



Long-list Handbook

Maribyrnong River catchment flood mitigation study

October 2025

Handbook at a glance

Executive summary.....	3
About the handbook.....	4
Background.....	7
Community feedback.....	12
How to participate.....	13
Levees.....	14
Multifunctional storage areas.....	23
Retarding basins	29
Dams.....	34
Alterations to existing bridges	36
Flood relief culverts	39
Channel modification	42
Flow diversion.....	45
Stormwater harvesting	48
Blue-green infrastructure.....	50
Nature-based solutions	55
Non-structural	59
Other.....	64
Speak to the team	66
Reference list.....	67

Executive summary

In Phase 2 of the Maribyrnong River catchment flood mitigation study (the study), Melbourne Water is engaging with stakeholders and community members about the long-list of flood mitigation options (the long-list), with the aim of refining it into a shortlist. This handbook provides an overview of the long-list and some key information about the mitigation options.

Together with the community, Melbourne Water is exploring options to help reduce flood risk for the lower Maribyrnong River catchment. 'Flood risk' refers to the overall level of risk that is posed by the chance of a flood, combined with the potential consequences of a flood. The study forms part of the work needed to identify, develop and implement flood mitigation options that will help to reduce flood risk in the lower Maribyrnong River catchment, while also reflecting community values as much as possible.

In Phase 1 of the study, we asked for feedback from community members and stakeholders about what is important to them and what they value within their local environments and communities. This feedback helped inform the study's 'Evaluation Criteria.' We also heard from community members and stakeholders about some of the flood mitigation options they would like to see explored as part of the study.

As part of Phase 2 of the study, we are calling on the community to join us in exploring the different options on the long-list. The purpose of this handbook is to provide a summary of the long-list of flood mitigation options.

For more information about the study and to view some frequently asked questions, please visit the Let's Talk website: [Melbourne Water - Let's Talk](#)

About the handbook

This handbook contains the long-list of flood mitigation options for the study and serves as a central source of information for the community.

It is important to note that this document reflects our current understanding of the available options. We will continue to gather information about the options through additional technical work and stakeholder engagement to help reduce the long-list into a shortlist.

How to use the handbook

As there are many different types of options we are considering as part of the study, we have grouped them according to their broader category in the handbook, as summarised in the table below.

Categories of flood mitigation options			
	Levees (including one-way valves)		Multifunctional storage areas
	Retarding basins		Dams
	Alterations to existing bridges		Flood relief culverts
	Channel modification		Flow diversion
	Stormwater harvesting		Blue-green infrastructure

Categories of flood mitigation options			
	Nature-based solutions		Non-structural
	Other		

As you move through the handbook, you will see that flood mitigation options have been marked as 'Progressed,' 'Requires further information' or 'Excluded.' This process has been informed by our initial screening of the long-list using the Evaluation Criteria. To learn more about this process, please read pages 10 to 11 of the handbook.

Abbreviations in the handbook

This handbook uses abbreviations throughout. The table below outlines the abbreviations and full terms used in the handbook.

Abbreviations	Full term
km	Kilometre
kms	Kilometres
km ²	Square kilometres
km ³	Cubic kilometres
m ³ /s	Cubic metres per second
m ³	Cubic metres
ML	Megalitres (note: 1 megalitre is equivalent to 1,000 cubic metres)
m	Metres

mm	Millimetres
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Constraints and limitations to consider

It is important to note that we are still in the initial stages of the study and the options detailed in the handbook are conceptual only, meaning their location, scale and visual appearance may differ.

There will be many competing factors when assessing flood mitigation options and trade-offs may be required when making decisions. We need to consider existing historical and contextual constraints, for example, the existing geographic features of the catchment. The study also needs to consider the relevant technical, economic, social and environmental considerations.

It is not practical to pursue flood mitigation options that are not feasible due to geographic issues or that cannot be implemented because of technical and engineering constraints.

The preferred mitigation options (or group of options) identified during the study are not yet confirmed for construction. Once the study is complete, they will need to go through several steps before any construction work can begin. For example, some of these steps might include preparing business cases to obtain funding, seeking funding from other agencies, conducting environmental assessments, geotechnical studies and obtaining planning approvals. In Phase 1 we heard frustration in the community about the timeframes associated with planning and delivering potential flood mitigation options projects. Melbourne Water acknowledges this feedback and will pursue flood mitigation options where there is an opportunity to deliver them faster, where appropriate.

We are committed to reporting how decisions have been made to the community, including why certain flood mitigation options have progressed or have not.

Background

This section provides background information about the Evaluation Criteria, the long-list and the 'screening' of the long-list.

About the Evaluation Criteria

The Evaluation Criteria will be used to examine the flood mitigation options and to help refine the long-list and shortlist of flood mitigation options.

The Evaluation Criteria has been developed based on a combination of:

- Community feedback collected during Phase 1 of the study
- Learnings from previous flood studies
- The knowledge of the specialists on the study project team and their understanding of rivers and catchments, specifically the Maribyrnong River catchment.

The approach we have taken to develop the Evaluation Criteria reflects our previous commitment to involve the community and your feedback into the decision-making process of the study.

You can provide feedback on the Evaluation Criteria on the Let's Talk website:

[Melbourne Water - Evaluation Criteria](#)

Currently, the Evaluation Criteria is as shown on the following page.

 Criteria	Exclude	Highly Unfavourable	Unfavourable	Favourable	Highly Favourable	Not enough information yet
 Safety Will this option help slow or reduce floodwaters to reduce the hazard?	May create a serious hazard and/or risk to life.	May create a safety hazard and/or minor injury risk.	No noticeable safety improvement.	Locally improves safety for a small number of people.	Significantly improves safety by reducing the depth, speed and/or extent of floodwaters.	
 Property Will this option help slow or reduce floodwaters to reduce damage to property?	Some properties experience increased flood damage.	Extent of flooding unchanged and no reduction in damage to property.	Locally it provides a small reduction in flood extent for a small number of properties.	Reduces flooding extent and flooding damages for many properties.	Widespread reduction in extent of flooding, with benefits most properties in the floodplain.	
 Environment & Heritage Will this option help to protect or improve local natural areas, parks, cultural sites or places that matter to the community?	Serious and long-lasting damage to the environment, heritage sites, or use of natural spaces.	Ongoing moderate, local damage to environmental or heritage values, or the use of natural spaces.	Small or local impacts that can be fixed or managed.	Helps protect environmental or cultural values and improve natural areas and open spaces.	Uses nature-based solutions that reduce flooding and greatly enhance natural areas and open spaces.	
 Value for money Are the benefits expected from this option likely to exceed the cost of implementing it?	Not applicable	This option would be very expensive (over \$100 million) but wouldn't reduce flood risk enough to justify the expense.	This option would be expensive (\$10–100 million) and the benefits wouldn't match the cost, or the benefits are not fairly-shared.	This option would reduce flood damage sufficiently to be worth the cost. Costs and benefits are shared fairly.	This option would greatly reduce flood damage and clearly be worth the cost. Costs and benefits are shared fairly.	
 Ability to implement Could this option be realistically put in place?	Not constructible on the proposed site.	Approval process will take years and may be costly. The community may strongly oppose. It could be built, but this would be complicated and risky.	Approval process could be challenging. Some people may have concerns. It could be built, but this would be moderately complex and risky.	A clear approval path. Little community opposition. It could be built using standard methods with no unusual risks.	A clear approval path. Would be welcomed by the community. It could be built using standard methods with no unusual risks.	
 Redundancy Is this option still relevant, and does it directly reduce flood risk?	The option does not address riverine flooding and/or this option is a duplicate.	Can not reduce riverine flooding by itself. Could be packaged with another option to enhance the overall benefit.		Can be a standalone option – apply the other criteria in this table.		

The Evaluation Criteria (source: Melbourne Water, 2025).

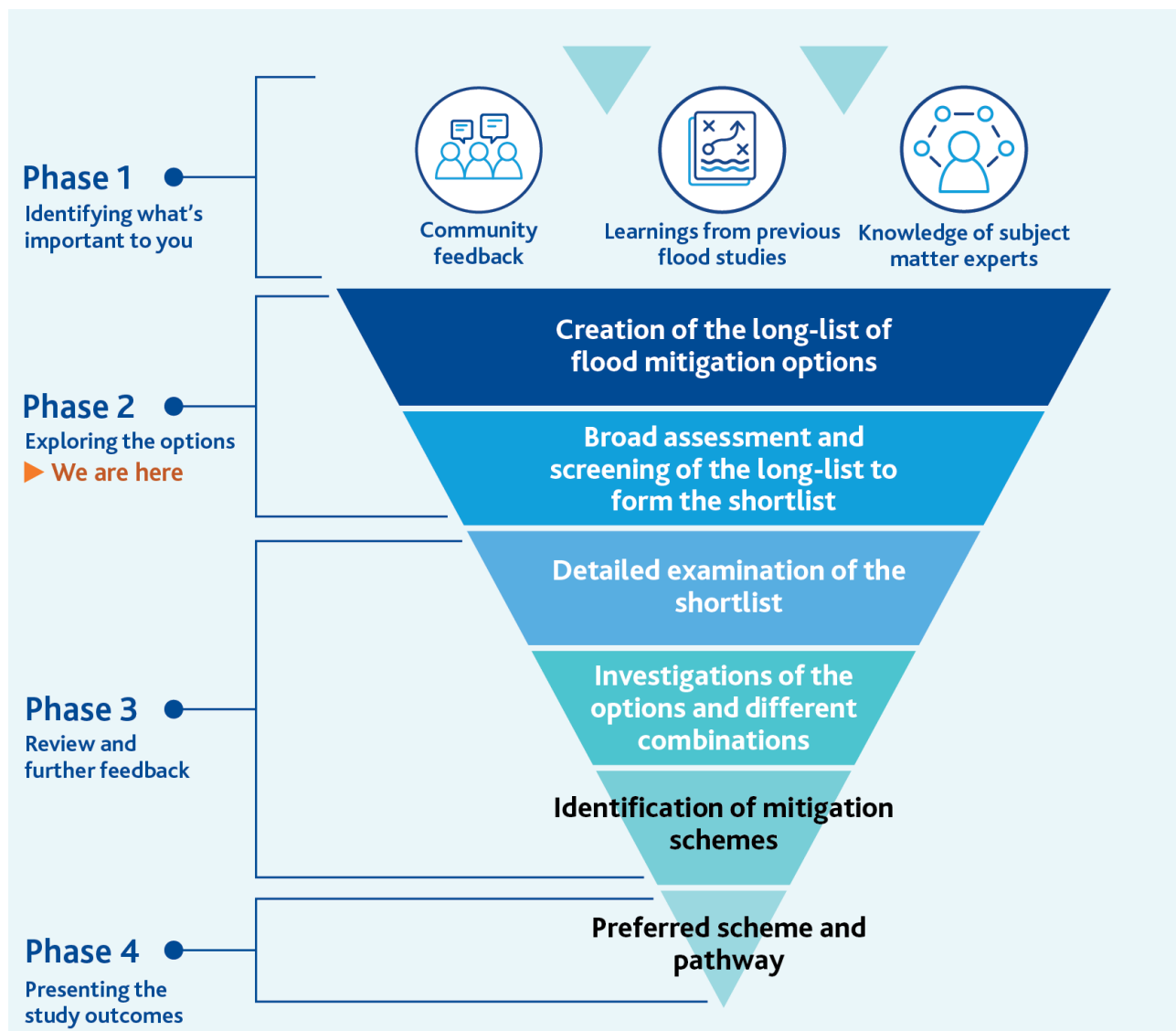
Use of the Evaluation Criteria

In Phase 1 of the study, we heard that protecting the safety of people and protecting property are the most important things to you. We also heard that the community might be willing to tolerate temporary impacts to recreation if it means reducing flood risk to homes or infrastructure.

This feedback and other key insights gathered in Phase 1 of the study has been given an increased 'weight' within the Evaluation Criteria to reflect what we heard from the community.

As we progress through the study, we will use the Evaluation Criteria and other assessment tools to look at the flood mitigation options in increasing levels of detail:

- Starting with a broad assessment of the options at the long-list stage (which is where we are now)
- Progressing through to a closer examination during the shortlisting of options
- Towards the end of the study, we will conduct highly detailed investigations into the shortlist and the different combinations of options
- Once our investigations become highly detailed, the use of the Evaluation Criteria will be supported by other assessments, including a cost-benefit analysis.



Graphic representing the phases of the Maribyrnong River catchment flood mitigation study (source: Melbourne Water, 2025).

About the long-list

The long-list is a comprehensive list of potential flood mitigation options for the Maribyrnong River catchment, as relevant to the study. Flood mitigation refers to strategies or interventions that could be implemented to reduce the likelihood of flooding, or the impacts of flooding on communities and infrastructure in the lower catchment.

To be considered in the study, a mitigation option must meet the requirements of reducing flood risk and prioritising the safety of those in our communities across the lower Maribyrnong River catchment area.

Development of the long-list

In total, there are around 200 options on the long-list and come from several sources, including:

- Ideas from community members suggested in Phase 1 of the study, or during previous community engagement
- Measures proposed in previous flood studies
- Findings from the Parliamentary Inquiry into the October 2022 flood event.

The study team have also drawn on Jacobs' international, national and local experience in the flood mitigation space to compile the long-list, to make sure it is as comprehensive and robust as possible.

During the development of the long-list, several mitigation options were found to be duplicates. For example, suggestions for the same option to be implemented in the same location within the catchment. This is because some of the mitigation options suggested by the community also featured in previous flood studies or the Parliamentary Inquiry. To avoid duplication, these repeated options have been combined into a single option in this handbook.

'Screening' of the long-list

It is important that we focus our attention on exploring options that are, above all, able to reduce flood risk and are also economically feasible, technically feasible and practical to implement.

The purpose of screening the long-list is to help make sure that the options progressed through the next phases of the study have the best chance of reducing flood risk and protecting people's safety and homes in the lower catchment. These are the top community priorities we heard during Phase 1.

The study team have used the Evaluation Criteria to conduct an initial 'screening' of the long-list. As a result of the screening, around 150 mitigation options have been categorised as excluded and will not progress further in the study. For transparency, all the excluded options are provided in this handbook.

This handbook includes all the options on the long-list and categorises them based on how they performed in the screening process:

- **Progressed** for further investigations and engagement
- **Excluded** and not progressed for investigations and engagement
- **Requires further information** before it can be decided if the option is to be progressed or excluded.

Excluded refers to options that are not progressing further in the study, this was because the option was either:

- A duplicate of an option already included on the long-list
- Not able to reduce flood risk in the lower catchment.

An example of a mitigation option that was excluded from the long-list is a dam which did not have the capacity required to hold flood water. In other words, the capacity of water that would need to be stored during a flood event is so large that this dam would have little to no impact on reducing the level of flood waters and would therefore not reduce flood risk in the lower catchment.

Community feedback

In Phase 2, we are seeking feedback on the long-list with the aim of helping us refine it into a shortlist. We invite the community to explore the different options in the long-list Handbook with us and share their feedback here: [Melbourne Water - long-list](#)

To support this, we have created a digital Options Map displaying over 40 options that have 'progressed' through the screening process or 'require further information' before a decision can be made. On the Options Map you can move around the catchment area to learn more about these options and share your feedback on each one.

You can access by visiting the Let's Talk website: [Melbourne Water - Options Map](#)

We are interested in hearing your views on:

- **The broad proposed location of each option** – including proximity to important places, potential impacts to land use and other location factors
- **Features of value** – how each option might affect things that matter to you, such as:
 - Community and visual amenity
 - Accessibility
 - Dwellings, recreation, biodiversity, infrastructure, water assets
 - Historic and cultural heritage
 - Anything else you value in your local environment.

The study team are highly motivated to make sure the flood mitigation options for the lower Maribyrnong River catchment reflect the interests and values of the community as much as possible, while also reducing flood risk.

Your feedback will help us to understand community preferences and will help influence how we prioritise the shortlisted options during Phase 3 of the study.

How to participate

In addition to the Options Map, there will be multiple in-person engagement opportunities for you to provide feedback.

In October 2025, we will be hosting community events throughout the catchment to gather feedback on the long-list.

To view upcoming events please visit the community events page on the Let's Talk website: [Melbourne Water - Let's Talk](#)



Levees

In this study, levees are areas of raised ground that form a physical barrier between flood waters and assets like property or road infrastructure.



Example of a levee, Koo Wee Rup (source: Melbourne Water, 2024).



Example of a levee, Dandenong Creek (source: Melbourne Water, 2020).

While levees can take many forms, they are usually earthen embankments, retaining walls or a combination of both. The exact form depends on the available space and other engineering constraints such as underground or overhead services like gas mains, power lines or masts.

Often drains through levees will need one-way valves to stop flood water backing up through the drain and causing flooding. These are considered in this section.

Progressed

In total, seven levee options have been progressed in the study, with the following options remaining on the long-list. Indicative details, such as the lengths and heights, of these options have been provided based on previous reports, where possible. This detail has not been included for some options, this is because the information was either unavailable or has been changed so many times that it is no longer correct. It is important to note that some of the details of these options will change, as they are dependent on several factors including updates to flood levels, the combination of options selected for this study, changes in the landscape and new design standards.



Ref.	Option	Description
L010	Rivervue Retirement Village	A levee at Rivervue Retirement Village to provide flood protection. This levee would protect the properties in Rivervue.
L020	The Boulevard, Aberfeldie	A levee along The Boulevard in Aberfeldie near the north bank of the Maribyrnong River. This levee would be around 1.2km long and would protect properties along The Boulevard.
L030	Maribyrnong Township Protection	A levee along Chifley Drive to Van Ness Avenue, near the south bank of the Maribyrnong River. This levee will primarily protect Maribyrnong Township and would be around 2km long and potentially up to 3.7m high. This levee may extend as far as the Afton Street Bridge in the upstream direction. It is important to note that constructing a levee only upstream of Raleigh Road Bridge or only downstream of the Bridge will not protect Maribyrnong Township. This is because flood water will work its way around the levee.
L042	Woods Street, Ascot Vale	A flood wall from Woods Street to Stanford Street and around Doncaster Street and Angler Parade intersection. This levee would be approximately 1km long.
L054	Hobsons Road, Kensington	This option was suggested to protect the area behind Hobsons Road. The levee would extend from Hobsons Road to the Saltwater River Rail Bridge and be approximately 300m long and more than 1.5m high. This option would involve raising a section of Hobsons Road.
L056	Kensington Banks Protection	An option combining aspects of levees, and other land raising in the Kensington Banks area, which would be designed to provide continuous protection to Kensington Banks. This option may require raising footpaths, levee banks and potentially roads.



L060	Saltwater River Rail Bridge to Hopetoun Bridge Levee	This option is a levee from Saltwater River Rail Bridge to Hopetoun Bridge to protect the area known as West Melbourne Waterfront. This would involve constructing a flood wall approximately 800m long and more than 1m high. Associated works would be required along the rail line and Sims Street to enable this option.
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Advantages of progressed options

The key advantage for the progressed levee options is that if implemented, they are all expected to reduce flood risk. Specific costing and economic feasibility for the progressed levee options will be investigated in further detail as the study progresses.

Disadvantages of progressed options

Levees can help protect certain areas from flooding, but they don't remove the water, they just redirect it. In other words, when a levee blocks off flood waters in one area, the water must be stored elsewhere. Levee options are likely to be used in combination with other levees or other mitigation measures. Importantly, a residual flood risk will remain with all levee options. For example, a levee could be overtopped by a flood event that exceeds the levee's capacity.

Requires further information

We need more information before we can assess the following option in detail. Once we have everything we need, we will either progress or exclude it and report the results at a later stage in the study.

Ref.	Option	Description
L070	Sims Street, West Melbourne	A flood wall along Sims Street, east of the Maribyrnong River.

Excluded

The following options have been excluded from the long-list. Over the past few decades, various levee options for the Maribyrnong River catchment have been suggested. In many cases, these options have evolved since they were first suggested, or land use has since changed. Where the options have evolved, the most recent or most comprehensive version of this option has been selected to



progress to the long-list. Additionally, two of the below options, Sims Street Dike Wall (L100) and Hobsons Road and Stock Bridge Dike (L110), have been excluded on the basis of their small size and because they are not designed to manage riverine flooding.

Ref.	Option	Description
L031	Maribyrnong Township, Telemetry Station, Raleigh Road, and Hillside Crescent	During the October 2022 flood, it was observed that flood water came through the culverts under Riverside Park and up stormwater drains. This option is an existing one-way valve in this drain which will be repaired by the local council. As this suggestion will be repaired, it has been excluded.
L032	Maribyrnong Township, Afton Street Bridge and Pipe Makers Park	This option is one version of a levee to protect the Maribyrnong Township. This option has been combined with the progressed Maribyrnong Township option (L030), which is a comprehensive levee to protect the Maribyrnong Township.
L033	Maribyrnong Township, Afton Street Bridge to Raleigh Road Bridge Upstream	This option is one version of a levee to protect the Maribyrnong Township. This option has been combined with the progressed Maribyrnong Township option (L030), which is a comprehensive levee to protect the Maribyrnong Township. Additionally, it is worth noting that a levee upstream of Raleigh Road Bridge (Maribyrnong Road Bridge) would not provide protection to the Maribyrnong Township on its own.
L034	Maribyrnong Township, Maribyrnong Road Bridge to Pipe Makers Park Downstream	This option is one version of a levee to protect the Maribyrnong Township. This option has been combined with the progressed Maribyrnong Township option (L030), which is a comprehensive levee to protect the Maribyrnong Township. Additionally, it is worth noting that a levee upstream of Raleigh Road Bridge (Maribyrnong Road Bridge) would not provide protection to the Maribyrnong Township on its own.



L040	Maribyrnong Road to Doncaster Street	This option is one version of a levee to protect Ascot Vale. This option has been combined with the progressed Woods Street option (L042), which is a comprehensive levee to protect Ascot Vale.
L041	Stanford Street from Fairbairn Park	This option is one version of a levee to protect Ascot Vale. This option has been combined with the progressed Woods Street option (L042), which is a comprehensive levee to protect Ascot Vale.
L043	Myers Road, Maribyrnong	This option is a version of a levee to protect the area known as Edgewater. Given the development of Edgewater, which has levees incorporated, this option is now redundant.
L050	Fisher Parade to Footscray Road	This option is a version of a levee to protect Kensington originally suggested in 1986. This levee covers the Victorian Racing Club's (VRC) Flood Wall and areas in Kensington. This option is covered by the progressed Kensington Banks Protection option (L056). Additionally, the VRC Flood Wall is considered in following options; Flemington Sector (L051), Kensington (L053), and Hobsons Road and Kensington Road (L055). Given the VRC Flood Wall has been constructed, and that Kensington Banks is covered by another progressed option, this original option is now considered redundant.
L051	Flemington Sector	This option is a version of a levee to protect the Flemington Racecourse, suggested in 1986. This option is redundant as the Victorian Racing Club's (VRC) Flood Wall has since been built.
L052	Kensington and Abattoirs	This option is a version of a levee suggested in 1986 to protect the area that is now Kensington Banks. Given the development of Kensington Banks, this option is now redundant. Additionally, the protection of Kensington Banks has been incorporated into the Kensington Banks Protection (L056) option.



L053	Kensington	This option is a version of a levee to protect the area that is now Kensington Banks. Given the development of Kensington Banks, this option is now redundant. Additionally, the protection of Kensington Banks has been incorporated into the Kensington Banks Protection (L056) option.
L055	Hobsons Road and Kensington Road	This option involves the raising of Hobsons Road and Kensington Road to above the flood level. The flooding outcome is similar to the Hobsons Road (L054) option for that area, and Kensington Rail Bridge to Hopetoun Bridge Levee (L060), for the Kensington Road area. For these reasons, the option is redundant.
L080	Hobsons Road Development	This option proposes changes to the Hobsons Road development precinct, including building raising. For the purposes of this study, it has been incorporated into the Hobsons Road (L054) option.
L090	Open Space Along Maribyrnong River	This option proposes open space along the banks of the Maribyrnong River as part of an integrated landscape levee from Hobsons Road to Sims Street. This option has been excluded because it was designed to manage local runoff and will not make a significant contribution to reducing flooding.
L0100	Sims Street Dike Wall	This option proposes a defensive wall along Sims Street. This option has been designed to manage local runoff and will not make a significant contribution to reducing flooding.
L0110	Hobsons Road and Stock Bridge Dike	This option proposes the extension of the levee at Riverside Park detention basin to meet the 30m riverside corridor landscape. This option has been designed to manage local runoff and will not make a significant contribution to reducing flooding.



One-way valves

One-way valves, backflow prevention devices, and potentially pumps will be important for some of the levee options we have discussed. These valves let water flow in one direction and can allow water stored behind a levee to flow through it, while preventing water from outside of the levee from flowing into the area being protected. One-way valves are commonly used on private and local drainage assets but are less common on larger Melbourne Water assets. Managing private drainage outfall is the responsibility of the property owner and will not be considered in the study.

At this stage of the study, the mitigation options – including levees – are still conceptual and not yet designed. As a result, the exact need for one-way valves for any given option is not known. For now, one-way valves have been excluded from the long-list. They may be considered later in the study depending on the specific requirements of each levee.

There are different types of one-way valves, sometimes referred to as backflow prevention devices, flap valves or non-return valves. The most suitable type would be selected as part of a detailed assessment of an option.

Pumps can also help remove water from behind a levee however, they are generally less preferred because of the risk of failure due to mechanical or electrical faults during a flooding event. That said, pumping solutions may be a suitable option in some circumstances. These types of decisions would be made during further design development if the option was pursued in the future.

It's important to note that **one-way valve options are not being considered as standalone options**. Instead, they may be included as part of levee options where required.

Excluded

Ref.	Option	Description
OW10	Drainage Under Riverside Park	During the October 2022 flood, it was observed that flood water came through the culverts under Riverside Park and up stormwater drains. This option is an existing one-way valve in this drain which will be repaired by the local council. As this suggestion will be repaired, it has been excluded.
OW20	Rivervue, One-Way Valves	This option involves installing one-way valves at Rivervue Retirement Village. The main source of



		flooding in the lower Maribyrnong River catchment is overtopping of the riverbank to inundate the surrounding areas. This means that the use of one-way valves in pipes would not provide a significant reduction in flooding by itself. However, backflow prevention could be an option in combination with other strategies that stop surface flow, such as a levee. The option will be considered as part of the progressed Rivervue Levee (L010) but will not be considered as a standalone option and for this reason is excluded.
OW30	Maribyrnong River Drainage Flap Valve Installation	This option proposes adding one-way valves to all council drainage pipes discharging to the Maribyrnong River. The addition of one-way valves prevents water from the Maribyrnong River flowing back up the drainage pipes and out of local drains. The main source of flooding in the Lower Maribyrnong River catchment is overtopping of the riverbank to inundate the surrounding areas. This means, that the use of one-way valves in pipes would not provide a significant reduction in flooding by itself. However, one-way valves will be considered with levees but not on their own as a standalone option.
OW31	Backflow Prevention Devices	This option proposes the inclusion of one-way valves on internal drainage systems, to prevent water flowing through the drainage network into a residential area. This option is redundant as it is similar to Maribyrnong River Drainage Flap Valve Installation (OW30).
OW40	One-Way Valves On Key Drainage Outlets	This option proposes the inclusion of one-way valves on internal drainage systems to prevent water flowing through the drainage network into a residential area at Rivervue and in the Hobson Road and Kensington Road areas. This option is redundant, as it is covered in the Rivervue one-way valves (OW20) option and the Maribyrnong River Drainage Flap Valve Installation (OW30) option.



PM10	Pumps at the Intersection of Kensington Road, Hobsons Road and Childers Street	As part of managing stormwater runoff a 2m ³ /s pump at the intersection of Kensington Road, Hobsons Road and Childers Street has been suggested. This option would address the insufficient capacity in the drainage network to carry local stormwater flows to the Maribyrnong River. This option is focused on managing local runoff and will not make a significant reduction to flooding during a flood of the lower Maribyrnong River catchment. For this reason, is has been excluded.
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Multifunctional storage areas

Multifunctional storage areas are places that can store flood water, while also serving other functions. For example, an oval that is used for sports or recreation that also provides temporary flood water storage.



Example of a multifunctional storage area, Wyndham community raingarden (source: Melbourne Water, 2017).

Progressed

Three options in this category have been progressed in the study.

Ref.	Option	Description
S060	Defence Site Maribyrnong	This option proposes changes to the northern area of the Defence Site Maribyrnong, close to where the Maribyrnong River undertakes a U-bend, to allow for increased volume and use for flood storage. It is estimated that this site would have a volume of around 675,000m ³ .
S070	Afton Street Conservation Park	This option proposes converting Afton Street Conservation Park into a single large basin, also



		encompassing two existing small wetlands. This option has up to 115,000m ³ of storage.
S0110	Fairbairn Park	This option is the conversion of Fairbairn Park, just south of Raleigh Road, into a single large basin for flood storage. Initial estimates suggest that this option could have more than 150,000m ³ of storage.

Advantages of progressed options

One advantage of the Defence Site Maribyrnong (S060) option is that it will likely provide benefits upstream of the site, with reductions in flood levels of greater than 50mm, according to the Jacobs Flemington Flood Wall - Options Assessment (Jacobs, 2025) report. This site is one of the largest available multifunctional storage areas within the lower catchment. If it is determined to be feasible, the flood prone area could be developed into a multifunctional storage area providing:

- Flood storage
- Management of runoff from the site
- Use for recreation
- Habitat for local fauna and flora.

On its own, the Defence Site Maribyrnong will not reduce flood risk in the lower catchment to an acceptable level. But given the 50mm flood level reduction upstream of the site, and its other potential benefits, it is recommended that this option is further investigated.

The Jacobs Flemington Flood Wall - Options Assessment (Jacobs, 2025) report showed that in combination with the Defence Site Maribyrnong (S060) option, Afton Street Conservation Park (S070) will result in a reduction of flood levels upstream of the Defence Site Maribyrnong of more than 50mm. There may also be opportunities to enhance the recreational value of this site through the development of parklands or extending the Afton Street Wetlands. It is recommended that this option is further investigated, along with the Defence Site Maribyrnong (S060).

For the Fairbairn Park (S0110) option, the Jacobs Flemington Flood Wall - Options Assessment (Jacobs, 2025) report modelling shows that this option presents some benefit for the protection of the Maribyrnong Township through the lowering of the ground levels in Fairbairn Park. Ideally, the park should be reinstated to retain its recreational function, potentially with improved facilities.



Disadvantages of progressed options

One consideration of the Defence Site Maribyrnong (S060) option is that the land is owned by the Department of Defence and is therefore Crown Land. The site also contains heritage listed buildings meaning the option sits within a complex regulatory and legislative context for future development. Importantly, it is likely that the site contains some level of contamination due to its historic use.

A disadvantage of the Afton Street Conservation Park (S070) option, as found in the Jacobs Flemington Flood Wall - Options Assessment (Jacobs, 2025) report, is that this option would result in minor increases in flood levels downstream.

The same Jacobs Flemington Flood Wall - Options Assessment (Jacobs, 2025) report showed that the Fairbairn Park (S0110) option contributes to increased flood levels around Ascot Chase. Additionally, lowering Fairbairn Park could be costly and the extent to which this option represents value for money needs further consideration.

Excluded

Various multifunctional storages identified in previous flood studies were incorporated into the existing Lower Maribyrnong Flood Model and their effects on flood levels were explored by simulating flood events (Jacobs, 2025). It was found that a large volume of water storage is required to reduce flood levels. For this reason, options with a volume lower than the required threshold of 100,000m³ have been excluded from the long-list. The majority of the options in this category have been excluded for this reason.

Additionally, options which would not result in a significant reduction in flood risk have also been excluded from the long-list. For example, when tested in the flood model, the Newells Paddock Reserve (S0190) option did not significantly reduce flood risk. This area is located immediately upstream of the Kensington rail embankments and bridges, which limits the ability of this option to reduce flood levels. Given the limited impact from this option, it has been excluded.

Regarding the option to turn the Flemington Racecourse (S0200) into a flood water storage area, the Victorian Racing Club (VRC) Wall & Mitigation Report for the 1% AEP 2024 Event (Jacobs, 2024) found that it did not significantly lower the flood levels across the lower catchment or increase flood levels in Kensington Banks during the October 2022 flood.

Ref.	Option	Description
S010	Grimes Flat, Avondale Heights	This option proposes a storage area or multifunctional wetland in Grimes Flat, upstream of the Canning Street Bridge. Flood modelling demonstrated that this option did not make a meaningful contribution to the reduction of flood risk.
S020	Canning Street, Avondale Heights	This option proposes a flood storage area north of Canning Street Bridge. This option did not have a large enough volume and was therefore excluded.
S030	Milleara Road Drain, Southern Bank	This option proposes flood storage on the western bank of Maribyrnong River and the southern bank of the Milleara Road Drain, near where the drain meets the river. It had a volume of around 150m ³ which would not reduce flood risk in the lower catchment. This option was therefore excluded.
S040	Milleara Road Drain, Northern Bank	This option proposes flood storage on the western bank of Maribyrnong River and the northern bank of the Milleara Road Drain, near where the drain meets the river. This option had a volume of around 2,000m ³ which would not significantly reduce flood risk. This option was therefore excluded.
S050	Steele Creek	This option proposes flood storage on the western bank of Maribyrnong River and the southern bank of Steele Creek, where the creek meets the river. This option had a volume of around 50,000m ³ and flood modelling confirmed this does not significantly reduce flood risk. This option was therefore excluded.
S080	Chifley Drive, Maribyrnong	This option is a storage of around 50,000m ³ in Chifley Drive Reserve. This option was found not to reduce flood levels significantly and was therefore excluded.



S090	Aberfeldie Park	This option proposes converting ovals at the southern end of Aberfeldie Park into a multifunctional storage area with a combined flood storage 13,000m ³ . This option did not have a large enough volume and was therefore excluded.
S0100	Coulson Gardens	This option proposes the Coulson Gardens in Maribyrnong Township be converted into a single large basin with an approximate volume of 40,000m ³ . This option did not significantly contribute to a reduction in flood risk and was therefore excluded.
S0120	Maribyrnong Park and Aberfeldie Park	This option proposes using Maribyrnong Park and Aberfeldie Park for flood storage. When investigated, it was found that this option did not result in a significant reduction in flood levels and was therefore excluded.
S0130	Maribyrnong Reserve and Coulson Gardens	This option proposes using Maribyrnong Reserve and Coulson Gardens for flood storage. It was a variation of the Coulson Gardens (S0100) option and performed similarly. As a result, this option was excluded from further consideration.
S0140	Frogs Hollow	This option proposes a storage with a volume of around 90,000m ³ . This option did not result in a meaningful reduction of flood levels and was therefore excluded.
S0150	Henry Turner Memorial Reserve	This option proposes using Henry Turner Memorial Reserve south as a potential flood storage which would have volume of around 30,000m ³ . This volume of storage would not make a meaningful reduction in flood risk and as a result was excluded.
S0170	Footscray Park	This option proposes converting an area in Footscray Park adjacent to the Maribyrnong Boulevard for use as flood storage with a volume



		of about 50,000m ³ . It was found that this option did not make a significant reduction in flood level and was therefore excluded.
S0180	Eastern Footscray Park	This option proposes converting the eastern end of Footscray Park for use as flood storage with a volume of around 30,000m ³ . It was found that this option did not result in a significant reduction in flood levels and as a result was excluded.
S0190	Newells Paddock Reserve	This option proposes converting an area to the western end of Newells Paddock Reserve. It was found that this option did not result in a significant reduction in flood levels and was therefore excluded.
S0200	Storage Area, Flemington Racecourse	This option proposes changes to the Flemington Racecourse flood wall to use the racecourse area as possible flood storage. Jacobs flood modelling detailed in the Victorian Racing Club (VRC) Wall & Mitigation Report for the 1% AEP 2024 Event (Jacobs, 2024) found this option only resulted in a minor reduction of flood levels in the Maribyrnong Township, some increases in flood levels in Kensington Banks and an overall outcome of no significant changes in flooding. This option was therefore excluded.
S0210	Medway Golf Course	This option proposes constructing a basin on the small creek in Medway Golf Course as flood storage. This option will not have enough storage to reduce flooding from the Maribyrnong River and was therefore excluded.





Retarding basins

Retarding basins are structures designed to temporarily store flood water during a flood event to alleviate the impacts of a flood downstream.



Example of a retarding basin, Moonee Ponds Creek (source: Jacobs).



Example of a retarding basin, Williams Landing (source: Melbourne Water, 2016).

Progressed

In total, twelve retarding basin options have been progressed in the study so far and remain on the long-list. Of these twelve options, three options; Arundel (RB70), Wildwood (RB65), and Konagaderra (RB60) are categorised as 'primary sites', meaning they can reduce flood risk on their own. The remaining options are flagged as 'secondary sites', meaning they must be combined with other mitigation options to significantly reduce flood risk.

Primary sites

Ref.	Option	Description
RB70	Arundel	This option proposes constructing a retarding basin near Arundel. The site is located on the Maribyrnong River and captures the flow from three main tributaries – Jacksons Creek, Emu Creek, Deep Creek – covering 90% of the catchment area. Previous studies have suggested that a storage volume of 44,500 ML ¹ would be required at this site to reduce flooding to an acceptable level. This would temporarily increase the depth of the river by

¹ The Upper Yarra Reservoir has a capacity of slightly more than 200,000 ML



		14m and lead to the inundation of the Organ Pipes National Park. The proposed site also has the potential to impact the Murrup Tamboore (formerly the Keilor Archaeological Area) near the junction with Arundel Creek. The site is managed by the Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation.
RB65	Wildwood	This option proposes constructing a retarding basin near Wildwood. The site is located on Deep Creek downstream of its junction with Emu Creek, and captures flow from both of these tributaries. Together, these tributaries represent around 60% of the catchment area. To manage flooding to an acceptable level the estimated storage volume required at this site would be around 47,500 ML.
RB60	Konagaderra	This option proposes constructing a retarding basin on Deep Creek near Konagaderra, capturing around 50% of the catchment. Previous studies have not estimated the storage volume required at this site to reduce flooding to an acceptable level.

Advantages of progressed primary options

Past flood studies indicate that the Arundel (RB70) and Wildwood (RB65) options are likely to significantly reduce flood risk on their own (Melbourne Metropolitan Board of Works, (1976), (1986) and Water4Good (2023)).

Given catchment areas upstream of Konagaderra (RB60), it is likely that this option could also make a meaningful contribution to the reduction of flooding in the lower catchment.

Disadvantages of progressed primary options

These retarding basins would need to be large in size and will likely be expensive to construct. For instance, Water4Good (2023) estimated that the Arundel Basin would cost more than \$200 million in today's prices. This figure does not account for additional factors that need to be considered in projects which will likely add further costs such as further studies required as part of the environmental and planning approval processes among other things such as geotechnical studies. Additionally, the retarding basins might present impacts for surrounding areas, including private properties. The options could introduce environmental disturbances during or after construction, and will most likely require the preparation of an Environment Effects Statement in line with environmental and planning requirements. For these reasons, these options sit within a

complex regulatory context for development that will require further assessment against State and Commonwealth legislation, such as:

- *Planning and Environment Act 1987*
- *Environment Effects Act 1978*
- *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Cth)*
- *Crown land - National Parks Act 1975 (Vic) and the Crown Land (Reserves) Act 1978*
- *Aboriginal Heritage Act 2006 (Vic)*
- *Native Title Act 1993 (Cth)*
- *Traditional Owner Settlement Act 2010 (Vic)*
- *Heritage Act 2017 (Vic)*
- *Flora and Fauna Guarantee Act 1988 (Vic)*
- *Fisheries Act 1995 (Vic).*

Secondary Sites

Ref.	Option	Description
RB15	Clarkefield	This option proposes constructing a retarding basin near Clarkefield on Emu Creek with an upstream catchment area of 140km ² .
RB20	Sunbury	This option proposes constructing a retarding basin upstream of Sunbury on Jacksons Creek with an upstream catchment area of 290km ² .
RB25	Willow Flat	This option proposes constructing a retarding basin at Willow Flat.
RB30	Lancefield	This option proposes constructing a retarding basin to the east of Lancefield on Deep Creek with a catchment area of 200km ² .
RB35	View Hill	This option proposes constructing a retarding basin to the northeast of Romsey on Deep Creek with a catchment area of 210km ² .

RB40	Donovans Creek	This option proposes constructing a retarding basin to the southeast of Romsey on Deep Creek with a catchment area of 300km ² .
RB45	Darraweit D2	This option proposes constructing a retarding basin on Deep Creek downstream of Darraweit Guim with a catchment area of 340km ² . This option is similar to Darraweit D1 (listed below) but is located slightly further downstream.
RB50	Darraweit D1	This option proposes a retarding basin be constructed on Deep Creek upstream of Darraweit Guim with a catchment area of 320km ² .
RB55	Beveridge West	This option proposes constructing a retarding basin on Deep Creek near Beveridge West with a catchment area of 520km ² .

Advantages of progressed secondary options

These options have the potential to be combined with other measures, including nature-based approaches to reduce flood risk. This approach allows for greater storage across the catchment compared to individual retarding basins and if designed correctly, allows for the upgrading of storage volumes in the future to respond to the expected increase in runoff from climate change. Another potential advantage is that construction can be staggered so it is easier to deliver options that can increase flood protection sooner.

Disadvantages of progressed secondary options

These options have similar disadvantages to the primary sites although, in general, they are not expected to be as challenging. Additionally, as these sites are likely to be developed with other retarding basins, there could be duplicate expenses associated with planning, spillways, and ongoing maintenance across multiple sites. While individual retarding basin storage volumes are reduced with multiple basins, spillways are still required to pass very large flows to maintain safety.

Excluded

In the study, small sites, meaning those with insufficient upstream catchment areas have been excluded as they are likely to not result in enough of a significant reduction in flood risk.

Ref.	Option	Description
RB5	Fenton Hill, Clarkefield	This option proposes constructing a retarding basin near Fenton Hill, Clarkefield.
RB10	Bolinda	This option proposes constructing a retarding basin near Bolinda.



Dams

For this study, dams are defined as a structure that is designed to permanently store water. Dams are different to retarding basins which are designed to temporary store water. Often, dams are designed for water supply, recreation and flood relief. In some circumstances, existing dams can be increased to provide flood storage and new dams can be designed to include flood storage.



Example of a dam, Lilydale (source: Melbourne Water, 2013).



Example of a dam, Ted Hill (source: Melbourne Water, 2012).



Excluded

Two dam options were suggested for the study, and both options have been excluded.

Ref.	Option	Description
D010	Rosslynne Reservoir	An initial desktop assessment found that there was limited availability to raise Rosslynne Reservoir due to the potential to inundate private property and Bacchus Marsh Road. This, coupled with the significant effort in terms of design, ensuring dam safety and regulatory compliance, means the option would be difficult to deliver and may not provide a significant reduction in flood risk.
D020	New Dams	This option proposes the construction of a new water supply dam with flood storage. There are currently no feasible proposals for new dams in the catchment that would significantly reduce flood risk.





Alterations to existing bridges

Alterations to existing bridges refers to making changes to features of existing bridges within the catchment area to improve the flow of water.

Bridge embankments or piers can obstruct the flow of flood water. It is not likely that bridges will be removed or replaced as part of this study, but there are actions that can be undertaken to improve the efficiency of flow under bridges such as pier shielding (making the pier shape more streamlined) or aligning piers with the main flow direction.



Example of a river bridge, the Maribyrnong River (source: Melbourne Water, 2016).

Progressed

One option has progressed in this category.

Ref.	Option	Description
Br10	Pier Shielding on Raleigh Road Bridge	Undertake Pier Shielding on Raleigh Road Bridge, making the pier shape more streamlined to improve flow and reduce upstream flood levels.



Advantages of progressed option

Advantages of the Pier Shielding on Raleigh Road Bridge (Br10) option are that it will likely be relatively cost-effective in terms of a reduction in upstream flood risk. Given the location of the bridge, this option could add to the possible benefits that could result from other options and reduce flood risk to the Maribyrnong Township.

Disadvantages of progressed option

The Pier Shielding on Raleigh Road Bridge (Br10) option would not result in a significant reduction in flood risk on its own but might be beneficial in combination with other mitigation options.

Requires further information

We need more information before we can assess the following options in more detail. Once we have everything we need, we will either progress or exclude them and report the results at a later stage in the study.

Ref.	Option	Description
Br20	Pier Shielding on Angliss Stock Bridge	This option proposes Pier Shielding on Angliss Stock Bridge, making the pier shape more streamlined to improve flow.
Br30	Pier Shielding on Kensington Rail Bridge	This option proposes Pier Shielding on Kensington Rail Bridge to streamline the pier shape to improve flow.
Br40	Pier Shielding on Dynon Road Bridge and Hopetoun Bridge	This option proposes Pier Shielding on Dynon Road Bridge and Hopetoun Bridge, making the pier shape more streamlined to improve flow.

Excluded

Bridge alterations, such as removing piers to improve the flow of water, would only result in a minor reduction in flood risk. These options are complex, expensive and involve significant engineering challenges. Given these challenges and their minor reductions to flood risk, they have been excluded from the long-list.

Ref.	Option	Description
Br11	Pier Reduction on Raleigh Road Bridge	This option proposes reducing the number of piers on Raleigh Road Bridge. The cost of reducing the number piers could not be justified against the likely reduction in flood risk for this option. If this bridge is replaced in the future, it is recommended that the number of piers are reduced or that it is designed in the future as a clear-span bridge.
Br31	Realignment of Piers at Saltwater River Rail Bridge	This option proposes realigning bridge piers with river flows at Saltwater River Rail Bridge. This option would be very expensive and not justifiable given the limited reduction in upstream flood levels. As a result, it has therefore been excluded.
Br50	Pier Reduction on Footscray Road Bridge	This option proposes reducing the number of piers on Footscray Road Bridge. Similar to the Piers Realignment of Kensington Rail Bridge (Br11) option and the Piers Realignment of Kensington Rail Bridge (Br31) option, the possible benefits of a reduction in flood risk reduction does not justify the costs of this option and has therefore been excluded.



Flood relief culverts

Flood relief culverts are structures built on the floodplain to allow flood water to flow through barriers such as embankments or other obstructions. By providing a pathway for water to flow downstream, culverts can help reduce the flood levels upstream of the embankment or obstruction.



Example of a culvert pipe (source: Melbourne Water, 2013).



Example of flood relief culverts, Farnsworth Avenue, Footscray (source: Jacobs).

Progressed

Two flood relief culvert options have been identified as having the potential to significantly reduce flood risk and have been progressed.

Ref.	Option	Description
Cu20	Heavenly Queen Temple Culverts, layout 1	This option proposes constructing a set of culverts at the Saltwater River Rail Bridge, near the Heavenly Queen Temple. These culverts would link Newells Paddock Wetlands Reserve to the Maribyrnong River downstream of the Heavenly Queen Temple.
Cu50	Canning Street Bridge Culverts	This option proposes increasing the capacity of the waterway at the Canning Street Bridge (located near the Canning Reserve Playground), most likely, by



		installing additional culverts at the road embankment west of the existing bridge.
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Advantages of progressed options

The Heavenly Queen Temple, layout 1 (Cu20) option was demonstrated to reduce flood levels by up to 100mm upstream and about 50mm around Kensington Banks (Jacobs, 2025).

For the Canning Street Bridge (Cu50) option, a preliminary test showed that a set of six 3m x 2.5m culverts could reduce flood levels by up to 50mm upstream.

Disadvantages of progressed options

In relation to the Heavenly Queen Temple, layout 1 (Cu20) option, preliminary investigations have identified some constraints:

- The location is in an area of cultural significance for the Wurundjeri People along the Maribyrnong River corridor which overlaps with the footprints of these culverts
- The construction costs for this option are likely to be high because the culverts cross under two passenger and freight railway lines and would require an estimated railway shutdown period of three months. It is estimated that the construction costs for this option alone would be between \$120 to \$250 million (Jacobs, 2025)
- There would be a complex regulatory context for future development.

Preliminary investigations have shown that the Canning Street Bridge Culverts (Cu50) option has the potential to increase downstream flood levels, with the culverts discharging in Canning Reserve. Further, there would likely be road disruptions before and during construction of the option, including traffic management.

Requires further information

We need more information before we can assess the following option in detail. Once we have everything we need, we will either progress or exclude it and report the results at a later stage in the study.

Ref.	Option	Description
Cu22	Heavenly Queen Temple, culvert deepening	This option proposes deepening the culverts at the Heavenly Queen Temple to allow an increase in flow. The potential benefits of this option require more investigation.

Excluded

Three options in this category have been excluded from the long-list.

Ref.	Option	Description
Cu10	Lynches Bridge	This option proposes constructing a flood relief culvert at Lynches Bridge. The option is expensive and would only result in a very minor reduction in flood risk (Jacobs, 2025).
Cu12	Heavenly Queen Temple Culverts, layout 2	This option proposes a variation of a progressed option, Heavenly Queen Temple, layout 1 (Cu20), and is a set of culverts at the Saltwater River Rail Bridge. These culverts would link Newells Paddock Wetlands Reserve to the Maribyrnong River downstream of the Heavenly Queen Temple. However, this option considers a different discharge point after the Heavenly Queen Temple carpark. For this study, only one of the Heavenly Queen Temple Culvert options has been progressed as they will have a similar performance.
Cu40	Culverts Under Avondale Heights Side Embankment	This option proposes constructing culverts under Avondale Heights side embankment. This is the same as the Canning Street Flood Relief Culverts (Cu50) which has been progressed, making this option redundant.





Channel modification

Channel modification refers to changing the river's channel to increase the amount of water that can flow through it. Modifications often involving dredging (the excavation of sediment), widening, straightening or deepening of a channel.



Example of channel modification, widening of Blind Creek (source: Melbourne Water, 2020).

Excluded

Channel modification options have been excluded from the long-list due to their impact on water quality and biodiversity. Modifying river channels such as widening, deepening or dredging can negatively affect water quality and biodiversity.

The following options were originally proposed in the 1976 Melbourne and Metropolitan Board of Works report *Flood Mitigation in the Maribyrnong River Basin – A Preliminary Hydrological Study*:

- Changes to Channel Capacity (CM141)
- Enlargement of Channel and Addition of Channel (CM140)
- Enlarged Maribyrnong River Channel (CM130).



Since the release of this report, land use along the river has significantly changed and these options are no longer feasible. In the lower catchment, these approaches are also not feasible due to the existing development in the area, the potential social and environmental disruption, and the high costs of disposing of the dredged material, which is likely to be contaminated.

Ref.	Option	Description
CM10	Dynon Road to Footscray Rail Bridges	This option proposes channel widening from around Dynon Road to Footscray Rail Bridges.
CM20	Footscray Rail Bridge to Lynchs Bridge	This option proposes channel widening from around Footscray Rail Bridge to Lynchs Bridge.
CM30	Lynchs Bridge to Fisher Parade	This option proposes channel widening from around Lynchs Bridge to Fisher Parade.
CM40	Fisher Parade to Charles Street	This option proposes channel widening from around Fisher Parade to Charles Street.
CM50	Charles Street to Raleigh Road Bridge	This option proposes channel widening from around Charles Street to Raleigh Road Bridge.
CM60	Raleigh Road Bridge to Aberfeldie Park	This option proposes channel widening from around Raleigh Road Bridge to Aberfeldie Park.
CM70	Raleigh Road to Afton Road	This option proposes channel widening between Raleigh Road to Afton Road.
CM80	Maribyrnong Township	This option proposes channel deepening near Maribyrnong Township.
CM90	Dredging	This option proposes channel dredging and channel widening between Dynon Road and Footscray Rail Bridges to increase flow.
CM100	Embankments	This option proposes high embankments to contain flood waters within the channel. This option is very general and effectively suggests the use of levees.



		This option is covered by other options proposed at more specific locations under the levees category.
CM110	Channel Modification near Bridges	This option relates to eight bridges over the Maribyrnong River, downstream of Maribyrnong, where channel widening and/or deepening of the waterway under the bridges could be considered. This option could impact the stability and structural integrity of the bridges, in addition to the issues discussed above, and has therefore been excluded.
CM120	Dredging along Maribyrnong River	This option proposes dredging along Maribyrnong River at various locations. It is a duplicate of the Dredging (CM090) option listed above.
CM130	Enlarged Maribyrnong River Channel	In 1906, it was proposed that the river channel be enlarged through widening and deepening at various locations. Subsequent reports have developed this option in further detail, and these are addressed in the Changes to Channel Capacity (CM141) option listed below.
CM140	Enlargement of Channel and Addition of Channel	This option proposes the enlargement of the existing channel, assisted by a second channel from Dynon Road to Napier Street.
CM141	Changes to Channel Capacity	This option is a suggestion in a 1921 report and further develops the Enlarged Maribyrnong River Channel (CM130) listed above. It relates to changes to channel capacity by widening, deepening, minor realignment, and the construction of levees from upstream of Raleigh Road Bridge to Dynon Road.





Flow diversion

Flow diversion involves diverting flood water into a different catchment or basin to help lower the peak flow of a flood.



Example of flow diversion (source: Heritage Council of Victoria, 2008).



Example of flow diversion (source: Melbourne Water, 2012).

Excluded

Flow diversions have been used in the past to transfer flood water from one area to another. However, the transfer of water is likely to cause harm to humans, property and the environment in the new location. For this reason, these options are generally not considered viable and have therefore been excluded.

Large scale pumping options are also included in this category. These are different to local pumping options which were discussed as part of one-way valves in the levee section of this handbook. The two large scale pumping options are Smithfield Road Drain (FD50) and Diversion via Pumping (FD70). Pump stations are viable options for moving drinking water, wastewater and stormwater as these can be moved steadily over a period of time and the volumes are usually small. The volume of water that needs to be moved to lower the flood levels in the Maribyrnong River catchment would require a pumping solution of a size that is unfeasible, both from an engineering and cost perspective. As such, all flow diversion options have been excluded from the long-list.



Ref.	Option	Description
FD10	Jacksons Creek to Werribee River	This option proposes flow diversion from Jacksons Creek to Werribee River. This option involves transferring flow from Djirri Djirri Creek and Toolern Creek through a tunnel or viaduct of approximately 1km in length. The option also requires deepening of Djirri Djirri Creek for around 4kms.
FD20	Jacksons Creek to Kororoit Creek	This option proposes flow diversion from Jacksons Creek to Kororoit Creek. This option involves transferring flow from Djirri Djirri Creek and Kororoit Creek through a tunnel or viaduct of approximately 2kms in length. The option also requires deepening of Djirri Djirri Creek for around 3kms.
FD30	Jacksons Creek to Kororoit Creek East	This option involves transferring flow from Jackson Creek to Kororoit Creek East southeast of Gisborne through a 3.5kms channel.
FD40	Upper Emu Creek and Upper Jackson Creek	This option proposes flow diversion and a 1km channel or canal between the Upper Emu Creek and Upper Jacksons Creek. This would transfer flow from one part of the Maribyrnong catchment to another part of the catchment and is not likely to reduce risk in the lower part of the catchment.
FD50	Smithfield Road Drain	This option proposes using a pump station to divert water from Smithfield Road Drain.
FD60	Moonee Ponds Creek	This option proposes flow diversion to Moonee Ponds Creek.
FD70	Diversion via Pumping	This option proposes using a pump station to divert normal flow and flood waters for use in a Hydroelectric Dam Storage Bank. Given the volume of water experienced during a flood, a very large pump would be required, as well as a very large storage dam. This option is not considered feasible from an engineering or cost perspective.



FD80	Footscray Park	This option proposes implementing large drains around oval areas, such as Footscray Park to provide storage for flood water. Large drains around parks would provide some additional storage, however, the storage provided would be limited compared to a Maribyrnong River flood. For instance, if 1km of 5.4m diameter pipes were installed, it would provide less than 25 ML of storage, which is not significant compared to the 2022 Maribyrnong River flood of 67,000 ML.
FD90	Edgewater and Footscray Park	This option proposes implementing new drains from the lake to the catchment to provide storage for flood water. Large drains around parks would provide some additional storage, however, the storage provided would be limited compared to a Maribyrnong River flood. For instance, if 1km of 5.4m diameter pipes were installed, it would provide less than 25 ML of storage, which is not significant compared to the 2022 Maribyrnong River flood of 67,000 ML.



Stormwater harvesting

Stormwater harvesting involves the process of collecting, treating, storing and reusing runoff rainwater from drains within an urban catchment area. Often this water is collected for alternative use.



Example of stormwater harvesting, Elsternwick Park (source: Melbourne Water, 2013).

Excluded

While stormwater harvesting schemes can be valuable for managing local runoff water, they are not relevant to riverine flooding. The below options all relate to stormwater harvesting near JJ Holland Park in Kensington. Preliminary assessments have shown that even when combined with other options, they would not be effective in reducing the flood risk from a Maribyrnong River flood. This is largely because the storage volume of these options is significantly smaller than what would be needed. As such, all stormwater harvesting options have been excluded from the long-list.

While these options will not play a role in reducing flood risk, they are relevant to future development of the precinct in and around Hobsons Road and West Melbourne. It is recommended that these options be considered as part of future development in these areas.



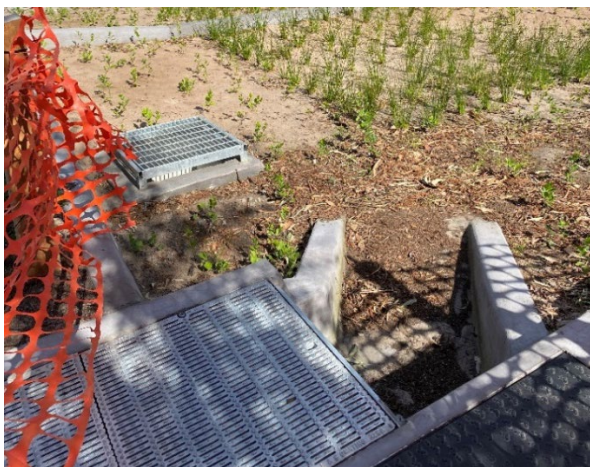
Ref.	Option	Description
SH10	Playground	Local stormwater harvesting at JJ Holland Park, near the playground.
SH20	Tennis Courts	Local stormwater harvesting at JJ Holland Park, near the tennis courts.
SH30	Oval	Local stormwater harvesting at JJ Holland Park, near the oval.
SH40	Childers Street	Local stormwater harvesting at JJ Holland Park, near Childers Street.
SH50	BMX Track and Skate Park	Local stormwater harvesting at JJ Holland Park, near the BMX track and the Skate Park at one corner of the park.





Blue-green infrastructure

Blue-green infrastructure involves incorporating natural elements, such as vegetation into the urban environment to manage rain or stormwater and improve local amenity. Often, it is infrastructure that is small-scale and designed to manage local runoff water. Common types of blue-green infrastructure include permeable gardens, car parks and road verges.



Example of blue-green infrastructure (source: Jacobs, 2025).



Example of blue-green infrastructure, Frankston (source: Melbourne Water, 2012).

Excluded

Blue-green infrastructure can play an important role in managing local runoff or surface water flooding, while also enhancing liveability. However, they are not relevant to riverine flooding as they are designed to manage local stormwater runoff. The volume of water generated in a local area during a rainfall event is much smaller than that of a Maribyrnong River flood. As such, these measures will not lead to a significant reduction in flood risk and have been excluded from the long-list. Although not recommended as part of this project, these options can be effective at managing local runoff and could be adopted by other organisations.

Many options have been suggested over time which have been listed below for completeness, and it is understood that some of these might not be relevant to water management. As these options will not be considered as part of this study detailed descriptions have not been provided.



Ref.	Option	Description
BG01	Kensington Banks	Pedestrian and cycle networks near Kensington Banks.
BG02	Childers Street	Pedestrian and cycle networks near Childers Street.
BG03	River Edge Path	Pedestrian and cycle networks near River Edge Path.
BG04	Dynon Road Bridge	Pedestrian and cycle networks near Dynon Road Bridge.
BG05	Dynon Road Wildlife Reserve	Pedestrian and cycle networks near Dynon Road Wildlife Reserve.
BG06	Tidal Canal	Pedestrian and cycle networks south of Tidal Canal.
BG07	Underpass	Pedestrian and cycle networks at an unspecified location.
BG08	Rail Corridor	Pedestrian and cycle networks near Rail Corridor, Dynon Road.
BG09	Footscray Community Arts Centre	Pedestrian and cycle networks near Footscray Community Arts Centre.
BG10	South Kensington Station	Pedestrian and cycle networks near South Kensington Station.
BG11	Kensington Banks	Open space near Kensington Banks.
BG12	Water Retention Opportunities	Open space with water retention opportunities.
BG13	Public Access Along River Edge	Open space with public access along river edge.
BG14	Kensington Road to Dynon Road Wildlife Reserve	Open space connecting Kensington Road to Dynon Road Wildlife Reserve.



BG15	Extension of Dynon Road Wildlife Reserve	Open space by extending of Dynon Road Wildlife Reserve.
BG16	High Line Corridor	Open space near the High Line Corridor.
BG17	Extension of River Frontage	Open space by expending river frontage.
BG18	Childers Street	Open space one Childers Street.
BG19	Lloyd Street	Open space on Lloyd Street.
BG20	Dynon Road	Open space on Dynon Road.
BG21	Tidal Canal	Open space on Tidal Canal.
BG22	Dynon's Renewal	Open space on Dynon's Renewal.
BG23	Left Side of the Riverbank	Open space on the left side of the riverbank.
BG24	Kensington Tennis Courts	Community assets near Kensington Tennis Courts.
BG25	Kensington Community Recreation Centre	Community assets near Kensington Community Recreation Centre.
BG26	Kensington Community Children Co-op	Community assets near Kensington Community Children Co-op.
BG27	South Kensington Station	Community assets near South Kensington Station.
BG28	Heavenly Queen Temple	Community assets near Heavenly Queen Temple.
BG29	River Studios	Community assets near River Studios.



BG30	Footscray Community Arts Centre	Community assets near Footscray Community Arts Centre.
BG31	Waterside Metal Art Studio	Community assets near Waterside Metal Art Studio.
BG32	Big Fish Workshop	Community assets near Big Fish Workshop.
BG33	Heritage Buildings	Community assets near Heritage Buildings.
BG34	Transition Structures	Community assets near transition structures.
BG35	Hobsons Road	Community assets near Hobsons Road.
BG36	Cycle Tube	Landforms on Hobsons Road.
BG37	Transitional Art Wall	Landforms as part of a Transitional Art Wall.
BG38	Flood Detention Areas	Landforms as part of Flood Detention Areas.
BG39	Grassed Embankments	Landforms as part of Grassed Embankments.
BG40	Extension of River Dike	Extension of the river dike near Kensington Road and Hobsons Road.
BG41	Hobsons Road	River crossing on Hobsons Road.
BG42	Rail Bridge	River crossing near the Rail Bridge.
BG43	Southern Rail Bridge	River crossing near the Southern Rail Bridge.
BG44	Kensington Road North	River crossing on the Kensington Road North.
BG45	Dynon Road	River crossing on Dynon Road.



BG46	Dynon Road Wildlife Reserve	River crossing as part of Dynon Road Wildlife Reserve.
BG47	Tidal Canal	A tidal canal.
BG48	Hard Infrastructure	Construction of hard infrastructure.
BG49	JJ Holland Park	Open space at JJ Holland Park.
BG50	Newell's Paddock Wetland Reserve	Pedestrian and cycle networks near Newell's Paddock Wetland Reserve.
BG51	Riverside Park	Pedestrian and cycle networks near Riverside Park.
BG52	Newton Street	Convert concrete spaces into green spaces and wetlands, near Newton Street Kensington.
BG53	Newell's Paddock Wetland	Wetlands near Newell's Paddock Wetland.
BG54	Supporting Diversity	Support diversity of animals and plants in Kensington.
BG55	Escarpment Reserve	Biodiversity at Escarpment Reserve.
BG56	Residential Amenities	Keep residential amenities.



Nature-based solutions

Nature-based solutions involve mimicking natural processes to reduce flood risk, while also providing a beneficial outcome for the environment or communities. For example, wetlands restoration is the reconnecting of wetlands and billabongs to create more storage for flood water, with the additional benefit of enhancing biodiversity.



Example of a nature-based solution, Kennedy Creek wetlands (source: Melbourne Water, 2013).

Progressed

Two options in this category have been progressed in the study.

Ref.	Option	Description
NBS3	Reconnection of Billabongs	Reconnecting disconnected or lost billabongs to increase flood storage volume in the upper Maribyrnong River catchment, potentially also resulting in other environmental benefits. Several potential sites have been identified and will be



		further explored in Phase 3, however, these generally have small areas.
NBS4	Leaky Dams	Structures across a watercourse that are designed to slow down flood water, while still allowing baseflow to pass through, typically made of materials like wood. While further work is required in Phase 3 of the study, the Lancefield Retarding Basin site (RB30) is a potential location for a Leaky Dam. Other retarding basin sites may also be suitable.

Advantages of progressed options

The Reconnection of Billabongs (NBS3) could generate carbon credits and rejuvenate natural areas. This option could also work well in combination with the Leaky Dam (NBS4) option, as the Leaky Dams would increase water levels and could thereby naturally reconnect the billabongs.

The Leaky Dams (NBS4) option slows water down and can spread it out, reconnecting wetlands and other disconnected parts of the flood plain and thereby reduce downstream flooding. Leaky Dams offer advantages in terms of potential carbon sequestration and enhanced social, recreational and environmental outcomes.

Disadvantages of progressed options

The Reconnection of Billabongs (NBS3) could be costly, difficult to maintain and might only be relevant to a small number of potential locations.

As Leaky Dams (NBS4) option are a new technology, there are several unknowns regarding their design and operation. There may be a high cost associated with maintaining the structures that are commonly made from a combination of natural and engineered materials. Further, if these structures are holding back large volumes of water, there will be a need to implement safety features such as a spillway, which may be difficult to blend into the Leaky Dam.

Requires further information

We need more information before we can assess the following option in detail. Once we have everything we need, we will either progress or exclude it and report the results at a later stage in the study.



Ref.	Option	Description
NBS1	Natural Measures	Natural Measures to encourage rewilding, rejuvenating wetlands, more trees on slopes and helping farmers in the Maribyrnong River catchment move towards regenerative practices. Rejuvenating wetlands is similar to option NBS3 Reconnection of Billabongs which is being progressed. The other elements of this represent a broad set of potential options and additional information and testing of what effect catchment land management would have on flood risk is required before this option can be progressed or excluded.

Excluded

The following options have been determined to be redundant or irrelevant for the purposes of the study and as a result have been excluded from the long-list. Specific reasons for each are outlined below.

Hobsons Road Development Tertiary Corridors (NBS6) and Riparian Corridors along Hobsons Road (NBS5) options are more suitable for managing local stormwater runoff water and will not lead to a significant reduction in flood risk from a riverine flood from the Maribyrnong River.

Ref.	Option	Description
NBS2	Reduce Flows	Catchment management through natural measures to reduce flows. This option is similar to some of the elements (rewilding, reforestation and on farm measures) covered in option Natural Measures (NBS1).
NBS5	Riparian Corridors Along Hobsons Road	Introduction of riverbank wetlands, upstream of Hobsons Road to downstream of Dynon Road Bridge. While this option will improve the amenity of this area, it is limited in the context of the Maribyrnong River catchment and will not make a meaningful difference to flooding.



NBS6	Hobsons Road Development Tertiary Corridors	Tertiary corridors to allow for future areas of development in the Hobsons Road development precinct. This would be for the purposes of discharging excess stormwater into these tertiary corridors, before it is released into riparian corridors.
NBS7	Purchasing Homes to Convert to Wetlands	Purchasing homes in areas of high flood risk and converting these areas into wetlands. This option is redundant and covered by Property Acquisition and Buy-Backs (NS10) option.
NBS8	Kensington Banks	Use nearby land to protect Kensington Banks, for example, near the Metro Tunnel works yard or Hobsons Road. While these areas are sizeable within the context of Kensington Banks, they are small compared to the Maribyrnong River catchment and there is not enough space in these areas to make a meaningful impact on reducing flood risk.





Non-structural

Non-structural refers to options that do not require a physical asset to directly manage flooding. For example, changes to planning schemes or flood warning systems.



Example of a non-structural option, community education (source: Melbourne Water, 2022).



Example of a non-structural option, flood preparedness (source: Melbourne Water 2024).

Progressed

Six options within the non-structural category have been progressed.

Ref.	Option	Description
NS10	Property Acquisition and Buy-Backs	The purchase of properties in areas subject to extremely high flood risk or deemed unacceptable.
NS15	Flood Resilient Homes and Flood Proofing	Retrofitting homes to make them more flood resilient.
NS20	Flood Warning Systems	Making improvements to flood warning systems through the use of new technologies or installation of additional streamflow and rainfall gauges. It is important to note that this study will not design an improved warning system but will provide an indication of the potential benefits of investing in one.



NS25	Improving and Enhancing Post Flood Support	Provision of a range of support services to residents that remain impacted by the October 2022 flood event, including temporary accommodation, counselling and insurance.
NS60	Agency and Community Flood Preparedness	Running mock floods events with response agencies, authorities or community members to train for actual events. This would improve the response to flood events.
NS80	Evacuation Routes	Improving access and egress for properties within floodplains to inform robust flood plans including evacuation routes.

Advantages of progressed options

In general, these options can be delivered relatively quickly as they do not require significant approvals or complex engineered solutions. Importantly, considering feedback from Phase 1, they are focused on improving safety.

Option Property Acquisition and Buy-Backs (NS10) removes people from areas of high flood risk and reduces flooding impacts, as well as increasing safety.

Option Flood Resilient Homes and Flood Proofing (NS15) can be an effective way of reducing the damages to property from a future flood event and reducing time for repairs. Similar options are in place in other locations impacted by riverine flooding, with a successful scheme operating in Brisbane since the 2011 floods.

Improvements to the Flood Warning Systems (NS20) aim to provide residents, business owners and other stakeholders with greater lead time ahead of flood events. This extended warning period helps reduce the impacts of flooding and enhances community safety.

Improving and Enhancing Post Flood Support (NS25) can assist with helping to limit some of social damages of flood events.

Running mock flood events can help to improve flood preparedness and response to a flood event as suggested in option Education and Communication (NS60).

Evacuation Routes (NS80) would allow residents to safely leave an area that is expected to be flooded and would allow emergency services access to these areas. As well as improving resident safety, this option would reduce the pressure on emergency management services.



Disadvantages of progressed options

Overall, these options do not physically prevent flooding.

Option Property Acquisition and Buy-Backs (NS10) would likely to be complex and costly to implement.

While option Flood Resilient Homes and Flood Proofing (NS15) can reduce the impact of flooding, it does not necessarily defend against flooding and buildings would be inundated. Further, it is unclear who would bear the costs.

The Flood Warning Systems and Preparedness (NS20) option and Improving and Enhancing Post Flood Support (NS25) option do not physically protect assets from flooding.

Agency and Community Flood Preparedness (NS60) would require coordination across multiple agencies and the community. Also, this does not physically protect assets from flooding.

Evacuation Routes (NS80) do not reduce the physical impact of flooding and may be costly to retrofit evacuation routes into some communities. Further, it is unclear who would bear the costs.

Requires further information

We need more information before we can assess the following option in detail. Once we have everything we need, we will either progress or exclude it and we will report the results at a later stage in the study.

Ref.	Option	Description
NS26	Compensation and Support	This option proposes offering compensation or support when new flood modelling adds properties to the Special Buildings Overlay (SBO) and Land Subject to Inundation Overlay (LSIO).

Excluded

The following options in this category are excluded from the long-list after it was determined that they are either redundant, irrelevant, covered by a more comprehensive mitigation option or outside the scope of the study.



Ref.	Option	Description
NS05	Planning and Development Controls	This option proposes that planning and development controls are updated to the latest flood modelling. This is currently being undertaken, and the option has therefore been excluded.
NS06	State-Led Flood Planning Framework	This option proposes a state led Flood Planning Framework, similar to Bushfire Overlays to better account for flood modelling. The current planning schemes are already being revised, and the option has therefore been excluded.
NS35	Insurance	This option proposes to offer affordable flood insurance for properties in areas of high flood risk. Melbourne Water does not have the jurisdiction to influence insurance prices to address this suggestion.
NS11	Relocation	This option proposes the relocation of people living in high flood risk areas and the purchase of properties in areas of very high flood risk. This option is redundant as it is covered by the Property Acquisition and Buy-Backs (NS10) option.
NS30	Education and Communication	Improve awareness within the community about flood risk, especially when looking at purchasing properties that are in floodplains and provide more transparent information about flood risk. This option is currently being delivered by Melbourne Water, local councils and VICSES and is therefore redundant.
NS40	Publicly Available Dataset for Coastal and Riverine Flooding	This option proposes a publicly available dataset for coastal and riverine flooding. Melbourne Water is currently undertaking the Flood Information Deployment Program to address this.
NS45	Improving and Upgrading Local Drainage Systems	This option proposes improving and upgrading local drainage systems. Local drainage systems are normally designed to manage local runoff and will not have a significant impact on reducing flooding from the Maribyrnong River.



NS50	Tidal Monitoring	This option proposes improving tidal monitoring and modelling, and the communication of this information to communities in areas of high flood risk. There are several tidal stations across Port Phillip Bay including Williamstown which is available from the Bureau of Meteorology. The data from these stations has been used to inform modelling studies such as the Port Phillip Bay Coastal Hazard Assessment Final Report (McInnes et al., 2022). The data from this project is publicly available including inundation information. As this information is available, this option is determined to be redundant.
NS70	Post-Flood Recovery	This option proposes the provision of a range of support services for people impacted by flooding. This option is redundant and covered by the more comprehensive Post Flood Support (NS25) option.
NS90	Property Values, Kensington	This option proposes improving or protecting property values in Kensington. Property values are changing for several reasons, and although flood mitigation options may reduce risk of flooding, this might not be directly linked to an increase in property value. This option is outside the scope of the study.
NS100	Protect Communities at Risk, Kensington	This option proposes protecting communities at risk of flooding in Kensington. This option is redundant and covered by more comprehensive options that suggest measures to reduce flood risk for Kensington.



... Other

In the context of the study, other refers to miscellaneous options that do not fall into one of the previously mentioned categories.



Example of an option that would fall in the 'Other' category, Thames Barrier, UK (source: Jacobs, 2025).

Requires further information

We need more information before we can assess the following options in detail. Once we have everything we need, we will either progress or exclude them and report the results at a later stage in the study.

Ref.	Option	Description
At10	Tidal Barrage Along Maribyrnong	Option At10 proposes to construct a tidal barrage along the Maribyrnong River. This option would create a tidal barrage at the outlet of the Maribyrnong River to the Yarra River, or the outlet of the Yarra River to Port Phillip Bay.
At60	Sunbury Line Railway Corridor Underpass Tunnel	This option proposes creating a tunnel under the Sunbury Line Railway Corridor to allow for egress as water levels rise.

Excluded

Two options in this category have not been progressed.

Ref.	Option	Description
At20	Tidal Barrage at Heads	This option proposes the construction of a tidal barrage at the Port Philip Heads. This option could reduce flood risk, although it would need to be operated with a sophisticated forecast system. The option falls outside the scope of the study, as to be effective it would need to cover all of Melbourne and Port Phillip. Additionally, indicative costs suggest this option would be overly expensive and as a result is unfeasible for the purpose of this study.
At30	Diverting Flow to Disused Mine Shafts	This option proposes diverting flood waters into disused mine shafts. A review of the Department of Energy, Environment and Climate Action Historical Mining Activity dataset shows only one mine shaft in the Maribyrnong River catchment. This suggests it is unlikely that many mine shafts exist in the area. The identified mine shaft, and even a combination of multiple mine shafts, would not have the storage volume required to make a significant difference to flood risk levels. In addition, flood water would need to be transferred into the shafts through surface channels or tunnels, which are likely to be expensive to construct and would need to be built on private property.

Speak to the team

If you have any questions, please call 131 722 or email enquiry@melbournewater.com.au

Visit the Let's Talk website to learn more about the study, view current and upcoming engagement opportunities and sign up to receive project updates: [Melbourne Water - Let's Talk](#)

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