

# **MEMP Flood and Storm Sub-Plan**

**A Sub-plan of the Municipal Emergency Management Plan**

**City of Glen Eira**

For the City of Glen Eira  
And  
VICSES Glen Eira Unit

Version 12.4  
Reviewed June 2026



## **Intentionally Blank**

## Acknowledgment of Traditional Owners

The City of Glen Eira Municipal Emergency Management Planning Committee respectfully acknowledges the Traditional Owners of the land and waters of Boon Wurrung/Bunurong and the Wurundjeri Woi Wurrung peoples of the Kulin Nation. We pay our respects to Elders past and present, and are committed to working with Aboriginal and Torres Strait Islander communities to achieve a shared vision of safer and more resilient communities.

## Authorised and published by

The Flood and Storm Sub-plan has been prepared by VICSES on behalf of, and in collaboration with the City of Glen Eira Municipal Emergency Management Planning Committee (MEMPC). It was prepared in accordance with, and complies with the requirements of the *Emergency Management Act 2013* including having regard to the guidelines issued under section 77, [Guidelines for Preparing State, Regional and Municipal Emergency Management Plans](#) (*the Guidelines*).

It was endorsed by the City of Glen Eira Municipal Emergency Management Planning Committee on **24 June 2026** as a sub-plan to the City of Glen Eira Municipal Emergency Management Plan (MEMP). A Statement of Assurance for this plan was approved by the Southern Metro Emergency Management Planning Committee on **13 July 2026**.

This sub-plan was published on the [VICSES website](#) on July 2026.

*Any printed hard copies of this Flood and Storm Sub-plan are considered 'uncontrolled documents' and may not reflect the most current or updated version.*

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## Distribution of MFSSP

Once endorsed and signed the, MFSSP should be distributed to all MEMPC committee members, MEMPC Chair, council, MEMO, Deputy MEMO, Representatives from; BoM, CMA, DEECA, Parks Victoria, Ambulance Victoria, Department of Transport and Planning (VicRoads), DFFH, relevant utilities, MERC, RERC, Police station, VICSES Units, VICSES Regional office, FRV district office, FRV stations, CFA brigades, CFA regional office.

## Document Transmittal Form / Amendment Certificate

This MEMP Flood and Storm Sub-plan (MFSSP) will be amended, maintained and distributed as required or every 3 years facilitated by VICSES in consultation with the Municipal Emergency Management Planning Committee (MEMPC)

Comments and feedback on this Sub-plan are welcome and should be sent to the MEMPC Chair.

Amendments listed below have been included in this Plan and updated as a new version.

| Amendment Number | Date of Amendment | Amendment Entered By   | Summary of Amendment                                                                                                                                                                                                                                                                                                                            |
|------------------|-------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0 – draft V1     | June 2012         |                        | Preparation and distribution of Version 1 of this MFEP                                                                                                                                                                                                                                                                                          |
| 1 – draft V2     | July 2012         | Glen Eira City Council | Version 2                                                                                                                                                                                                                                                                                                                                       |
| 2 – draft V3     | July 2012         | MCA                    | Corrected flood / no-flood tool and evacuation check list inserted                                                                                                                                                                                                                                                                              |
| 3 – draft V4     | November 2012     | MCA                    | Incorporate GECC & VICSES comments                                                                                                                                                                                                                                                                                                              |
| V5               | June 2013         | MP                     | Version 5 June 2013                                                                                                                                                                                                                                                                                                                             |
| V6               | November 2013     | MCA                    | Added description of all maps to 1st page of Appendix F plus section headings, removed table of vulnerable facilities and inserted reference to the MEMP, updated Section 3.14 (no sandbags from GECC), Section 3.16.2 (pit lids), Appendix C Section 6.4.1 (use of tool), minor edits including DSE and DPI to DEPI, version and date changed. |
| V7               | November 2013     | MCA                    | Section 3.16.2 (pit lids) edited, added SEW to list of acronyms, document version incremented.                                                                                                                                                                                                                                                  |
| V8               | November 2014     | VicSES / MCA           | Minor edits, Appendix F mapping updated, Appendix G (Catchment Schematics) added and document version incremented. Disclaimer re mapping added to Appendix F.<br><br>Plan has not been re-endorsed as edits not substantial. All edits accepted at MEMPC meeting on 12th November 2014.                                                         |
| V9               | Sept 2015         | VicSES / MCA           | Edits to acronyms to accommodate organisational and SEMP changes and for internal consistency. Update of number of properties identified as subject to over-ground and over-floor flooding in Appendices A & C                                                                                                                                  |

## OFFICIAL

|       |                |                |                                                                                                                                                                                    |
|-------|----------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |                |                | following updated studies and intel from MelbWater. Plan has not been re-endorsed as edits not considered substantial.                                                             |
| V9.1  | November 2016  | VicSES / MCA   | Minor updates and edits following annual review. Inclusion of reference to downstream impacts and Elwood Canal.                                                                    |
| V9.2  | November 2017  | VicSES / MCA   | Added overview, consequences and timings associated with the 29th December 2016 event to Appendices A, B & C. Checked and adjusted SEMP references.                                |
| V9.3  | March 2018     | MCA            | Added Flooding and Drainage FAQ Appendix as well as a text box with triggers and actions for Council's MEMOs inside the front cover.                                               |
| V10   | March 2021     | VicSES         | Changes and edits to accommodate Emergency Management Legislation Amendment Act 2018 amended the Emergency Management Act 2013 (EM Act 2013) changes and for internal consistency. |
| V11   | February 2024  | VICSES         | Update of Agency and document references. Update of Appendix A, B, C, F & H                                                                                                        |
| V11.5 | October 2024   | VICSES         | Updates to acronyms and changes to "Vulnerable Establishments" to align with wording in the MEMPlan.                                                                               |
| V12   | July 2025      | VICSES         | Update of Appendix A, B, C, F & H following updated new stormwater catchment modelling (GHD, August 2023)                                                                          |
| V12.1 | September 2025 | VICSES         | Update of Agency and document references, updated title, update of Appendix F.                                                                                                     |
| V12.2 | November 2025  | VICSES         | Minor updates incorporated based on the MFSSP Review Working Group recommendations                                                                                                 |
| V12.3 | March 2026     | VICSES & MEMPC | Minor updated incorporated based on feedback from the MEMPC<br><br>MEMPC Endorsement/Assurance                                                                                     |
| V12.4 | June 2026      | VICSES & REMPC | Minor update incorporated based on feedback from the Southern Metro REMPC.<br><br>Approved by Southern Metro REMPC                                                                 |

This Plan will be published on the VICSES website at [www.ses.vic.gov.au/get-ready/your-local-flood-information](http://www.ses.vic.gov.au/get-ready/your-local-flood-information) located with the associated local flood guides, and the City of Glen Eira website (if required).

## 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                                                               | IIA    | Initial Impact Assessment                                                                |
| AEP                                                           | Annual Exceedance Probability                                                     | IMS    | Incident Management System                                                               |
| AHD                                                           | Australian Height Datum (the height of a location above mean sea level in metres) | IMT    | Incident Management Team                                                                 |
| AIDR                                                          | Australian Institute of Disaster Resilience                                       | JSOP   | Joint Standard Operations Procedure (as issued by the Emergency Management Commissioner) |
| AIIMS                                                         | Australasian Inter-service Incident Management System                             | LSIO   | Land Subject to Inundation Overlay                                                       |
| AoCC                                                          | Area of Operations Control Centre / Command Centre                                | MEMO   | Municipal Emergency Management Officer                                                   |
| 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                                                             | MFSSP  | Municipal Flood & Storm Emergency Plan                                                   |
| CEO                                                           | Chief Executive Officer                                                           | MFEPCC | Municipal Flood Emergency Planning Committee                                             |
| CERA                                                          | Community Emergency Risk Assessment                                               | MRM    | Municipal Recovery Manager                                                               |
| CFA                                                           | Country Fire Authority                                                            | PMF    | Probable Maximum Flood                                                                   |
| CMA                                                           | Catchment Management Authority                                                    | RAC    | Regional Agency Commander                                                                |
| DEECA                                                         | Department of Energy, Environment and Climate Action                              | RCC    | Regional Control Centre                                                                  |
| DFFH                                                          | Department of Families, Fairness and Housing                                      | RDO    | Regional Duty Officer                                                                    |
| DH                                                            | Department of Health                                                              | RERC   | Regional Emergency Response Coordinator                                                  |
| DJSIR                                                         | Department of Jobs, Skills, Industry and Regions                                  | RERCC  | Regional Emergency Response Coordination Centre                                          |

|      |                                      |        |                                    |
|------|--------------------------------------|--------|------------------------------------|
| DTP  | Department of Transport and Planning | REMP   | Regional Emergency Management Plan |
| EMLO | Emergency Management Liaison Officer | SAC    | State Agency Commander             |
| EMT  | Emergency Management Team            | SBO    | Special Building Overlay           |
| EMV  | Emergency Management Victoria        | SCC    | State Control Centre               |
| ERC  | Emergency Relief Centre              | SDO    | State Duty Officer                 |
| EMV  | Emergency Management Victoria        | SEMP   | State Emergency Management Plan    |
| FO   | Floodway Overlay                     | SEWS   | Standard Emergency Warning Signal  |
| FRV  | Fire Rescue Victoria                 | SOP    | Standard Operating Procedure       |
| IC   | Incident Controller                  | VicPol | Victoria Police                    |
| ICC  | Incident Control Centre              | VICSES | Victoria State Emergency Service   |
| IEMT | Incident Emergency Management Team   |        |                                    |

## Glossary

Below are terms defined for the purpose of this plan:

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

## Part 1. INTRODUCTION

### 1.1 Approval and Endorsement

The City of Glen Eira Municipal Emergency Management Planning Committee (MEMPC) is the owner of this MEMP Flood and Storm Emergency Plan (MFSSP), pursuant to Part 6A of the Emergency Management Act 2013 (as amended). If the certificate of assurance is signed and dated, then the Southern Metro REMPC has approved this plan.

In accordance with its roles and responsibilities set out in the [State Emergency Management Plan \(SEMP\)](#), the Victoria State Emergency Service (VICSES) has prepared this plan in collaboration with the MEMPC.

Depending on the specific needs of the municipality, engagement for this plan may be coordinated through the MEMPC or dedicated working group such as the Municipal Flood & Storm Planning Committee (MFSPC), with input from subject matter experts.

This MFSSP is a sub plan to the City of Glen Eira [Municipal Emergency Management Plan \(MEMP\)](#). It is consistent with the [SEMP](#) and the [Victorian Floodplain Management Strategy \(2016\)](#).

The plan is also consistent with and subordinate to:

- [SEMP Flood Sub-Plan](#), [SEMP Storm sub-plan](#)
- The Southern Metro [Regional Emergency Management Plan](#)
- The Central (Southern Metro) [Regional Flood Sub-plan](#), [Regional Storm Sub-plan](#)

This MEMPC prepared this plan in alignment with the Guidelines for Preparing State, Regional and Municipal Emergency Management Plans, including formal consultation and statement of assurance.

It also takes into account the outcomes of the Community Emergency Risk Assessment (CERA) process undertaken by the Municipal Emergency Management Planning Committee (MEMPC).

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

This Plan is endorsed by the Glen Eira MEMPC as a sub-plan to the MEMP.

## 1.2 Certificate of Assurance

Certificate of Assurance for the MEMP Flood and Storm Sub-plan for the City of Glen Eira

**Plan Preparer:** The Victoria State Emergency Service prepared this sub-plan on behalf of the Municipal Emergency Management Planning Committee

I certify that the attached sub-plan complies with the requirements of the *Emergency Management Act 2013*, including having regard to any relevant guidelines issued under section 77 of that Act, to the extent outlined in the attached checklist.

|                                                                                                                                                                            |                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>On behalf of the Municipal Emergency Management Planning Committee:</b><br><br><b>Chair, Municipal Emergency Management Planning Committee</b><br><br><b>24/06/2026</b> | <b>Nominated representative of preparer:</b><br><br><b>a/Assistant Chief Officer VICSES</b><br><br><b>24/06/2026</b> |
| <b>The Southern Metro Regional Emergency Management Planning Committee approves this plan.</b><br><br><b>Chair, Southern Metro REMPC</b><br><b>13 July 2026</b>            |                                                                                                                      |

## 1.3 Purpose and scope of this Flood and Storm Sub-plan

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

As such, the scope of the Plan is to:

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

## 1.4 How to read this plan

This is a sub-plan and therefore should be read in conjunction with the:

- [SEMP](#), [SEMP flood Sub-plan](#) and [SEMP Storm Sub-plan](#)
- Southern Metro REMP
- City of Glen Eira MEMP

### 1.4.1 Linkages and hyperlinks

This plan refers to a range of existing resources relating to floods/storms, including documents and websites. This plan does not seek to duplicate the information contained in these resources and instead provides links to where the reader can obtain further information.

For more operational or sensitive information, a log-in may be required, such as for documents saved on the Emergency Management Common Operating Picture ([EM-COP](#)) or VICSES Standard Operating Procedures. Contact your local VICSES representative for access to VICSES Standard Operating Procedures.

Documents or resources that are referred to frequently throughout this plan (such as the [SEMP](#)) may not be hyperlinked in each instance.

All hyperlinks were accurate at time of publication and currency of the linked content remains the responsibility of the host agency.

## 1.5 Requirements of EMP guidelines

Emergency Management Victoria has published [guidelines for preparing emergency management plans including municipal plans](#). In accordance with section 2.8 (Legislated Requirements) this plan has been:

- prepared collaboratively, efficiently and effectively (section 60AA(1))
- is consistent with other existing in force EMPs and where possible not duplicate or conflict with those plans (section 60AC)
- has adopted an integrated, coordinated and comprehensive approach to emergency management (sections 60AD, 60ADA and 60ADB)
- contain arrangements for mitigation, response, and recovery plus roles and responsibilities (section 60AE)
- Has been assured, approved and published every three years, or more frequently if required (sections 60AG, 60AH, and 60AI).

## 1.6 Municipal Flood and Storm Planning Committee (MFSPC)

Within the City of Glen Eira, the functions of a Municipal Flood and Storm Planning Committee will be undertaken by the MEMPC.

Details of MEMPC membership are provided in the MEMP.

## 1.7 Responsibility for planning, review & maintenance of this plan

To remain effective and to place the community at centre of its planning, the MEMPC must ensure it maintains the MFSSP.

VICSES through the MEMPC has responsibility for facilitating the preparation, review, maintenance and distribution of this plan. To facilitate this process the MEMPC may delegate a working group to review and update this Plan and provide advice back to the MEMPC accordingly.

In this instance, engagement was coordinated through a working group consisting of VICSES, Council and Victoria Police. Consultation was also undertaken with the local VICSES Glen Eira Unit, as well as Glen Eira MEMPC. Feedback received through these engagements has been incorporated into the plan.

The MEMPC will meet as per the MEMP documented program for the year.

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

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

## **1.8 Authority**

In 2020, the Emergency Management Legislation Amendment Act 2018 amended the Emergency Management Act 2013 to provide for new integrated arrangements for emergency management planning in Victoria at the State, regional and municipal levels; and create an obligation for a Municipal Emergency Management Planning Committee (MEMPC) to be established in each of the municipal districts of Victoria. Each MEMPC is a multi-agency collaboration group whose members bring organisation, industry or personal expertise to the task of emergency management planning for the municipal district.

Once endorsed and adopted by the Glen Eira MEMPC, this Storm and Flood Sub-plan will become a Sub-Plan to the Municipal Emergency Management Plan and supersede any prior versions of the Municipal Storm and Flood Emergency Plan.

## **1.9 Plan Assurance and Approval**

This Storm and Flood Management Plan has been prepared in accordance with and complies with the requirements of the EM Act 2013 including having regard to the guidelines issued under section 77, [\*Guidelines for Preparing State, Regional and Municipal Emergency Management Plans\*](#).

A Statement of Assurance (including a checklist and certificate) has been prepared and submitted to the Southern Metro Regional Emergency Management Committee (SM REMPC) pursuant to EM Act 2013 (s60AG).

This Plan is approved by the SM REMPC. This Plan comes into effect when it is published on the VICSES website and remains in effect until superseded by an approved and published update.

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

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

Details of this MFSSP will be released to the community through local media, VICSES community engagement programs, and websites (VICSES and the Municipality) once approved.

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

### **2.2 Structural flood mitigation measures**

Structural flood mitigation measures are any physical construction to reduce or avoid possible impacts of flood hazards, or the application of engineering techniques or technology to achieve flood hazard resistance and resilience in structures or systems<sup>1</sup>. The following is a summary of structural flood mitigation measures that exist within the Council area:

- levees (location, owner, condition, maintenance responsibility and protection levels).
- retarding basins (location, owner, condition, maintenance responsibility and protection levels) etc.

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

### **2.3 Non-structural flood mitigation measures**

Non-structural flood mitigation measures<sup>1</sup> are measures not involving physical construction which use knowledge, practice or agreement to reduce disaster risks and impacts, in particular through policies and laws, public awareness raising, training and education. The following are a summary of non-structural flood mitigation measures in the municipality.

#### **2.3.1 Exercising the plan**

The MEMPC is responsible for arranging for the exercising of this plan, which should occur annually. Ideally, the MEMPC will schedule the exercise shortly prior to the highest risk period for flooding.

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<sup>1</sup> [United Nations Office of Disaster Risk Reduction](#)

### 2.3.2 Flood intelligence

Flood intelligence supports decision making and planning for flooding by providing reliable and accurate information relating to:

- the expected level, depth, and velocity of floodwater and its consequences
- determination of actions to be undertaken in response to the identified consequences.

DEECA maintains the [FloodZoom flood intelligence platform](#). Inquiries regarding FloodZoom access should be directed to [accounts@floodzoom.vic.gov.au](mailto:accounts@floodzoom.vic.gov.au).

### 2.3.1 Severe Weather and Flood Warning

Arrangements for storm and flood warnings are contained within the [SEMP Flood Sub-Plan](#), [SEMP Storm Sub-Plan](#), and on the Bureau of Meteorology (BoM) website [www.bom.gov.au](http://www.bom.gov.au)

Details on Warnings issued by VICSES through [VicEmergency](#) and VICSES channels are outlined in Appendix E.

### 2.3.2 Local knowledge

Local knowledge is a critical element of planning. The community and other organisations can provide valuable local information about hazards, incidents and how they may evolve. This information is commonly referred to as local knowledge. This plan aims to ensure that planners and responders capture appropriate local knowledge before, during and after incidents.<sup>2</sup> People with experience of historic flood or storm events that have affected the municipality are a source of information. Events that have affected the municipality are located in [Appendix A](#).

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<sup>2</sup> [VICSES Policy 10.02 Local Knowledge V4.0](#)

## Part 3. DURING: RESPONSE / RELIEF ARRANGEMENTS

### 3.1 Introduction

#### 3.1.1 Activation of Response

VICSES may be notified of flood and storm incidents through several sources, but the most common source is calls received via 132 500 or if the emergency is life threatening, Triple Zero (000). Other sources are via other emergency management agencies and local government. In most cases, these events are of a small scale (a level 1 incident<sup>3</sup>), which local VICSES units manage without significant outside support.

In the case of more significant level 2 (medium complexity, resources beyond initial response) or level 3 (an incident that has high complexity, response duration is protracted) flood and storm response arrangements may be activated by the Regional Duty Officer (RDO) VICSES Southern Metro Region or Regional Agency Commander (RAC).

The VICSES Incident Controller (IC)/RDO/RAC will activate agencies as required as documented in the [SEMP Flood Sub-plan](#) or [SEMP Storm Sub-plan](#).

#### 3.1.2 Responsibilities

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

The general roles and responsibilities of supporting agencies are as agreed within the City of Glen Eira MEMP, the SEMP, VICSES Southern Region Flood Emergency Plan and State Flood and Storm Sub Plans.

Appendix G2 lists the roles and capabilities of other agencies when assisting VICSES to respond to storm events.

#### 3.1.3 Municipal Emergency Coordination Centre or equivalent

If established, liaison with the emergency coordination centre will be through the established Division/Sector Command and through Municipal involvement in the IEMT, in particular the Municipal Emergency Response Coordinator (MERC). The VICSES RDO or ICC will liaise with the centre directly if they have not established division or sector command arrangements.

The function, location, establishment and operation of an emergency coordination centre if relevant will be as detailed in the MEMP.

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<sup>3</sup> For a detailed definition of the levels of incidents, refer to Table 3 Levels of Incidents within the [State Emergency Management Plan](#).

### 3.1.4 Escalation

Many flood or storm 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 [SEMP](#).

## 3.2 State emergency management priorities

The [State Emergency Management Priorities](#) shall form the basis of incident action planning processes.

## 3.3 Command, Control, Coordination, Consequences, Communication and Community

The Command, Control and Coordination arrangements in this Plan must be consistent with these detailed in State and Regional Storm and Flood Emergency Plans. For further information, refer to the SEMP.

Command, Control and Coordination are familiar and traditional mechanisms in emergency and incident management however over the past few years there has been a supplementary focus on Consequence, Communication and Community Connection.

This is an approach to emergency management and an approach that is inclusive and community focused. It is also one that supports resilience in communities and in the EM sector.

### 3.3.1 Control

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

The Role Statement within the SEMP identifies VICSES in its response functions as the [Control Agency for flood and storm](#). It identifies DEECA as the [Control Agency responsible for dam safety as well as reticulated water and wastewater \(sewerage\) service](#).

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

### 3.3.2 Incident Controller (IC)

On the advice of the Bureau of Meteorology (BoM) or other reliable source, that a flood or storm event will occur or is occurring, VICSES as the control agency will appoint an Incident Controller (IC). The IC is typically from VICSES but may be from another agency when resources are constrained. The IC will lead and manage incident-tier response control including:

- controlling the operational elements of the response
- providing operational leadership during the incident at a static location or a dynamic incident, including the tactical resolution.

The IC responsibilities are as defined in the [SEMP](#). While providing support to the IC, support agencies retain command of their own people.

### 3.3.3 Incident Control Centre (ICC)

As required, the IC will establish an Incident Control Centre (ICC). The ICC is where they manage the incident response command and control functions from. The IC will make the decision to activate the ICC and when it should commence operations. The ICC may be activated in advance based on the severity of warnings and in accordance with VICSES readiness arrangements:

- VICSES readiness and response triggers *table 1* – flooding within the [SEMP Flood sub-plan](#).
- VICSES readiness response triggers summary *table 1* – severe weather within the [SEMP Storm sub-plan](#).

A list of pre-determined ICCs are identified and detailed within the Southern Metro REMPC.

### 3.3.4 Divisions and Sectors

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

The location of divisions and sectors are chosen based on their suitability for maintaining operations during a flood and may differ from those used in other types of emergencies. The IC may establish divisions and sectors at the following locations to assist with the management of flooding within the Municipality. The following location could be utilised as a Sector Command Point:

- VICSES Glen Eira Unit: 90 – 92 Bignell Road, East Bentleigh

Currently the following locations have been identified as possible Divisional Command Points for events within the City of Glen Eira Municipality.

- VICSES Knox Unit - 607 Burwood Hwy, Knoxfield
- VICSES Glen Eira Unit - 92 Bignell Road, Bentleigh East

### 3.3.5 Incident Management Team (IMT)

The Incident Controller will form an Incident Management Team (IMT) to support the IC in managing the incident-tier operational response to the emergency. This includes the functional areas of planning, intelligence, public information, operations, investigation, logistics and finance. Where possible, the IMT will be joint-agency, pre-planned and include personnel with relevant local knowledge.

The IC will form an IMT in line with the AIIMS principles.

For more detail, refer to the [SEMP](#) on IMTs and Incident Management Systems (IMSS).

### 3.3.6 Incident Emergency Management Team (IEMT)

The IC will establish a multi-agency Incident Emergency Management Team (IEMT) to support the IC in managing the effects and consequences of the flood or storm emergency.

The IEMT consists of key personnel (with appropriate authority) from stakeholder agencies and relevant organisations who need to be informed of strategic issues related to incident

control. They can provide the IC with high level strategic guidance and policy advice for consideration in developing incident management strategies.

Organisations, including City of Glen Eira required within the IEMT 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.

For more detail refer to the [SEMP](#) for guidance on IEMTs.

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

The SEMP Flood Sub-Plan and the SEMP Storm Sub-Plan detail the arrangements for public information and warnings for flood and storm. VICSES SOP008 Severe Weather Notification and Activation Process and VICSES SOP009 Flood Notification and Activation Process outline in detail the actions that VICSES will undertake upon receipt of a Severe Weather Warning or Flood Watch/Flood Warning from the Bureau of Meteorology.

Additionally, the VICSES Regional Duty Officer (until an incident controller is appointed) or IC will undertake actions as defined within the flood intelligence cards (Appendix C). General considerations by the IC/VICSES RDO will be as follows:

- Review storm and flood intelligence to assess likely storm or flood consequences
- Monitor weather and flood information – [www.bom.gov.au](http://www.bom.gov.au)
- Assess Command and Control requirements.
- Review local resources and consider needs for further resources regarding personnel, property protection, storm/flood rescue and air support
- Notify and brief appropriate officers. This includes RCC (if established), SCC (if established), 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 Severe Weather and Flood Warnings**

VICSES RDO (until an incident controller is appointed) or IC will undertake actions as defined within the flood intelligence cards (Appendix C). The IC/VICSES RDO will have general regard for the following considerations:

- Develop an appreciation of current flood levels and predicted levels. Are floodwaters, rising, peaking or falling?
- Review flood 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, sewage, health, transport or emergency service infrastructure interruption
  - The characteristics of the populations at risk
- Determine what the at-risk community need to know and do as the storm and/or flood develops.
- Warn the at-risk community including ensuring that an appropriate warning and community information strategy is implemented. This includes:
  - The current storm and/or flood situation
  - Storm and/or Flood predictions
  - What the consequences of predicted activity and/or levels may be
  - Public safety advice
  - Who to contact for further information
- Who to contact for emergency assistance
- Liaise with relevant asset owners as appropriate (i.e. water and power utilities)
- Implement response strategies as required based upon flood consequence assessment.
- Continue to monitor the weather and flood situation – <http://www.bom.gov.au>
- Continue to conduct reconnaissance of low-lying areas

### **3.4 Community information and warnings including media comms**

The SEMP Flood Sub-Plan and the SEMP Storm Sub-Plan detail the arrangements for public information and warnings for flood and storm.

Refer to Appendix E for more details on public information and warnings for the municipality.

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. The City of Glen Eira will work with the IC/VICSES RDO to assist with the dissemination of public messaging and/or warnings to ensure that consistent and timely messaging occurs.

### **3.5 Initial Impact assessment**

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

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

### **3.6 Preliminary deployments**

When storm and/or flooding is expected to be severe enough to cut access to towns, suburbs and/or communities the IC will consult with relevant agencies to ensure that resources are in place

if required to provide emergency response. These resources may include but not limited to emergency service personnel, food items and non-food items such as medical supplies, shelter, assembly areas, relief centres.

### 3.7 Response to flash flooding

Flash flooding can be defined as flooding that occurs within six hours or less of the flood-producing rainfall within the affected catchment. This may result in isolation of individuals and communities as time to warn and respond to flash flooding is limited<sup>4</sup>. The safest place to be in a flash flood is well away from the affected area. Accordingly, pre-event planning for flash floods should commence with an assumption that evacuation is the most effective strategy, provided evacuation can be safely implemented.

Emergency management response to flash flooding should be consistent the [SEMP Storm Sub-Plan](#).

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 and resources available.
2. If evacuation is possible, then evacuation should be the adopted strategy and it must be supported by a public information capability and a rescue contingency plan.
3. Where it is likely people will become trapped by floodwaters due to limited evacuation time or options the IC needs to ensure they provide safety advice to people at risk. This advice should advise people not to attempt to flee by entering floodwater. If people become trapped, it may be safer to seek the highest point within the building and to telephone 000 if they require rescue.
4. where this plan has identified buildings that are known to be structurally unsuitable, the plan needs to provide for an earlier evacuation trigger (return to step 1 of this cycle).
5. If an earlier evacuation is not possible then the IC must make specific preparations to rescue occupants trapped in structurally unsuitable buildings either pre-emptively or as occupants call for help.
6. Contact the City of Glen Eira MERC and MEMO at the earliest opportunity to allow for relief preparation to commence.

Due to the rapid development of flash flooding it will often be difficult, to establish relief centres ahead of actually triggering the evacuation. While this is normal practice it should not be used as a reason for not adopting evacuation.

Refer to Appendix C for response arrangements for flash flood events.

### 3.8 Evacuation

Where practical, evacuation is the primary strategy for ensuring the safety of at-risk communities. The purpose of evacuation is for people to relocate temporarily from areas at risk of the consequences of flooding, to places of safety. It is essential to assess risks involved in undertaking an evacuation, as evacuation may not always be the most appropriate action. This will ensure that

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<sup>4</sup> [AFAC Emergency Planning and Response to Protect Life in Flash Flood Events – Guideline v2.0](#)

people are not exposed to more hazardous environments because of their evacuation, for example, travelling through deep, fast-flowing floodwater<sup>5</sup>.

Under the SEMP, Victoria Police (VicPol) has the responsibility for evacuation (Evacuation Manager) – in consultation with the control agency and other expert advice. EMV has developed a standardised procedure for evacuation under [JSOP 03.12 – Planned Evacuation for Major Emergencies](#).

The IC decides whether to warn people to evacuate within a specified timeframe or whether it is necessary to advise them to evacuate immediately. The IC must make this decision having regard for the requirements of the JSOP.

Once the IC makes a decision to recommend evacuation, VicPol's Evacuation Manager is responsible for the management of the evacuation process where possible. VICSES and other agencies will assist where practical. VICSES is responsible for the development and communication of evacuation warnings.

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

Refer to Appendix D of this Plan and the MEMP for additional local evacuation considerations for the municipality.

Except in limited circumstances, evacuation is not compulsory in Victoria<sup>6</sup>. Recent historic floods that were managed under current legislation and emergency management arrangements, demonstrated that some people will choose not to evacuate. Therefore, this plan must consider arrangements for managing these people in the event they require assistance or rescue.

Considerations include:

- Registering persons who intend not to evacuate (refer to Appendix D).
- Providing additional information that may assist them in making a decision to evacuate.
- Identifying vulnerable people who may be willing to evacuate if assisted.

### 3.9 Flood rescue

Under the [SEMP Response table 9](#) the control agency for rescue from land and water is VicPol, which operates the State Police Search and Rescue Coordination Centre (SPSARCC). VICSES is a support agency for search and rescue on land and water evacuations and incidents involving mass casualties.

VICSES may conduct flood rescues. Appropriately trained and equipped VICSES units or other agencies that have appropriate training, equipment and support 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.

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<sup>5</sup> [AUSTRALIAN DISASTER RESILIENCE HANDBOOK COLLECTION Flood Emergency Planning for Disaster Resilience - First edition 2020](#)

<sup>6</sup> Powers to compel evacuation rely on the Minister making a declaration of a State of Disaster under section 23(2)(e) of the [Emergency Management Act 1986](#). However, section 23(7) prevents these powers be used to compel a person to evacuate if they have a pecuniary interest in the land or building or goods or valuables on the land or in the building.

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.

Victoria State Police Search and Rescue Coordination Centre (SPSARCC) should be notified of any rescues that occur: (03) 9399 7500. On occasion, VicPol may opt to respond a field capability of its rescue coordination centre to a location near the emergency. It may also work with the Triple Zero Victoria to deploy its dispatch capability to the same location to enhance rescue coordination and dispatch. Details in this plan may assist VicPol and Triple Zero Victoria in undertaking this function in the field or from the primary rescue coordination centre.

### **3.10 Aircraft management**

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

The IC may request aircraft support through the State Air Desk located at the SCC. The Air Desk Supervisor will establish priorities. The IC controls the conduct of Air support operations.

### **3.11 Resupply**

Communities, neighbourhoods or households can become isolated during floods and in some cases, storms. This can be 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, VICSES will advise businesses and/or households that they should stock up on essential items.

After the impact, VICSES can support isolated communities through assisting 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 with VICSES working with the relief agencies to service communities that are isolated.

### **3.12 Essential community infrastructure and property protection**

Essential community infrastructure and property such as residences, businesses, roads and utilities, may be affected in the event of a flood.

The IC will determine the priorities related the use of sandbags, which will be consistent with the strategic priorities.

The VICSES Operations Management Manual sets out the principles for sandbag use and allocation to the community. These principles do not apply to the use of sandbags by VICSES to construct and/or alter a levee. Refer to Sandbag filling and collection point guide and VICSES SOP036 Construction, Removal or Altering of Levee and Removal of Debris for further detail.

If VICSES sandbags are becoming limited in supply, then priority will be given to protection of essential community infrastructure. Other high priorities may include for example the protection of historical buildings.

Property may be protected by:

- Sandbagging to minimise entry of water into buildings.
- Encouraging businesses and households to lift or move contents.

- Construction of temporary levees in consultation with the CMA, LGA and VicPol and within appropriate approval frameworks.

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

Contact your local VICSES representative for the most current sandbag guidelines.

### **3.13 Disruption to services**

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

### **3.14 Traffic Management and Road closures**

Traffic management and road closures will be undertaken in accordance with JSOP 03.10 Traffic Management at Major Emergencies. The IC, who has overall responsibility for incident control, will consult with Victoria Police and, where possible, the responsible road authority, to develop, implement, and monitor a Traffic Management Plan. Victoria Police has responsibility for Traffic Management in consultation with the Control Agency and other expert advice.

Glen Eira City Council and DTP will continue to carry out their formal road management functions, for their respective roads and related assets, where safe to do so. This might include surveillance, placement of warning signs, and supporting overall traffic management arrangements in conjunction with VICPOL and the Incident Controller.

Where possible, Glen Eira City Council and DTP will publish information on road impacts for their respective roads via VicTraffic.

### **3.15 Dam spilling/ failure**

The Department of Energy, Environment and Climate Action (DEECA) is the control agency for dam safety incidents. This includes breach, failure or potential breach/failure of a dam. However, VICSES is the control agency for any resultant flooding.

The Moorabbin Reservoir (located at 673 Warrigal Rd Glen Eira) is the only reservoir located in the Glen Eira municipal area and is owned and operated by South East Water.

South East Water as the owner/operator have an up to date Contingency Plan that has been created to aid in the rapid response essential to control and mitigate damage caused by a failure in the dam.

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

### **3.16 Wastewater 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 responsible agency for the critical sewerage asset should undertake the following:

- Advise VICSES and the Glen Eira MEMO of the security of critical sewerage assets to assist preparedness and response activities in the event of flood.
- Maintain or improve the security of critical sewerage assets.
- Check and correct where possible the operation of critical sewerage assets in times of flood.

- Advise the ICC in the event of inundation of critical sewerage assets.

It is the responsibility of the City of Glen Eira environmental health officer to inspect and report to the MEMO and the ICC on any water quality issues relating to flooding.

### 3.17 Access to technical specialists

VICSES manages contracts with private specialists who can provide technical assistance in the event of flood operations or geotechnical expertise. The Regional Controller or delegate (e.g.: VICSES RDO or IC) should make a formal request to the VICSES State Duty Officer (SDO) for the engagement of a Flood Analyst or Technical Specialist. VICSES SOP061 Technical Specialists outlines this detail, including the procedure for accessing technical specialists.

These services may be required particularly where Melbourne Water or Local Government staff are unable to assist in an Incident Control Centre. Specifically, they can provide the following key professional services:

- Flood intelligence (Flood Analysts)
- Geotechnical assessments

### 3.18 Relief

Relief is the provision of assistance to meet the essential needs of individuals, families and communities during and in the immediate aftermath of an emergency.

As per the [role statement for municipal councils](#) within the SEMP, municipal councils are responsible for municipal relief coordination.

#### 3.18.1 Activation of emergency relief

Refer to the [SEMP Roles and Responsibilities - Relief](#) for more detail of services that may be provided and the responsible coordinating agencies.

Details of the relief arrangements are available in the City of Glen Eira MEMP.

### 3.19 Animal welfare

Matters relating to the welfare of domestic animals are to be referred to City of Glen Eira Council Animal Management team.

Matters relating to the welfare of wildlife are to be referred to DEECA who has developed the [Victorian Emergency Animal Welfare Plan](#).

For more details, refer to the City of Glen Eira MEMP.

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

### 4.1 General

As per the [role statement for municipal councils](#) within the SEMP, municipal councils are responsible for coordinating local level recovery activities. They are also the lead agency to coordinate post emergency needs assessment to determine long term recovery needs (Post Emergency Needs Assessment).

Arrangements for recovery from a flood and/or storm event within the City of Glen Eira is detailed in the City of Glen Eira MEMP.

### 4.2 Transition from Response to Recovery

The [SEMP](#) sets out the transition to recovery arrangements. During the response phase, the IC will ensure they develop a plan for transition from response to recovery. The IC at the municipal tier should take a lead role in facilitating transition to recovery, working with the MRM, as it marks the end of the response phase which the Controller leads and manages.

### 4.3 After Action Review – Lessons management

Lessons management is the critical process of learning from how we worked before and during an event, to improve the system for next time.

Depending on the size and scale of the flood event, VICSES will normally coordinate a debrief or after action review of flood operations as soon as practical following an event. Under the [VicPol SEMP role statement](#), it is the responsibility of the Municipal Emergency Response Coordinator (MERC) to ensure that this occurs.

When the flood and/or storm is being managed as a level 3 event, it may be that Emergency Management Victoria in consultation with VICSES assumes responsibility for debriefing.

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

## APPENDIX A - FLOOD AND STORM THREATS

### General

The Municipality of Glen Eira is located approximately 15km south-east of the Melbourne CBD and covers a total land area of 39km<sup>2</sup>. Glen Eira has a population of approximately 148,908, containing 66,162 households<sup>7</sup>. The municipality includes the suburbs of Bentleigh, Bentleigh East, sections of Brighton East, Carnegie, Caulfield, Caulfield South, Caulfield East, Caulfield North, Elsternwick, Gardenvale, Glenhuntly, McKinnon, Murrumbeena, Ormond and parts of St Kilda East.

Most of the flooding that occurs within the City of Glen Eira is a result of a combination of:

- Drainage infrastructure with limited capacity: the capacity of Melbourne Water drains within the municipality is generally less than 20% AEP and there are currently no plans to upgrade this capacity. The City has identified that over 95km of drainage network within the Municipality cannot convey the peak 10% AEP flow.
- Blocked or non-existent overland flow paths, a particular issue on the upstream side of some road and rail embankments: there is limited opportunity for stormwater in excess of drainage system capacity to flow above ground without impacting on properties or infrastructure;
- Infill development: increased development density and more impervious areas gives rise to more runoff for which the drainage network was not designed;
- Older areas without underground drainage pipes and pits: some of these areas are drained only by the kerb and channel of the road network;
- A lack of open waterways: there are now no open waterways (e.g. creeks) within the Municipality; and
- A build-up of debris in and on drainage system inlet pits and grates: generally results in localised flooding.
- The most frequent type of flooding in the City of Glen Eira is 'flash flooding' due to runoff from a storm being greater than the capacity of the existing underground stormwater drainage system.

Council's current drainage practice is to aim to provide 10% AEP capacity within the underground drainage system for which it is responsible (i.e. in catchments of less than 60ha in area) when upgrades are being undertaken (although this cannot always be achieved) and conveyance within road reserves and open spaces for flows that are in excess of pipe capacity (including the 1% AEP flow).

While there are no formal overland flow paths within the Municipality, roads, parks and both public and private property act as overland flow paths in areas where the capacity of the underground drainage system is not sufficient. Further, flooding is exacerbated in some areas where development and infrastructure cover areas that act as significant overland flow paths and in locations where open spaces used for the conveyance of overland flows are not channelled sufficiently.

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<sup>7</sup> '2021 Census', Australian Bureau of Statistics, 2021

## 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 that 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 and drains

Waterways within Glen Eira have undergone significant modification as the municipality has been developed. This has resulted in all natural waterways being engineered into a constructed underground drainage network. There are no open waterways (such as creeks) within the Municipality although there is a short section of the Elster Creek Main Drain. This Main Drain, which collects other Main Drain flows, along with others that either originate in or pass through the Municipality feeds into Elwood Canal – see the Elster Creek and Elwood Canal Catchment Schematic at Appendix F.

There are some areas in Glen Eira where there are no underground drainage pipes and pits. These areas (i.e. generally the older areas of Glen Eira) are drained either by private drainage pipes or by the kerbs and channels of the road network. When it rains heavily, the roads in these areas can carry a substantial flow of water. Water will also pond in lower lying areas creating a local flood hazard.

Some stormwater flows into Glen Eira from neighbouring Municipalities. Flooding within Glen Eira results from rain that falls on the Municipality as well as on catchments in the neighbouring municipalities.

All Council drains (generally in catchments of less than 60ha in area) connect into a network of larger Melbourne Water main drains. No Council drains discharge into an open waterway. These main drains are large underground pipes that flow (i.e. carry stormwater) out of the Municipality into downstream creeks or directly into Glen Eira Bay. However, the Melbourne Water main drains have limited capacity to accommodate flows arising from major storm events.

| Melbourne Water<br>Drains & Waterways | Description                                                                                                                                            |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Heatherton Drain                      | This drain starts from the intersection of Centre Road and Mackie Rd, runs towards south and falls on City of Kingston at South Road, Moorabbin        |
| Murrumbeena Drain                     | This drain starts from City of Monash, runs towards north through Glen Eira City and falls on City of Stonnington at Princes HWY, Murrumbeena          |
| Koornang Rd Main Drain                | This drain starts from No. 19 Truganini Rd, Carnegie runs towards south and connected to Elster Creek at Beech St, Bentleigh                           |
| Grange Rd Main Drain                  | This drain starts from the intersection of Grange & Neerim Roads runs towards south and connected to Koornang Rd main drain at Wattle Grove, Bentleigh |
| Moorabbin Main Drain                  | This drain starts from City of Kingston, runs towards west and connected to Elster Creek                                                               |
| Caulfield South Main Drain            | This drain start from Pyne St, Caulfield South runs towards south and connected to Brighton Cemetery Main Drain at Gardenvale Rd, Caulfield South      |
| Yanakie Crescent Main Drain           | This drain starts from Yanakie Crescent , Caulfield North, runs towards west and falls on City of Glen Eira                                            |
| Byron Street Main Drain               | This drain starts from Caulfield Park, runs towards west and connected to Yanakie Crescent main drain.                                                 |

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

## Historic Storms and Floods

The City of Glen Eira has been subject to flash flooding of varying scales over the past 25 years. The most recent noteworthy flood within the municipality is the January 2022 flash flood event. This rainfall event resulted in vast impacts across the municipality, with extensive damage to properties and public infrastructure. 40mm of rain was recorded in one hour, resulting in the Elsternwick Main Drain swelling up to 2.73m at the Head Street gauge.

Significant floods (with high flood gauge levels and/or likely flooding consequences to property and infrastructure) that have occurred within the City of Glen Eira are as follows in the table below. It is rare that a storm will affect all catchments in the municipality in the one event except in the most extreme situations. Results below highlighted in black indicate when either stream level rise was significant enough to cause riverine flooding or when rainfall was significant enough to cause flash flooding; while results in grey indicate either stream level rise or rainfall that was unlikely enough to contribute to flooding at or around the gauge location. These results have been included however to show the relationship between these catchments and others that were recorded to indicate flooding.

Note that the % AEP frequency results are for rainfall. It is expected that some rainfall 'losses' will occur meaning that not all rain will translate to an equivalent level % AEP flood level event. Use the % AEP rainfall as a guide only for the area around the gauge location. The colours associated with the % AEP Frequency also are independent of the colours for Minor, Moderate and Major Flood Class Warning Levels.

| % AEP Frequency                |            | 1EY or more | 50% AEP                                                  | 20% AEP     | 10% AEP                       | 5% AEP                              | 2% AEP                             | 1% AEP       | Less than 1% AEP |
|--------------------------------|------------|-------------|----------------------------------------------------------|-------------|-------------------------------|-------------------------------------|------------------------------------|--------------|------------------|
| Event                          | Event type |             | Elsternwick Main Drain at Head St, Elsternwick (229660A) |             | Caulfield Rain Gauge (586115) | Caulfield North Rain Gauge (586194) | Oakleigh South Rain Gauge (586185) |              |                  |
|                                | Wind       | Rain        | Rainfall at Gauge                                        | Drain Level | Rainfall at Gauge             | Rainfall at Gauge                   | Rainfall at Gauge                  |              |                  |
| Normal Water Level             |            |             |                                                          | 0.7m        |                               |                                     |                                    |              |                  |
| Minor Flood Class              |            |             |                                                          | 2.1m        |                               |                                     |                                    |              |                  |
| Moderate Flood Class           |            |             |                                                          | 2.3m        |                               |                                     |                                    |              |                  |
| Major Flood Class              |            |             |                                                          | 2.6m        |                               |                                     |                                    |              |                  |
| 22 <sup>nd</sup> November 1988 |            | ✓           | -                                                        | 2.25m       | 53mm / 6hrs                   | -                                   | -                                  | -            | -                |
| 23 <sup>rd</sup> January 1991  |            | ✓           | 36mm / 3hrs                                              | 2.54m       | 43mm / 2hrs                   | -                                   | -                                  | -            | -                |
| 27 <sup>th</sup> January 1993  |            | ✓           | 12mm / 10min                                             | 2.43m       | 22mm / 10min                  | -                                   | -                                  | 13mm / 10min | -                |
| 17 <sup>th</sup> November 1993 |            | ✓           | 21mm / 15min                                             | 2.27m       | 20mm / 15min                  | -                                   | -                                  | 7mm / 15min  | -                |
| 27 <sup>th</sup> December 1993 |            | ✓           | 82mm / 48hrs                                             | 2.38m       | 67mm / 48hrs                  | -                                   | -                                  | 51mm / 12hrs | -                |
| 5 <sup>th</sup> January 1995   |            | ✓           | 27mm / 15min                                             | 2.22m       | 19mm / 15min                  | -                                   | -                                  | 20mm / 15min | -                |
| 1 <sup>st</sup> January 1996   |            | ✓           | 63mm / 24hrs                                             | 2.34m       | 48mm / 24hrs                  | -                                   | -                                  | 36mm / 1hr   | -                |
| 5 <sup>th</sup> April 2000     |            | ✓           | 20mm / 30min                                             | 2.29m       | 21mm / 1hr                    | 37mm / 6hrs                         | 37mm / 6hrs                        | 37mm / 6hrs  | -                |
| 22 <sup>nd</sup> December 2000 |            | ✓           | 28mm / 2hrs                                              | 2.28m       | 30mm / 3hrs                   | 31mm / 2hrs                         | 39mm / 2 hrs                       | 39mm / 2 hrs | -                |
| 3 <sup>rd</sup> December 2003  |            | ✓           | 22mm / 2hrs                                              | 2.22m       | 17mm / 2hrs                   | 0mm / 0hrs                          | 29mm / 1hr                         | 29mm / 1hr   | -                |
| 30 <sup>th</sup> January 2004  |            | ✓           | 23mm / 15min                                             | 2.54m       | 45mm / 3hrs                   | 0mm / 0hrs                          | 52mm / 2hrs                        | 52mm / 2hrs  | -                |

| % AEP Frequency                |            | 1EY or more | 50% AEP                                                  | 20% AEP     | 10% AEP                       | 5% AEP                              | 2% AEP                             | 1% AEP | Less than 1% AEP |
|--------------------------------|------------|-------------|----------------------------------------------------------|-------------|-------------------------------|-------------------------------------|------------------------------------|--------|------------------|
| Event                          | Event type |             | Elsternwick Main Drain at Head St, Elsternwick (229660A) |             | Caulfield Rain Gauge (586115) | Caulfield North Rain Gauge (586194) | Oakleigh South Rain Gauge (586185) |        |                  |
|                                | Wind       | Rain        | Rainfall at Gauge                                        | Drain Level | Rainfall at Gauge             | Rainfall at Gauge                   | Rainfall at Gauge                  |        |                  |
| Normal Water Level             |            |             |                                                          | 0.7m        |                               |                                     |                                    |        |                  |
| Minor Flood Class              |            |             |                                                          | 2.1m        |                               |                                     |                                    |        |                  |
| Moderate Flood Class           |            |             |                                                          | 2.3m        |                               |                                     |                                    |        |                  |
| Major Flood Class              |            |             |                                                          | 2.6m        |                               |                                     |                                    |        |                  |
| 24 <sup>th</sup> February 2006 |            | ✓           | 26mm / 3hrs                                              | 2.31m       | 15mm / 15min                  | 17mm / 15min                        | 16mm / 15min                       |        |                  |
| 22 <sup>nd</sup> December 2007 |            | ✓           | 12mm / 10min                                             | 2.16m       | 0mm / 0hrs                    | 20mm / 5min                         | 36mm / 30min                       |        |                  |
| 30 <sup>th</sup> October 2009  |            | ✓           | 18mm / 10min                                             | 2.14m       | 0mm / 0hrs                    | 5mm / 10min                         | 23mm / 15min                       |        |                  |
| 6 <sup>th</sup> March 2010     |            | ✓           | 12mm / 10min                                             | 2.21m       | 0mm / 0hrs                    | 21mm / 10min                        | 20mm / 2min                        |        |                  |
| 5 <sup>th</sup> February 2011  |            | ✓           | 135mm / 12hrs                                            | 2.94m       | 108mm / 12hrs                 | 132mm / 12hrs                       | 128mm / 12hrs                      |        |                  |
| 9 <sup>th</sup> November 2011  | ✓          | ✓           | 10mm / 10min                                             | 2.15m       | 15min / 10min                 | 5mm / 10min                         | 23mm / 10min                       |        |                  |
| 26 <sup>th</sup> November 2011 |            | ✓           | 17mm / 30min                                             | 2.35m       | 11mm / 15min                  | 23mm / 30min                        | 24mm / 1hr                         |        |                  |
| 1 <sup>st</sup> October 2013   | ✓          |             | 0mm / 0min                                               | 0.75m       | 2mm / 1hr                     | 2mm / 30min                         | 2mm / 1hr                          |        |                  |
| 10 <sup>th</sup> October 2016  | ✓          |             | 2mm / 6hrs                                               | 0.88        | 2mm / 10min                   | 2mm / 1hr                           | 2mm / 10min                        |        |                  |
| 29 <sup>th</sup> December 2016 |            | ✓           | 44mm / 2hrs                                              | 2.80m       | 56mm / 2hrs                   | 45min / 2hrs                        | 47mm / 2hrs                        |        |                  |
| 5 <sup>th</sup> February 2017  |            | ✓           | 10mm / 10min                                             | 2.22m       | 13mm / 15min                  | 38mm / 3hrs                         | 32mm / 3hrs                        |        |                  |
| 19 <sup>th</sup> December 2017 |            | ✓           | 19mm / 10min                                             | 2.33m       | 15mm / 10min                  | 14mm / 10min                        | 20mm / 10min                       |        |                  |
| 6 <sup>th</sup> November 2018  |            | ✓           | 26mm / 2hrs                                              | 2.36m       | 28mm / 2hrs                   | 27mm / 2hrs                         | 22mm / 2hrs                        |        |                  |
| 19 <sup>th</sup> January 2020  | ✓          | ✓           | 43mm / 6hrs                                              | 2.29m       | 17mm / 10min                  | 14mm / 10min                        | 34mm / 12hrs                       |        |                  |
| 28 <sup>th</sup> January 2022  | ✓          | ✓           | 23mm / 2hrs                                              | 2.73m       | 40mm / 1hr                    | 37mm / 1hr                          | 18mm / 10min                       |        |                  |
| 13 <sup>th</sup> February 2024 | ✓          | ✓           | 12mm / 10min                                             | 2.13m       | 15mm / 10min                  | 0.1mm / 10min                       | 18mm / 10min                       |        |                  |

Table A2 – Selection of Historical Flood and Storm Events within the City of Glen Eira

## **December 2003**

Overnight from the 2<sup>nd</sup> to the 3<sup>rd</sup> severe thunderstorms formed near Craigieburn around midnight. Very heavy rainfall was recorded in the northeast suburbs of Melbourne. Other suburbs also received heavy rainfall. Flooding occurred in many suburbs within a one to two hour period around 2:00am. The heaviest hourly rainfall rates were consistent with a 1% AEP (100-year ARI) event.

## **January 2004**

On the 30<sup>th</sup>, severe thunderstorms developed over Glen Eira Bay then moved northward affecting Sandringham and Moorabbin before continuing over the city and inner suburbs. Rainfall totals from the early morning storms were around 50-70mm in an hour causing flash flooding and traffic chaos. The highest 24 hour rainfall totals to 9am in the vicinity of Glen Eira were: Brighton (69mm), Oakleigh South (56.2mm), St Kilda Marina (53mm), Sandringham (49.2mm), Hampton (45.4mm), and Cheltenham (43mm).

## **January 2005**

On the 4<sup>th</sup>, severe thunderstorms developed in western and central districts early in the morning. Severe thunderstorms redeveloped during the afternoon resulting in some damage in the Melbourne metropolitan area.

## **4 February 2011**

Tropical moisture from ex-Tropical Cyclone Yasi (and the remnants of Tropical Cyclone Anthony) interacted with a cold front, triggering extreme rainfall and convective thunderstorms across the Melbourne Metropolitan area and other parts of the State between late afternoon on the 4<sup>th</sup> and midday on the 6<sup>th</sup>. Daily rainfall totals between 100–200 mm were widespread in the eastern and south-eastern suburbs of Melbourne and were the equivalent of what most stations would usually observe in an entire summer season. The exceptionally high daily rainfall totals resulted in severe flash flooding across the Metropolitan area, particularly in the south-eastern suburbs during the evening of the 4<sup>th</sup>.

In Glen Eira, the storm and subsequent flooding resulted in flooding of numerous streets, properties and houses and extensive damage to residential and commercial properties: more than 150 homes and businesses were damaged and around 200 properties affected. A number of residences were rendered uninhabitable.

## **December 2016**

Storms and heavy rain resulted across Melbourne on the afternoon of the 29<sup>th</sup>. These caused flash flooding when stormwater drainage systems were overloaded, some riverine flooding as creeks and the Elwood Canal broke their banks, and extensive storm and water damage along with disruptions to road and rail networks. During this event, the Glen Eira unit received over 170 RFAs.

## **January 2022**

From mid-January, the remnants of ex-Tropical Cyclone Tiffany brought heavy rain to central Australia as it moved south, forming a complex low-pressure system. Widespread moderate to heavy rainfall caused ponding, overland flow, and rises in local creeks, which impacted local transport networks and necessitated lengthy detours on some transport routes. In western and central Victoria, there were further storms, heavy rain, flash flooding, and large hail on the 26<sup>th</sup> and 27<sup>th</sup>, with widespread loss of power. During this event, the Glen Eira unit received over 100 RFAs.

## **February 2024**

Severe thunderstorms which saw damaging and destructive winds, heavy rainfall, and large hailstones had widespread impacts, with power outages affecting more than 535,000 customers across the state. VICSES received over 6,700 RFAs during the period of declared operations from 13 – 29 February. During this event, the Glen Eira unit received over 150 RFAs.

## Dam spilling or failure

Flooding resulting from failure of the following dams is likely to cause significant structural and community damage within the City of Glen Eira. 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.

DEECA is the control agency for dam safety incidents (such as breach, failure or potential breach/failure of a dam). VICSES is however the control agency for any resultant flooding.

| Location                                                | Owner            | Dam height<br>(Full Supply Level) | Dam Capacity | Comments |
|---------------------------------------------------------|------------------|-----------------------------------|--------------|----------|
| <b>Moorabbin<br/>Reservoir<br/>(Bentleigh<br/>East)</b> | South East Water | 62.9m AHD                         | 56.8 ML      |          |

Table A3 – Reservoirs that pose a risk to the City of Glen Eira from dam failure