pascoe Vale South	Coonans Road Main Drain	Flash
✓	✓	✓	9 Parkstone Avenue	Pascoe Vale South	Coonans Road Main Drain	Flash
✓	✓	✓	9A Parkstone Avenue	Pascoe Vale South	Coonans Road Main Drain	Flash
✓	✓	✓	11A Parkstone Avenue	Pascoe Vale South	Coonans Road Main Drain	Flash
✓	✓	✓	13 Parkstone Avenue	Pascoe Vale South	Coonans Road Main Drain	Flash
✓	✓	✓	15 Parkstone Avenue	Pascoe Vale South	Coonans Road Main Drain	Flash
		✓	17 Parkstone Avenue	Pascoe Vale South	Coonans Road Main Drain	Flash
		✓	2 Percy Street	Brunswick	Hope Street Main Drain	Flash
		✓	6 Percy Street	Brunswick	Hope Street Main Drain	Flash
		✓	1/8-38 Percy Street	Brunswick	Hope Street Main Drain	Flash
		✓	2/8-38 Percy Street	Brunswick	Hope Street Main Drain	Flash

Properties at risk from flash flooding over-floor in Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South

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				
		✓	3/8-38 Percy Street	Brunswick	Hope Street Main Drain	Flash
		✓	4/8-38 Percy Street	Brunswick	Hope Street Main Drain	Flash
		✓	23 Percy Street	Brunswick	Hope Street Main Drain	Flash
		✓	25 Percy Street	Brunswick	Hope Street Main Drain	Flash
		✓	27 Percy Street	Brunswick	Hope Street Main Drain	Flash
		✓	29 Percy Street	Brunswick	Hope Street Main Drain	Flash
		✓	31 Percy Street	Brunswick	Hope Street Main Drain	Flash
		✓	33 Percy Street	Brunswick	Hope Street Main Drain	Flash
		✓	35 Percy Street	Brunswick	Hope Street Main Drain	Flash
		✓	37 Percy Street	Brunswick	Hope Street Main Drain	Flash
	✓	✓	130 Reynard Street	Coburg	Melville Main Drain	Flash
		✓	373 Reynard Street	Pascoe Vale South	Coonans Road Main Drain	Flash
		✓	375 Reynard Street	Pascoe Vale South	Coonans Road Main Drain	Flash
		✓	375 Reynard Street	Pascoe Vale South	Coonans Road Main Drain	Flash
✓	✓	✓	49 Richards Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	21 Salisbury Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	21A Salisbury Street	Coburg	Harding Street Main Drain	Flash
		✓	37 Salisbury Street	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	1 Saxon Street	Brunswick	Local Drainage	Flash
		✓	94 Shaftsbury Street	Coburg	Melville Main Drain	Flash
		✓	98 Shaftsbury Street	Coburg	Melville Main Drain	Flash
	✓	✓	100 Shaftsbury Street	Coburg	Melville Main Drain	Flash
	✓	✓	102 Shaftsbury Street	Coburg	Melville Main Drain	Flash
	✓	✓	104 Shaftsbury Street	Coburg	Melville Main Drain	Flash
		✓	106 Shaftsbury Street	Coburg	Melville Main Drain	Flash
	✓	✓	108 Shaftsbury Street	Coburg	Melville Main Drain	Flash
		✓	128 Shaftsbury Street	Coburg	Melville Main Drain	Flash
	✓	✓	130 Shaftsbury Street	Coburg	Melville Main Drain	Flash
		✓	132 Shaftsbury Street	Coburg	Melville Main Drain	Flash
	✓	✓	134 Shaftsbury Street	Coburg	Melville Main Drain	Flash
	✓	✓	2/69 Shamrock Street	Brunswick West	Melville Main Drain	Flash
✓	✓	✓	3/69 Shamrock Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	1/75 Shamrock Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	2/75 Shamrock Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	3/75 Shamrock Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	4/75 Shamrock Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	5/75 Shamrock Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	6/75 Shamrock Street	Brunswick West	Melville Main Drain	Flash
	✓	✓	35 Soudan Street	Coburg	Melville Main Drain	Flash
	✓	✓	37 Soudan Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	39 Soudan Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	41 Soudan Street	Coburg	Melville Main Drain	Flash

Properties at risk from flash flooding over-floor in Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South						
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				
	✓	✓	47 Soudan Street	Coburg	Melville Main Drain	Flash
✓	✓	✓	49 Soudan Street	Coburg	Melville Main Drain	Flash
		✓	51 Soudan Street	Coburg	Melville Main Drain	Flash
		✓	18A Sutherland Street	Brunswick	Hope Street Main Drain	Flash
✓	✓	✓	175 Sydney Road	Brunswick	Local Drainage	Flash
✓	✓	✓	177-179 Sydney Road	Brunswick	Local Drainage	Flash
		✓	358 Sydney Road	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	360 Sydney Road	Coburg	Harding Street Main Drain	Flash
		✓	362 Sydney Road	Coburg	Harding Street Main Drain	Flash
		✓	364 Sydney Road	Coburg	Harding Street Main Drain	Flash
		✓	366 Sydney Road	Coburg	Harding Street Main Drain	Flash
		✓	368A Sydney Road	Coburg	Harding Street Main Drain	Flash
		✓	368B Sydney Road	Coburg	Harding Street Main Drain	Flash
		✓	368C Sydney Road	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	368 Sydney Road	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	370 Sydney Road	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	372 Sydney Road	Coburg	Harding Street Main Drain	Flash
✓	✓	✓	374A Sydney Road	Coburg	Harding Street Main Drain	Flash
	✓	✓	702 Sydney Road	Brunswick	Albion Street Main Drain	Flash
	✓	✓	702A Sydney Road	Brunswick	Albion Street Main Drain	Flash
		✓	706 Sydney Road	Brunswick	Albion Street Main Drain	Flash
	✓	✓	99 Victoria Street	Coburg	Melville Main Drain	Flash
	✓	✓	101 Victoria Street	Coburg	Melville Main Drain	Flash
		✓	319 Victoria Street	Brunswick	Hope Street Main Drain	Flash
		✓	331 Victoria Street	Brunswick	Hope Street Main Drain	Flash
		✓	380-382 Victoria Street	Brunswick	Hope Street Main Drain	Flash
✓	✓	✓	1 Vincent Street	Coburg	Melville Main Drain	Flash
	✓	✓	18A Wales Street	Brunswick West	Melville Main Drain	Flash
✓	✓	✓	20 Wales Street	Brunswick West	Melville Main Drain	Flash
✓	✓	✓	47 Wales Street	Brunswick West	Melville Main Drain	Flash
		✓	13 Wattle Grove	Coburg	Melville Main Drain	Flash
✓	✓	✓	28 Wattle Grove	Coburg	Melville Main Drain	Flash
		✓	11 West Street	Brunswick	Hope Street Main Drain	Flash
	✓	✓	29 Winifred Street	Pascoe Vale South	Coonans Road Main Drain	Flash
		✓	31 Winifred Street	Pascoe Vale South	Coonans Road Main Drain	Flash
Totals						
192	312	440				

Table C5.3 – Properties at risk of flash flooding over-floor in Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South in the City of Moreland

Isolation

No major isolation risks exist for areas around Coburg, Pascoe Vale South, Brunswick West, Brunswick East & Brunswick during a 1% AEP (100yr ARI) event. Some localised short-duration isolation may occur due to flash flooding.

Essential Infrastructure

During an event, see the Public Transport Victoria's Website for details on delays or alterations to services. <http://ptv.vic.gov.au/live-travel-updates/>. A map of Public Transport routes within Moreland is available via the website at: https://static.ptv.vic.gov.au/siteassets/Maps/Localities/PDFs/37_Moreland_LAM.pdf

Apart from the roads outlined below, all other essential infrastructure and services areas around Coburg, Pascoe Vale South, Brunswick West & Brunswick 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 Coburg, Pascoe Vale South, Brunswick West, Brunswick East & Brunswick. Check the VicRoads website for more details: <https://traffic.vicroads.vic.gov.au/>

VicRoads Roads flooded in a 1% AEP (100yr ARI) event	
• Bell Street, Coburg around Linsey Street	
• Sydney Road, Coburg at Sheffield Street	

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

Moreland City Council Roads flooded in a 1% AEP (100yr ARI) event			
BRUNSWICK	BRUNSWICK WEST		COBURG NORTH
• Albion Street	• Cadman Street	• Haig Avenue	• Mehegan Avenue
• Cliff Street	• Cornwall Street	• Kelson Street	FITZROY NORTH
• Henkel Street	• Everett Street	• Kirkby Street	• Alister Street
• Hope Street	• McLean Street	• Linda Street	• Glenlyon Road
• Lyle Street	• Trenoweth Street	• Linsey Street	• Willowbank Road
• Michael Street	• Wales Street	• Munro Street	PASCOE VALE
• Percy Street	COBURG	• Murray Street	• Derby Street
• Talbot Street	• Bateman Court	• Park Street	• Shedden Street
• Victoria Street	• Bellevue Street	• Richards Street	PASCOE VALE SOUTH
	• Berry Street	• Sheffield Street	• Coonans Road
	• Cramer Street	• Soudan Street	• Parkstone Avenue
	• Grafton Street	• Wattle Grove	• Sussex Street
		• Willow Grove	

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

Flood Mitigation

Retarding Basins

A reserve may hold a large amount of stormwater during an event. These include:

Reserve / Park	On Drain / Waterway	Location	Melway Reference
Dunstan Reserve	Melville Main Drain	Peacock Street, Brunswick West	29 B4

Table C5.6 – Parks and Reserves along the Melville Main Drain in the City of Moreland

There is a Levee along the Glenlyon Road Drain in Fitzroy North adjacent to the Merri Creek that will likely impact local roads during a flash flood event.

Levees

Levee	Reach	Side	Levee Height	Levee Length	Expected Level of Protection	ANCOLD Hazard Rating	Consequences of Failure	Melway Reference
Merri Creek, Fitzroy North	Alister Street	West	1.8m (31.50m AHD)	0.3km	11% AEP Flood (freeboard unknown). 1% AEP Flood Level is: 32.10m AHD. Max Recorded Flood: 30.48m AHD	Significant	11 residential properties at risk of flooding along Alister Street	30 C9

Table C5.7 – Melbourne Water Levees in the Merri Creek Catchment in the City of Moreland

Sewerage Infrastructure

Sewerage Infrastructure of note during a severe flood event located around Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South is contained within the following table.

Sewer Emergency Relief Points

There are Sewer Emergency Relief Points along or close to the stormwater drainage network in Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale 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
Harding Street Main Drain	-	Yarra Valley Water	Harding Street at Park Street, Coburg	29 J1
Local Drainage	-	Yarra Valley Water	Albion Street at Peacock St, Brunswick West	29 B5
Melville Main Drain	-	Yarra Valley Water	Cnr Gaffney Street and Derby Street, Pascoe Vale	17 D10
Melville Main Drain	-	Yarra Valley Water	Cnr Sussex Street and Ohea Street, Pascoe Vale South	17 D11
Melville Main Drain	-	Yarra Valley Water	Cramer Street, Coburg	17 E11
Melville Main Drain	-	Yarra Valley Water	Linsey Street, Coburg	17 E12
Melville Main Drain	-	Yarra Valley Water	Haig Avenue, Coburg	29 F4
Melville Main Drain	-	Yarra Valley Water	Lane between Cornwall Street and Shamrock Street, Brunswick West	29 E4
Melville Main Drain	-	Yarra Valley Water	Cnr Hope Street and Percy Street, Brunswick	29 G6
Melville Main Drain	-	Yarra Valley Water	Newman Street at Stranks Avenue, Brunswick West	29 D5
Melville Main Drain	-	Yarra Valley Water	Wales Street, Brunswick West	29 C4

Table C5.8 – Sewer Emergency Relief Points along the stormwater drainage network in Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South

Command, Control and Coordination

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

Flood Impacts & Operational Considerations (Intelligence Cards)

The table on the following pages provide a breakdown of the possible consequences of flooding along the stormwater drains in Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South at various rain totals. This table is 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:

- Stormwater Drains in Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South

FLOOD INTELLIGENCE CARD – STORMWATER DRAINS, COBURG, BRUNSWICK AND PASCOE VALE SOUTH (UNGAUGED)

Version 3 – April 2019



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

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

CLOSEST RAIN GAUGE	Essendon North
LOCATION	North Essendon Service Reservoirs on Lebanon St, Essendon Fields
MELWAY REF:	16 D7

GAUGE NUMBER	586182
GAUGE TYPE	Rain
TELEMETRIC/MANUAL	Telemetric

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
11mm in 10 mins; 19mm in 30 mins; 24mm 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 ungauged nature of the catchment. This should be used as a guide only.	20% AEP (5 year ARI)	Properties at Flood Risk (Over-Floor) 40 Properties in Total Elizabeth Street Main Drain <ul style="list-style-type: none"> 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115 & 117 Elizabeth Street, Coburg North 2 Murray Road, Coburg North Harding Street Main Drain <ul style="list-style-type: none"> 39 Chambers Street, Coburg 1, 3, 5, 7 & Units 1-13/41-43 Harding Street, Coburg 12 & 15 Park Street, Coburg 368, 370, 372 & 374A Sydney Road, Coburg Melville Main Drain <ul style="list-style-type: none"> 10 Bellevue Street, Coburg 54 Everett Street, Brunswick West 28 Wattle Grove, Coburg Water Over Road (over 300mm depth) Melville Main Drain <ul style="list-style-type: none"> Linsey Street, Coburg near Bell Street Bellevue Street, Coburg Kelson Street, Coburg near Munro Street Wattle Grove, Coburg at Maranoa Crescent 	VICSES to respond on a request by request basis. Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements

Design Rainfall Depths (mm) – <i>Indication of Possible Flooding</i>	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> Haig Avenue, Coburg Everett Street, Brunswick West near Bakers Parade Hope Street Main Drain <ul style="list-style-type: none"> Cliff Street, Brunswick 	
14mm in 10 mins; 22mm in 30 mins; 28mm in 1 hour; 35mm in 2 hours; 40mm in 3 hours; or 50mm 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.	10% AEP (10 year ARI)	Properties at Flood Risk (Over-Floor) 65 Properties in Total Elizabeth Street Main Drain <ul style="list-style-type: none"> 51, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115 & 117 Elizabeth Street, Coburg 11 Meadow Street, Coburg 2, 4, 6, 8 & 10 Murray Road, Coburg North Harding Street Main Drain <ul style="list-style-type: none"> 39 Chambers Street, Coburg 1, 3, 5, 7 & Units 1-13/41-43 Harding Street, Coburg 12 & 15 Park Street, Coburg 21 & 21A Salisbury Street, Coburg 360, 368, 370, 372 & 374A Sydney Road, Coburg Hope Street Main Drain <ul style="list-style-type: none"> 6 & 10 Bryant Street, Brunswick Melville Main Drain <ul style="list-style-type: none"> 284, 286, 288 & 290 Bell Street, Coburg 10 Bellevue Street, Coburg 54 & 56 Everett Street, Brunswick West 1 & 3 Grafton Street, Coburg 4 Kelson Street, Coburg 1/40 Linsey Street, Coburg 17 Mclean Street, Brunswick West 118A & 121 Munro Street, Coburg 49 Soudan Street, Coburg 47 Wales Street, Brunswick West 28 Wattle Grove, Coburg Community Infrastructure Flooded Melville Main Drain <ul style="list-style-type: none"> Moreland Community Child Care Co-op on Everett Street, Brunswick West likely flooded Essential Infrastructure Likely Impacted Melville Main Drain <ul style="list-style-type: none"> Bus Route along Munro Street: 512 Sewer Emergency Relief Points located at Cnr Gaffney St and Derby St, Pascoe Vale; Cnr Sussex St and Ohea Street, Pascoe Vale South; Cramer St, Coburg; 	<p>VICSES may provide warnings using EM-COP and VicEmergency as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding.</p> <p>VICSES to respond on a request by request basis. Local unit will likely require additional support from surrounding units due to high RFA numbers</p> <p>MCC EHOs to have awareness of potential public and environmental health impacts of outfalls from Sewer Emergency Relief Structures within floodwaters</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p>

Design Rainfall Depths (mm) – <i>Indication of Possible Flooding</i>	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<p>Linsey Street, Coburg; Haig Ave, Coburg; lane between Cornwall St and Shamrock St, Brunswick West; and Wales St, Brunswick West</p> <p>Hope Street Main Drain</p> <ul style="list-style-type: none"> • Bus Route along Hope Street: 509 • Sewer Emergency Relief Points located at cnr Hope St and Percy St, Brunswick; and Newman St at Stranks Ave, Brunswick West <p>Water Over Road (over 300mm depth)</p> <p>Melville Main Drain</p> <ul style="list-style-type: none"> • Sussex Street, Pascoe Vale South between O'hea Street and Soudan Street • Murray Street, Coburg near Sussex Street • Cramer Street, Coburg • Linsey Street, Coburg near Bell Street • Bellevue Street, Coburg • Kelson Street, Coburg near Munro Street • Munro Street, Coburg at Shaftsbury Street roundabout • Berry Street, Coburg near Shaftsbury Street • Wattle Grove, Coburg at Maranoa Crescent • Haig Avenue, Coburg • Wales Street, Brunswick West near McGregor Avenue • Everett Street, Brunswick West near Bakers Parade <p>Hope Street Main Drain</p> <ul style="list-style-type: none"> • Cliff Street, Brunswick • Hope Street, Brunswick at Ford Street and Pearson Street Roundabout <p>Elizabeth Street Main Drain</p> <ul style="list-style-type: none"> • Mehegan Avenue, Coburg North 	
<p>16mm in 10 mins; 27mm in 30 mins; 34mm in 1 hour; 41mm in 2 hours; 47mm in 3 hours; or 59mm in 6 hours</p> <p>Note: rainfall depths are a very rough method of estimating flood events and have been used due to the ungagged nature of the catchment. This should be used as a</p>	5% AEP (20 year ARI)	<p>Properties at Flood Risk (Over-Floor)</p> <p>192 Properties in Total</p> <p>Coonans Road Main Drain</p> <ul style="list-style-type: none"> • 69, 71 & 75 Coonans Road, Pascoe Vale South • 9, 9A, 11A, 13 & 15 Parkstone Avenue, Pascoe Vale South <p>Elizabeth Street Main Drain</p> <ul style="list-style-type: none"> • 33, 3/35, 45, 51, Units 1-15/93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115 & 117 Elizabeth Street, Coburg • 11 Meadow Street, Coburg • 2, 4, 6, 8, 10 & 12 Murray Road, Coburg North <p>Harding Street Main Drain</p> <ul style="list-style-type: none"> • 37 & 39 Chambers Street, Coburg • 1, 3, 5, 7, 28 & Units 1-13/41-43 Harding Street, Coburg • 12 & 15 Park Street, Coburg • 49 Richards Street, Coburg 	<p>VICSES may provide warnings using EM-COP and VicEmergency to Moreland Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident.</p> <p>VICSES to respond on a request by request basis. Local unit will likely require additional support from surrounding units due to high RFA numbers</p>

Design Rainfall Depths (mm) – Indication of Possible Flooding guide only.	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> 21 & 21A Salisbury Street, Coburg <p>Hope Street Main Drain</p> <ul style="list-style-type: none"> 6 & 10 Bryant Street, Brunswick <p>Local Drainage</p> <ul style="list-style-type: none"> 1, 1A, 1B, 1D & Apartments 101-708/1C Michael Street, Brunswick 1 Saxon Street, Brunswick 175, 177-179, 360, 368, 370, 372 & 374A Sydney Road, Brunswick <p>Melville Main Drain</p> <ul style="list-style-type: none"> 280A, 282A, 282, 284, 286, 288, 290, 292, 294 & 308 Bell Street, Coburg 6-8, 10 & 12 Bellevue Street, Coburg 55 Berry Street, Coburg 32 Cadman Street, Brunswick West 5, 5A & 7 Deakin Street, Coburg 49-55, 54 & 56 Everett Street, Brunswick West 1, 2, 3 & 4 Grafton Street, Coburg 1 & 4 Kelson Street, Coburg 1/40 Linsey Street, Coburg 17 Mclean Street, Brunswick West 118, 118A & 121 Munro Street, Coburg 3/69 Shamrock Street, Brunswick West 39, 41 & 49 Soudan Street, Coburg 1 Vincent Street, Coburg 20 & 47 Wales Street, Brunswick West 28 Wattle Grove, Coburg <p>The Avenue Main Drain</p> <ul style="list-style-type: none"> 41, 53 & 53 Nicholson Street, Coburg <p>Community Infrastructure Flooded</p> <p>Melville Main Drain</p> <ul style="list-style-type: none"> Scout Hall at Jacobs Reserve on Jolley Street, Brunswick West Moreland Community Child Care Co-op on Everett Street, Brunswick West likely flooded with access restrictions along Everett Street <p>Essential Infrastructure Likely Impacted</p> <p>Harding Street Main Drain</p> <ul style="list-style-type: none"> Tram Route 19 along Sydney Road, Coburg at Sheffield Street Sewer Emergency Relief Point located at Harding and Park St, Coburg <p>Melville Main Drain</p> <ul style="list-style-type: none"> Bus Route along Munro Street: 512 Sewer Emergency Relief Points located at Cnr Gaffney St and Derby St, Pascoe Vale; Cnr Sussex St and Ohea Street, Pascoe Vale South; Cramer St, Coburg; Linsey Street, Coburg; Haig Ave, Coburg; lane between Cornwall St and Shamrock 	<p>MCC EHOs to have awareness of potential public and environmental health impacts of outfalls from Sewer Emergency Relief Structures within floodwaters</p> <p>Underground car parks in multi-story developments very likely to be flood affected. This may cause some issues with vehicle damage and isolation of residents if lifts are impacted.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p>

Design Rainfall Depths (mm) – <i>Indication of Possible Flooding</i>	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<p>St, Brunswick West; and Wales St, Brunswick West</p> <p>Hope Street Main Drain</p> <ul style="list-style-type: none"> • Bus Route along Hope Street: 509 • Sewer Emergency Relief Points located at cnr Hope St and Percy St, Brunswick; and Newman St at Stranks Ave, Brunswick West <p>Water Over Road (over 300mm depth)</p> <p>Melville Main Drain</p> <ul style="list-style-type: none"> • Derby Street, Pascoe Vale south of Gaffney Street • Sussex Street, Pascoe Vale South between O'hea Street and Soudan Street • Murray Street, Coburg near Sussex Street • Cramer Street, Coburg • Soudan Street, Coburg east of Cramer Street • Bell Street, Coburg around Lindsey Street • Linsey Street, Coburg near Bell Street • Bellevue Street, Coburg • Kelson Street, Coburg near Munro Street • Munro Street, Coburg at Shaftsbury Street roundabout • Berry Street, Coburg near Shaftsbury Street • Grafton Street, Coburg • Willow Grove, Coburg northbound • Linda Street, Coburg near Shaftsbury Street • Wattle Grove, Coburg at Maranoa Crescent • Haig Avenue, Coburg • Wales Street, Brunswick West near McGregor Avenue • Everett Street, Brunswick West near Bakers Parade <p>Albion Street Main Drain</p> <ul style="list-style-type: none"> • Albion Street, Brunswick between Sydney Road and Railway Line <p>Hope Street Main Drain</p> <ul style="list-style-type: none"> • Percy Street, Brunswick at Cliff Street • Cliff Street, Brunswick • Hope Street, Brunswick at Ford Street and Pearson Street Roundabout <p>Elizabeth Street Main Drain</p> <ul style="list-style-type: none"> • Mehegan Avenue, Coburg North <p>Harding Street Main Drain</p> <ul style="list-style-type: none"> • Richards Street, Coburg • Sheffield Street, Coburg • Sydney Road, Coburg at Sheffield Street <p>Local Drainage</p> <ul style="list-style-type: none"> • Michael Street, Brunswick 	

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		Coonans Road Main Drain <ul style="list-style-type: none"> Coonans Road, Pascoe Vale South Parkstone Avenue, Pascoe Vale South 	
64mm in 6 hours	1 st June 2013 Flash Flood Event		
43mm in 2 hours	6 th November 2018 Flash Flood Event	Event Summary <ul style="list-style-type: none"> Ground floor and underground car parks of Multi-lot properties in Michael Street, Brunswick flooded, impacting elevators and isolating a vulnerable persons on upper level apartment Properties along the Harding Street Main Drain flooded 	
21mm in 10 mins; 34mm in 30 mins; 42mm in 1 hour; 51mm in 2 hours; 58mm in 3 hours; or 72mm 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.	2% AEP (50 year ARI)	Properties at Flood Risk (Over-Floor) 312 Properties in Total Albion Street Main Drain <ul style="list-style-type: none"> Shops 1-7/200 Albion Street, Brunswick Coonans Road Main Drain <ul style="list-style-type: none"> 63, 65, 67, 69, 71 & 75 Coonans Road, Pascoe Vale South 9, 9A, 11A, 13 & 15 Parkstone Avenue, Pascoe Vale South 29 Winifred Street, Pascoe Vale South Elizabeth Street Main Drain <ul style="list-style-type: none"> 32, 36, 40, 44, 48 & 52 Bateman Court, Coburg 12 Connolly Avenue, Coburg 33, 3/35, 45, 51, Units 1-15/93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115 & 117 Elizabeth Street, Coburg 2 Goff Street, Coburg 11 Meadow Street, Coburg 2, 4, 6, 8, 10, 12 & 49-53 Murray Road, Coburg North Harding Street Main Drain <ul style="list-style-type: none"> 2 & 4 Budds Street, Coburg 37 & 39 Chambers Street, Coburg 1, 3, 5, 7, 28, 30 & Units 1-13/41-43 Harding Street, Coburg 9, 12, 15 & 16 Park Street, Coburg 49 Richards Street, Coburg 21 & 21A Salisbury Street, Coburg Hope Street Main Drain <ul style="list-style-type: none"> 15 Breese Street, Brunswick 6 & 10 Bryant Street, Brunswick 8 & 10 Cliff Street, Brunswick Local Drainage <ul style="list-style-type: none"> 1, 1A, 1B, 1D & Apartments 101-708/1C Michael Street, Brunswick 1 Saxon Street, Brunswick 	<p>VICSES will provide warnings using EM-COP and VicEmergency to Moreland Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident.</p> <p>VICSES to respond on a request by request basis. Local unit will likely require additional support from surrounding units due to high RFA numbers</p> <p>MCC EHOs to have awareness of potential public and environmental health impacts of outfalls from Sewer Emergency Relief Structures within floodwaters</p> <p>Underground car parks in multi-story developments very likely to be flood affected. This may cause some issues with vehicle damage and isolation of residents if lifts are impacted.</p>

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> 175, 177-179, 360, 368, 370, 372, 374A, 702 & 702A Sydney Road, Brunswick <p>Melville Main Drain</p> <ul style="list-style-type: none"> 46 & 47 Anketell Street, Coburg 241, 278-280, 280A, 282A, 282, 284, 286, 288, 290, 292, 294, 1/296 & 308 Bell Street, Coburg 6-8, 10, 12 & 14 Bellevue Street, Coburg 53, 55, 57 & 74 Berry Street, Coburg 32 Cadman Street, Brunswick West 44 & 48 Cornwall Street, Brunswick West 2 Culloden Street, Brunswick West 3, 5, 5A, 7, 9 & 11 Deakin Street, Coburg 49-55, 54 & 56 Everett Street, Brunswick West 1, 2, 3 & 4 Grafton Street, Coburg 1, 4 & 6 Kelson Street, Coburg 1/40, 44, 50, 53, 55 & 57 Linsey Street, Coburg 15, 17, 1/19, 2/19, 3/19, 4/19, 21, 21A, 21B, 21C, 21D & Units 1-7/26 Mclean Street, Brunswick West 327A & 329 Moreland Road, Coburg Apartments 1-28/508-510 Moreland Road, Brunswick West 118, 118A, 119, 121 & 123 Munro Street, Coburg 130 Reynard Street, Coburg 100, 102, 104, 108, 130 & 134 Shaftsbury Street, Coburg 2/69, 3/69 & Units 1-6/75 Shamrock Street, Brunswick West 35, 37, 39, 41, 47 & 49 Soudan Street, Coburg 99 & 101 Victoria Street, Coburg 1 Vincent Street, Coburg 18A, 20 & 47 Wales Street, Brunswick West 28 Wattle Grove, Coburg <p>The Avenue Main Drain</p> <ul style="list-style-type: none"> 41, 53 & 53 Nicholson Street, Coburg <p>Community Infrastructure Flooded</p> <p>Elizabeth Street Main Drain</p> <ul style="list-style-type: none"> Barry Beckett Children's Centre on Connolly Avenue, Coburg <p>Harding Street Main Drain</p> <ul style="list-style-type: none"> Coburg High School on Urquhart Street, Coburg <p>Melville Main Drain</p> <ul style="list-style-type: none"> Coburg West Bowling Club on Bellevue Street, Coburg Scout Hall at Jacobs Reserve on Jolley Street, Brunswick West Moreland Community Child Care Co-op on Everett Street, Brunswick West likely flooded with access restrictions along Everett Street <p>Essential Infrastructure Likely Impacted</p>	<p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p> <p>Bow wave effect of vehicles driving through floodwater may impact businesses on Sydney road that may otherwise have not been flood affected</p>

Design Rainfall Depths (mm) – <i>Indication of Possible Flooding</i>	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<p>Harding Street Main Drain</p> <ul style="list-style-type: none"> Tram Route 19 along Sydney Road, Coburg at Sheffield Street Sewer Emergency Relief Point located at Harding and Park St, Coburg <p>Melville Main Drain</p> <ul style="list-style-type: none"> Bus Route along Munro Street: 512 Sewer Emergency Relief Points located at Cnr Gaffney St and Derby St, Pascoe Vale; Cnr Sussex St and Ohea Street, Pascoe Vale South; Cramer St, Coburg; Linsey Street, Coburg; Haig Ave, Coburg; lane between Cornwall St and Shamrock St, Brunswick West; and Wales St, Brunswick West <p>Hope Street Main Drain</p> <ul style="list-style-type: none"> Bus Route along Hope Street: 509 Sewer Emergency Relief Points located at cnr Hope St and Percy St, Brunswick; and Newman St at Stranks Ave, Brunswick West <p>Water Over Road (over 300mm depth)</p> <p>Melville Main Drain</p> <ul style="list-style-type: none"> Derby Street, Pascoe Vale south of Gaffney Street Sussex Street, Pascoe Vale South between O'hea Street and Soudan Street Murray Street, Coburg near Sussex Street Cramer Street, Coburg Soudan Street, Coburg east of Cramer Street Bell Street, Coburg around Lindsey Street Linsey Street, Coburg near Bell Street Bellevue Street, Coburg Kelson Street, Coburg near Munro Street Munro Street, Coburg at Shaftsbury Street roundabout Berry Street, Coburg near Shaftsbury Street Grafton Street, Coburg Willow Grove, Coburg northbound Linda Street, Coburg near Shaftsbury Street Wattle Grove, Coburg near Maranoa Crescent Haig Avenue, Coburg Cornwall Street, Brunswick West at Appleby Crescent Cadman Street, Brunswick West Trenoweth Street, Brunswick West Wales Street, Brunswick West near McGregor Avenue Everett Street, Brunswick West near Bakers Parade McLean Street, Brunswick West <p>Albion Street Main Drain</p> <ul style="list-style-type: none"> Albion Street, Brunswick between Sydney Road and Railway Line <p>Hope Street Main Drain</p>	

Design Rainfall Depths (mm) – <i>Indication of Possible Flooding</i>	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> Victoria Street, Brunswick either side of the Railway Line Percy Street, Brunswick Talbot Street, Brunswick Henkel Street, Brunswick Cliff Street, Brunswick Hope Street, Brunswick at Ford Street and Pearson Street Roundabout Elizabeth Street Main Drain <ul style="list-style-type: none"> Bateman Court, Coburg Mehegan Avenue, Coburg North Harding Street Main Drain <ul style="list-style-type: none"> Park Street, Coburg Richards Street, Coburg Sheffield Street, Coburg Sydney Road, Coburg at Sheffield Street Local Drainage <ul style="list-style-type: none"> Michael Street, Brunswick Coonans Road Main Drain <ul style="list-style-type: none"> Coonans Road, Pascoe Vale South Parkstone Avenue, Pascoe Vale South 	
24mm in 10 mins; 39mm in 30 mins; 49mm in 1 hour; 60mm in 2 hours; 67mm in 3 hours; or 83mm 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 (Over-Floor) 440 Properties in Total Albion Street Main Drain <ul style="list-style-type: none"> 183, Shops 1-2/185 & Shops 1-7/200 Albion Street, Brunswick 5 Florence Street, Brunswick 702, 702A & 706 Sydney Road, Brunswick Coonans Road Main Drain <ul style="list-style-type: none"> 6 & 8 Brentwood Avenue, Pascoe Vale South 58, 61, 1/61, 2/61, 63, 65, 67, 69, 71 & 75 Coonans Road, Pascoe Vale South 22 & 24 Dickens Street, Pascoe Vale South 52 Ellenvale Avenue, Pascoe Vale South 1, 7, 9, 9A, 11A, 13, 15 & 17 Parkstone Avenue, Pascoe Vale South 373, 375 & 375 Reynard Street, Pascoe Vale South 29 & 31 Winifred Street, Pascoe Vale South Elizabeth Street Main Drain <ul style="list-style-type: none"> 3, 5, 32, 36, 40, 44, 48 & 52 Bateman Court, Coburg 12 Connolly Avenue, Coburg 33, 2/35, 3/35, 45, 49 & 51 Elizabeth Street, Coburg Units 1-15/93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115 & 117 Elizabeth Street, Coburg North 	<p>VICSES will provide warnings using EM-COP and VicEmergency to Moreland Council and appropriate agencies where possible and as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES Central Duty Officer in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident.</p> <p>VICSES to respond on a request by request basis. Number of RFAs will likely be too great for local resources to manage within 48 hours.</p>

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> 2 Goff Street, Coburg 8, 9 & 11 Meadow Street, Coburg 11 Mehegan Avenue, Coburg North 2, 4, 6, 8, 10 & 12 Murray Road, Coburg North 49-53, 120, 122, 124, 126, 128, 130 & 132 Murray Road, Coburg <p>Glenlyon Road Main Drain</p> <ul style="list-style-type: none"> 267 & 269 Glenlyon Road, Fitzroy North <p>Harding Street Main Drain</p> <ul style="list-style-type: none"> 2 & 4 Budds Street, Coburg 37 & 39 Chambers Street, Coburg 1, 3, 5, 7, 28, 30, 32, 37 & Units 1-13/41-43 Harding Street, Coburg 9, 12, 15 & 16 Park Street, Coburg 49 Richards Street, Coburg 21, 21A & 37 Salisbury Street, Coburg 358, 360, 362, 364, 366, 368A, 368B, 368C, 368, 370, 372 & 374A Sydney Road, Coburg <p>Hope Street Main Drain</p> <ul style="list-style-type: none"> 15 Breese Street, Brunswick 6 & 10 Bryant Street, Brunswick 2, 4, 6, 8 & 10 Cliff Street, Brunswick 2 Frederick Street, Brunswick 42, 44, 46 & 50 Henkel Street, Brunswick 1/17-19, 36 & 50 Hope Street, Brunswick 1/4, 2/4 & 3/4 Jolley Street, Brunswick West 11, 11A, 11B, 13, 13A, 13B, 13C & 15 Merrifield Street, Brunswick 2, 6, 1/8-38, 2/8-38, 3/8-38, 4/8-38, 23, 25, 27, 29, 31, 33, 35 & 37 Percy Street, Brunswick 18A Sutherland Street, Brunswick 319, 331 & 380-382 Victoria Street, Brunswick 11 West Street, Brunswick <p>Local Drainage</p> <ul style="list-style-type: none"> 1, 1A, 1B, 1D, Apartments 101-708/1C Michael Street, Brunswick 1 Saxon Street, Brunswick 175 & 177-179 Sydney Road, Brunswick <p>Melville Main Drain</p> <ul style="list-style-type: none"> 46 & 47 Anketell Street, Coburg 237A, 239, 241, 278-280, 280A, 282A, 282, 284, 286, 288, 290, 292, 294, 1/296, 298, 300, 302, 304, 306 & 308 Bell Street, Coburg 6-8, 10, 12, 14 & 16 Bellevue Street, Coburg 53, 55, 57 & 74 Berry Street, Coburg 27, 29, 30 & 32 Cadman Street, Brunswick West 	<p>MCC EHOs to have awareness of potential public and environmental health impacts of outfalls from Sewer Emergency Relief Structures within floodwaters</p> <p>Underground car parks in multi-story developments very likely to be flood affected. This may cause some issues with vehicle damage and isolation of residents if lifts are impacted.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p>

Design Rainfall Depths (mm) – <i>Indication of Possible Flooding</i>	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> • 44 & 48 Cornwall Street, Brunswick West • 2 Culloden Street, Brunswick West • 3, 5, 5A, 7, 9 & 11 Deakin Street, Coburg • 49-55, 54 & 56 Everett Street, Brunswick West • 27 Francis Street, Coburg • 1, 2, 3 & 4 Grafton Street, Coburg • 1, 2A, 4 & 6 Kelson Street, Coburg • 89 Linda Street, Coburg • 1/40, 44, 50, 53, 55 & 57 Linsey Street, Coburg • 13, 15, 17, Units 1-4/19, 21, 21A, 21B, 21C, 21D, Units 1-4/22, 23, Units 1-6/26 & Units 1-6/28 Mclean Street, Brunswick West • 327A, 329, 331 & 333 Moreland Road, Coburg • Apartments 1-28/508-510 Moreland Road, Brunswick West • 110, 118, 118A, 119, 121 & 123 Munro Street, Coburg • 130 Reynard Street, Coburg • 94, 98, 100, 102, 104, 106, 108, 128, 130, 132 & 134 Shaftsbury Street, Coburg • 2/69, 3/69, 1/75, 2/75, 3/75, 4/75, 5/75 & 6/75 Shamrock Street, Brunswick West • 35, 37, 39, 41, 47, 49 & 51 Soudan Street, Coburg • 99 & 101 Victoria Street, Coburg • 1 Vincent Street, Coburg • 18A, 20 & 47 Wales Street, Brunswick West • 13 & 28 Wattle Grove, Coburg <p>The Avenue Main Drain</p> <ul style="list-style-type: none"> • 24, 24 & 56 Glengyle Street, Coburg • 41, 53 & 53 Nicholson Street, Coburg <p>Community Infrastructure Flooded</p> <p>Elizabeth Street Main Drain</p> <ul style="list-style-type: none"> • Barry Beckett Children's Centre on Connolly Avenue, Coburg <p>Harding Street Main Drain</p> <ul style="list-style-type: none"> • Coburg High School on Urquhart Street, Coburg <p>Melville Main Drain</p> <ul style="list-style-type: none"> • Coburg West Bowling Club on Bellevue Street, Coburg • Scout Hall at Jacobs Reserve on Jolley Street, Brunswick West at risk from over-floor flooding • Moreland Community Child Care Co-op on Everett Street, Brunswick West likely flooded with access restrictions along Everett Street <p>Essential Infrastructure Likely Impacted</p> <p>Harding Street Main Drain</p> <ul style="list-style-type: none"> • Tram Route 19 along Sydney Road, Coburg at Sheffield Street • Sewer Emergency Relief Point located at Harding and Park St, Coburg 	

Design Rainfall Depths (mm) – <i>Indication of Possible Flooding</i>	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<p>Melville Main Drain</p> <ul style="list-style-type: none"> • Bus Routes along Bell Street: 513; 561 & 903 • Bus Route along Munro Street: 512 • Sewer Emergency Relief Points located at Cnr Gaffney St and Derby St, Pascoe Vale; Cnr Sussex St and Ohea Street, Pascoe Vale South; Cramer St, Coburg; Linsey Street, Coburg; Haig Ave, Coburg; lane between Cornwall St and Shamrock St, Brunswick West; and Wales St, Brunswick West <p>Hope Street Main Drain</p> <ul style="list-style-type: none"> • Bus Route along Hope Street: 509 • Sewer Emergency Relief Points located at cnr Hope St and Percy St, Brunswick; and Newman St at Stranks Ave, Brunswick West <p>Water Over Road (over 300mm depth)</p> <p>Melville Main Drain</p> <ul style="list-style-type: none"> • Derby Street, Pascoe Vale south of Gaffney Street • Shedden Street, Pascoe Vale • Sussex Street, Pascoe Vale South between O'hea Street and Soudan Street • Murray Street, Coburg near Sussex Street • Cramer Street, Coburg • Soudan Street, Coburg east of Cramer Street • Bell Street, Coburg around Lindsey Street • Linsey Street, Coburg near Bell Street • Bellevue Street, Coburg • Kelson Street, Coburg near Munro Street • Munro Street, Coburg at Shaftsbury Street roundabout • Berry Street, Coburg near Shaftsbury Street • Grafton Street, Coburg with Significant Levels • Willow Grove, Coburg northbound • Linda Street, Coburg near Shaftsbury Street • Wattle Grove, Coburg near Maranoa Crescent • Haig Avenue, Coburg • Cornwall Street, Brunswick West at Appleby Crescent • Cadman Street, Brunswick West • Trenoweth Street, Brunswick West • Wales Street, Brunswick West near McGregor Avenue • Everett Street, Brunswick West near Bakers Parade • McLean Street, Brunswick West <p>Albion Street Main Drain</p> <ul style="list-style-type: none"> • Albion Street, Brunswick between Sydney Road and Railway Line <p>Hope Street Main Drain</p> <ul style="list-style-type: none"> • Victoria Street, Brunswick either side of the Railway Line 	

Design Rainfall Depths (mm) – <i>Indication of Possible Flooding</i>	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> • Percy Street, Brunswick • Talbot Street, Brunswick • Henkel Street, Brunswick • Lyle Street, Brunswick • Cliff Street, Brunswick • Hope Street, Brunswick at Ford Street and Pearson Street Roundabout Elizabeth Street Main Drain <ul style="list-style-type: none"> • Bateman Court, Coburg • Mehegan Avenue, Coburg North Harding Street Main Drain <ul style="list-style-type: none"> • Park Street, Coburg • Richards Street, Coburg • Sheffield Street, Coburg • Sydney Road, Coburg at Sheffield Street The Avenue Main Drain <ul style="list-style-type: none"> • Kirkby Street, Coburg Glenlyon Road Drain <ul style="list-style-type: none"> • Alister Street, Fitzroy North • Glenlyon Road, Fitzroy North • Willowbank Road, Fitzroy North Local Drainage <ul style="list-style-type: none"> • Michael Street, Brunswick Coonans Road Main Drain <ul style="list-style-type: none"> • Coonans Road, Pascoe Vale South • Parkstone Avenue, Pascoe Vale South 	

Table C5.9 – Breakdown of possible consequences at various rainfall intensities around Coburg, Brunswick, Brunswick West, Brunswick East and Pascoe Vale South with operational considerations

APPENDIX D - FLOOD EVACUATION ARRANGEMENTS

Phase 1 - Decision to Evacuate

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

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

The following should be considered when planning for evacuation:

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

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

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

No triggers for the City of Moreland have been defined.

This table will be populated when more detailed flood analysis has been completed.

Sector	Gauge	Trigger

Phase 2 – Warning

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

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

Phase 3 – Withdrawal

Withdrawal will be controlled by VICPOL. VICSES will 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/VicRoads with route control and may assist VicPol in arranging evacuation transportation.

VicPol will control security of evacuated areas.

Evacuees will be encouraged to move using their own transport where possible. Transport for those without vehicles or other means will be arranged where possible – requests from the MERC to the MERO for assistance will be responded to dependant on available resources.

Vulnerable People in Emergencies

Vulnerable people living in the community will be identified through funded agencies, community service organisations or other community networks. A list of facilities where vulnerable people may be located is also kept by Council. These may be funded facilities including education, health and childcare, Commonwealth regulated aged care facilities and other locally identified facilities. Further information on Vulnerable People in Emergencies can be obtained from Moreland Council's MRM.

Possible Evacuation Routes to be used:

Sector	Evacuation Route	Evacuation route closure point and gauge height of closure
This table will be populated when more detailed flood analysis has been completed		To be determined by VICSES with advice from VicPol, City of Moreland and VicRoads

No Specific landing zones for helicopters have been identified however there are numerous parks and open areas that could be used in an emergency.

Phase 4 – Shelter

Emergency 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 or flooding. Relief centres will be determined dependant on the location and size of the event. Relief Centres/ Assembly areas that may be used are noted in the Relief and Recovery Plan and based on location and extent of event

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

Animal Shelter

The need for animal shelter facilities for domestic pets and companion animals will be determined dependant on the location and size of the event. The Moreland MEMP may contain further details regarding animal shelters

Caravans

There is a caravan park within Moreland – Melbourne Big4 Holiday Park. Additionally, while not a caravan park, the Federation Residential Village in Glenroy predominantly consist of transportable homes. Caravan evacuation sites have not been identified within the Moreland City Council area.

Phase 5 – Return

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

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

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

Considerations for deciding whether to evacuate include:

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

Disruption to Services

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

This table will be populated when more detailed flood analysis has been completed

Service	Impact	Trigger Point for action	Strategy/Temporary Measures

Essential Infrastructure and Property Protection

Essential Infrastructure and properties (e.g. roads, power supply, telecommunications, industry etc.) that require protection are:

This table will be populated when more detailed flood analysis has been completed

Facility	Impact	Trigger Point for action	Strategy/Temporary Measures

VICSES, supported by Moreland City Council will establish a sandbag collection point, determined by the location and requirements of the flood event. For small scale events, sandbags can be purchased by the public from most hardware and garden suppliers.

Rescue

Requests for Moreland City Council resources to support rescue operations should be forwarded to the MECC or EMLO if an ICC has been established.

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

APPENDIX E - FLOOD WARNING SYSTEMS

Storm and Flood Warning

Flood and Storm 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 next page for an example of a BoM Flood Warning on the VicEmergency page.

Flood Bulletins

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

The relevant VICSES Region Headquarters or the established ICC will normally be responsible for drafting, authorizing and issuing issue Flood Bulletins, using EM-COP and VicEmergency systems.

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

Flood Bulletins should follow the following structure

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

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

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

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

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

Local Flood Warning System Arrangements

There are no local flood warning systems in place within Moreland. General warnings during flood events will be disseminated as noted in Part 3.

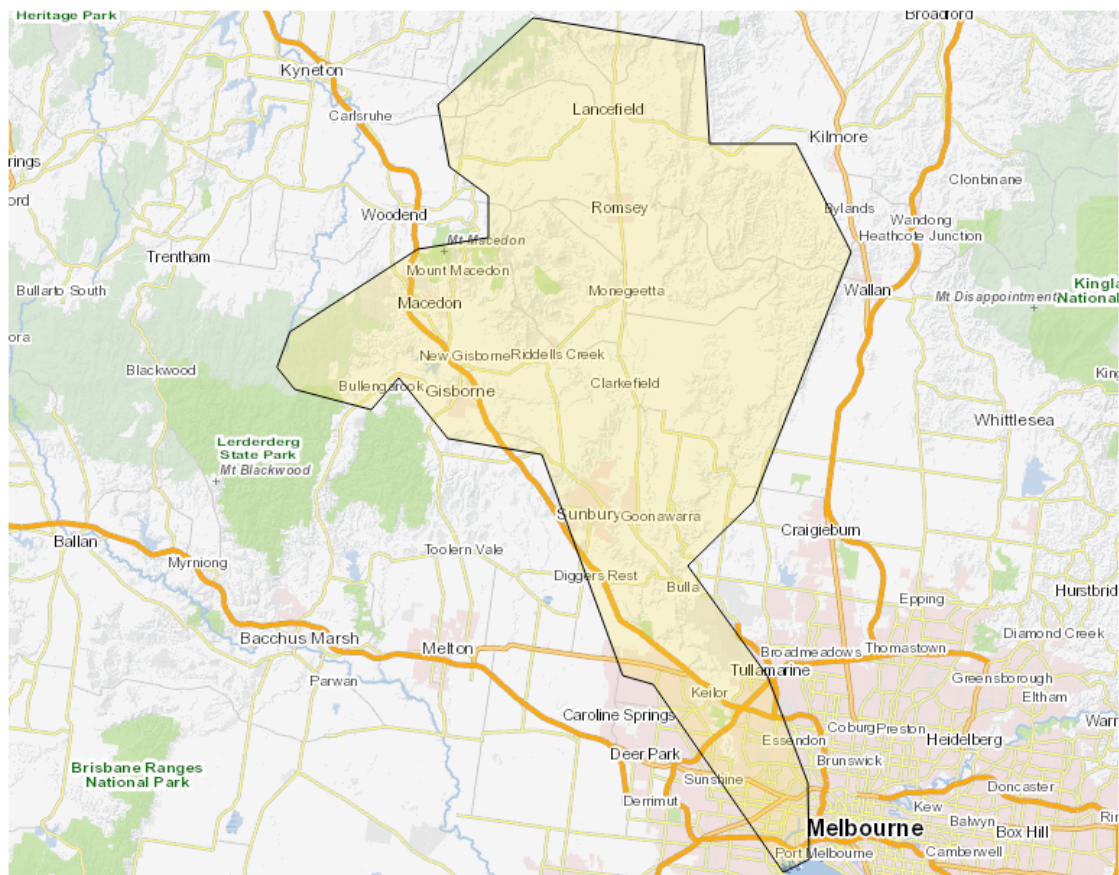
Flood Warning Example



ADVICE - FLOOD

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

Map



Message

This **Minor Flood Warning** is being issued for Maribyrnong River.

- The Maribyrnong River catchment has received rainfall averaging about 31mm since 0900am yesterday. Rainfall totals of 5mm have been forecast for the catchment in the next 2 hours.
- Water levels of the Maribyrnong River and its tributaries at various locations are rising in response to the rain.
- The level of the Deep Creek at Darraweit Guim is currently 5.41m and rising. It is expected to peak above the Minor Flood Level (5.50m) this morning.
- Minor flooding in the Deep Creek and Maribyrnong River catchment is expected to affect low lying areas adjacent to the waterway. Minor roads may be closed.

The river heights at 08.14am 14/09/2016 were:

- Deep Creek at Doggetts Bridge, Lancefield: 2.22 metres, rising
- Deep Creek at Darraweit Guim: 5.47 metres, falling
- Deep Creek at Konagaderra: 3.62 metres, falling
- Bolinda Creek at Clarkefield: 1.19 metres, rising
- Deep Creek at Bulla: 2.39 metres, falling
- Rosslynne Reservoir, Head Gauge: 38.52 metres, rising
- Jacksons Creek at Sunbury: 2.13 metres, rising
- Steele Creek at Keilor East: 1.19 metres, rising
- Maribyrnong River at Keilor North: 3.58 metres, rising
- Maribyrnong River at Keilor: 1.84 metres, rising
- Maribyrnong River at Maribyrnong: 0.04 metres, rising

Stay informed - monitor your local conditions and remain alert.

What you should do:

- Be prepared to act if your situation changes.
- You should stay informed by listening to emergency broadcasters and monitoring warnings.
- Monitor weather forecasts and river levels. Go to www.bom.gov.au/vic/warnings.
- Floodwater is dangerous - never drive, walk or ride through floodwater.

Impacts in your area:

- Flooding above floor level of a single story home is likely to occur in some locations.
- Local roads may be closed and low bridges may be underwater.
- Areas around rivers and streams may be flooded.

This message was issued by State Emergency Service.

The next update is expected by 4PM this afternoon or as the situation changes.

Flood information:

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

APPENDIX F – MAPS

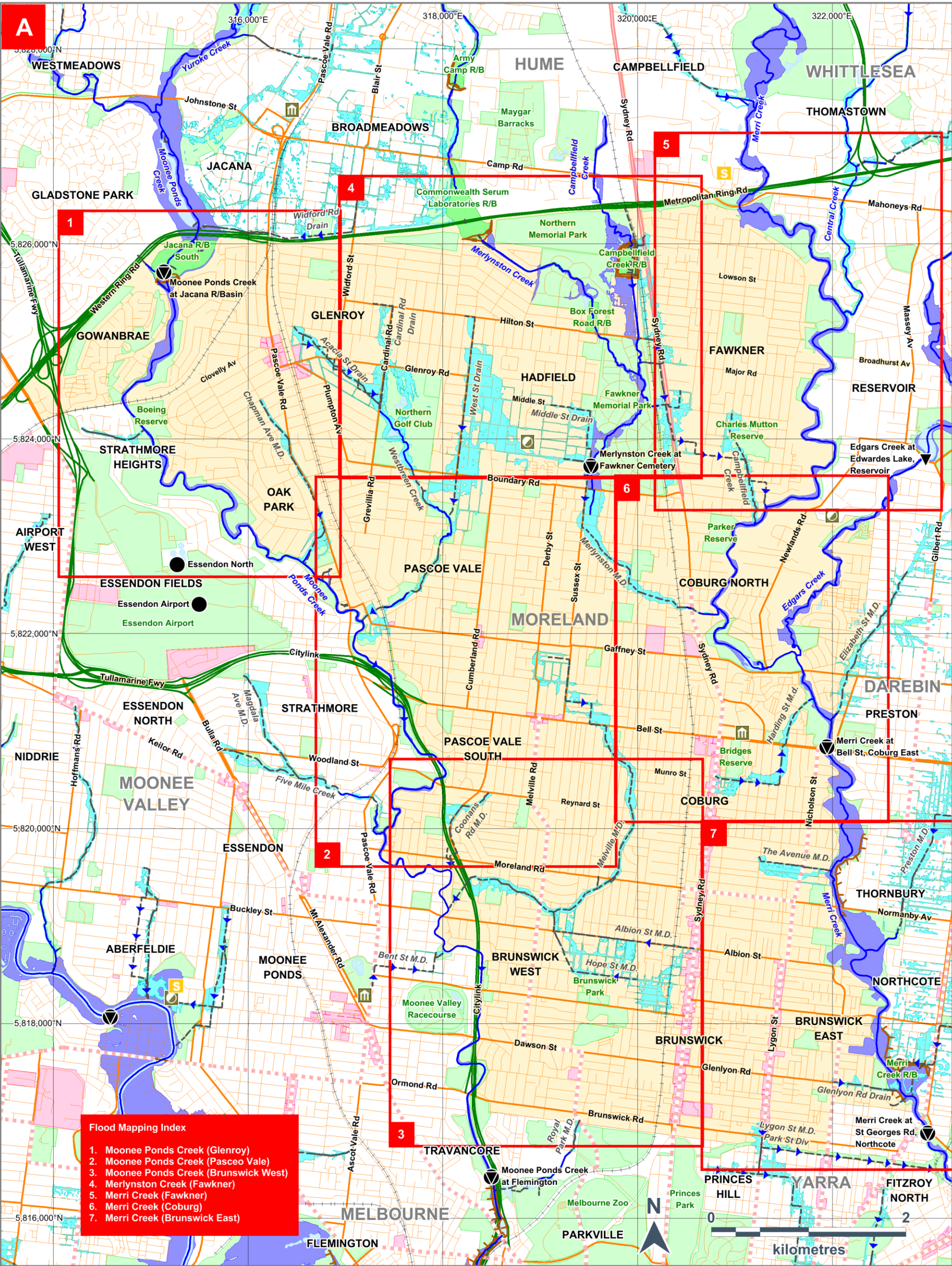
Overview

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




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

Note that:

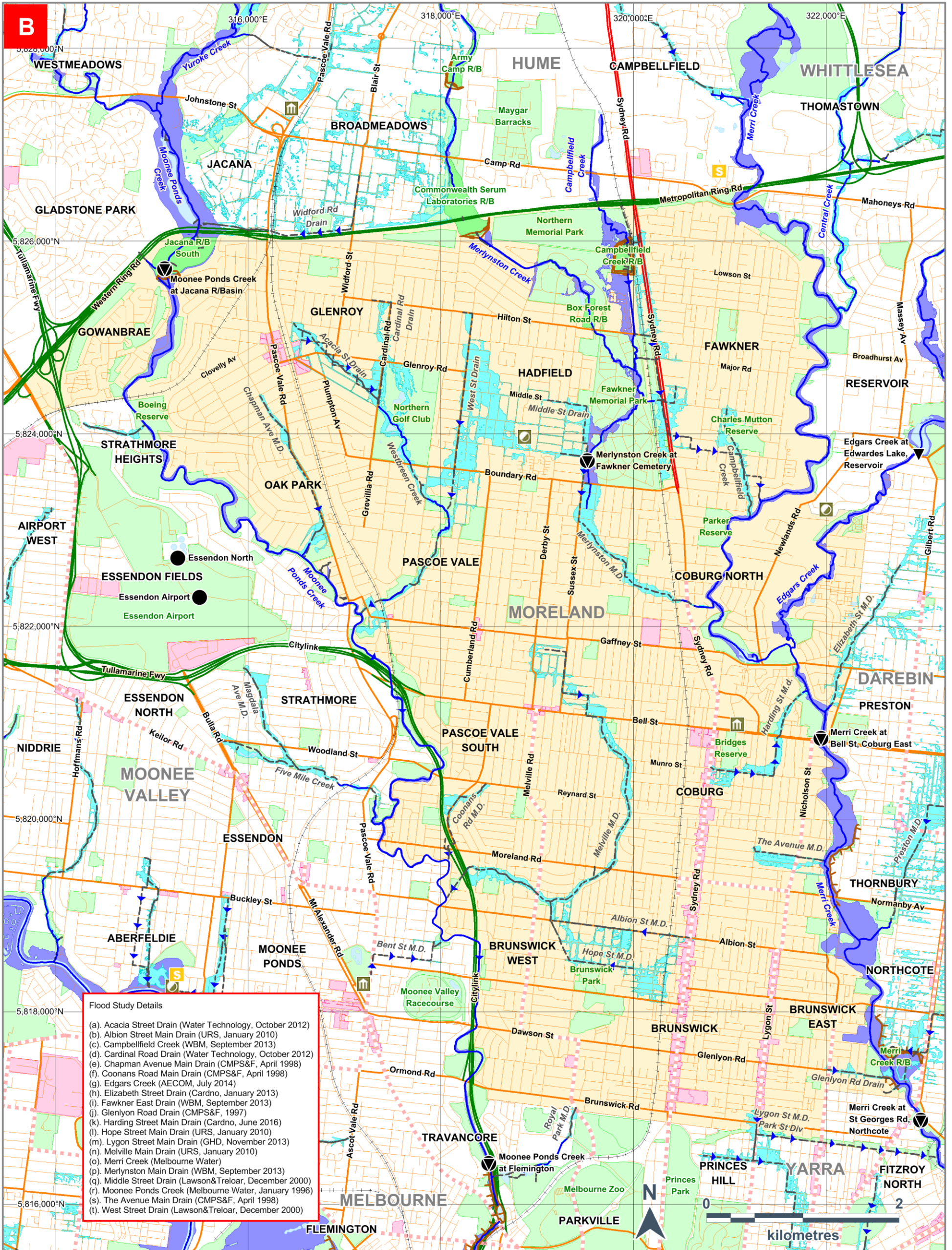
- The mapping/data provided in this Appendix has been developed from Melbourne Water and other sources and taken from historical records and flood modelling. It may not include more recent data or local anecdotal information. It is planned that the mapping/data be updated as further studies or modelling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



CITY OF MORELAND
Version 3: April 2019
A - Flood Mapping Index



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CITY OF MORELAND

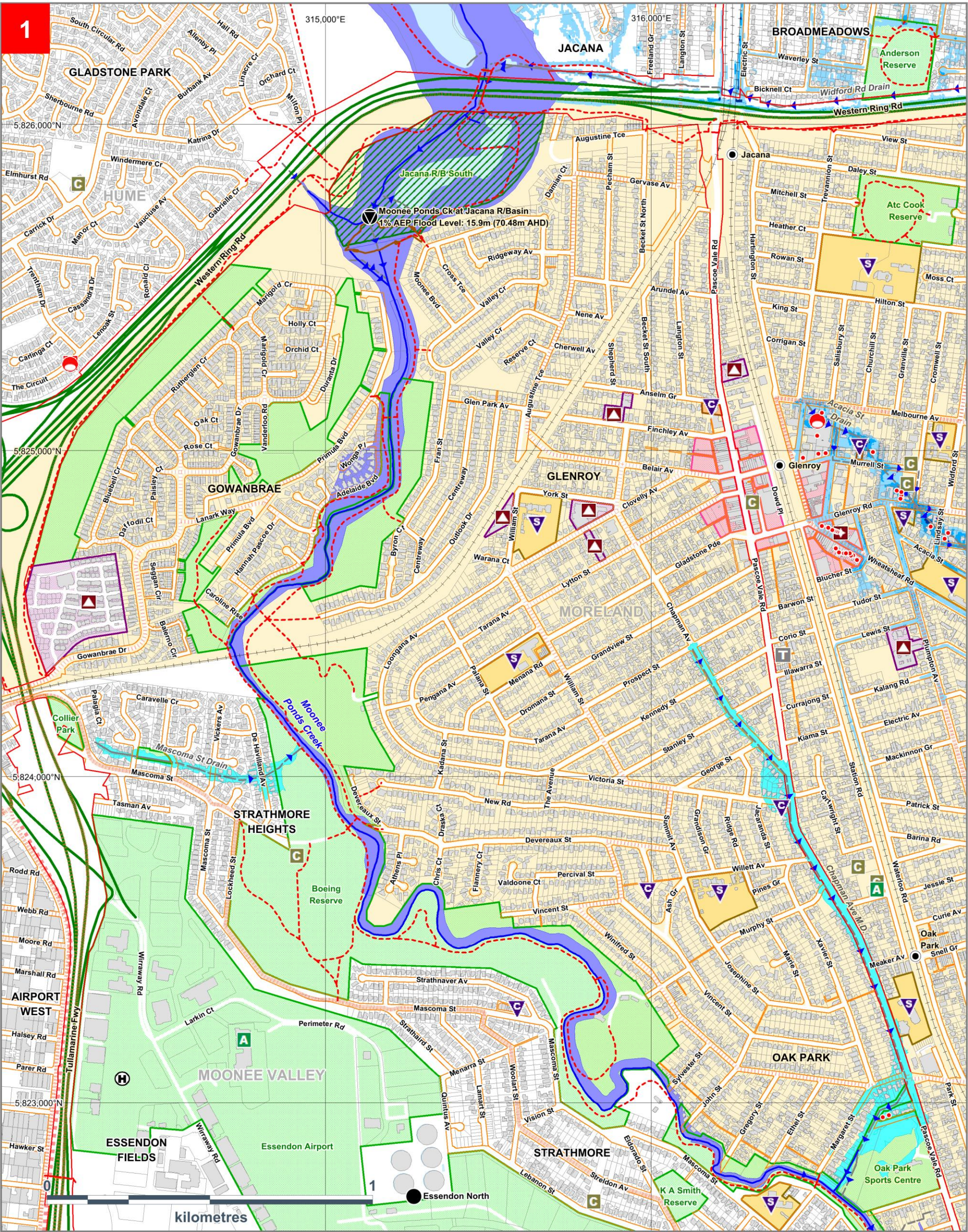
Version 3: April 2019

**B - 1% AEP (100yr ARI)
Flood Extent**

	1% AEP Riverine Flood Extent		Commercial Precinct		River / Creek
	1% AEP Flash Flood Extent		River Level Gauge		Melbourne Water Stormwater Drain
	Reserve / Area of Interest		Rain Gauge		Embankment
	Waterbody / Reservoir		Municipal Building		Levee
	Melbourne Water Retarding Basin		Municipal Depot		Tramway
			SES LHQ		



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Moonee Ponds Creek flood modelling completed by Melbourne Water, Jan 1996. Chapman Ave flood modelling completed by CMPS&F, April 1998. Acacia St Drain flood modelling completed by Water Technology, Oct 2012. Map Produced by VICSES April 2019.

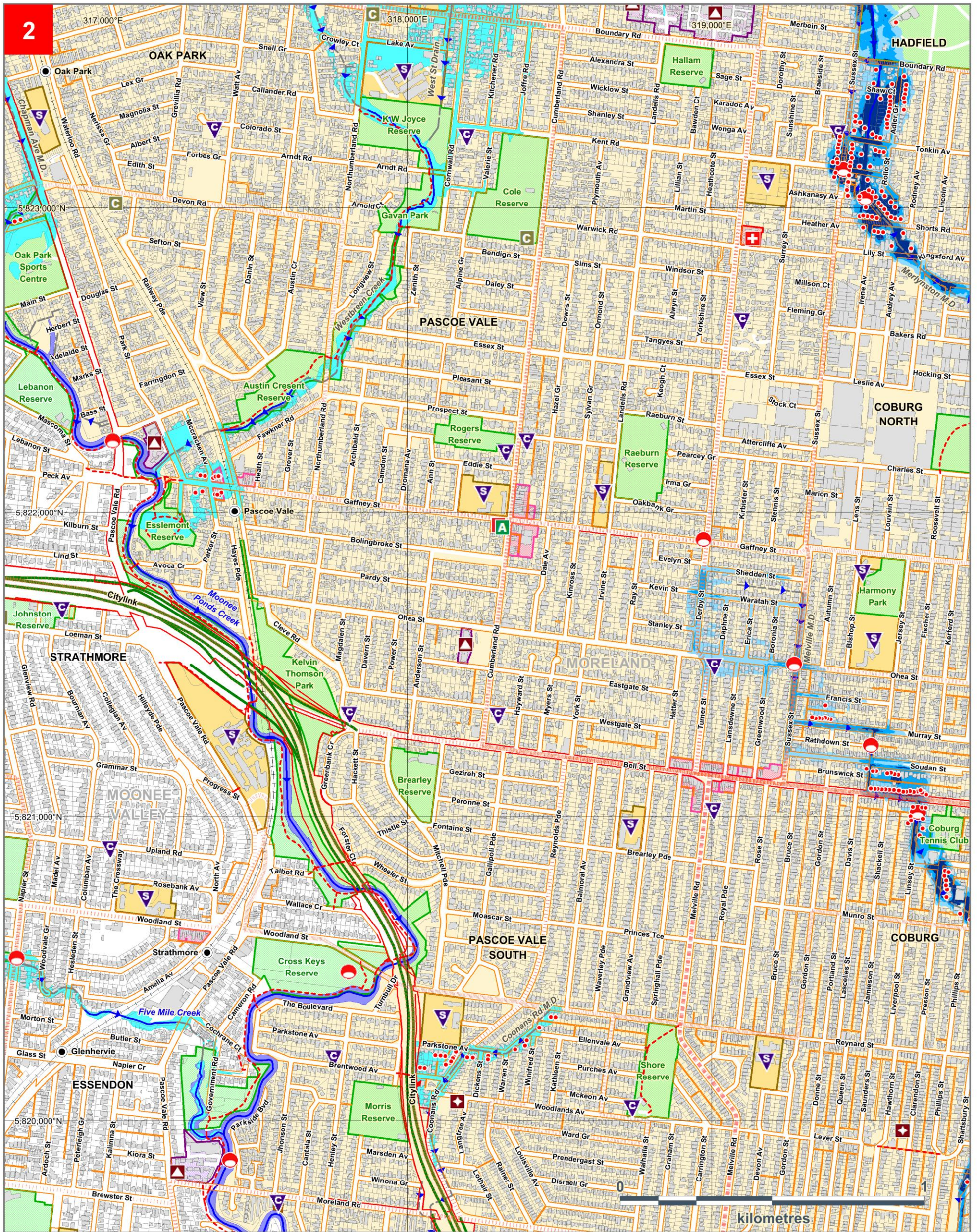
CITY OF MORELAND
1% AEP (100yr ARI) Flooding
1. Moonee Ponds Creek (Glenroy)

- | | | |
|--------------------------------------------------|----------------------------------|-----------------------------------------|
| Building | Shopping Precinct | School / College |
| Waterbody | Reserve / Park | Kindergarten / Child Care |
| 1% AEP Flash Flood Extent (Depth Unavailable) | Creek | Sewer Emergency Relief Point |
| 1% AEP Riverine Flood Extent (Depth Unavailable) | Melbourne Water Stormwater Drain | Aged Care Facility |
| Greater than 60cm | Bicycle / Walking Trail | Heliport |
| Between 30cm and 60cm | Bus Route (PTV) | Stream Level Gauge & 1% AEP Flood Level |
| Up to 30cm | Ambulance Station | Rain Gauge |
| Melbourne Water Retarding Basin | Community Centre | 1% AEP Over-Floor Flooding Risk |
| | Place Of Worship | |



VICTORIA
State Government
Melbourne Water

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Moonee Ponds Creek flood modelling completed by Melbourne Water, Jan 1996. Melville M.D. flood modelling completed by URS, Jan 2010. Merlynston M.D. flood modelling completed by WBM, Sept 2013. Westbreen Creek flood modelling completed by CMPS&F, April 1998. Map Produced by VICSES April 2019.

CITY OF MORELAND

1% AEP (100yr ARI) Flooding
2. Moonee Ponds Creek (Pascoe Vale)

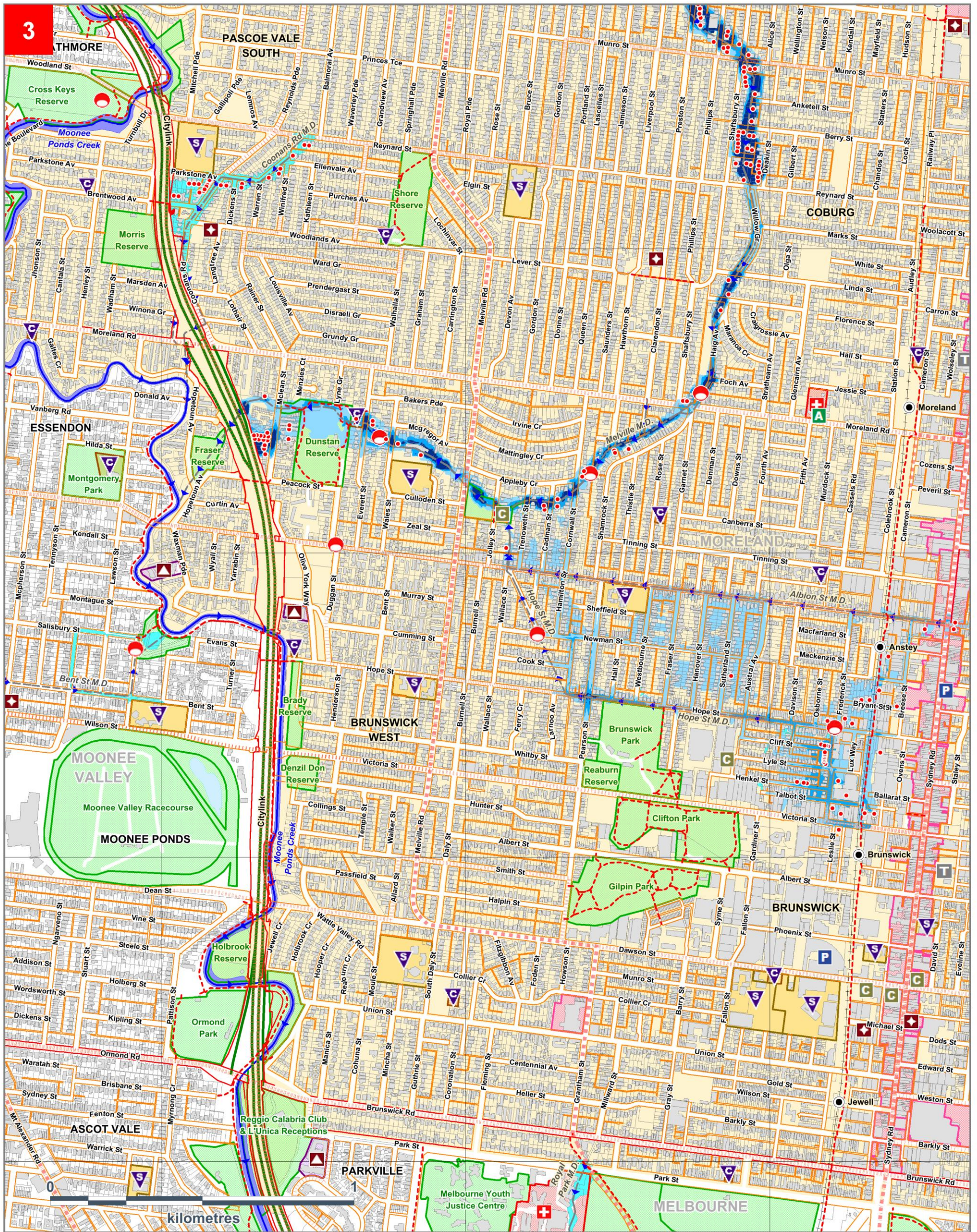
- | | | |
|--------------------------------------------------|----------------------------------|---------------------------------|
| Building | Reserve / Park | School / College |
| Waterbody | Tramway | Kindergarten / Child Care |
| 1% AEP Flash Flood Extent (Depth Unavailable) | Creek | Sewer Emergency Relief Point |
| 1% AEP Riverine Flood Extent (Depth Unavailable) | Melbourne Water Stormwater Drain | Aged Care Facility |
| 1% AEP Flash Flood Depth | Bicycle / Walking Trail | Hospital |
| Greater than 60cm | Bus Route (PTV) | 1% AEP Over-Floor Flooding Risk |
| Between 30cm and 60cm | Ambulance Station | |
| Up to 30cm | Community Centre | |
| Shopping Precinct | Place Of Worship | |



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Moonee Ponds Creek flood modelling completed by Melbourne Water, Jan 1996. Melville M.D. flood modelling completed by URS, Jan 2010. Merlynston M.D. flood modelling completed by WBM, Sept 2013. Westbreen Creek flood modelling completed by CMPS&F, April 1998. Map Produced by VICSES April 2019.

CITY OF MORELAND

1% AEP (100yr ARI) Flooding
3. Moonee Ponds Creek (Brunswick West)

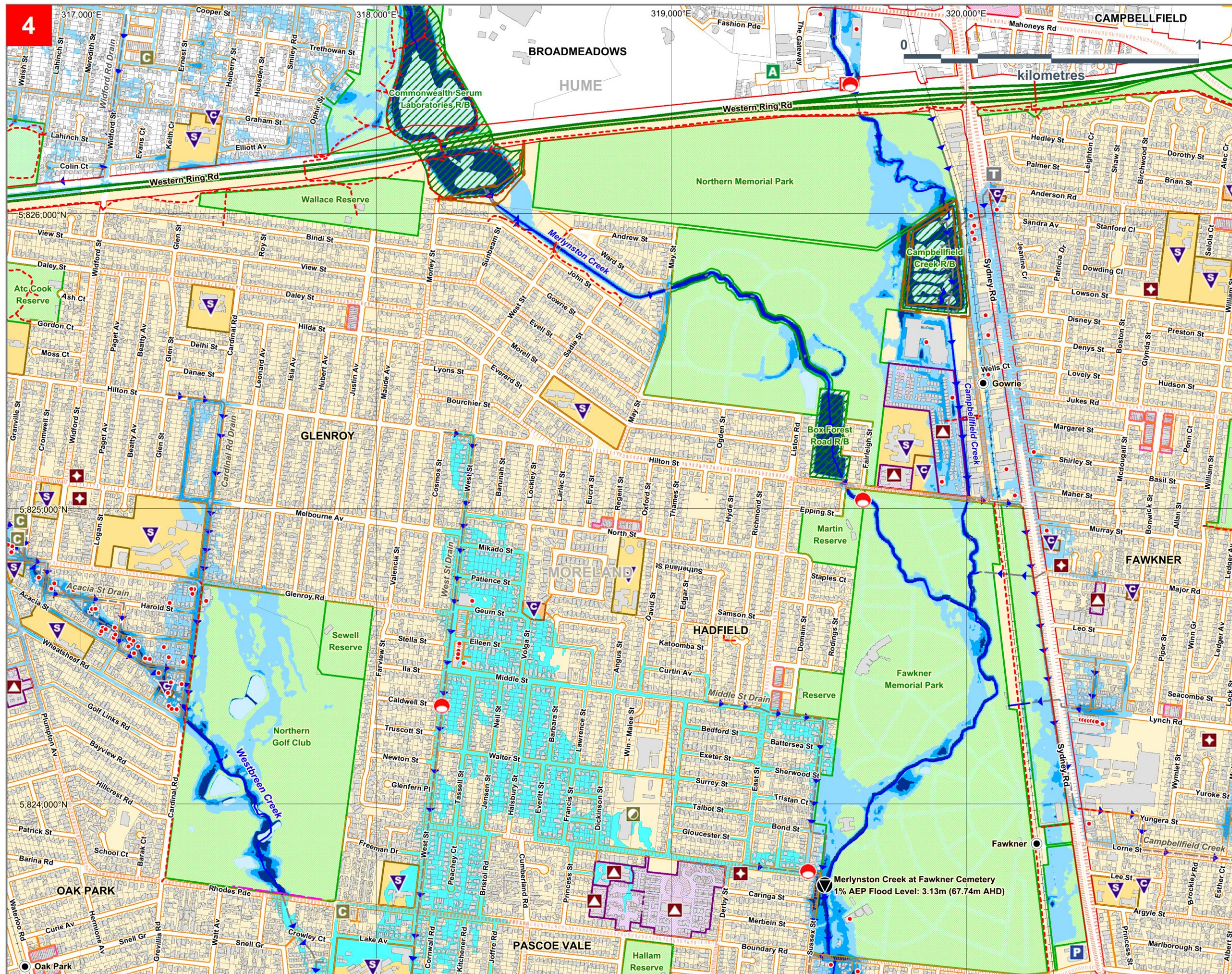
- | | | |
|--------------------------------------------------|----------------------------------|---------------------------------|
| Building | Reserve / Park | School / College |
| Waterbody | Tramway | Kindergarten / Child Care |
| 1% AEP Flash Flood Extent (Depth Unavailable) | Creek | Sewer Emergency Relief Point |
| 1% AEP Riverine Flood Extent (Depth Unavailable) | Melbourne Water Stormwater Drain | Aged Care Facility |
| 1% AEP Flash Flood Depth Greater than 60cm | Bicycle / Walking Trail | Hospital |
| 1% AEP Flash Flood Depth Between 30cm and 60cm | Bus Route (PTV) | 1% AEP Over-Floor Flooding Risk |
| 1% AEP Flash Flood Depth Up to 30cm | Ambulance Station | Police Station |
| Shopping Precinct | Community Centre | Telephone Exchange |
| | Place Of Worship | |



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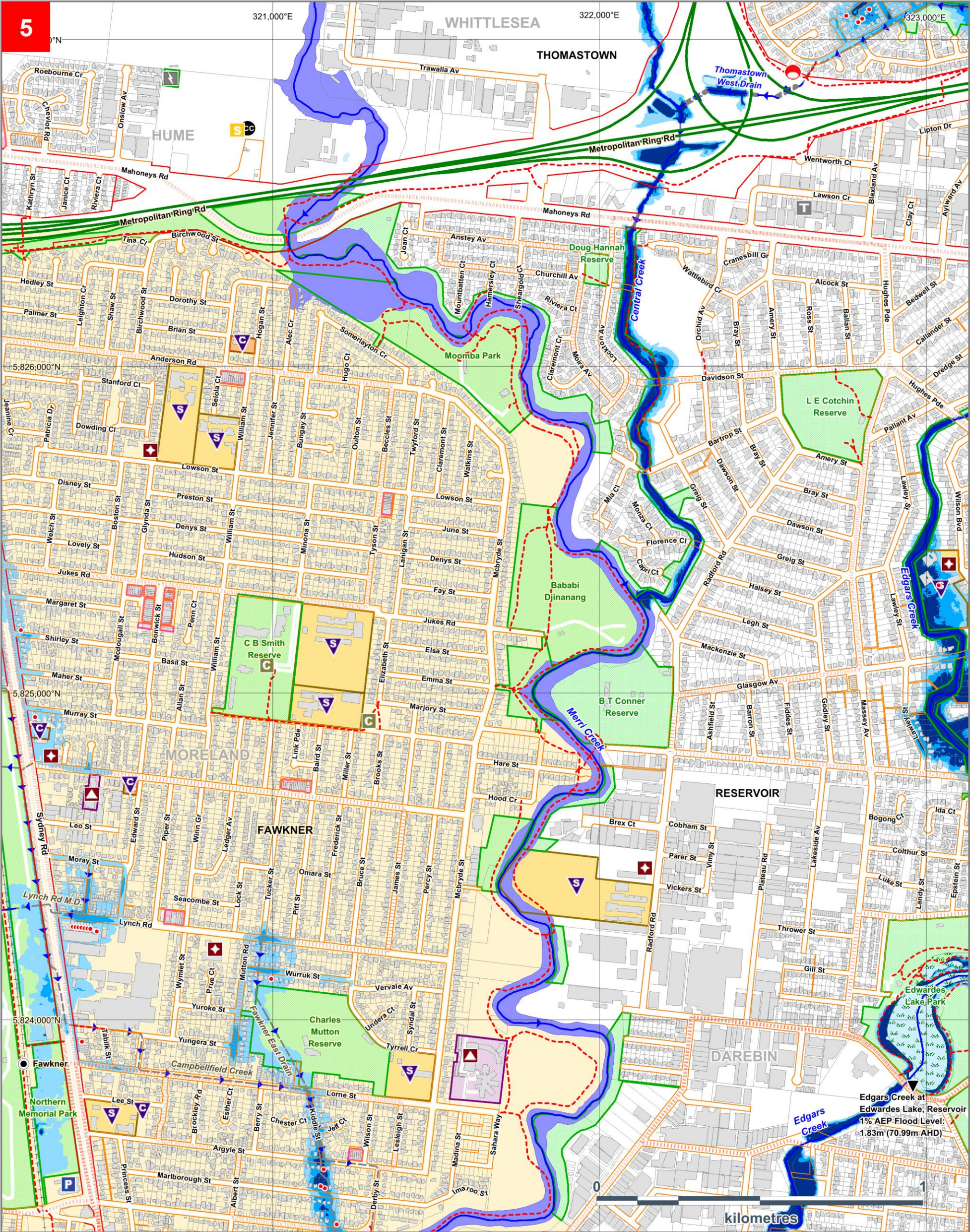
- Building
- Area of Interest
- Waterbody
- Natural Wetland
- Shopping Precinct
- 1% AEP Flash Flood Depth
 - Greater than 60cm
 - Between 30cm and 60cm
 - Up to 30cm
- Melbourne Water Retarding Basin
- 1% AEP Flash Flood Extent (Depth Unavailable) Embankment
- Creek / Waterway
- Bicycle / Walking Trail
- Bus Routes (PTV)
- Melbourne Water Stormwater Drain
- Aged Care Facility
- Community Centre
- Place Of Worship
- School / College
- Telephone Exchange
- Kindergarten / Child Care
- Sewer Pumping Station
- Stream Level Gauge & 1% AEP Flood Level
- Ambulance Station
- 1% AEP Over-Floor Flooding Risk
- Rain Gauge
- Sewer Emergency Relief Point
- Police Station
- Municipal Depot



CITY OF MORELAND
1% AEP (100yr ARI) Flooding
4. Merlynston Creek (Fawkner)



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Merri Creek flood modelling completed by Melbourne Water. Fawknerville East Drain flood modelling completed by WBM, September 2013. Map Produced by VICSES April 2019.

CITY OF MORELAND

1% AEP (100yr ARI) Flooding

5. Merri Creek (Fawknerville)

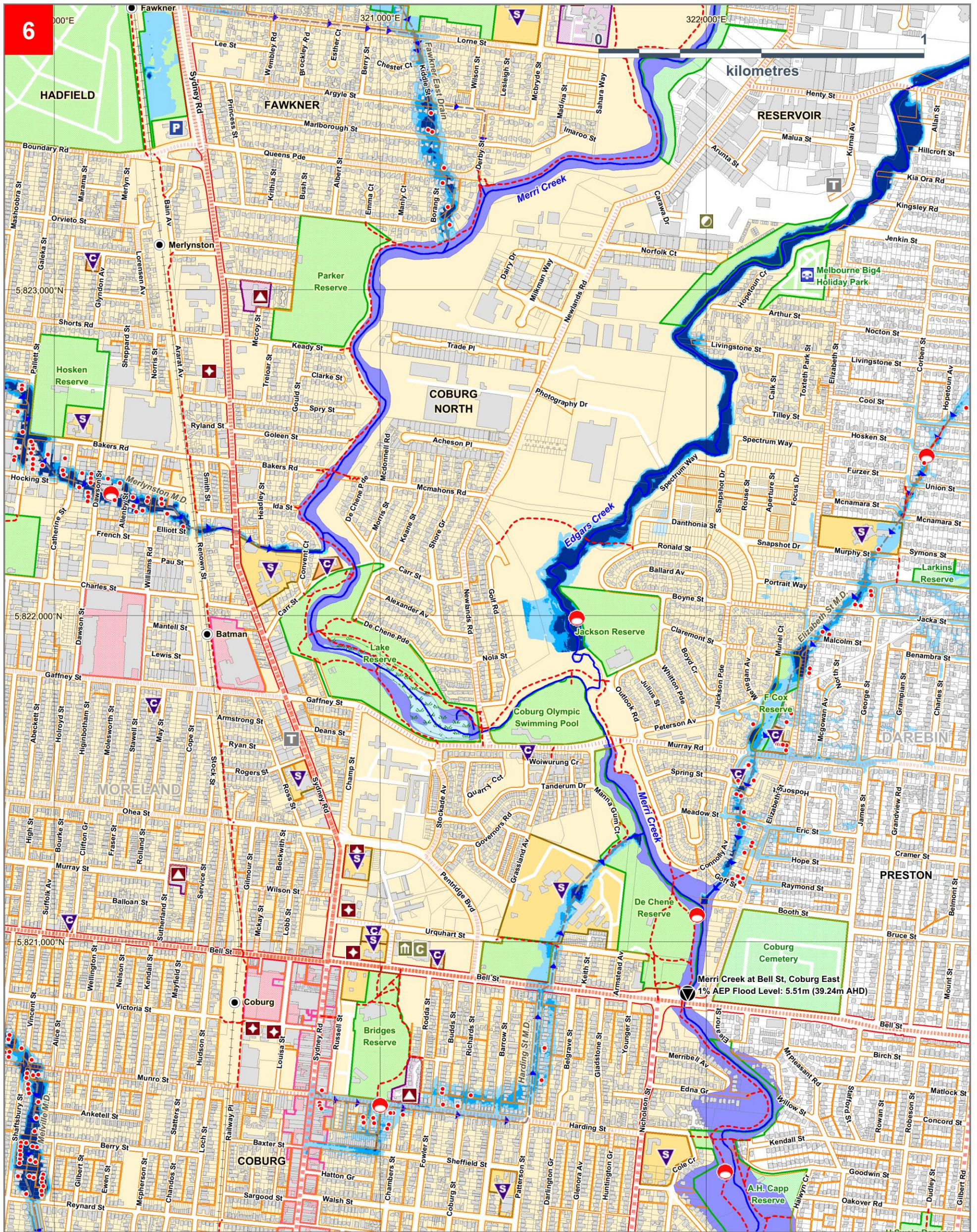
- | | | | |
|--------------------------------------------------|----------------------------------|-----------------------------------------|----------------|
| Building | Shopping Precinct | School / College | Hospital |
| Waterbody | Reserve / Park | Kindergarten / Child Care | Police Station |
| 1% AEP Riverine Flood Extent (Depth Unavailable) | Creek | Sewer Emergency Relief Point | |
| 1% AEP Flash Flood Depth Greater than 60cm | Melbourne Water Stormwater Drain | Aged Care Facility | |
| 1% AEP Flash Flood Depth Between 30cm and 60cm | Bicycle / Walking Trail | Place Of Worship | |
| 1% AEP Flash Flood Depth Up to 30cm | Bus Route (PTV) | Stream Level Gauge & 1% AEP Flood Level | |
| Natural Wetland | Community Centre | Emergency Command Facility | |
| State Emergency Service | Power Terminal Station | 1% AEP Over-Floor Flooding Risk | |
| | Telephone Exchange | | |



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Merri Creek flood modelling completed by Melbourne Water. Harding St M.D. flood modelling completed by Cardno, June 2016. Edgars Creek flood modelling completed by AECOM, July 2014. Merlynston M.D. flood modelling completed by WBM, Sept 2013. Map Produced by VICSES April 2019.

CITY OF MORELAND

1% AEP (100yr ARI) Flooding

6. Merri Creek (Coburg)

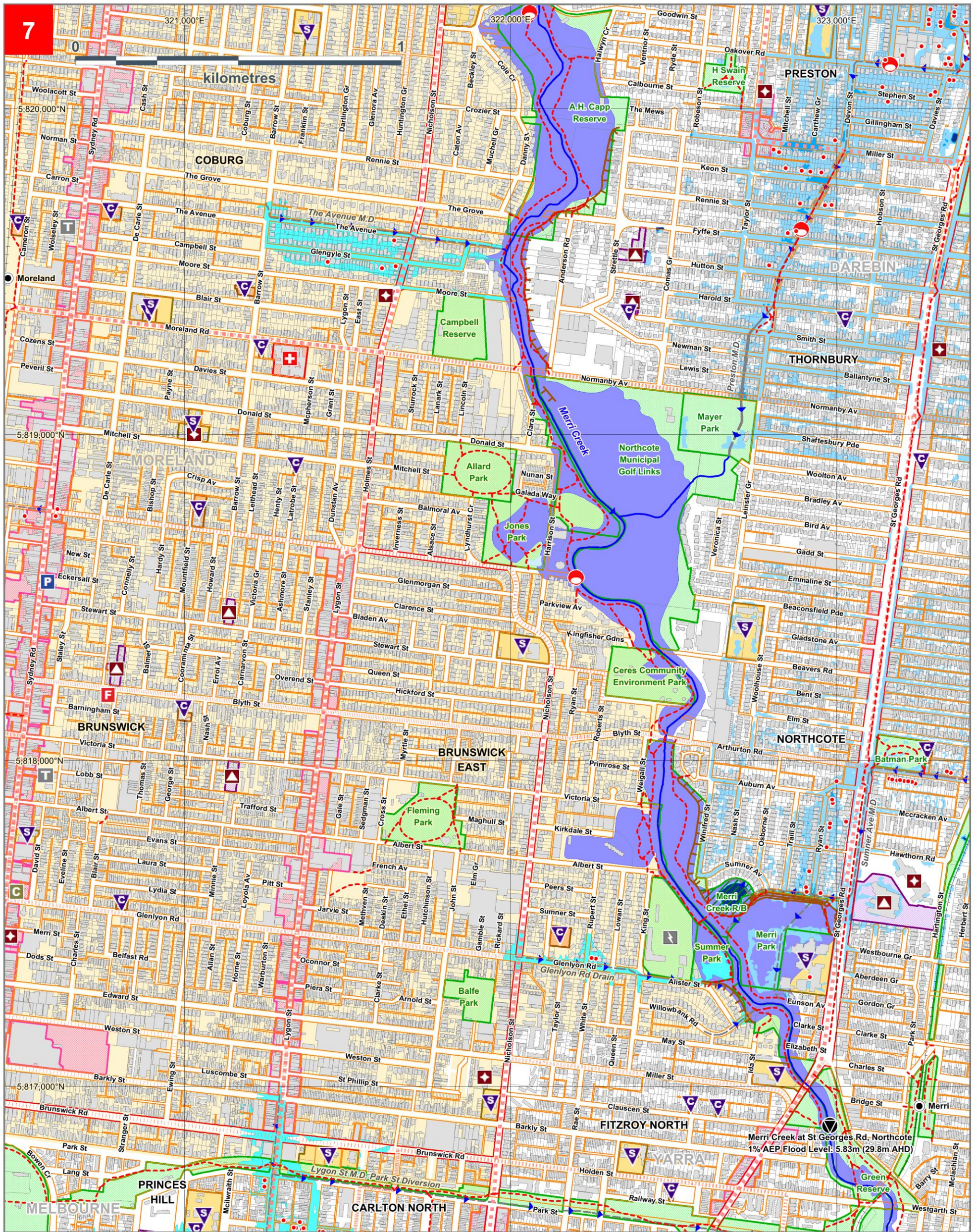
- | | | | |
|--------------------------------------------------|----------------------------------|-----------------------------------------|-------------------|
| Building | Creek | School / College | Municipal Depot |
| Waterbody | Melbourne Water Stormwater Drain | Kindergarten / Child Care | Municipal Offices |
| 1% AEP Riverine Flood Extent (Depth Unavailable) | Bicycle / Walking Trail | Sewer Emergency Relief Point | |
| 1% AEP Flash Flood Depth Greater than 60cm | Bus Route (PTV) | Aged Care Facility | |
| 1% AEP Flash Flood Depth Between 30cm and 60cm | Tramway | Place Of Worship | |
| 1% AEP Flash Flood Depth Up to 30cm | Community Centre | Stream Level Gauge & 1% AEP Flood Level | |
| Shopping Precinct | Police Station | Rain Gauge | |
| Reserve / Park | Telephone Exchange | 1% AEP Over-Floor Flooding Risk | |
| | Caravan Park | | |



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Merri Creek flood modelling completed by Melbourne Water. Glenlyon Rd Drain and The Avenue Main Drain flood modelling completed by CMPS&F, April 1998. Map Produced by VICSES April 2019.

CITY OF MORELAND 1% AEP (100yr ARI) Flooding **7. Merri Creek (Brunswick East)**

- | | | | |
|--------------------------------------------------|----------------------------------|-----------------------------------------|------------------------|
| Building | Shopping Precinct | School / College | Power Terminal Station |
| Waterbody | Reserve / Park | Kindergarten / Child Care | Community Centre |
| 1% AEP Flash Flood Extent (Depth Unavailable) | Creek | Sewer Emergency Relief Point | Fire Station |
| 1% AEP Riverine Flood Extent (Depth Unavailable) | Melbourne Water Stormwater Drain | Aged Care Facility | Hospital |
| 1% AEP Flash Flood Depth Greater than 60cm | Bicycle / Walking Trail | Place Of Worship | Police Station |
| 1% AEP Flash Flood Depth Between 30cm and 60cm | Bus Route (PTV) | Stream Level Gauge & 1% AEP Flood Level | |
| 1% AEP Flash Flood Depth Up to 30cm | Tramway | Rain Gauge | |
| Melbourne Water Retarding Basin | Embankment | 1% AEP Over-Floor Flooding Risk | |
| | Levee | | |
| | Telephone Exchange | | |



Melbourne Water

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APPENDIX G – CATCHMENT SCHEMATICS

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

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

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

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

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



Moonee Ponds Creek Catchment Schematic

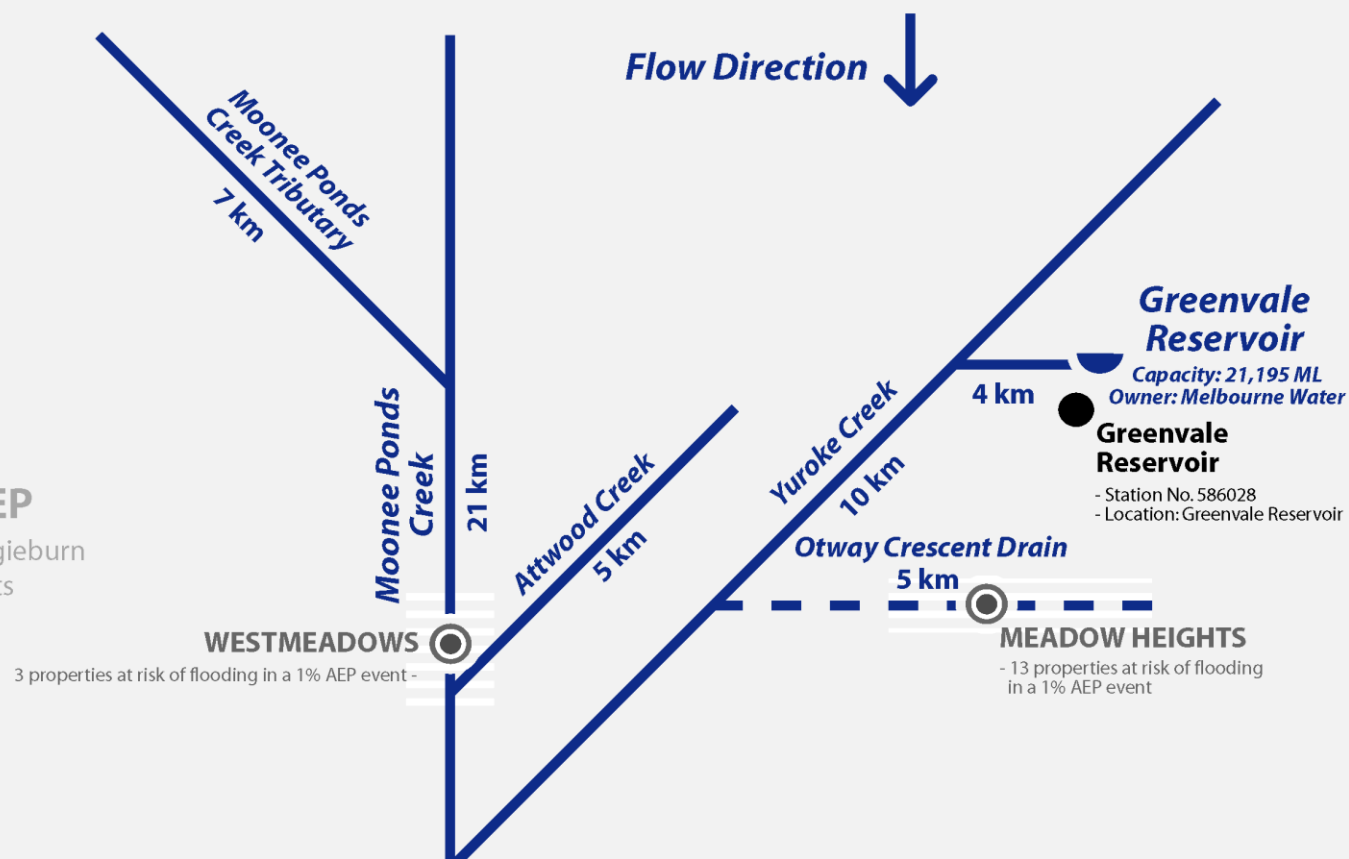
Version 4 - April 2019

LEGEND

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

Schematic Not To Scale

HUME MSFEP
Broadmeadows, Craigieburn
& Sunbury Units



Jacana Retarding Basin

Moonee Ponds Creek at Jacana Retarding Basin

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

Essendon North

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

MOONEE VALLEY MSFEP
Essendon Unit

OAK PARK

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

GLENROY

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

MORELAND MSFEP
Broadmeadows Unit

COBURG

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

BRUNSWICK WEST

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

Moonee Ponds Creek at Flemington

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

MELBOURNE MSFEP
Footscray & Port Phillip Units

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

Docklands

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

DOCKLANDS

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

Yarra River at Southbank

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



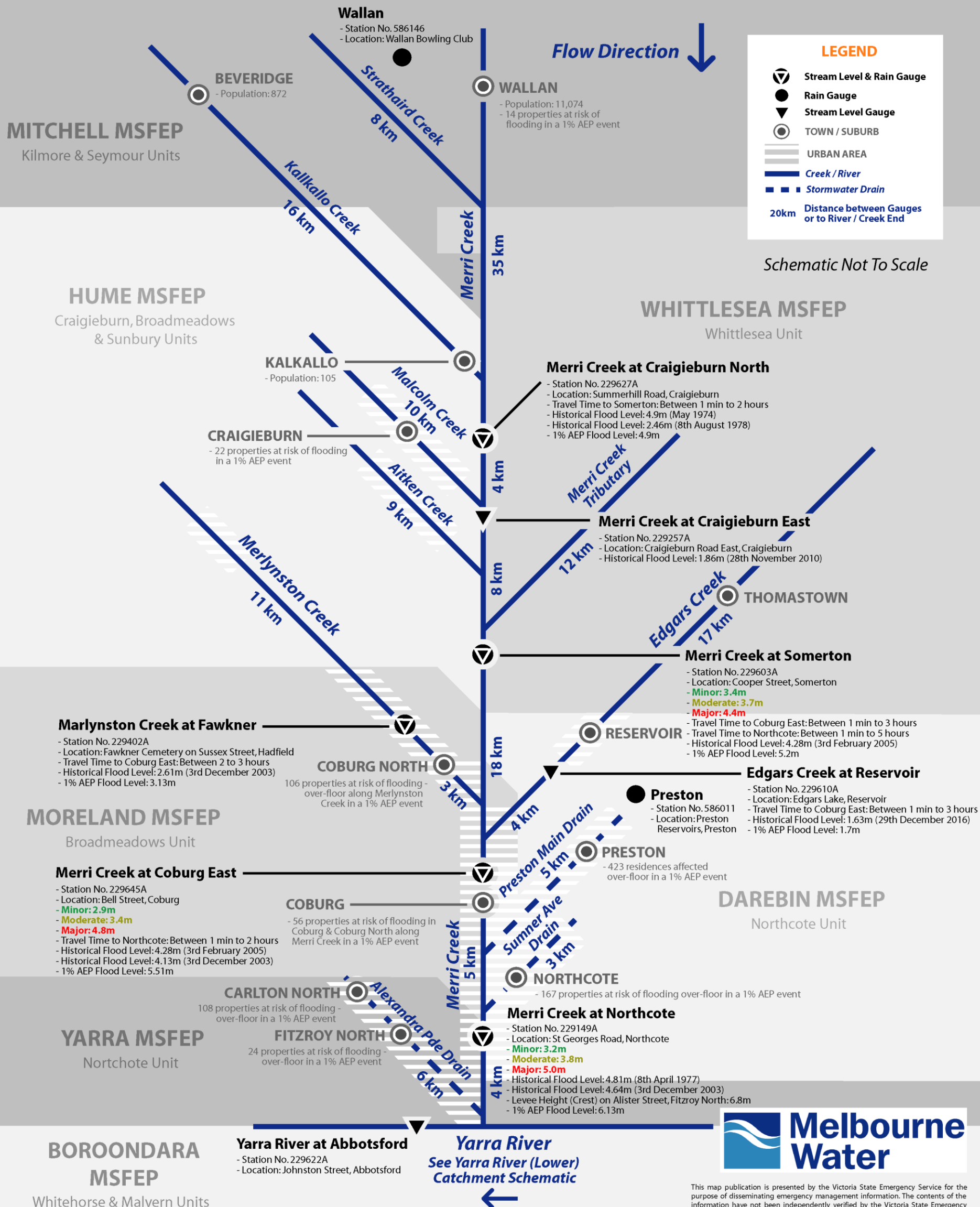
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Information Sources: Melbourne Water Flood Warning Manual; Municipal Flood Emergency Plans; Melbourne Water GIS; Melbourne Water HYDSTRA Database; ABS Census 2016



Merri Creek Catchment Schematic

Version 5 - April 2019



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

APPENDIX H – SEVERE WEATHER (STORM) EVENTS

Overview

Moreland municipality is susceptible during severe weather events because of a combination of its undulating terrain, mature trees in close proximity to properties and wind exposed properties. Storm events the City of Moreland may be subject to include wind storms, dust storms, hailstorms, heavy rain leading to flash flooding and thunderstorms (including lightning activity). There have also been isolated occurrences of atmospheric downbursts/microburst in adjacent municipalities.

Older homes may be more susceptible to damage, as can properties undergoing development and renovation. Construction works can interfere and excavations can interfere with natural drainage or stability of existing trees. Blocked drains and pits, or drainage systems that may be insufficiently sized for the level of development in the City of Moreland also contribute to the effects of storm activity.

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

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

VICSES Severe Weather Requests for Assistance

The Victoria State Emergency Service records requests for assistance made by the public during severe weather events. Additional calls may have been made directly to Council during these events. Table H1 below is a breakdown of requests by suburb and damage type during the period June 2010 and January 2018 in relation to severe weather and storm events.

VICSES Request for Assistance (June 2010 – December 2018)					
Suburb	Building Damage	Flooding	Other*	Tree Down	Tree Down Traffic Hazard
Brunswick	203	29	3	112	50
Brunswick East	72	12	0	43	31
Brunswick West	89	12	2	60	37
Coburg	205	22	1	154	75
Coburg North	58	12	0	41	16
Fawkner	91	24	2	46	52
Fitzroy North (part)	5	2	1	3	4
Glenroy	175	29	3	132	62
Gowanbrae	18	5	0	5	2
Hadfield	73	11	0	23	15
Oak Park	43	11	0	40	21
Pascoe Vale	144	26	0	86	47
Pascoe Vale South	79	7	0	45	33
Tullamarine (part)	1	0	0	2	3

Table H1 – Breakdown of Severe Weather Requests for Assistance received by VICSES Broadmeadows Unit by suburb

* Rescue Persons Trapped, Rescue Structure Collapse, Landslide / Hazards & Loose Debris / Objects

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

Table H2 is a breakdown of requests for assistance by date (month) and damage type. High figures during December 2011 were the result of an intense storm with large hail on Christmas Day 2011 that moved across the north west metropolitan suburbs causing significant building damage and some flooding issues. Severe wind events in August 2013, October 2013 and June 2014 led to many RFAs for building damage and tree down related issues, which lead to secondary traffic issues as a result of trees across roads. Most recently, a widespread high wind event in October 2016 and July 2017 passed through Melbourne causing road closures, building damage, power outages, traffic congestion and public transport issues. Heavy rain events in December 2017 lead to building damage and issues with flooding of properties and roads.

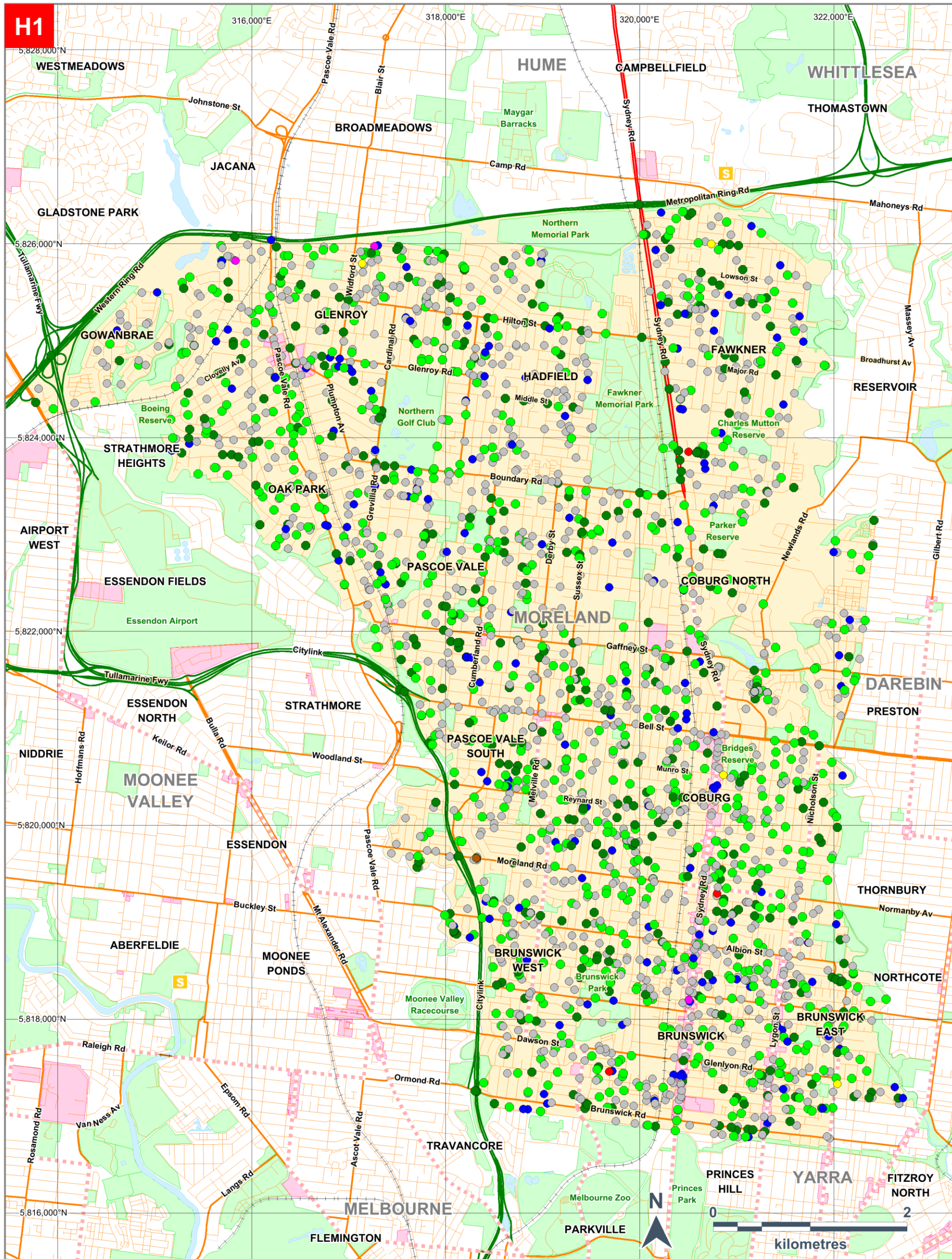
VICSES Request for Assistance (July 2009 – December 2018)					
Date	Building Damage	Flooding	Other*	Tree Down	Tree Down Traffic Hazard
July 2009	6	0	0	2	0
August 2009	38	0	0	29	6
September 2009	14	0	0	7	4
October 2009	3	2	0	2	0
November 2009	30	3	0	2	4
December 2009	1	0	0	2	1
January 2010	5	0	0	3	3
February 2010	14	8	0	1	0
March 2010	14	8	0	2	4
April 2010	0	0	0	0	0
May 2010	1	0	0	0	0
June 2010	9	0	0	10	6
July 2010	7	0	0	5	4
August 2010	8	1	0	7	4
September 2010	6	0	0	9	3
October 2010	30	13	1	2	3
November 2010	14	1	0	8	4
December 2010	10	3	0	4	4
January 2011	8	4	0	7	2
February 2011	16	18	0	7	3
March 2011	2	0	0	1	0
April 2011	0	0	0	0	0
May 2011	0	0	0	0	0
June 2011	7	0	0	1	4
July 2011	2	0	0	1	0
August 2011	3	0	0	1	2
September 2011	22	2	0	9	9
October 2011	2	0	0	9	4
November 2011	8	0	0	4	5
December 2011	98	42	1	22	9
January 2012	12	0	0	14	1
February 2012	17	1	0	18	7
March 2012	4	2	0	4	4
April 2012	2	0	0	2	0
May 2012	11	2	0	2	1
June 2012	4	1	0	4	3
July 2012	1	0	0	1	1
August 2012	7	0	0	3	3
September 2012	13	0	0	15	13
October 2012	2	0	0	1	2
November 2012	3	1	0	1	2
December 2012	4	0	0	10	2
January 2013	5	0	0	2	2
February 2013	5	1	0	2	2
March 2013	17	1	0	22	13
April 2013	2	0	0	5	1

VICSES Request for Assistance (July 2009 – December 2018)					
Date	Building Damage	Flooding	Other*	Tree Down	Tree Down Traffic Hazard
May 2013	16	10	0	1	2
June 2013	9	3	0	1	1
July 2013	6	0	0	4	3
August 2013	15	0	0	39	27
September 2013	23	1	0	27	5
October 2013	53	0	0	77	46
November 2013	3	0	0	1	0
December 2013	4	0	0	5	13
January 2014	8	0	0	7	4
February 2014	4	0	0	2	4
March 2014	0	0	0	0	0
April 2014	8	0	0	1	4
May 2014	0	0	0	0	0
June 2014	59	0	0	26	11
July 2014	9	0	0	2	6
August 2014	2	0	0	0	0
September 2014	25	9	0	8	8
October 2014	4	0	0	7	6
November 2014	6	0	0	3	0
December 2014	9	0	0	8	2
January 2015	6	0	0	9	2
February 2015	8	0	0	4	7
March 2015	12	0	0	23	3
April 2015	2	0	0	0	1
May 2015	5	0	0	1	1
June 2015	2	0	0	1	0
July 2015	12	1	1	1	0
August 2015	1	0	0	0	1
September 2015	3	0	0	1	1
October 2015	6	1	0	2	0
November 2015	8	0	0	10	6
December 2015	10	0	0	10	1
January 2016	30	11	0	7	5
February 2016	3	0	0	1	0
March 2016	4	0	0	3	2
April 2016	3	0	0	1	2
May 2016	7	2	0	8	2
June 2016	6	0	1	3	1
July 2016	5	0	0	4	1
August 2016	8	1	0	2	3
September 2016	5	1	0	2	1
October 2016	81	2	1	65	27
November 2016	4	0	0	1	0
December 2016	25	7	0	7	3
January 2017	2	0	0	7	5
February 2017	6	0	0	3	2
March 2017	5	0	0	3	7
April 2017	13	2	0	2	2
May 2017	0	0	0	0	1
June 2017	0	0	0	0	0
July 2017	64	0	1	37	23
August 2017	6	0	0	3	1
September 2017	10	0	0	3	3
October 2017	1	1	0	1	3
November 2017	2	1	0	1	1
December 2017	44	8	0	7	3
January 2018	8	0	0	8	4
February 2018	3	2	0	14	8
March 2018	3	1	0	7	3
April 2018	12	0	0	5	1
May 2018	11	3	0	11	6

VICSES Request for Assistance (July 2009 – December 2018)					
Date	Building Damage	Flooding	Other*	Tree Down	Tree Down Traffic Hazard
June 2018	5	3	0	0	3
July 2018	9	0	0	6	4
August 2018	4	0	0	4	3
September 2018	2	0	0	4	1
October 2018	1	0	0	0	1
November 2018	24	14	4	12	1
December 2018	6	3	1	5	4

Table H2 – Breakdown of severe weather requests for assistance received by VICSES Broadmeadows Unit within City of Moreland by date














* Dam Incident, Rescue Persons Trapped



**CITY OF
MORELAND**

Version 3: April 2019

H1 - Severe Weather Request for Assistance (RFA) Received by Type (Jul 2009 - Dec 2018)

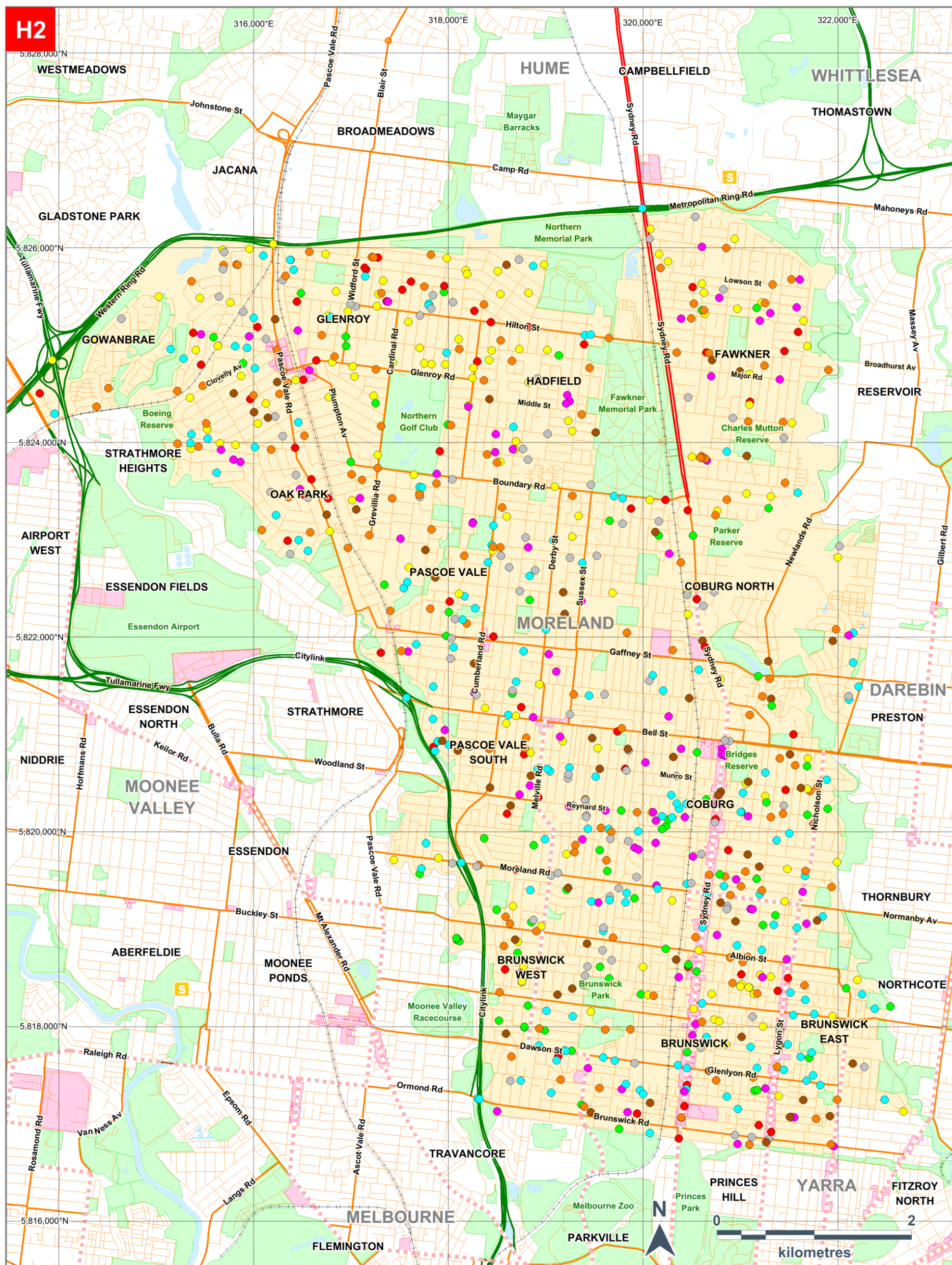
Legend		Severe Weather RFAs (Storm or Flood)	
	Commercial Precinct		Building Damage (1256)
	Reserve / Area of Interest		Flooding (202)
	Waterbody / Reservoir		Landslide / Hazards (1)
	Tramway		Loose Debris / Objects (4)
	SES LHQ		Rescue Persons Trapped (3)
			Rescue Structure Collapse (4)
			Tree Down (792)
			Tree Down Traffic Hazard (448)



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Figure H1 – Breakdown of Severe Weather Requests for Assistance received by VICSES Broadmeadows Unit within Moreland by request type

Moreland Storm and Flood Emergency Plan – A Sub-Plan of the MEMPlan



CITY OF MORELAND
Version 3: April 2019
H2 - Severe Weather Request for Assistance (RFA) Received by Date (Jul 2009 - Dec 2018)

- Commercial Precinct
- Reserve / Area of Interest
- Waterbody / Reservoir
- Tramway
- S SES LHQ

Severe Weather RFAs (Storm or Flood)		
(By Month > 60 Requests Received)		
●	April 2009	(73)
●	December 2011	(172)
●	August 2013	(81)
●	October 2013	(176)
●	June 2014	(96)
●	October 2016	(176)
●	July 2017	(125)
●	December 2017	(62)



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Figure H2 – Breakdown of Severe Weather Requests for Assistance received by VICSES Broadmeadows Unit within Moreland by date.

Activation Triggers

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

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

STORM READINESS AND ACTIVATION TRIGGER CONSIDERATIONS - V3.0 - SEPTEMBER 2017						
Readiness Level	RL 1- LOW TO MODERATE	RL 2 - HIGH	RL 3(A) - VERY HIGH	RL 3(B) - VERY HIGH	RL 4 - SEVERE	RL 5 - EXTREME
FDI	0 - 11	12 - 24	25 - 34*	35 - 49*	50 - 74	75 - 99
Fire Behaviour	Fires can be easily controlled	Fires can be controlled, expect short distance spotting	Fires can be difficult to control, crown fires may develop in forest.	Fires can be difficult to control, crown fires may develop in forest.	Fires may be uncontrollable and move quickly. Spot fires may occur up to 4km ahead of the fire.	Fires will be uncontrollable, unpredictable and fast moving. Spot fires up to 6km ahead of the fire.
	THUNDERSTORM FORECAST CHART [TFC] issued daily Oct - Apr			SEVERE WEATHER INTELLIGENCE BRIEFING [SWIB] issued TUE & FRI		
Storm Prediction or Warning READINESS CONSIDERATION	No Thunderstorms No Severe Weather	TFC show THUNDERSTORMS POSSIBLE No SWW	TFC shows SEVERE THUNDERSTORMS POSSIBLE SWW issued for winds and/or possible heavy rainfall STW issued for wind and/or heavy rainfall and/or hail	Severe Weather Intelligence Briefing (SWIB) colored YELLOW TFC shows SEVERE THUNDERSTORM LIKELY SWW issued for wind and/or heavy rainfall STW issued for wind and/or heavy rainfall and/or hail	SWIB colored ORANGE for winds and rainfall, showing TFC shows SEVERE THUNDERSTORMS LIKELY including potential for LARGE Hail, Damaging Winds, Heavy Rainfall leading to flash flooding SWW issued for Damaging Winds and/or Heavy Rainfall STW issued for wind and/or heavy rainfall and/or hail	SWIB colored RED for Damaging to Destructive Winds and Very Heavy Rainfall TFC shows SEVERE THUNDERSTORMS LIKELY including potential for GAI NT Hail, Damaging Winds, Heavy Rainfall leading to flash flooding SWW for damage or destructive winds or heavy rainfall STW - Super Cells possible, Heavy Rain and/or Very Dangerous Thunderstorm warning issued
Storm Behaviour READINESS CONSIDERATIONS	No Thunderstorms No Severe Weather	Wind gusts < 90km/h, rain rates not conducive to flash flooding, small hail (<2cm)	SWIB - 50km/hr+ average winds, gusts reaching 90-100 km/hr for prolonged periods. TFC - Possibility of Thunderstorms, may or may not include small hail <3cm. SWW or STW - Chance of flash flooding and damaging winds considered Possible.	SWIB - 60km/hr+ average winds, gusts reaching over 100km/hr (101-109 km/hr) for 6 or more hour period. TFC - Severe Thunderstorms Possible, high possibility of 3 or 4cm hail, wind gusts over 100km/hr. SWW - Heavy Rainfall leading to flash flooding across Districts considered 'Possible' STW - Localised flash flooding rates of >20mm per 30mins likely.	SWIB - 70km/hr+ average winds, DAMAGING gusts reaching over 110km/hr (110-120 km/hr) for 3 or more hour period. TFC - Severe Thunderstorms LIKELY SWW - Heavy Rainfall leading to flash and/or riverine flooding across Districts considered 'Likely' STW - Possibility of hail of 4-5cm, wind gusts over 110km/hr. POTENTIAL for Super Cell, Squall or Tornado. Localised flash flooding rates of >30mm per 30mins likely.	SWIB - Very unstable weather conditions including 80km/hr+ average winds, DAMAGING (120km/hr to DESTRUCTIVE > 125km/hr for 3 or more hour period CERTAIN. TFC - Severe Thunderstorms more LIKELY. SWW - Heavy Rainfall leading to flash and/or riverine flooding across Districts considered 'Very Likely' STW - Super Cells including Hail > 5cm, wind gusts > 120km/hr. Localised flash flooding rates of >40mm per 30mins. Squalls or likely Tornado.
NOTE: ADD 10km/hr to average winds and/or gusts when considering Alpine District predictions and/or warnings						
Storm Activity ACTIVATION CONSIDERATIONS	Local level unit response with less than 10 RFAs	Local level unit response with less than 10 RFAs	Local Unit level response with local agency support METRO 30+ RFA active at each 8-10 Units RURAL 15+ RFA active at each 4-6 Units	Multi-Unit responses with increasing multi-agency responses METRO 250+ active RFA in the region, where multi Units have more than 30 RFAs, ESTA has activated Critical Incident Response Plan (CIRP) Level 1 RURAL 100+ active RFA across the region, where Units have 15+ RFA at more than 5 Units	Multi-Unit response activity with multi-agency support and high level of multi-agency response activity (eg: Fire Alarms) METRO 400+ RFA active across the region, where Units have more than 30 RFAs or ESTA CIRP Level 2, event creation has increased to 2-4 per minute, < 15 calls waiting RURAL 250+ RFA, where multi Units have more than 30+ RFA each	Multi-Unit response and high level of multi-agency response activity with significant impacts across multi municipalities METRO 1000+ RFA across ICC footprint, where Units have more than 60 RFAs or ESTA CIRP Level 2 event creation has increased to more than 4 per minute, 15+ calls waiting consistently RURAL 500+ RFA across ICC footprint, where multi Units have more than 45+ RFA each
VICSES - Business as Usual Operations				JSOP 2.03 LINE OF CONTROL		
Readiness (State)	SCC Level White	SCC Level White	SCC Level White/Blue	SCC Level Blue or when ICC activated	SCC Level Orange. Multiple ICCs activated or multi region	SCC Level Red. Multiple ICCs activated or multi region
	SAC and SDO (monitor)	SAC and SDO (monitor)	SAC and SDO (actively monitoring)	SDO and SAC in place	SDO and SAC in place. Consider day/ night	SDO and SAC in place day and night
Readiness levels (Regional)	RDO (monitor)	RAC (monitor)	Regional Command IN PLACE	RURAL: Regional Cmd In Place, RC notified METRO - RCC OPEN: Base RCT in place	RCC OPEN: RCT in place, some agencies available on immediate recall	RCC OPEN: Full RCT/ most REMT in place
	RAC (aware)	RAC (aware)	RAC/RDO attends Regional Office	Rural - RAC & RDO In Place at Regional Office Metro - RC, RAC, RDO at RCC	RC, RAC and RDO In Place at RCC	RCT, RAC and RDO In Place at RCC
Readiness levels (Incident)	RDO (monitor)	RDO (monitor)	RDO - RAC IN PLACE Resource Officer (STBY-OnCall) Management Support (STBY)	RURAL - BASE IMT (Rostered) METRO - BASE IMT (In Place) Observed activity - BASE IMT (In Place)	RURAL - BASE IMT (In Place), CORE (Stby) METRO - CORE IMT (In Place) Observed activity - CORE IMT (In Place)	RURAL - CORE IMT (In Place), FULL (Stby) METRO - FULL IMT (In Place) Observed activity - FULL IMT (In Place)

