

Maribyrnong River Flood Model

Questions & Answers

11 July 2024

Modelling

Question

1. What instigated the re-modelling? Was it just the 2022 floods or was the re-modelling always going to happen?

Answer

The Australian Rainfall and Run off guidelines were updated in 2019 (ARR 2019) – since then we have increased our budget for flood modelling to \$13 million over 5 years and implemented a program to update all models by 2026.

We now have the technology to do more sophisticated modelling more regularly – in the past it would not have been possible to continuously update flood models across Melbourne.

Melbourne Water has adopted the recommendations of the independent [Maribyrnong River Flood Review](#), and will review the models every 5 years and update them every 10. Any major flood event experienced within this timeframe, will also trigger a review of our flood modelling.

The 2022 flood event was the first major flood since the Maribyrnong River modelling was last updated. The flood itself provided an enormous amount of data that will help us plan and prepare for future floods – including being an important source of information for our updated model.

Question

2. Why was the previous modelling so outdated?

Answer

As mentioned in response 1, since the introduction of the ARR 2019, we have increased our budget for flood modelling to \$13 million over 5 years and implemented a program to update all models by 2026. We now have the technology to do more sophisticated modelling more regularly – in the past it would not have been possible to continuously update flood models across Melbourne.

Consistent with the recommendations of the independent [Maribyrnong River Flood Review](#), we will review models every 5 years and update them every 10. If there is a major flood event within this timeframe, this will also trigger a review of our flood modelling.

Question

3. Will modelling be re-done after any future mitigation works?

Answer

Yes, in some cases there may be cause to re-model the flood extents after mitigation works. However, this will be subject to the mitigation solutions that might ultimately be implemented.

Question

4. How do we know the current modelling isn't incorrect, if the old one was? Have you modelled the 2022 flood using the current model? Would Melbourne Water support an independent review of their modelling?

Answer

Melbourne Water engaged Jacobs Consulting, a global modelling consultant, to perform the detailed flood modelling work. This work was independently peer reviewed by HARC consulting at key milestones of development. The work of both consultancies was also informed through access to an independent academic panel (two leading hydrologists) enabling an additional layer of review and challenge to ensure a robust modelling outcome. Furthermore, a leading flood modelling specialist, Mark Babister also considered the model as part of the Pagone Independent Review and commented positively on its integrity at the Victorian Parliamentary Inquiry.

The new Maribyrnong River Flood Model is a riverine flood model and provides the latest flood information for the Maribyrnong River. It uses the most up to date data about rainfall and run-off, the physical features of the floodplain and nearby urban areas, and the most recent flood in October 2022 for accurate results.

As a more advanced 2-dimensional model than the previous model, it can simulate water flow across an entire area and in multiple directions. With this improved capability, the model gives a more accurate picture of how water flows, which helps predict flood patterns and their effects.

The new modelling has been prepared according to the current climate change guidelines, including recommended values for rainfall intensity increases and sea level rise, and latest standards and industry best practice set out in the ARR 2019.

Current flood modelling methods are very sophisticated using the latest computing and other technology to map millions of data points through the catchment. The approach and the methodology for the hydrology (RORB) and the hydraulic (TUFLOW) modelling used to develop the flood mapping was reviewed by Melbourne Water and external industry experts (as mentioned above) as part of a comprehensive quality assurance process to provide confidence in the modelling results.

Question

5. How was it responsible to lower the flood level between 1986 to 2003, given in 2003 the world knew about climate change and its effect on flooding?

Answer

Any historic decisions which modified the flood levels or floodplains were made with the best available information at the time, which included any consideration for climate change at that time.

Climate change is one of many factors that can contribute to flooding and influence the risk over periods of time. Flooding can be caused by:

- rivers and creeks bursting their banks (riverine flooding)
- ocean tides above normal sea levels (coastal tidal and storm surge flooding)
- sea level rise resulting from climate change
- rainwater exceeding the capacity of drainage systems (overland flows or flash flooding).

Our region has an extensive network of drainage infrastructure. Drainage systems built for earlier development were fit for purpose at the time; however, were not designed to hold the increased volumes of water we now have flow through our landscape.

Urbanisation means rainwater flows faster off hard surfaces instead of filtering into soils. This increases flooding along waterways and on low-lying land. Urbanisation and climate change will continue to increase flood risk as the intensity of rainfall events increases, severe storms become more common, and the sea level rises.

Question

6. Can flood risk be better demarcated between higher and lower risk areas?

Answer

A usual part of the flood modelling process is Urban Flood Zone mapping, which is designed to apply to areas where the potential flood risk is high and strict controls over land use are required. The three overlays (Flood Overlay, Land Subject to Inundation Overlay, and Special Building Overlay) cover a range of situations in both urban and rural areas. One of the next steps is to commence the Planning Scheme Amendment Process for the Maribyrnong River.

The Planning Scheme Amendment process provides an opportunity for the community and stakeholders to review proposed new controls and make a submission – the impacted community will be advised when this public exhibition stage commences.

Question

7. Will Melbourne Water pay for land surveyors to gauge exact flood levels for Kensington Banks houses?

Answer

Melbourne Water can provide information on the flood level to Australian Height Datum (AHD), and the minimum and maximum depths that may be experienced on individual properties. We encourage all property owners to contact us to obtain this information.

If property owners need further details, they may wish to consider engaging an independent surveyor who can advise on property flood depths relative to the flood level AHD we have provided.

Question

8. Will Melbourne Water provide some more information on how residents can interpret their individual levels for their homes (many people do not understand what they mean)?

Answer

If residents need more assistance in understanding the information provided about their individual properties, you can [ask our team a question](#) online or by phone, or request a meeting with a Melbourne Water representative.

Question

9. Why does fig.9 in Jacob's report which shows the increase in water levels due to the wall, show an increase in the levels in Kensington Banks when the levy was not overtopped?

Answer

The Kensington Banks flood protection infrastructure largely protected the estate from flooding during the 2022 event. There was some minor flooding within the local drainage network, located predominately within the Riverside Park area and nearby areas.

Melbourne Water continues to work with other agency partners to further understand the flooding at this location. The Victorian Racing Club flood wall may have resulted in some minor increases in the flood level of the Riverside Park area. To view the figure, see figure 5.4, in [Jacob's Report](#) (page 24).

Question

10. If the Kensington Banks area has a low elevation to begin with, and having knowledge of the 1974 flood, why was the area deemed fit to build housing on? What did the modelling show before the estate was planned for and following the 1974 flood?

Answer

Kensington Banks Estate was developed during the 1990s using the best available information at the time, including the 1986 catchment study of which we understand to have designated the flood lines at the time. The 1986 catchment study, which took into consideration the 1974 flood data, identified the Kensington Banks development area as 'subject to inundation'.

Prior to the development, the numerous stakeholders undertook to implement mitigation works to reduce any flood risk, for instance the internal drainage

under and levee bank around the perimeter of the estate. We understand that the mitigation works would have been subject to extensive modelling, and at the time, deemed satisfactory to allow the development to progress for redevelopment and improved land use purposes.

Question

11. Why are some homes not being provided with the 2003 flood levels at their properties (some certificates just say this information isn't available)?

Answer

Some flood level information letters provided by Melbourne Water state, 'Flood Information for this property was not available in the 2003 Flood Model'. What this means is this location was not identified as subject to flooding in the 2003 flood modelling.

Question

12. Will Melbourne Water be doing new flood modelling more frequently in future?

Answer

Yes, as mentioned in response 1, we are currently updating all flood models across the Port Phillip and Westernport catchment and, will review models every 5 years and update them every 10 and after the occurrence of a major flood, as and where necessary.

Question

13. When will the Land Subject to Inundation (LSIO) be implemented? And will this be based on the 1% 2024 levels or the 2100 levels?

Answer

We'll be working with Local and State Government to use the 2100 model to update municipal planning schemes. The Planning Scheme Amendment process provides an opportunity for the community and stakeholders to review proposed new controls and make a submission – the impacted community will be advised when this public exhibition stage commences. It is through this process that the LSIO will be implemented.

Question

14. Will mitigation be done before the LSIO is put in place, or will the LSIO be done first and mitigation afterwards? If mitigation is done afterwards, will flood re-modelling then be re-done and the LSIO removed?

Answer

We are concurrently progressing the LSIO implementation with Local and State Government and, a Maribyrnong River catchment flood mitigation study. This work began last year with a preliminary desk top review of past flood mitigation studies for the Maribyrnong River, you can read more [here](#).

Once any mitigation solutions are implemented, we will evaluate any need to re-model the flood extents and any amendments to the planning controls.

Question

15. Exactly why does Kensington Banks flood in a 2024 model - is it water coming in from Smithfield Road (near the racecourse) or up from Riverside Park, or both, or elsewhere, and what's the relative effect of each area?

Answer

The fundamental reason that there is inundation in Kensington Bank for the updated 1% AEP scenario is that the calculated flood levels have increased since the last model was completed. This is due to:

- a better understanding of the catchment's response to flood forming rainfall given additional data which includes several significant flood events (2011 and 2022)
- better and more sophisticated analytical techniques such as using a Bayesian Framework with high and low flow censoring in the Flood Frequency Analysis
- improved rainfall statistics (updated in 2016); and
- significant advances in hydraulic modelling such as the use of 2-dimensional modelling techniques.

The floodwater flow paths into Kensington Banks are predominately due to a breakout flows from Smithfield Road and overtopping of the Riverside Park levee.

Question

16. The modelling shows removing the Flemington Racecourse Flood wall would not have a positive effect (would not reduce flood depths) on Kensington Banks - but that it provides a protective effect. However, it looks as though

you have not modelled removing the flood wall but keeping the associated mitigation measures. This may result in a different conclusion. Will you be modelling this scenario?

Answer

Removing the wall, but not the mitigation measures would result in higher flood levels in Kensington Banks than with the wall in place. The mitigation measures are modelled to contribute to this 'shielding' effect the wall provides to Kensington Banks, though as noted in the Jacobs modelling, they did not appear to have the effect expected.

We will not be conducting further modelling of the impact of the wall – we have all the necessary iterations to inform the mitigation study. Melbourne Water is now focussed on modelling the whole catchment and understanding the catchment wide response. This will occur through the flood mitigation study, outlined in response 18 below, and will take into consideration the existence and effect of the flood wall and mitigation works as they currently stand.

Mitigation

Question

17. Is it Melbourne Water's job to mitigate the flood risk?

Answer

It is a shared responsibility between many organisations to manage flood risk in the Port Phillip and Westernport region, including Melbourne Water, councils, state government and emergency management services. All have responsibilities for protecting people, infrastructure, assets, economic activity and the environment. As part of Melbourne Water's responsibility to minimise the impact of flooding where possible, we have a flood mitigation program that determines appropriate responses on flood risk.

Councils may implement mitigation infrastructure at the local scale and in some instances, other government agencies and/or developers may be responsible for the funding the infrastructure.

Infrastructure, land use planning and education programs are all mitigation options that are delivered to reduce flood risk. There are actions in the [Flood Management Strategy](#) that cover all of these mitigation options.

Question

18. What mitigation measures are being investigated?

Answer

Now that the new modelling is complete, a comprehensive identification and assessment of mitigation options is being progressed, including looking at previously identified traditional solutions, as well as any new innovative solutions for the riverine flood hazards.

The study will consider feasible flood mitigation solutions for the riverine flood hazards, that prioritise the safety and resilience of the communities within the catchment and have the greatest impact on reducing the flood risk, both now and anticipated by the year 2100 and beyond. Consideration of applicability and scalability of options to the Melbourne-wide context will also be made.

The community will be invited to participate in the development and assessment of options later this year.

Question

19. How do residents go about suggesting mitigation options?

Answer

We know that the community will want to have a say in the options analysis. Over the coming months we will seek community input into this work and will also ensure the community is kept up-to-date and provided opportunities to participate throughout the study.

We encourage the community to register interest in the mitigation study by completing our short survey [here](#).

Question

20. What is the budget for mitigation measures across Maribyrnong? What is the budget for mitigation directly for Kensington Banks?

Answer

We will need to finalise our mitigation study, with community input, before we can determine a budget for implementation of works.

Question

21. The revised flood lines look exactly like the old 100-year flood line before the 1990s flood mitigation that created Kensington Banks - what has changed that mitigation?

Answer

The flood lines from the 1986 catchment study, and subsequently from modelling over the course of the Kensington Banks development – during the 1990's, were designated using the best available information at the time. The implemented mitigation works (i.e. the levee banks) were fully reflected in the modelling; however, since that time, the substantial changes include:

- more sophisticated 2-dimensional modelling that predicts how flood water may flow over an area or floodplain, incorporating flow in multiple directions;
- improved digital representation of the Maribyrnong River channel and adjacent land as a result of more advanced technology;
- nationally updated modelling standards and industry guidance;
- the impacts of climate change. For example, modelling to the year 2100 in accordance with the Planning Scheme, to allow for predicted sea level rises and tidal impacts on the Maribyrnong River;
- changes to the river itself and urban development in the floodplain that has occurred over the last 20 years; and
- calibration with millions of data points from the October 2022 flood event.

Question

22. Who will undertake mitigation investigations? Is it Melbourne Water, or another state government body, or outsourced to a private provider?

Answer

As mentioned in response 17, it is a shared responsibility between many organisations to manage flood risk in the Port Phillip and Westernport region, including Melbourne Water, councils, state government and emergency management services. All have responsibilities for protecting people, infrastructure, assets, economic activity and the environment. As part of our responsibility to minimise the impact of flooding where possible, we have a flood mitigation program that determines appropriate responses on flood risk.

Question

23. Will anything be ruled 'in' or 'out' in terms of mitigation options?

Answer

As mentioned in response 17 and 18, our flood mitigation study will consider all options and identify the most feasible flood mitigation solutions that prioritise the safety and resilience of the communities within the catchment, and have the greatest impact on reducing the flood risk, both now and anticipated by the year 2100 and beyond. This work began last year with a preliminary desk top review of past flood mitigation studies for the Maribyrnong River, you can read more [here](#).

The study will consider the balance between a range of important factors in determining which options may be progressed. This will include consideration of the flood mitigation effect with other factors such as environmental impacts, impacts on Traditional Owner values, community appetite for possible other impacts such as amenity, as well as cost relative to impact.

Question

24. Will Melbourne Water revisit the proposal for a flood mitigation natural flow dam upstream of Keilor (1986 proposal)?

Answer

Further to responses 17 and 18, during the flood mitigation study process, all options will be considered. Any option and outcome will be subject to extensive analysis and community input to understand what is technically viable and seen as an acceptable solution to the community in terms of impact across the catchment, considering the potential downside, whether that be loss of community amenity, impact on environment or impact on Traditional Owner values.

Question

25. How do we know that Kensington Banks was built to the correct flood standard, or that flood mitigation works were done correctly during the development? Has there been any assessment of this?

Answer

Kensington Banks Estate was developed during the 1990s using the best available information at the time, including the 1986 catchment study. The development process involved numerous stakeholders, including local and

state government, Melbourne Water, and multiple developers and sub-developers, and was subject to extensive modelling and conditions.

Question

26. Jacobs Report stated the compensatory works failed in the 2022 floods. Can we have more clarity on what exactly this means?

Answer

The Independent Review Panel and the Jacobs report found that the mitigation works put in place to offset the impact of the wall didn't perform as well as expected. We will now incorporate an examination of the flood wall mitigation into our broader investigation of potential mitigation options across the catchment. See page 100, point 173 in the Independent Maribyrnong River Flood Review report [here](#) for more information about the compensatory works.

Question

27. Did the valve in Riverside Park fail during 2022? Does this have any bearing on the 2024 flood levels?

Answer

The Riverside Park valve is not a Melbourne Water asset. We are however continuing to work with the asset owner to understand the performance of that asset during the event and into the future.

Question

28. Is the modelling based on mitigation measures already existing in Kensington working or not working?

Answer

The modelling takes into account the mitigation measures currently in place. However, the mitigation measures have minimal impact in the 2024 and 2100 scenarios due to the increased flood level as a result of the 20 years of urban development and climate change.

Question

29. Are there any mitigation measures currently proposed or in the works, or is it all dependent on future investigation?

Answer

As mentioned in response 18, now the new Maribyrnong River flood modelling has been completed, detailed assessment of long-term sustainable flood mitigation options is being progressed, including looking at previously identified traditional solutions, as well as any new innovative solutions for the riverine flood hazards. This work began last year with a preliminary desk top review of past flood mitigation studies for the Maribyrnong River, you can read more [here](#).

Mitigation measures cannot be progressed in isolation for just one area, as adverse impacts on other areas neighbouring or upstream will also need to be considered, within a total catchment context.

Question

30. What is the likely timeline for mitigation measures for Kensington Banks?

Answer

As mentioned in response 18, now the new Maribyrnong River flood modelling has been completed, detailed assessment of long-term sustainable flood mitigation options is being progressed. A timeframe will be confirmed once a preferred contractor is selected to conduct the study and their work methodology is agreed. The community and stakeholders will be invited to participate in the development and assessment of options later this year.

Question

31. How will Melbourne Water manage the impacts on all areas across the catchment and weigh these against each other (eg: if a levee in one part of the catchment makes their risk lower but Kensington Banks risk higher, how is this reckoned with?

Answer

As mentioned in response 18 and 29, our flood mitigation study will consider feasible flood mitigation solutions, that prioritise the safety and resilience of the communities within the catchment and have the greatest impact on reducing the flood risk, both now and anticipated by the year 2100 and beyond.

Mitigation measures cannot be progressed in isolation for just one area, as adverse impacts on other areas neighbouring or upstream will also need to be considered, within a total catchment context.

Communication

Question

32. The modelling is hard to find on the website. Could it be easier to find for affected community areas?

Answer

The flood modelling is available on our Let's Talk page [here](#). For the members of the community that are finding the information difficult to access online, we encourage them to contact us directly on 131 722 or enquiry@melbournewater.com.au.

Question

33. Why did residents first hear about this on the news? Why didn't Melbourne Water contact residents directly (other than with a leaflet about 'get flood ready')?

Answer

Melbourne Water worked hard to communicate the flood risk to the Maribyrnong catchment community as soon as the model was completed.

This included letterboxing approximately 8,000 properties in the new flood extent with a bulletin that explained that the model was finished and was available on our website, and how to get more information. Targeted social media was also seen by some 40,000 people.

We encourage you, and the community members, to keep informed by joining community sessions, and by following this link of our Let's Talk page [here](#).

Question

34. When will Melbourne Water release the full Jacobs Report supporting the new maps?

Answer

The summary report and full technical report are available on our Let's Talk page [here](#).

Question

35. Will there be justification provided to residents about property devaluations and increased insurance?

Answer

This new modelling represents the flood risk that exists – it is not creating more risk. Melbourne Water is releasing the modelling information so that we can prepare for the impacts of climate change and plan for the future.

It is Melbourne Water’s responsibility to ensure that planning and emergency agencies, communities and individual landholders are able to understand their flood risk so that as a community we can best prepare before and in the event of any flood event.

We are not best placed to speculate or comment on property values or insurance premiums. These climate change impacts are global issues that the insurance industry has been dealing with and taking into account in setting their premiums.

We would advise householders to engage with their insurance companies to understand their own circumstances.

Question

36. Will you hold another community meeting to answer specific questions about Kensington Banks and the modelling (not just how to be 'flood ready')?

Answer

The recent [flood education sessions](#) aimed to both improve community awareness of flood risk and improve knowledge of how to be prepared for floods.

As well as the in-person sessions, Melbourne Water held a comprehensive flood model community webinar in May, see the recording [here](#). We also published a detailed list of questions and answers from the community, including Kensington Banks residents, published on our [Let’s Talk page](#).

You can also [ask our team a question](#) online, by phone or request a meeting with a Melbourne Water representative. To be notified of any upcoming community sessions, click the ‘follow’ button at the top of the [Let’s Talk page](#).

Compensation

Question

37. Will Melbourne Water support compensation measures for residents affected by this such as home buy-backs, compensation for loss of value, subsidies for insurance, etc given that people bought their homes based on explicit advice from Melbourne Water that we're now told was incorrect?

Answer

Buy backs are not an option Melbourne Water is progressing. There is not the same level of risk in the Maribyrnong catchment as other catchments in Australia where Governments have used buy backs. Nonetheless, there are a wide range of options we are pursuing or considering to manage flood risk, detailed above.

The most immediate support to impacted households is by way of raising awareness of the flood risk and supporting them in understanding how to prepare for and respond to a flood event should it occur, including access to a range of materials available from VICSES and Councils to support this.

The comprehensive flood mitigation study is now underway for the Maribyrnong catchment using the new flood modelling. The study will seek to identify viable options for structural mitigation to reduce the current flood risk across the lower Maribyrnong River catchment.

Find out more

Watch a recording of our community webinar

Hear industry experts give an overview of the new Maribyrnong River flood model - [Watch the community webinar on YouTube.](#)

Let's Talk

For more information and to keep up to date with progress, sign up to follow the [Let's Talk page](#).

Property information

To make a request for information on flood level and flood depths for your property, please call 131 722 or email enquiry@melbournewater.com.au, and

our team will be able to lodge a request on your behalf. Please note, our time frames for this information may take up to 14 days.

Contact us

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