



Flood Management  
Strategy Port Phillip and  
Westernport, Action Plan  
2021–2026



## ACKNOWLEDGEMENT OF COUNTRY

Melbourne Water respectfully acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Owners and custodians of the land and water on which all Australians rely. We pay our respects to Bunurong, Boon Wurrung, Wurundjeri Woi wurrung and Wadawurrung, their Elders past, present and future as Traditional Owners and the custodians of the land and water on which we rely and operate.

We acknowledge and respect the continued cultural, social and spiritual connections of all Aboriginal Victorians, and the broader Aboriginal and Torres Strait Islander community have with lands and waters, and recognise and value their inherent responsibility to care for and protect them for thousands of generations.

Melbourne Water acknowledges Aboriginal Victorians as Traditional Owners and in the spirit of reconciliation, we remain committed to working in partnership with Traditional Owners to ensure meaningful ongoing contribution to the future of land and water management.

Traditional Owner organisations were given the opportunity to provide content and feedback on the refresh of this flood strategy.

## ACKNOWLEDGEMENTS

This action plan was developed through a collaborative process with partners across the region. Melbourne Water is grateful for the energy, experience and expertise of everyone who was involved in developing this shared understanding of our collective vision, the challenges in the region and the opportunities for improving flood management delivery.

### The Flood Leadership Committee

Melbourne Water prepared this document with governance from the Flood Leadership Committee, which included representatives from:

- Cardinia Shire Council
- City of Melbourne
- City of Port Phillip
- Department of Environment, Land, Water and Planning
- Emergency Management Victoria
- Insurance Council of Australia
- Melbourne Water
- Moonee Valley City Council
- Mornington Peninsula Shire Council
- Victorian Planning Authority
- Municipal Association of Victoria
- South East Water
- Victoria State Emergency Service
- Wyndham City Council

## CONTENTS

|  |           |
|--|-----------|
| <b>Preface</b>   | <b>3</b>  |
| About this action plan   | 3         |
| A collaborative approach   | 4         |
| <b>Overview of the strategic approach</b>  | <b>5</b>  |
| Monitoring, evaluation, reporting and improvement  | 6         |
| Table 1. KPI staged targets  | 7         |
| <b>Objective 1: The right information is available at the right time to the people who need it</b>   | <b>8</b>  |
| FOCUS AREA 1 Fit-for-purpose information   | 8         |
| FOCUS AREA 2 Empowering communities  | 10        |
| <b>Objective 2: Flood risks and opportunities are managed to reduce impacts and get the best social, economic and environmental outcomes</b> | <b>12</b> |
| FOCUS AREA 3 Flood effects mitigation  | 12        |
| FOCUS AREA 4 Land use planning   | 14        |
| FOCUS AREA 5 Challenges of climate change  | 17        |
| FOCUS AREA 6 Multiple benefits embedded in decision-making   | 20        |
| <b>Objective 3: Land, water and emergency agencies work together to manage flooding effectively</b>  | <b>24</b> |
| FOCUS AREA 7 Clarifying roles and responsibilities   | 24        |
| FOCUS AREA 8 Emergency agency preparedness and response  | 25        |
| FOCUS AREA 9 Flood recovery  | 26        |
| <b>Research objectives</b>   | <b>28</b> |
| <b>Bibliography</b>  | <b>29</b> |
| Key legislation  | 29        |
| <b>Glossary</b>  | <b>30</b> |
| <b>Abbreviations</b>   | <b>31</b> |

Flinders Street flooding 2010 (Image Ellen Smith)



## PREFACE

This *Action Plan* accompanies the *Flood Management Strategy Port Phillip and Westernport*. Melbourne Water prepared the strategy through a collaborative process and governance from the Flood Leadership Committee.

Our partners are all organisations in the region who have flood management responsibilities, including local and state government, water authorities and emergency services. Reflecting this successful partnership, the pronoun 'we' throughout this document refers to all flood management agencies in the region.

The context of this strategy is to enhance community safety. We developed the strategy to ensure that we are working together to enhance our understanding of the problem of flooding in a rapidly changing context of climate change and increasing urbanisation. We wanted to make sure we have the right mix of solutions and embed a process of continuous improvement.

The strategy is part of a framework of related legislation, policies and strategies and reflects national and state best-practice standards and guidelines.

This is a 'refresh' of the *2015 Flood Management Strategy Port Phillip and Westernport*.

The strategy defines our long-term vision, objectives and outcomes, and the focus areas that direct our actions. This action plan is the first of two consecutive five-year action plans that will span the life of the strategy. It sets out the actions we will take to deliver the strategy.

### About this action plan

This five-year action plan (the first of two supporting the action of the strategy) is intended to be read in conjunction with the strategy and the documents should be considered as a package.

The actions in this plan only relate to the first five years of the strategy (2021–2026) and are subject to funding. Some actions may be included in both action plan periods (2021–2026 and 2026–2031) to ensure the 10-year directions and outcomes can be met.

We have embedded a process of continuous improvement through our monitoring, evaluation, reporting and improvement (MERI) plan.



Cora Lynn flooding (Image David Hannah)



Street flooding (Image David Hannah)



Flooding, Heatherton Road, Dandenong (Image Ben Swinnerton)



### A collaborative approach

Melbourne Water will lead coordination of the strategy implementation, including the monitoring, evaluation, reporting and improvement process.

The Flood Leadership Committee will have strategic oversight of the strategy and our endorsing partners will collaborate to implement, report, review and renew our commitments.

An annual planning process will be undertaken. Implementation will also involve working with communities, particularly in high-flood-risk areas, to understand their needs and develop solutions.

The Flood Leadership Committee and the Melbourne Water Board of Directors endorsed the strategy and accompanying action plan in 2021. Partner organisations that have endorsed the strategy prior to publication are identified in the strategy. Implementation and monitoring will be a collective effort, coordinated by Melbourne Water.

## OVERVIEW OF THE STRATEGIC APPROACH

**Vision** Together we are aware, responsive and resilient. Communities, business and government understand flooding, plan collaboratively for challenges and take action to manage risks and optimise opportunities, for now and the future.



\* Our collaborative approach to delivering this strategy will help deliver this outcome.

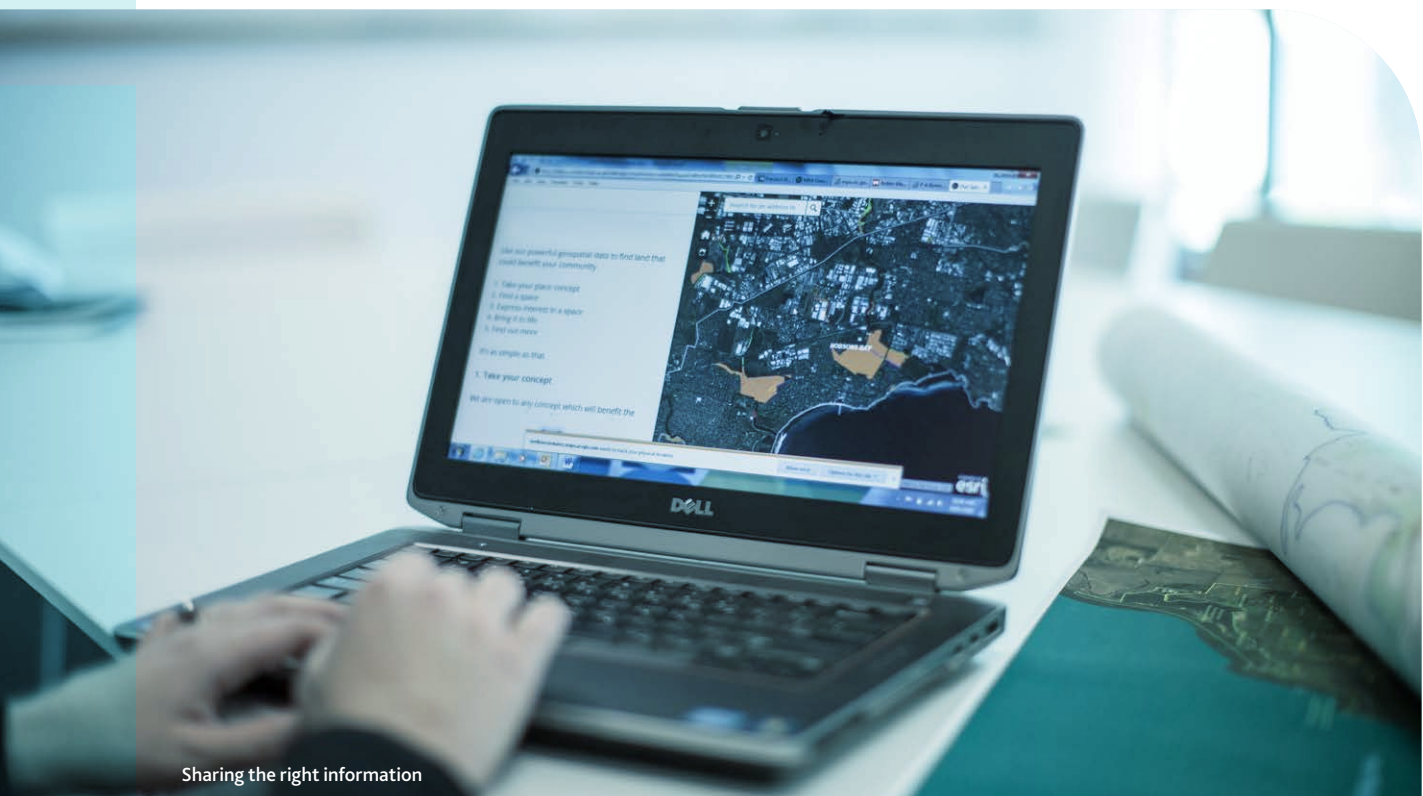
## Monitoring, evaluation, reporting and improvement

We have developed a monitoring, evaluation, reporting and improvement (MERI) plan to embed accountability, learning, and continuous improvement into the implementation of the strategy. The plan has been developed through our governance framework and is available separate from the strategy and action plan.

The MERI plan is designed to build capacity and capability in MERI over its 10-year lifetime. The indicators, monitoring, data collection and evaluation approaches will evolve as capacity to implement it increases. This 'learning by doing' approach has been selected based on the needs of partner organisations and recognition that the collaborative delivery model will continue to mature over the life of strategy.

The strategy incorporates five Key Performance Indicators (KPIs) that will be regularly monitored to help drive implementation progress. A staged approach to the targets associated with these KPIs has been developed for the strategy. The staged approach consists of a five-year fixed KPI target (aligning with the first Action Plan) and a 10-year nominal/provisional KPI target that is reviewed in year five. This approach allows for greater certainty around investment and data reporting by various partners, which in turn can facilitate long term targets that balance aspiration and achievability. The staged KPI targets for the Flood Management Strategy are listed on page 7 (Table 1).

These KPIs are one part of the MERI plan, which will also measure the outcomes we are achieving. Performance expectations for outcomes are based on what success looks like in 10 years' time at the end of the strategy.



Sharing the right information



**Table 1. KPI staged targets**

|   |   |
|---|---|
| <b>KPI 1 (Fit-for-purpose information)</b>  |   |
| <b>Five-year fixed target</b>               | 234 flood-affected catchments have flood mapping renewed to meet agreed standards and shared between relevant agencies  |
| <b>10-year nominal target</b>               | 468 flood-affected catchments have flood mapping renewed to meet agreed standards and shared between relevant agencies  |
| <b>KPI 2 (Empowering communities)</b>       |   |
| <b>Five-year fixed target</b>               | 13,000 properties have been involved in community engagement initiatives to increase knowledge of flood risk and appropriate actions to take to reduce flood impacts  |
| <b>10-year nominal target</b>               | 32,500 properties have been involved in community engagement initiatives to increase knowledge of flood risk and appropriate actions to take to reduce flood impacts  |
| <b>KPI 3 (Flood effects mitigation)</b>     |   |
| <b>Five-year fixed target</b>               | Reduction in Annual Average Damages (AAD) of \$10m through agency initiatives to mitigate flood effects   |
| <b>10-year nominal target</b>               | During the five-year review, we will look to the Integrated Water Management (IWM) forum catchment strategy targets to inform the development of the 10-year target   |
| <b>KPI 4 (Agency collaboration)</b>         |   |
| <b>Five-year fixed target</b>               | Agency rating of inter-organisational collaboration in flood management and Flood Strategy implementation either:   |
| <b>10-year nominal target</b>               | <ul style="list-style-type: none"> <li>• Achieves a minimum rating score of four (out of five); or</li> <li>• Improves by at least 0.2 rating scale points annually (corresponding to a shift of one full rating category over five years)</li> </ul> |
| <b>KPI 5 (Implementation effectiveness)</b> |   |
| <b>Five-year fixed target</b>               | 80% of all Flood Management Strategy actions are on track in any year and all actions have a clear owner by year three  |
| <b>10-year nominal target</b>               |   |



## OBJECTIVE 1

### The right information is available at the right time to the people who need it

The first step to managing flood risk is to understand where floods could happen and what the impacts could be. Different aspects of flood management require different information and flood management agencies need it to be easily accessible to them. The community also needs to be able to access relevant flood information. Making clear flood risk information easily accessible to people and businesses enables them to understand their risk and to be prepared to take action before, during and after a flood event.

#### FOCUS AREA 1 Fit-for-purpose information

We need fit-for-purpose flood information to quantify flood risk and use it to inform decisions about the way we best manage and reduce flood risk.

Melbourne Water will lead an escalation of the regional flood modelling program, with appropriate resourcing. The focus of the program is to keep mapping information for each catchment current and fit-for-purpose, using the best available data. Local councils will be key partners in this program to implement a whole-of-catchment mapping approach.

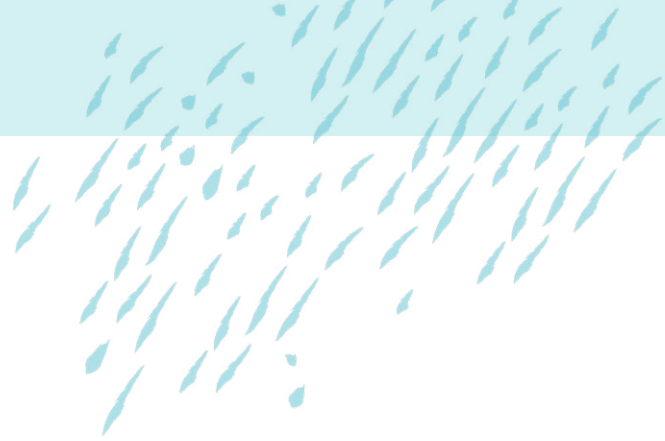
Flood modelling and mapping will incorporate best practice climate change information and techniques with regard to rainfall and runoff, coastal flooding and sea level rise. The purpose is to understand flood risk to people, property and the environment, and the effects of mitigation responses.

We will:

- strengthen our flood modelling program to ensure we have appropriate flood information available to provide planning and development advice.
- define and articulate clear flood information standards and processes to ensure the development and generation of flood information is current, consistent and fit-for-purpose.
- align all organisations' flood modelling work to ensure the most up-to-date information is available to the people and organisations that need it.
- run capacity building programs to support partners in their flood modelling and mapping actions.

#### Where will we be in 10 years?

The purpose of the information we generate is clearly identified and understood. All agencies work together to generate fit-for-purpose information to agreed standards. We share this information effectively between agencies. Flood information for high-priority areas is no older than 10 years.



| Number                        | Action   | Action output  | Lead                 | Supporting  |
|-------------------------------|--|--|----------------------|---|
| <b>Generating information</b> |  |  |                      |   |
| 1.1                           | Strengthen our flood modelling program to better support the provision of planning scheme amendments as well as development advice and decisions | <ul style="list-style-type: none"> <li>• Current base modelling program expanded to enhance up-to-date mapping coverage</li> <li>• Basin scale models trialled for the Werribee, Maribyrnong, Yarra, Dandenong and Westernport basins</li> </ul>                                     | Melbourne Water (MW) | Councils, Department of Environment, Land, Water and Planning (DELWP) |
| 1.2                           | Develop approved flood information standards, including for modelling, data and reporting, consistent with the purposes for which it is used     | <ul style="list-style-type: none"> <li>• Agreed flood modelling technical specifications</li> <li>• Agreed flood data management technical specification/standard Understand and report on the quality of flood information, consistent with the needs of relevant users</li> </ul>  | MW                   | Councils, DELWP   |
| 1.3                           | Develop and deliver a program of flood modelling that aligns the efforts, and meets the needs, of all partners across the region                 | <ul style="list-style-type: none"> <li>• Mapping prioritised and risks and opportunities documented</li> <li>• Mapping for prioritised catchments delivered and shared</li> </ul>  | MW                   | Councils  |
| 1.4                           | Develop standards for coastal flooding and sea level rise including developing and updating information (Link to 1.1)                            | <ul style="list-style-type: none"> <li>• Baseline coastal flooding and sea level rise information developed and available</li> <li>• Agreement reached on coastal flooding and sea level rise data custodian</li> <li>• Standards for data update/maintenance established</li> </ul> | DELWP                | Bureau of Meteorology (BoM*), Coastal councils                        |
| 1.5                           | Enhance the process for sharing data between Melbourne Water and councils (Link to Focus Area 2)   | <ul style="list-style-type: none"> <li>• Method/process for agency data sharing agreed</li> <li>• Data shared</li> </ul>   | MW                   | Councils  |
| 1.6                           | Run capacity building programs for partners to improve data capture, modelling and interpretation of information                                 | <ul style="list-style-type: none"> <li>• Capacity building programs delivered for our partners</li> </ul>  | MW                   | N/A   |

\* The Bureau of Meteorology's (BoM) lead and supporting roles are in accordance with the BoM's principles and policies related to standard and supplementary services delivery, including the use of cost recovery for bespoke or tailored services. This will stand for the entirety of actions mentioned with BoM.

## FOCUS AREA 2 Empowering communities

Communities involve individuals, groups and businesses.

Empowered communities are 'flood ready'. Flood ready communities are aware of their level of flood risk, can take steps to prepare for and manage flooding, and understand what to do when warnings are issued. They are likely to experience less loss, damage, stress and disruption, and recover faster when flood events occur.

Communities are diverse. Different parts of the community require information tailored to their needs; for example, renters and non-renters, younger and older age groups, and various preferred languages, all require different information or information presented in a different way.

Flood risk varies across the region based on geography, therefore education and awareness programs need to provide general flood awareness to communities at lower risk, and more specific, local information in flood prone or high-risk areas.

We empower communities by giving them the information they need to make informed decisions and to prepare for flood events. Programs will be developed based on community engagement and research into ways to engage effectively with communities to build awareness and resilience to flooding. Partner agencies will work together to deliver these programs, with Melbourne Water, Victoria State Emergency Service (VICSES), Emergency Management Victoria (EMV) and local councils all having a role to play.

We will:

- develop a clear community strategy for capacity building including agreed roles and responsibilities for program delivery.
- deliver tailored programs to communities with the highest risk of flooding, as well as a broad regional community awareness program, to build resilience to, and mitigate the impacts of, flooding.
- continue and improve flash flooding and storm surge warnings. We will monitor the stormwater pipe network in high-priority areas. We will develop automated flash-flood warnings for high-priority areas and incorporate them into existing community warnings systems.
- continue to work together to deliver riverine flood warnings to the community, and expand the network, as appropriate, throughout the life of the strategy.
- based on an approved business case – develop a platform that provides the community with the information they need to prepare, respond and recover effectively from floods.
- run capacity building programs for partners to support effective and consistent community engagement across the region.

### Where will we be in 10 years?

There is a tailored and effective community awareness and preparedness program. As a result, at-risk communities understand the risks and opportunities and are more prepared to take action and make informed choices. An ongoing regional campaign is in place, and it is improving general community awareness about flood impacts and safety.

| Number  | Action  | Action output  | Lead       | Supporting                                    |
|---|---|--|------------|---|
| <b>Community awareness and preparedness program</b> |   |  |            |   |
| 2.1   | Develop a clear strategy for community capacity building, including the articulation of roles and responsibilities  | <ul style="list-style-type: none"> <li>• Agreed roles and responsibilities established for program delivery</li> </ul> | MW, VICSES | Councils, Emergency Management Victoria (EMV) |
| 2.2   | Deliver community engagement programs to build resilience to, and awareness of risks, and promote protective action | <ul style="list-style-type: none"> <li>• Targeted and general flood awareness programs delivered</li> </ul>            | VICSES     | Councils, EMV, MW                             |

| Number  | Action   | Action output  | Lead       | Supporting                   |
|---|--|--|------------|------------------------------|
| <b>Community awareness and preparedness program (continued)</b> |  |  |            |                              |
| 2.3   | Deliver community engagement programs to mitigate flood risk across the region   | <ul style="list-style-type: none"> <li>Targeted and general flood awareness programs delivered</li> </ul>  | MW         | Councils, VICSES             |
| <b>Flash flooding warnings</b>                                  |  |  |            |                              |
| 2.4   | Enhance timely dissemination of flash flood information and advice to communities  | <ul style="list-style-type: none"> <li>Established protocols and process for dissemination for flash flooding</li> <li>Melbourne Water to share real-time alerts and warning and data for timely distribution to community</li> </ul>  | MW, VICSES | EMV                          |
| <b>Riverine flood warnings</b>                                  |  |  |            |                              |
| 2.5   | Continue with current level of riverine flood warning service including ongoing upgrades, renewals and improvement projects  | <ul style="list-style-type: none"> <li>Business-as-usual: ongoing upgrades, renewals and improvement projects</li> </ul>   | MW         | Councils, BoM, MW, VICSES    |
| <b>Community knowledge portal</b>                               |  |  |            |                              |
| 2.6   | Project scoping: Develop problem definition, identify user needs, undertake research and development, and evaluate options including costing   | <ul style="list-style-type: none"> <li>Business case completed outlining project scope, needs, a review of options and recommended approach</li> </ul>   | MW         | Councils, DELWP, EMV, VICSES |
| 2.7   | Undertake pilot project to test proposed community knowledge platform approach before implementing regionally  | <ul style="list-style-type: none"> <li>Pilot undertaken in one catchment</li> <li>Learnings captured</li> <li>Project scope revised to reflect learnings and ensure regional implementation runs smoothly</li> </ul>   | MW         | Councils, EMV                |
| 2.8   | Build, deliver, test and launch the platform with ongoing maintenance, licensing and platform support arrangements. Implement monitoring and evaluation of the platform for continuous improvement | <ul style="list-style-type: none"> <li>Community knowledge platform solution delivered</li> <li>Platform promoted to ensure community awareness</li> <li>Platform support, maintenance and licencing plan in place</li> <li>Monitoring, review and update process established</li> </ul> | MW         | Councils, EMV                |
| <b>Partner capacity building</b>                                |  |  |            |                              |
| 2.9   | Capacity building programs for partners to support effective and consistent community engagement across the region are identified and communicated   | <ul style="list-style-type: none"> <li>Capacity building programs delivered</li> </ul>   | MW         | Councils, EMV, VICSES        |



Flooding in Yarra Glen (Image David Hannah)

## OBJECTIVE 2

### Flood risks and opportunities are managed to reduce impacts and get the best social, economic and environmental outcomes

Taking action to manage current and future flood risks will require a mix of solutions tailored to each specific location and community. Identifying the best approach for each location requires an understanding of local needs, broader environmental and catchment conditions, possible future risks, and the lifecycle costs and additional benefits (or drawbacks) of each potential flood management solution. This information is used to develop the best-fit solution for each location.

#### FOCUS AREA 3 Flood effects mitigation

We have well-established ways to mitigate the impacts (or 'effects') of flooding including our drainage system, which continues to be extended and optimised; flood management infrastructure; and multi-functional assets. We will continue to manage, maintain and renew effective assets.

To respond to the challenges of urbanisation and climate change, we need to build new assets, and it is essential that we continue to innovate and broaden the suite of tools available for managing flooding. These new approaches may include infrastructure, technology, community education or land use planning controls. Not all approaches are viable for all situations, which means it is essential we use a broad suite.

We will think strategically across the whole catchment, considering flooding, stormwater and drainage functions together. We will incorporate green infrastructure, such as wetlands, replace hard surfaces with vegetation, and direct water to support useable green space for urban greening and cooling – for multiple benefits. We need to develop corresponding and agreed long-term service standards for assets, which consider their long-term viability in the face of climate change.

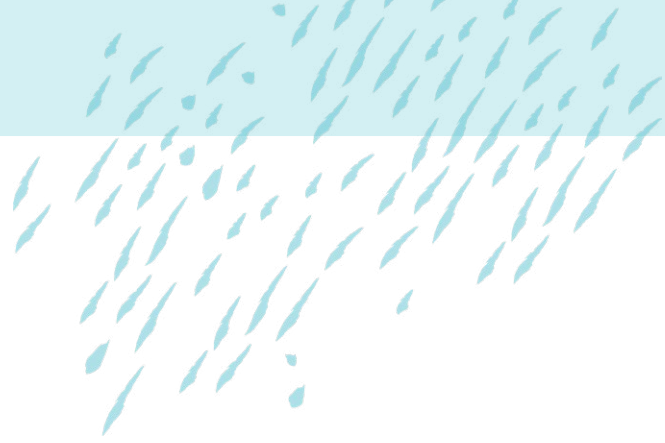
Local councils represent their communities when locations for flood management are being prioritised. Local communities will be involved in developing potential solutions to the flooding problems being considered.

We will:

- continue to refine our approach to prioritisation to identify high-priority areas and investigate these areas for flood mitigation options.
- continue to investigate asset solutions and deliver feasible flood mitigation infrastructure. Once we have agreed on priority locations for exploration, we will work with local communities to develop the actions that need to occur.
- develop and deliver flood and drainage infrastructure maintenance programs. The Melbourne Urban Stormwater Institutional Arrangements (MUSIA) project will clarify roles and responsibilities for stormwater management, including maintenance (see Focus Area 7).
- continue to investigate approaches to broaden our suite of tools available for flood management. We will identify new opportunities and innovations and assess their feasibility. We will pilot place-based solutions and adopt successful solutions as 'business-as-usual'.

#### Where will we be in 10 years?

Through the delivery and maintenance of infrastructure solutions, flood effects are reduced (compared to a do-nothing scenario). Agencies and the community work together to identify the right mix of solutions for each location. We continue to explore innovative solutions and expand our suite of tools to manage flood risks.



| Number                      | Action  | Action output   | Lead                                | Supporting                                      |
|-----------------------------|---|---|-------------------------------------|---|
| <b>Foundational actions</b> |   |   |                                     |   |
| 3.1                         | Identify high-priority areas for flood effects mitigation, then consider a diverse range of potential solutions to identify the right approach for prioritised locations and their communities. Deliver outcomes in collaboration with partners and the community | <ul style="list-style-type: none"> <li>• Prioritisation criteria and approach for flood impact mitigation projects established</li> <li>• Priority flood impact mitigation areas identified by accountable partners</li> <li>• The right mix of solutions identified for prioritised locations (for example, capital, information and warnings, planning scheme amendments and other types of development controls and innovative solutions)</li> <li>• Opportunities for co-delivery identified</li> </ul> | Councils (local infrastructure), MW | DELWP, Victorian Planning Authority             |
| <b>Infrastructure</b>       |   |   |                                     |   |
| 3.2                         | Investigate, develop and deliver place-based capital asset solutions where feasible   | <ul style="list-style-type: none"> <li>• Best-fit asset-based solutions identified for selected locations</li> <li>• Solutions implemented at selected locations</li> </ul>   | Councils (local infrastructure), MW | Relevant government departments                 |
| <b>Maintenance</b>          |   |   |                                     |   |
| 3.3                         | Develop and deliver flood and drainage infrastructure maintenance programs  | <ul style="list-style-type: none"> <li>• Maintenance program defined for each organisation</li> <li>• Maintenance program delivered for flood and drainage assets</li> </ul>  | Councils (local infrastructure), MW | Councils, MW                                    |
| <b>Innovation</b>           |   |   |                                     |   |
| 3.4                         | Identify new opportunities and innovations to mitigate flooding and its effects and assess their feasibility  | <ul style="list-style-type: none"> <li>• Case-studies, environment scan completed</li> <li>• Industry networks and partnerships established</li> <li>• New funding models established</li> </ul>  | Councils, MW                        | N/A   |
| 3.5                         | Pilot feasible place-based opportunities and innovations to mitigate flooding and its effects   | <ul style="list-style-type: none"> <li>• Projects delivered</li> <li>• Case-studies and learnings captured</li> <li>• Feasible approaches are transitioned to business-as-usual</li> </ul>  | Councils, MW                        | Water Retailers                                 |
| 3.6                         | Develop information (for home owners) to consider flood mitigation options for retrofitting existing homes to enhance flood resilience  | <ul style="list-style-type: none"> <li>• Flood mitigation information given for retrofits to improve flood resilience</li> <li>• Agency learning and capacity for appropriate flood mitigation options increased</li> <li>• All new builds continue to meet flood level requirements</li> </ul>   | MW                                  | Councils, DELWP, Insurance Council of Australia |



Flood resilient home (Image James Davidson Architects)

#### FOCUS AREA 4 Land use planning

The land use planning system involves a range of policy instruments including legislation, regulation, policy, strategic planning, guidelines and standards to guide and manage land use and development. Partners use these instruments, relevant to their roles and responsibilities. In most cases, councils manage the planning scheme for their municipality.

We will:

- expedite the approach to planning scheme amendments for flood controls to ensure flood mapping can be more readily incorporated into the planning system and actively supports councils in engaging with affected parts of the community.
- by 2026, apply best practice climate change flood modelling in all flood-related planning scheme amendments and emerging greenfield development schemes.
- enhance our risk-based approach by exploring opportunities for new approaches through effective strategic planning so that planning schemes guide land uses and development to appropriate locations on the basis of flood risk.
- explore the introduction of planning controls to a catchment or specific area, or other measures, to reduce upstream runoff by increasing stormwater capture and/or permeability targets to reduce downstream flood risk.
- explore options to support better design outcomes in flood prone areas that will meet architectural and urban design, integrated water management, and flood management and mitigation outcomes. We will review guidelines and support updates to the Victorian Planning Provisions. Floor level requirements will be met in all locations.
- prepare a regional statutory decision guideline that adopts best practice integrated water management and flood management.

#### Where will we be in 10 years?

Planning decisions are based on best available information about future conditions including sea level rise and increased rainfall intensity from climate change. Planning scheme updates are expedited to incorporate flood information when it is available.

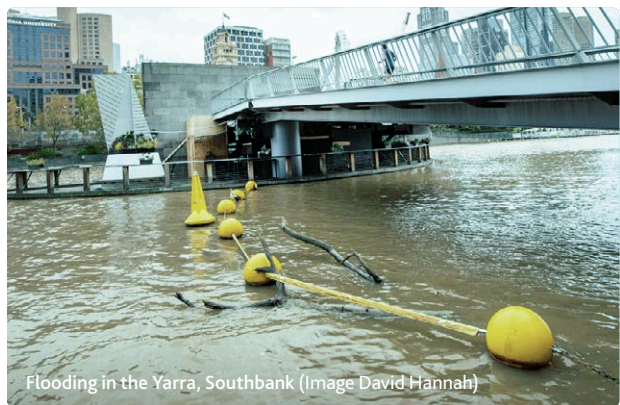
Planning controls have been introduced to reduce downstream catchment flooding. More nuanced approaches are used to consider flood risks determining the types of land uses and development allowed in flood prone areas. Land use planning will respond proactively to flood risk.



| Number   | Action  | Action output   | Lead         | Supporting   |
|--|---|---|--------------|--|
| <b>Streamline planning scheme amendment approach</b> |   |   |              |  |
| 4.1  | Investigate opportunities to amend the Victorian Planning System to allow high-risk flood hazard information to be included directly into planning schemes                          | <ul style="list-style-type: none"> <li>• Opportunities investigated to amend provisions, regulations, policy and schedules</li> <li>• Relevant authority supported to remove barriers to incorporating approved and updated flood hazard information into planning schemes</li> </ul> | MW           | Councils, DELWP, Municipal Association of Victoria (MAV) |
| 4.2  | Actively support councils in engaging with all affected parts of the community when new flood hazard planning scheme amendments are proposed to be incorporated in planning schemes | <ul style="list-style-type: none"> <li>• Improved planning scheme amendment consultation explored</li> </ul>  | MW           | Councils, DELWP  |
| <b>Climate change</b>                                |   |   |              |  |
| 4.3  | Adopt Australian Rainfall and Runoff guidance on climate change rainfall and runoff as best practice  | <ul style="list-style-type: none"> <li>• Australian Rainfall and Runoff scenarios included in flood mapping</li> </ul>  | MW           | DELWP  |
| 4.4  | Incorporate best practice climate change flood hazard modelling in flood hazard planning scheme amendments (Link to 1.3)  | <ul style="list-style-type: none"> <li>• By 2026, 2100, high emissions scenario, 1% annual exceedance probability (AEP) climate change factors applied to modelling and mapping for to inform all future planning scheme amendments</li> </ul>  | Councils, MW | DELWP  |
| 4.5  | Incorporate best practice climate change flood hazard modelling in all emerging greenfield development schemes (Link to 1.3)  | <ul style="list-style-type: none"> <li>• By 2026, 2100, high emissions scenario, 1% AEP climate change factors applied to modelling and mapping for all new drainage schemes in greenfield areas</li> </ul>   | MW           | DELWP  |

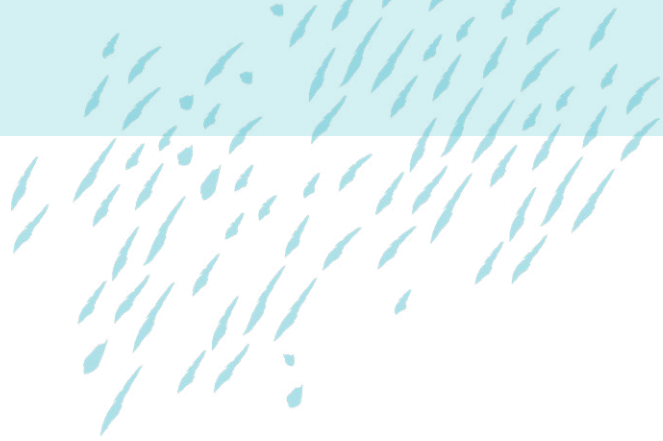


Flooding in the Yarra, Abbotsford



Flooding in the Yarra, Southbank (Image David Hannah)

| Number                               | Action   | Action output  | Lead | Supporting                   |
|--------------------------------------|--|--|------|------------------------------|
| <b>Risk-based approach</b>           |  |  |      |                              |
| 4.6                                  | Undertake a review of current flood overlays and controls to evaluate the effectiveness of our current approach to permitting sensitive uses in current flood prone areas  | <ul style="list-style-type: none"> <li>• Our current approach reviewed and opportunities for increased risk consideration identified</li> <li>• Advocate for appropriate risk-based guidelines</li> </ul>  | MW   | Councils, DELWP, MAV, VICSES |
| <b>Upstream stormwater capture</b>   |  |  |      |                              |
| 4.7                                  | Explore planning and/or building controls in upstream areas to mitigate downstream flood impacts   | <ul style="list-style-type: none"> <li>• High-priority areas identified (Link to 6.5)</li> <li>• Implications of introducing planning controls to mitigate downstream impacts studied</li> <li>• Learnings developed and shared</li> </ul>   | MW   | Councils, DELWP              |
| <b>Integrated design outcomes</b>    |  |  |      |                              |
| 4.8                                  | Update the Guidelines for Development in Flood Affected Areas (2019) to support the community and all decision makers in ensuring that development decisions support design outcomes that protect and enhance places, spaces and environments in existing urban areas while mitigating future flood risk | <ul style="list-style-type: none"> <li>• Revised Decision Guidelines for Development in Flood Affected Areas (2019) including: <ul style="list-style-type: none"> <li>– New risk-based application pathways and design requirements for developments</li> <li>– New discretionary criteria guidelines for non-compliant proposals</li> </ul> </li> </ul> | MW   | Councils, DELWP, MAV         |
| 4.9                                  | Investigate opportunities to amend the Victorian Planning System to better support balanced architectural and building design decisions in flood hazard areas  | <ul style="list-style-type: none"> <li>• Potential updates to Victorian Planning Provisions 44.03, 44.04 and 44.05 in relation to application and decision guidelines</li> </ul>   | MW   | Councils, DELWP, MAV         |
| <b>Supporting planning decisions</b> |  |  |      |                              |
| 4.10                                 | Revision of the greenfield decision guidelines for all greenfield development decision services that adopts best practice integrated water management and flood management   | <ul style="list-style-type: none"> <li>• Revise design manuals, procedures and decision-making processes including the Greenfield Land Development Manual</li> </ul>   | MW   | Councils, DELWP              |



Police road flooding (Image David Hannah)



Local flooding (Image David Hannah)

### FOCUS AREA 5 Challenges of climate change

Climate change adaptation requires a shift in thinking. It needs to be considered in flood policy, planning and operations. In addition to building our scientific knowledge base, values and institutional arrangements, a shared commitment is crucial in refining appropriate responses to climate related flood risk.

Flood management will require a range of infrastructure. Infrastructure solutions can be expensive, including property redevelopment and upgrades to drainage systems, roads and bridges, so we need to trial the inclusion of adaptive approaches to ensure they are cost effective.

Approaches and solutions need to consider a range of climate scenarios. In the long-term, we will need to consider a range of approaches that may reshape the region from protecting floodplains to retreating from high-risk areas. A focus on choosing no-regret, flexible approaches will ensure they are beneficial under any future scenario.

We will:

- further develop our understanding of the impacts of climate change including valuing the cost of annual average damage due to the increased rainfall intensity from climate change, and considering opportunities to use climate change scenarios to support adaptive thinking and action.

- consult, engage and educate. Linked with our community knowledge platform and community awareness and preparedness programs, we will consult to understand community knowledge of the impacts of climate change flood risk. We will deliver shared communication and engagement activities to raise awareness of the increasing flood risk due to climate change, and an education program targeted for at-risk communities.
- develop tools for adaptation projects at regional and local place-based scales, by preparing guidance for Melbourne Water and councils to strategically, efficiently and consistently assess local hazards and vulnerability to enact a consistent approach to climate change adaptation – one that considers opportunities to combine place-based solutions in catchment-wide planning.

#### Where will we be in 10 years?

We understand the likely range of climate change impacts and costs on flooding in the region. Climate change is incorporated into all new mapping and modelling. Our best available knowledge is embedded in flood management decision making including land use planning and flood infrastructure. Climate change knowledge is shared with partners and the community. Adaptive approaches are understood and we have tools to consider climate change in identifying locally specific solutions.

| Number  | Action  | Action output   | Lead | Supporting  |
|---|---|---|------|---|
| <b>Understanding impacts</b>                  |   |   |      |   |
| 5.1   | Identify an appropriate set of scenarios for use in Port Phillip and Westernport region flood planning. Develop guidance on when and how to use the scenarios | <ul style="list-style-type: none"> <li>Scenarios developed for us to use in flood planning in the region</li> <li>Guidance given on different contexts and how scenario planning could be used</li> </ul>   | MW   | Councils, BoM, DELWP                                |
| 5.2   | Understand where flood risks are likely to change due to climate change   | <ul style="list-style-type: none"> <li>Maps and models updated with climate change impacts (Links to 1.3, 4.4 and 4.5)</li> <li>High-risk areas identified for consideration in prioritisation process (Link to 3.1)</li> <li>Opportunities identified for larger scale interventions that will benefit multiple areas</li> </ul>                                     | MW   | Councils, BoM, DELWP                                |
| 5.3   | Increase our understanding of the cost of increased damages caused by climate change  | <ul style="list-style-type: none"> <li>Update future annual average damage calculation every two years to reflect new insights about climate change, as they become available, to inform decision making</li> </ul>   | MW   | Councils, DELWP, BoM*                               |
| <b>Consultation, education and engagement</b> |   |   |      |   |
| 5.4   | Community consultation, education and engagement about the impact of climate change on flood risk (Link to Focus Area 2)                                      | <ul style="list-style-type: none"> <li>Climate change is included in the general flood awareness program</li> <li>Climate change is included in the tailored engagement program</li> <li>Opportunities to engage flood impacted communities in place-based adaptation projects have been identified and included in the climate change adaptation tool kit</li> </ul> | MW   | Councils, Insurance Council of Australia, VICSES    |
| <b>Co-ordinating regional adaptation</b>      |   |   |      |   |
| 5.5   | Investigate and report on regional adaptation options   | <ul style="list-style-type: none"> <li>Identify regional climate change adaptation approaches for flood management</li> <li>Identify opportunities for collaboration of several precincts to achieve wide scale benefits</li> </ul>   | MW   | Councils, DELWP, Integrated Water Management Forums |

| Number   | Action   | Action output  | Lead         | Supporting      |
|--|--|--|--------------|-----------------|
| <b>Developing tools for regional and place-based adaptation projects</b> |  |  |              |                 |
| 5.6  | Develop and adopt a common approach to assess the effects of climate change on risk and vulnerability to inform prioritisation and flood impact mitigation | <ul style="list-style-type: none"> <li>Guidance for place-based 'risk and vulnerability assessment' made available (Link to 3.1)</li> </ul>  | MW           | Councils, DELWP |
| 5.7  | Incorporate climate change adaptation into design, planning and implementation of flood mitigation projects  | <ul style="list-style-type: none"> <li>Climate change adaptation toolkit developed for flood mitigation</li> <li>Pilot project testing and toolkit improved as part of flood reduction innovation (Link to 3.5)</li> <li>On-ground projects built with future climate in mind</li> <li>Guidance given on appropriate adaptation approaches</li> <li>Guidance (document) prepared providing consistent and transparent approach to available/appropriate climate change options and case-studies of completed projects</li> </ul> | Councils, MW | Councils, DELWP |



Receding flood water damage (Image Eleen Smith)



Malvern to Murrumbidgee Flood mitigation project (Image David Hannah)

### FOCUS AREA 6 Multiple benefits embedded in decision-making

Clean, available water and green space are fundamental to liveability in the region. Population growth, urbanisation and climate change threaten liveability by limiting the extent and quality of green space, and reducing water supply. We experienced these threats and their severity through the millennium drought.

Flood management and drainage infrastructure and assets are costly to build and maintain, and are complex, particularly in dense urban environments. Traditionally, we have built flood management solutions for the single purpose of reducing flood risk. Thinking about stormwater capture and management to deliver multiple benefits such as flood management, waterway protection, reduced reliance on mains water and cooling and greening our environment will allow us to achieve better outcomes for our community and greater value for money.

It is critical to understand the local flood context when designing infrastructure and assets. Inappropriate responses that alter flood regimes can exacerbate flooding.

We are taking a systematic approach in the way we consider multiple benefits in flood management. We need to review relevant policies, strategies, guidelines, codes, standards and frameworks. We will develop infrastructure projects that achieve multiple benefits based on priority areas, established processes, and innovative solutions, where appropriate.



Malvern to Murrumbidgee flood mitigation project (Image David Hannah)

We will:

- create an enabling strategic environment by determining the level of risk that is acceptable to partners who are responsible for infrastructure and assets, particularly in flood-affected areas, develop a collaborative process and principles to support the development of projects that achieve multiple benefits, and review policies, so they consistently enable us to consider multiple benefits in decision-making.
- pilot innovative flood management solutions in new precincts (e.g. Fisherman's Bend) and use this experience to review standards, codes, strategies and guidelines where appropriate so that innovative, place-based approaches, delivering multiple benefits, become business-as-usual.
- deliver stormwater projects that deliver multiple benefits including mitigating flood risks. To do this we will identify high-priority catchments where delivering integrated water management will bring multiple benefits, and develop projects through existing forums, partnerships, grants and major projects.

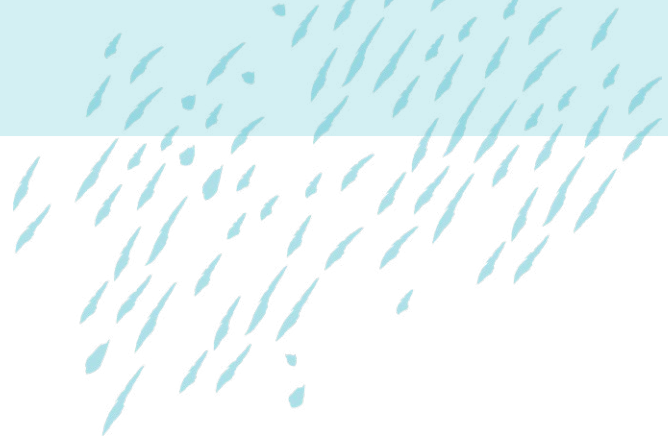
- review land use and water planning process for greenfield developments by identifying opportunities to integrate IWM and other strategic benefits within existing frameworks in greenfield developments.
- deliver flood management infrastructure and assets that achieve multiple benefits in high-priority locations.

#### Where will we be in 10 years?

Flood management is recognised as an important element of integrated water management. Flood management solutions achieve multiple benefits to contribute to a city that is safe, cool and walkable, with blue-green corridors and mixed-use spaces, and a city that supports biodiversity and enhanced amenity.

| Number  | Action  | Action output   | Lead              | Supporting   |
|---|---|---|-------------------|--|
| <b>Foundational actions</b>   |   |   |                   |  |
| 6.1   | Unlock opportunities for integrated water management (IWM) and amenity outcomes in flood assets. Balance risk by determining a risk management approach | <ul style="list-style-type: none"> <li>• Risk management guidelines for appropriate 'multiple benefits' infrastructure established</li> </ul>   | MW                | Councils, DELWP, MAV, IWM forums                                     |
| 6.2   | Develop a collaborative process and principles to support place-based solutions that are linked to aligned policies and strategies                      | <ul style="list-style-type: none"> <li>• Relevant catchment organisations have identified opportunities for collaboration</li> <li>• Knowledge and capacity are shared between members</li> <li>• Optimal place-based solutions identified and collaborative delivery of on ground solutions enabled</li> </ul>   | DELWP, IWM forums | Councils, MW   |
| 6.3   | Review relevant policy, governance and funding mechanisms to incorporate multiple benefits  | <ul style="list-style-type: none"> <li>• Tools developed to support the consideration of flood benefits in water cycle projects</li> <li>• Lessons from projects shared</li> <li>• Findings to support multiple benefits from flood projects implemented</li> </ul>   | DELWP             | Councils, MW   |
| <b>New precincts (infill and redevelopment e.g. Fisherman's Bend)</b> |   |   |                   |  |
| 6.4   | Embed innovative, place-based approaches to deliver multiple benefits in new precincts (infill and redevelopment)                                       | <ul style="list-style-type: none"> <li>• Innovative flood management solutions in new precincts piloted</li> <li>• Project learnings and follow-up case studies established</li> <li>• Case studies, frameworks, guidelines, or practice notes based on new projects developed, as appropriate</li> </ul>   | MW                | Councils, VPA  |
| <b>Integrated water management and stormwater</b>                     |   |   |                   |  |
| 6.5   | Identify high-priority catchments to mitigate flood impacts through stormwater management projects and deliver projects in these areas                  | <ul style="list-style-type: none"> <li>• Potential stormwater project sites identified for flood mitigation</li> <li>• Inform action 4.7 regarding reducing upstream runoff</li> <li>• Collaborated with new and existing forums, partnerships, grants and major projects</li> <li>• On-ground stormwater projects delivered that also mitigate flood impacts</li> <li>• Monitor performance and lessons on co-operation of multifunctional assets</li> <li>• Learnings developed and shared</li> </ul> | MW                | Councils, DELWP, Integrated Water Management Forums, Water retailers |





| Number                        | Action  | Action output   | Lead         | Supporting                            |
|-------------------------------|---|---|--------------|---------------------------------------|
| <b>Greenfield development</b> |   |   |              |                                       |
| 6.6                           | Review the Development Services Scheme (DSS) model with all stakeholders to assess the opportunities and constraints to delivering integrated water management (IWM) outcomes in emerging and existing greenfield development schemes | <ul style="list-style-type: none"> <li>Revise design manuals, procedures and decision-making processes that including the Greenfield Land Development Manual</li> <li>Engineering and finance review of all existing greenfield development schemes</li> </ul>  | MW           | DELWP, Growth area councils, MAV, VPA |
| 6.7                           | Ensure that new Precinct Structure Planning Guidelines and supporting Practitioner Guidelines include best practice IWM and Plan Melbourne strategic water objectives   | <ul style="list-style-type: none"> <li>Precinct Structure Planning (PSP) Practitioner Guideline for Integrated Water Management, including flooding and drainage schemes, in Melbourne's Greenfields</li> <li>Initial Drainage Scheme Investigation Assessment for newly allocated PSP areas</li> <li>Ongoing collaboration between MW and VPA</li> </ul> | MW, VPA      | DELWP, Growth area councils, MAV      |
| <b>Flood infrastructure</b>   |   |   |              |                                       |
| 6.8                           | Consider opportunities to achieve stormwater, open space and/or amenity outcomes on all existing and future flood infrastructure projects. Deliver assets that provide these benefits where appropriate                               | <ul style="list-style-type: none"> <li>New flood assets incorporate open space and/or amenity benefits where feasible</li> <li>Existing assets enhanced to achieve open space and/or amenity benefits where appropriate</li> </ul>  | Councils, MW | Water retailers                       |



Fallingwater Estate, constructed waterway



Fallingwater Estate



## OBJECTIVE 3

Working together

### Land, water and emergency agencies work together to manage flooding effectively

As a large number of organisations influence flood management in Port Phillip and Westernport, cooperation and collaboration between agencies is crucial. Aligning and coordinating the delivery of flood management actions will lead to more effective and efficient outcomes for the community.

This objective will be met both with delivering actions under the following three focus areas (numbers 7-9), and through the coordinated approach we take to delivering this strategy.

#### FOCUS AREA 7 Clarifying roles and responsibilities

Stormwater, drainage and flood management activities need to deliver a number of outcomes to meet the needs of the community and the environment, including delivery of improved water quality, amenity and flood mitigation.

Stormwater and drainage assets, and services in our region, are jointly managed by Melbourne Water and 38 councils. The institutional arrangements around flood, drainage and stormwater management were established over 90 years ago and need to be reviewed to meet the needs of the growing city and its inhabitants and communities into the future.

Department of Environment Land, Water and Planning is leading a review of the arrangements known as the Melbourne Urban Stormwater Institutional Arrangements (MUSIA) review. Melbourne Water and the Municipal Association of Victoria (on behalf of councils) are partners in the project and stakeholders are being engaged throughout.

The review covers catchment thresholds, roles and responsibilities, governance and funding arrangements of stormwater assets and services delivered by Melbourne Water and councils in the Port Phillip and Westernport region.

We will complete the MUSIA review and implement new arrangements as a result of the review.

The review of these institutional arrangements, alongside a suite of state stormwater policy reforms and catchment-scale initiatives, offers a unique opportunity to provide for future needs of the community and address legacy issues surrounding existing assets and services.

#### Where will we be in 10 years?

The MUSIA review is complete and its outcomes are being implemented. Councils and Melbourne Water have clearly defined roles and responsibilities when it comes to flood and stormwater management, and are working effectively together to deliver the best community outcomes.

| Number | Action   | Action output   | Lead  | Supporting        |
|--------|--|---|-------|-------------------|
| 7.1    | Complete MUSIA review.<br>Implement MUSIA outcomes | <ul style="list-style-type: none"> <li>Flood and stormwater institutional arrangements between Melbourne Water and councils clearly defined</li> <li>New arrangements implemented enabling effective delivery of flood and stormwater outcomes for the community</li> </ul> | DELWP | Councils, MAV, MW |

## FOCUS AREA 8

### Emergency agency preparedness and response

Emergency management requires clear roles, responsibilities and accountabilities to plan, prepare and respond to different types of flooding. *Under the Emergency Management Act 1986 and 2013*, municipal councils must prepare and maintain a Municipal Emergency Management Plan. Key legislation includes:

- *Emergency Management Act 1986 and 2013*
- *Emergency Management Legislation Amendment Act 2018*
- *Victoria State Emergency Service Act 2005*
- *Victorian Floodplain Management Strategy 2016*

The success of flood response efforts is strongly aligned with the awareness and preparedness of the community. The 'empowering community' focus area will identify communities with a high risk of flooding, deliver targeted communication and engagement at the start of high-risk periods and work with partners to ensure we have an integrated and aligned approach. These activities will support the agency-centred actions of this focus area.

We will:

- strengthen agency communication. Emergency management agencies will work together to further integrate and align their approach to communicating with each other and the community.
- continuously improve by continuing to develop the capacity of communities and emergency services, including embedding continuous improvement and learning from our experiences.

#### Where will we be in 10 years?

Agencies with emergency management responsibilities, as outlined in the *State Emergency Management Plan (SEMP)*, will work towards enhanced response capability and capacity that reflect changing flood risks for the community. Emergency preparedness and response approaches are community focused with emphasis on communities at higher risk.

| Number                        | Action   | Action output  | Lead   | Supporting                    |
|-------------------------------|--|--|--------|-------------------------------|
| <b>Foundational actions</b>   |  |  |        |                               |
| 8.1                           | Work with all relevant emergency management agencies to ensure we have an integrated and aligned approach to communicating between all agencies  | <ul style="list-style-type: none"> <li>• Consistent and aligned communication established between and from agencies</li> </ul>   | VICSES | Councils, BoM, DELWP, EMV, MW |
| <b>Continuous improvement</b> |  |  |        |                               |
| 8.2                           | Continue to develop agency capacity to respond to flood events   | <ul style="list-style-type: none"> <li>• Ongoing training and learning programs (within agencies and cross sector) continued</li> </ul>  | VICSES | Councils, DELWP, MW           |
| 8.3                           | Embed continuous improvement through regular reviews and updates of processes and procedures including incorporating learnings from incidents.<br><br>Conduct post-flood event reviews to incorporate learnings from incidents | <ul style="list-style-type: none"> <li>• Continuous improvement process put in place</li> <li>• Regular updates/review of documents and processes conducted to incorporate learnings from incidents</li> </ul> | VICSES | BoM, Councils, EMV            |

## FOCUS AREA 9 Flood recovery

Recovery efforts are critical to support communities so they can function again and heal – emotionally, physically and materially. Recovery is a long-term, complex process and includes cleaning-up, rebuilding and restoring property and infrastructure; community support programs; counselling and material aid. Adequate insurance is also required for recovery.

The *State Emergency Management Plan* outlines the importance of focusing on resilience in recovery. Through a resilient recovery approach, community resilience is supported, recovery services are streamlined, and communities are allowed to lead and act to shape their future after a flood event. Resilient recovery considers social, economic, built and natural environments to address the wide range of recovery outcomes.

In the recovery phase, it is imperative that the community receives clear and consistent information, particularly as both the community and responders may be experiencing trauma. To ensure the information provided to the community is consistent, we need to be clear about our roles and responsibilities.

The lead and support roles for agencies are defined in the *State Emergency Management Plan* and we need to ensure that key staff at all relevant agencies are familiar with and understand the state, regional, municipal emergency

management frameworks and their agency's roles and responsibilities. Under the Victorian emergency management arrangements, municipal councils are responsible for the coordination of local relief and recovery efforts. Each local municipality has a municipal emergency management officer and a municipal recovery manager.

We will:

- define our recovery framework and develop our approach to flood recovery based on different types and severity of floods and established channels of communication including communicating with affected communities and agencies.
- embed a process of continuous improvement to learn from our experiences.
- run capacity building programs for partners to build response capacity.

### Where will we be in 10 years?

All agencies with responsibilities in recovery understand their roles and responsibilities, and communicate this clearly to affected communities. Recovery incorporates the lessons from previous flood events. Recovery is community focussed.



Rosanna flood clean up works



Flood debris at Banyule Creek, Drysdale Street, Yallambie



Flood clean up at Salt Creek Inlet, Lower Plenty Road

| Number                   | Action   | Action output  | Lead   | Supporting                   |
|--------------------------|--|--|--------|------------------------------|
| <b>Foundational</b>      |  |  |        |                              |
| 9.1                      | Develop flood recovery framework based on different severity and types of flood  | <ul style="list-style-type: none"> <li>• Framework designed to enable recovery based on type and severity of flooding</li> <li>• A community communication plan for flood recovery developed and implemented</li> <li>• Handover/transition process from flood response to recovery including communication channels reviewed</li> </ul> | VICSES | Councils, EMV, MW, Red Cross |
| <b>Post event</b>        |  |  |        |                              |
| 9.2                      | Facilitate debriefs between communities and agencies to learn from events and improve the allocation of resources to communities | <ul style="list-style-type: none"> <li>• Joint debrief conducted with affected communities and response and recovery agencies post event</li> <li>• Agency learnings recognised to enable us to understand how resourcing and recovery activities can be better allocated and delivered</li> </ul>                                       | VICSES | Councils, EMV, MW, Red Cross |
| <b>Capacity building</b> |  |  |        |                              |
| 9.3                      | Capacity building programs for partners to build response capacity that is community focussed are identified and communicated    | <ul style="list-style-type: none"> <li>• Capacity building programs delivered</li> </ul>   | MW     | Councils, EMV, MAV, VICSES   |



Patterson River flooding (Image David Hannah)

## RESEARCH OBJECTIVES

To support the achievement of the outcomes of this, and future, flood strategies, it is essential that we engage in a program of research to address the knowledge gaps that have been highlighted during the development of this strategy. Undertaking research will allow us to better understand the effectiveness of management activities and better assess the most appropriate flood management options.

These research objectives are linked to the actions in this action plan and are collated here for completeness. They will be achieved through partnership with industry, universities and other research organisations.

| Number | Research objective   | Research outcome   | Lead       |
|--------|--|--|------------|
| 1      | Identify ways to effectively engage with communities to build awareness and resilience to flooding   | <ul style="list-style-type: none"> <li>Community awareness campaigns created using the most effective engagement strategies based on the demographics of the target communities</li> </ul>   | MW, VICSES |
| 2      | Quantify the benefit of flood awareness programs on reducing the impact of flooding  | <ul style="list-style-type: none"> <li>The costs and benefits of flood awareness programs are accurately represented</li> </ul>  | MW         |
| 3      | Develop new approaches and identify new technologies that may reduce flood risks   | <ul style="list-style-type: none"> <li>More flood management options are made available to address flood risk in the region</li> </ul>   | MW         |
| 4      | Quantify the reduction in flood risk that can be achieved by new flood management approaches (Link to Research Objective 3)  | <ul style="list-style-type: none"> <li>The costs and benefits of new flood approaches are accurately represented</li> </ul>  | MW         |
| 5      | Develop tools to ensure climate projections are effectively considered in flood management approaches  | <ul style="list-style-type: none"> <li>Partner organisations are supported to embed climate projections in flood decision making</li> </ul>  | MW         |
| 6      | Understand the ecological benefits of floodplain engagement and what management actions can be taken to address the competing needs of ensuring safety for people and property | <ul style="list-style-type: none"> <li>A better understanding established of the competing ecological and safety needs to floodplains, and the options for managing the trade-off</li> </ul> | MW         |
| 7      | Lessons from previous flooding events are captured   | <ul style="list-style-type: none"> <li>Improvements to flood preparedness and recovery strategies</li> </ul>   | VICSES     |

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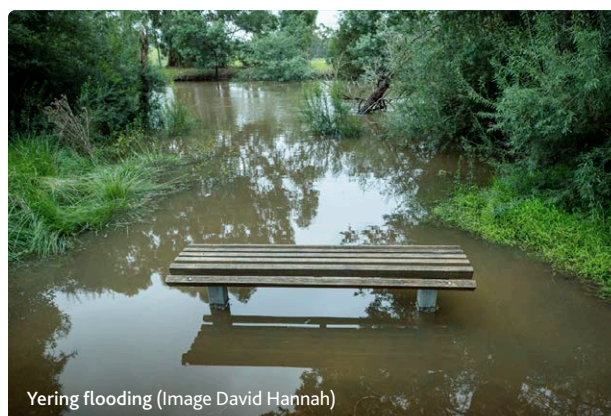
Melbourne Water 2015, *Flood Management Strategy Port Phillip and Westernport*, Melbourne

### Key legislation

*Emergency Management Act 1986 and 2013*

*Emergency Management Legislation Amendment Act 2018*

*Victoria State Emergency Service Act 2005*



## Glossary

### **Annual Exceedance Probability**

Likelihood of occurrence of flooding in any given year usually expressed as a percentage, e.g. 1% Annual Exceedance Probability flood.

### **Average Annual Damage**

Represents the average yearly cost of flooding in a particular area, calculated by taking the total damage caused by all flooding over a period of time and dividing it by the number of years in that period. Annual average damage provides a basis for comparing the economic effectiveness of different mitigation measures.

### **Catchment**

The region from which all rainfall flows, other than that removed by evaporation, into waterways and then to the sea. A catchment can be defined at many different levels such as the whole river basin (e.g. the Yarra catchment) or at a very local level (e.g. individual drains).

### **Climate change adaptation**

Adjustment in response to actual and expected climate change and/or effects, to reduce harm or take advantage of opportunities.

### **Coastal flooding (tidal inundation)**

Increases in coastal water levels above the predicted tide level. Coastal flooding in a storm surge gives some advance notice.

### **Drainage system**

Network of regional and local drains, roads and retarding basins.

### **Flash (stormwater) flooding**

Inundation by local runoff caused by heavier than usual rainfall. Flash flooding from the stormwater system tends to be rapid and dangerous due to the speed and depth of flows and the lack of advance warning.

### **Flood**

A natural phenomenon that occurs when water covers land that is normally dry.

### **Flood awareness**

Appreciation of the likely effects of flooding, and a knowledge of the relevant flood warning, response and evacuation procedures.

### **Flood mitigation**

Permanent or temporary measures (structural and non-structural) aimed at reducing the impact of flood. Could be planning controls, infrastructure or activities on waterways.

### **Flood modelling and mapping**

Flood studies that map flood risks for a range of uses including land use planning, insurance and emergency response.

### **Flood resilience**

Ability to plan for flooding as a natural and inevitable disturbance; act to mitigate risks and respond to flood events; and recognise the changing context presented by climate change and population growth while enabling the achievement of safety, liveability and sustainability goals within the region.

### **Floodplain**

An area of land that is subject to inundation by floods up to, and including, the largest probable flood event. Areas of land may be adjacent to a creek, river, estuary, lake, dam or artificial channel. Floodplains are often valued for their ecological properties.

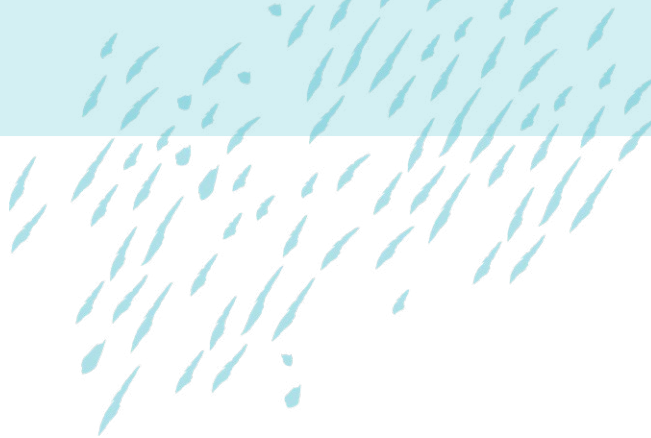
### **Fit-for-purpose flood information**

Information that informs decisions about managing and reducing flood risk, including flood modelling and mapping.

### **Greenfield**

Areas identified for urban development (residential, commercial or industrial) by state and/or local government, located on or beyond the boundaries of existing urban development.





## Glossary continued

### Integrated water management

Water management approach that considers all components of the water cycle as a whole to maximise social, environmental and economic outcomes. It achieves this through the coordinated management of drainage, flooding, waterways, water supply and sewerage services.

### Liveability

Wellbeing of a community, and the many characteristics that make a place somewhere people want to live. A liveable city or region meets the social, environmental and economic needs of its people. It also addresses community values and preferences for amenity, wellbeing and a sense of place.

### Overlay

Planning control applied to land that requires a specific design treatment.

### Planning scheme

Regulates land use and development within a municipal district. Includes state and local flood policies and controls.

### Stormwater

Water that runs off land when it rains.

### Waterway

A collective term that refers to rivers, estuaries and wetlands.

### Wetland

Inland, standing, shallow bodies of water, which may be permanent or temporary, fresh or saline.

## Abbreviations

|              |   |               |   |
|--------------|---|---------------|---|
| <b>AAD</b>   | Annual average damage                               | <b>MERI</b>   | Monitoring, evaluation, reporting and improvement (plan)        |
| <b>AEP</b>   | Annual exceedance probability                       | <b>MUSIA</b>  | Melbourne Urban Stormwater Institutional Arrangements (project) |
| <b>BoM</b>   | Bureau of Meteorology                               | <b>MW</b>     | Melbourne Water   |
| <b>DELWP</b> | Department of Environment, Land, Water and Planning | <b>VICSES</b> | Victoria State Emergency Service                                |
| <b>EMV</b>   | Emergency Management Victoria                       | <b>VPA</b>    | Victorian Planning Authority                                    |
| <b>IWM</b>   | Integrated water management                         |               |   |
| <b>MAV</b>   | Municipal Association of Victoria                   |               |   |





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