

# TRANSCRIPT

## LEGISLATIVE COUNCIL ENVIRONMENT AND PLANNING COMMITTEE

### Inquiry into the 2022 Flood Event in Victoria

Melbourne – Friday 10 May 2024

#### MEMBERS

Ryan Batchelor – Chair

David Ettershank – Deputy Chair

Melina Bath

Gaelle Broad

Jacinta Ermacora

Wendy Lovell

Samantha Ratnam

Rikkie-Lee Tyrrell

Sheena Watt

#### PARTICIPATING MEMBERS

John Berger

Ann-Marie Hermans

Evan Mulholland

Rachel Payne

Richard Welch

**WITNESSES**

Dr Nerina Di Lorenzo, Managing Director,

Craig Dixon, Executive General Manager, Service and Asset Lifecycle, and

Tim Wood, General Manager, Service Programs, Melbourne Water.

**The CHAIR:** I declare open the Environment and Planning Committee's public hearing – our final public hearing – for the inquiry into the 2022 flood event. The Environment and Planning Committee is an all-party committee of the Legislative Council looking into the October flood event, and we will be providing our report to Parliament in the coming months. Can I ask everyone involved in the proceedings today, including in the gallery, to ensure your mobile phones have been switched to silent and to minimise background noise to assist with the broadcast.

I acknowledge the traditional owners of the land we are meeting on here today and pay my respects to elders past and present and also welcome any members of the Aboriginal and Torres Strait Islander community participating in today's hearing. Welcome to those who are joining us either online or in the public gallery, and for those in our public gallery, a reminder to please to be respectful of proceedings and to remain silent at all times.

Welcome back, Melbourne Water. I will re-read the note about evidence.

All evidence taken in today's proceedings is protected by parliamentary privilege as provided by the *Constitution Act* and the provisions of the Legislative Council standing orders. The information you provide during the hearing is protected by law. You are protected against any action for what you say during these hearings, but if you go elsewhere and repeat the same things, those comments may not be protected by this privilege. Any deliberately false evidence or misleading of the committee may be considered a contempt of Parliament.

All evidence is being recorded. You will be provided with a proof version of the transcript following the hearings. Transcripts will ultimately be made public and posted on the committee's website.

I know you have been here before, but we will reintroduce ourselves. I am Ryan Batchelor, Member for Southern Metropolitan Region and Chair of these proceedings.

**David ETTERS HANK:** David Ettershank, Western Metropolitan Region, Deputy Chair of the committee.

**Samantha RATNAM:** Morning, everyone. Samantha Ratnam, Member for Northern Metropolitan.

**Rikkie-Lee TYRRELL:** Rikkie-Lee Tyrrell, Member for Northern Victoria Region.

**Gaëlle BROAD:** Hi. I am Gaëlle Broad, Member for Northern Victoria.

**Wendy LOVELL:** Wendy Lovell, also Member for Northern Victoria.

**Melina BATH:** Melina Bath, Eastern Victoria. Hello.

**The CHAIR:** Sheena Watt will be joining us when she walks across the road, and Jacinta Ermacora will join us online shortly.

Melbourne Water is back. I might ask you to make an opening statement, should you choose to do so, and then will move into questions.

**Nerina DI LORENZO:** Thank you, Chair. Good morning, everyone. Thank you for the opportunity to reappear before the committee today. My name is Nerina Di Lorenzo. I am Melbourne Water's Managing Director, and with me today are my colleagues Craig Dixon, our Executive General Manager of Service and Asset Lifecycle, and Tim Wood, our General Manager of Service Programs. I would like to, first and foremost, acknowledge the affected residents, present here or watching the session today, from all communities, all of the impacted suburbs and, more broadly, communities across Victoria, who have been impacted by the floods of

October 2022. As outlined in your interim report, flooding can have a devastating effect on communities, which we have absolutely seen. So I pay my respects to the community.

We tabled the outcomes of the Pagone review with the committee in October 2023. At that time I advised that we were in the process of developing a new flood model for the Maribyrnong River catchment, to be completed by April 2024. I also advised that once that work was complete, we would reconvene Justice Pagone's independent review panel to examine the impacts of the Flemington flood wall on the October 2022 flood event. Both of these pieces of work are complete and were released in April as planned, with the intent of assisting the parliamentary inquiry, and that brings us here today. Today I would like to cover a range of topics related to these two pieces of work. I would like to cover the outcomes of the updated flood models, Justice Pagone's findings relating to the Flemington Racecourse wall, our progress on the Pagone recommendations and the broader implications from a climate change perspective that are illustrated by these new models.

First, I would like to set some brief context that informs these issues. As we have established, Melbourne has over 25,000 kilometres of waterways, and they are essential. They are vital to our city. This includes the major river catchments, such as the Maribyrnong, Yarra and Werribee, and all of their tributaries, along with the smaller catchments like Dandenong and Western Port. Our rivers expand into the flood plain during a high rain event as part of the natural cycle, and there are over 200,000 properties that are located within a flood plain that have a 1 per cent chance of flooding during any given year. Like bushfire risk, flood risk cannot be eliminated but it can be managed, and no two floods are the same.

There are three important levers that we use to manage flood risk: through flood awareness and preparedness, through land use planning and building design and through physical infrastructure where it is feasible. Flood data and modelling is the key enabler for all three of those levers, so it sits underneath all of those. Melbourne Water undertakes that modelling for Melbourne and Western Port regions and shares this information with a range of authorities, councils and property owners. We produce flood maps that show the areas on the properties that have a 1 per cent chance of flooding in any given year, and we are able to show how high the water would be on each of those properties. This could be as low as a few centimetres or it could be as high as over a metre, so it is a very broad range. For these properties, their topography, their slope, the location of buildings and, critically, their floor heights determine whether the impact of that flood is water in the garden or actually getting into homes, so both of those things need to be considered together to know that. We provide information on where the water will go and how high, so that is the piece we provide, and property owners can then see what kind of impact it may have based on their detailed knowledge of their properties.

When Melbourne Water is considering development referrals for any new homes we set floor levels at 60 centimetres above the known flood height, which is a further buffer over and above the modelled flood heights. This flood information is available to property owners through a range of channels, like the VICSES website, through councils and section 32 property certificates, and we are also able to provide advice as to how to interpret this information. Call us on 13 17 22, and we will help individuals interpret that information.

With that context in mind, we now have an updated Maribyrnong flood model, which we released in April 2024. This model tells us the likely area and height of waters in a 1 per cent likelihood event as of 2024. We have also produced a model that encompasses climate change and provides areas and heights projected out to the year 2100. At a high level the 2024 model is similar to the 2003 model but with a number of breakout locations where the area has expanded, so overall there is an increase in land subject to flooding by approximately 5 per cent, which we would attribute to a range of impacts such as continued urbanisation and the beginnings of some climate variability during that period of time. Now, we can elaborate further, more specifically on those things through my colleagues during the discussion, but overall that is the general impact. The 2100 model shows a more significant – 42 per cent – increase in the land area that we project would be subject to flooding in 70 years time. Now, that is a long-term projection, and again, we would be able to elaborate further through the discussion if you would like to unpack that further.

We will now use this information to reduce flood risk using those three important levers that I opened with. We will use the 2024 model now and work with relevant councils and VICSES to translate this information into their municipal flood emergency management plans and local flood guides. The flood information is also available to help the community with their individual flood emergency management plans. We will also use the 2100 model to guide land use planning and building design. We will be working with the state government, councils and the community to move this information into planning schemes as efficiently as possible, which

will guide floor heights and building design. We will also be able to use this information to continue providing guidance on how individual property owners can do further flood-proofing of their homes.

We will also now undertake a comprehensive study of potential mitigation options – that third lever – for the Maribyrnong catchment to determine what is feasible and effective, utilising the new 2100 model. A comprehensive engagement plan is also underway. We have notified all of the affected properties and are holding a range of in-person sessions and webinars regarding the new model information. And we are working closely with the VICSES and councils on flood awareness. For some residents this will be new information, and there will be many questions and concerns. It is really important to hold in mind that the information itself is not the risk; however, it provides property owners and authorities a means to help manage that risk. And we are committed to working with community members to help them understand and interpret the information, knowing that this will be new information to some people. The full updated Maribyrnong flood model and supporting information is available on the Melbourne Water website and has been provided to the committee.

I would now like to move on to the Flemington Racecourse flood wall. We have received and published the second addendum of Justice Pagone's independent review, which has considered the impact of the Flemington Racecourse flood wall on the October 2022 event, and we have also published the Jacobs technical report on the impact of the racecourse wall. The key findings are that the Flemington flood wall contributed to an increase in flood area of 1 per cent and an increase in depth of approximately 2 per cent, and that there are 240 properties which had a pre-existing flood depth of 80 centimetres on average, which is increased by 1.7 centimetres on average as a result of the wall. They are average numbers, but the depth increase in residential areas is between 0.8 centimetres and 3 centimetres; that is the range. There are a range of other depths in less sensitive land use areas which we can also cover as needed during the discussion.

Justice Pagone and the panel also found that the mitigation works put in place to offset the wall's impact did not perform as well as expected at the time of its design and approval in 2004. Prior to the new model, Pagone noted that the wall did not appear to make a significant increase to flood risk based on the area maps but held off on a finding at the time subject to the new model. This new model now gives us more granular understanding of that impact, and it now provides us with data to quantify that. As noted previously, we will now be considering mitigation options as part of our work across the Maribyrnong catchment, and we would consider whether the offsetting works could be strengthened also as part of that work. Like the updated flood modelling, the report has been made publicly available on our website and provided to this committee. I thank Justice Pagone and his panel for their thorough and diligent work, and I again reiterate that Melbourne Water accept all of Justice Pagone's findings and we continue to implement the 15 recommendations.

Since we appeared before this committee, we have made significant progress to implement these recommendations, which I will touch on briefly. Three of the panel's recommendations related to Melbourne Water's flood modelling program are embedded as standard practice. Four of the panel recommendations relevant to the transition of flood forecasting services from Melbourne Water to the Bureau of Meteorology are progressing well, and we are continuing to work closely with the bureau on the transition. The remaining eight recommendations are on track and ongoing for completion. A detailed project report was published in April as our six-month community report and is available on Melbourne Water's website, and we will do the same at 12 months.

Finally, I would like to comment on the longer term challenge posed by climate change and its impacts. Melbourne Water's work is closely linked to all parts of the natural water cycle, and we are closely attuned to climate impacts. Climate science tells us to expect greater variability and extremes – wetter wets and drier dries and higher intensity storms that are less predictable. We are already seeing some aspects of climate change at play, with more events starting to be highest on record. For example, the October 2022 event is acknowledged as the wettest month on record, so we are already starting to see that happen. We are also seeing this science starting to find its way into standards. For example in 2019 the *Australian Rainfall and Runoff* national guide to flood estimation was updated to take climate change impacts into consideration. In 2021 Melbourne Water was able to secure funding via our pricing submission to create a flood modelling program that will provide a new model for both today's flood events and flood levels and for the 2100 year flood levels for every catchment in Melbourne by the end of 2026; so we were able to secure that funding. This is a nation-leading program, and we are well progressed, with models like the Maribyrnong starting to be available to guide awareness and preparedness, development and building design and physical mitigations where feasible.

I cannot overemphasise how important this program is for the future development of our city. It is a game changer and it gives us more capacity to manage flood risk with time to implement solutions and to move as far away from the risk as much as possible during the time we have to prepare. We know we cannot build our way out of that after the fact, and we think this planning helps us avoid the worst impacts and assists us to live with the natural cycles of flood plain behaviour. We are committed to using this information to keep improving flood risk management and to closely engage with the community. We will take on learnings and insights from all the various reviews and the parliamentary inquiry, and we hope this is useful information that we provide to you today. So I will draw to a close and invite any questions for myself or my colleagues.

**The CHAIR:** Thank you, Dr Di Lorenzo. We have obviously got an hour and 10 minutes, I suppose, in this session – a good amount of time. We should be able to get into quite a lot of detail. We will take turns in asking questions, and I think we are going to have about 7½ minutes each to ask. But if people do not want to use all their time, they can come back later. I want to give everyone the same amount of time, but I am happy to be flexible in the way that we do that.

I should also say, just for the benefit of those following along at home, two things. One, I just thank Melbourne Water for really providing the committee, I think, with all the information that we could possibly need to assess this. The amount of detail you have provided to us has been very helpful, and certainly from our perspective coming back following the release of the new model is important. I should also say that the committee received a briefing on the detail of the model and its outputs, I suppose, on Monday, which was very enlightening. We spent a lot of time going through the forensic detail of exactly what was happening where – just so members of the public understand that we have already had the opportunity to kind of drill down into the maps and stuff. So that will be informing, no doubt, the questions that we are asking today.

With that I might kick off. It seems to me that, if I can summarise a little bit of what you have said here, the changes that the new model show us are being driven largely by, in my readout, and correct me if I am mistaken, three things. One is that it is a better model. It is more accurate, it has got more up-to-date data and it has got more detailed mapping of the physical environment as it currently stands. That would include things like the recent developments, the Flemington flood wall – all of those things. Secondly, taking account of our changing weather patterns – this is driven by climate change – things like intensity of rainfall are a big part of what is happening. The way water comes out of the sky is changing; I think we are all seeing that. And thirdly, there are the developments in the catchment. Do you think that is an accurate summary of the kinds of key things that this model has been driven by?

**Nerina DI LORENZO:** Yes, absolutely. That is exactly the way we would characterise it as well.

**The CHAIR:** Is there anything that we are sort of missing in terms of what you would like us to be thinking about when understanding, for residents and businesses, what is driving the changes that they are seeing between the various shades of colour on your maps?

**Nerina DI LORENZO:** I think I will just cover that very broadly and perhaps pass to my colleague. But those, broadly, are the three categories. And just in further elaboration of the technology – the type of work that happens today in modelling – it is a 1-metre-by-1-metre grid in terms of what is now being created for that entire catchment. It is over a million computations. And also the technology that we use today, again, is just advancing so quickly. What that is enabling us to set ourselves up to do, as technology keeps developing and having all of that data, is to be able to move on quicker cycles in the future, knowing that things will potentially change more quickly as well. So the technology is a game changer for us. I just wanted to highlight that because I think that is particularly important, but perhaps my colleague might elaborate.

**Tim WOOD:** I think you have characterised it well. The only other thing I would add is that obviously we are learning a lot more about, I guess, how we predict and model and the like. So the standards are evolving regularly. I think the application of our new understanding of modelling techniques and approaches and how they are shaped within the emerging standards within the industry is also obviously a key change. Even climate change at the moment – ARR 2019, the climate change chapter of that is actually under review at the moment. So it is a changing environment that we need to make sure that we keep abreast of.

**The CHAIR:** So the science is not static, but the latest science is informing what it is that you are doing?

**Tim WOOD:** Yes, the current modelling that we are doing reflects all current-day standards, but of course that will evolve.

**The CHAIR:** One of the things that strikes me, on the maps – and this might be a level of detail that is hard to do for those following along at home – is that obviously a big point of contention in this hearing has been what the consequences of the flood wall are. We have had the report and the review from Mr Pagone and his team, who will be here next. But even looking at these maps, the levels of flooding predicted for a 1 per cent AEP in 2024, but also out to 2100, show that there is substantial inundation likely in a 1 per cent AEP of the racecourse. Would that be a fair assessment of the model?

**Tim WOOD:** Yes, there is inundation of the racecourse in the 1 per cent AEP event that has been modelled for today, 2024.

**The CHAIR:** For today, 2024, but also for the future. And that is even with the changes that have been made?

**Tim WOOD:** Yes. The future 2100 map obviously shows greater inundation, yes.

**The CHAIR:** Okay. I just wanted to clarify that as a point. One of the things we have got to think about when we get these models is what happens next as a result, and that is really where members of the community are interested. If you could step through for the committee succinctly – now you have done the updated modelling we see where we think more homes are likely to be subjected to inundation – what happens now in terms of flood overlays and consequences, particularly on the planning side?

**Craig DIXON:** I will take that question. As Dr Di Lorenzo pointed out at the start, there are three levers, or controls, we have at our disposal to respond to this. They are community awareness and preparedness, implementing this in the planning system and mitigation studies. I will just step through each of those as succinctly as I can. The most immediate thing that we can do, and we have actually started doing it already, is deploy this into the community. The best thing we can do to support community right now, today, as opposed to what we can do in the coming period, is make sure the community are aware of their flood risk, so individual people in the community affected understand what their risk is. They understand what that means in their setting. They understand what they need to do – what they can do to prepare for flood risk should it eventuate. And they understand when a flood event occurs what they need to look for and listen for, what the trigger is and then when to enact their flood response plan. So to support that, since the model –

**The CHAIR:** Sorry. This is going to be interesting; I think we will come back to it. I am particularly interested in – just because I am going to run out of time – what is going to trigger changes to the LSIO, the flooding overlay, in the planning system, and which maps will be used to inform the new overlays. When will that happen, and how long will it take?

**Craig DIXON:** Specifically with the planning system, the model that goes in the planning system is a 2100 model, because that is the thing that is used to make decisions for decades to come for assets that will be constructed that will be around potentially at that time.

**The CHAIR:** So following along on the maps, that is the orange shading on the maps?

**Craig DIXON:** That is the orange, exactly. Basically what we are doing at the moment is preparing what we call a planning scheme amendment request, so we are putting all the documentation together for that now. We then submit that through to the relevant planning authority, and that would go through our process to get implemented into the planning scheme. Now, we will have that submission or that application made within the next couple of months. How long that takes – it is a process that requires, appropriately, public input and consideration of that, so it is a little bit hard to put an exact time on how long that can take. It depends –

**The CHAIR:** And it will be done through the relevant planning authority for that?

**Craig DIXON:** Exactly.

**The CHAIR:** So residents who wish to understand how this process is going to work should be following what happens probably at their local council in terms of changes to the planning scheme?

**Craig DIXON:** There are two options. It can either go through council or because this model sits across four councils it alternatively can go potentially through the department of planning. We are having discussions with the relevant councils right now – we started that this week – and with the department of planning next Tuesday just to align on what the most effective way is to get this into the system appropriately.

**The CHAIR:** That is awesome. That is my time done. Mr Ettershank.

**David ETTERS HANK:** Thank you, Chair. Thank you for all the documentation. I think, like many of the committee members, I am having trouble digesting it in the time that is available, so my apologies in advance for dumb questions. Can I also thank you for the briefing on Monday; that was really helpful. In terms of the 2024 model, can I just get something clear. In terms of, say, for example, Kensington Banks, Edgewater and Ascot Chase, do we know actually how many properties are going to be subject to inundation under the 2024 model for the 1 per cent?

**Tim WOOD:** We do, yes.

**David ETTERS HANK:** Can you share with the committee those numbers in those sites, please?

**Tim WOOD:** So for Edgewater, there will not be any for the 2024 event. For Ascot Chase there are only a couple of properties, and these are approximate figures. For Kensington Banks, that is where there is the greatest change, and it will be something like 850 additional properties in that 1 per cent AEP event.

**David ETTERS HANK:** 850 properties.

**Nerina DI LORENZO:** And it is important to add, that early discussion about ‘We have information on how high the water will be’ – it could be a centimetre, it could be higher – that is any property that might have any level of water on it, whether it is low or high. The next part of the equation of working with residents is understanding what impact that has. Those 800-plus properties could be a centimetre or they could be higher; they could be high, basically. That is the piece we are now able to communicate.

**David ETTERS HANK:** You took the next question out of my mouth. Let us focus on Kensington Banks for a minute then. You said you have now got this up to a metre-by-metre grid. Is that three-dimensional? Is that like you would know its height as well as its geospatial relationship? Is that correct?

**Tim WOOD:** Yes. The mapping that we have actually provides the extent of the 1 per cent event – the area that it will cover – but we do also have the depths of that event for each individual property as well. That information is available. If any individual property owner wants that information, if they call our call centre, we can provide that information for them.

**David ETTERS HANK:** I guess I have sort of got one eye towards the publication of the report and such like, and I think the secretary did actually request a 1 per cent flood map with contour lines on it, which was provided. However, the contour lines do not tell us anything about the flooded areas – there are no contour lines there – so we are none the wiser as to whether there are 4 metres of water or 1 centimetre of water. Say, for example, on Kensington Banks, how do we understand the amount of water that will be affecting properties across that site, which up until now, as I understand it, has not even been literally on the map in terms of the flood zone. I am correct there, I think, aren't I?

**Tim WOOD:** As I mentioned, we have the information for each individual property, and we can provide that. If property owners ring us, we can provide them that individual information. Apologies about the contour maps; we probably just misread what you asked for. We can provide a map with the contours within the flood shape if you would like that. We can definitely provide that.

**The CHAIR:** Excuse me, Mr Wood. Can you just speak up a little to be clear?

**Tim WOOD:** Yes, we can provide that information. Apologies. Like I said, that information is available. I think the best outcome for individual property owners is to ring our call centre number and we can provide that.

**David ETTERS HANK:** I will be guided by my colleagues here, but I think we would really like the report to be able to have graphically represented maps – graphics that show the properties that will be affected and the degree of impact across those. If we look at some of the maps that were provided today, I really struggle to

actually figure out what was dry land normally as opposed to being buried under the blue. So can we actually look to get some graphics that we can incorporate into our report that show the affected areas, the depth of the floodwaters in each of the 2020, 2024 and 2100 models and I guess relevant landmarks so people can actually work out what is what? Is that possible to do and provide in a timely manner to the committee?

**Nerina DI LORENZO:** We will take that request away, and we will provide a response to it.

**David ETTERS HANK:** I am happy for that to be taken on notice.

**Nerina DI LORENZO:** It is probably worth adding that we are also rolling out a community engagement program at the moment, so as late as last night we had a pop-up in Maribyrnong. It was one-on-one discussions with community members. That is happening at the same time, so there are a number of ways and ultimately always the call centre number but also to recognise that we know we need to be out in the community with this information, so we are doing that at the moment.

**David ETTERS HANK:** That is great. That is where some of my staff were yesterday, so it is good to see. I would like to understand a little bit about the flood modelling and I guess the historic context. My understanding is that when the original approval was made for the flood wall it was in the context of the 1 per cent flood or the one-in-100-years flood. Is that correct?

**Tim WOOD:** Yes, that is correct.

**David ETTERS HANK:** Am I correct in saying that the testing that was done by Jacobs for you was premised on the impact of the flood wall based on what happened in 2022?

**Tim WOOD:** That is correct.

**Nerina DI LORENZO:** It is calibrated in the model.

**David ETTERS HANK:** Okay. So that event in 2022 was a 2 per cent flood – it was a one-in-50-year flood, not a one-in-100-year flood?

**Tim WOOD:** Approximately, yes.

**David ETTERS HANK:** Clearly for people living in Kensington Banks the results were pretty catastrophic. I mean, we are talking about somewhere north of 8 centimetres of extra water across at least some parts of Kensington Banks – it is a bit unclear from the report, but I will come back to that in a minute. I guess the question in my mind is: if the bar was set initially at the 1 per cent mark and we have measured the impact of a 2 per cent flood, what is the impact of the flood wall being there for surrounding properties if, as per the original criteria, we were assessing the impact of the flood wall against a 1 per cent flood?

**Tim WOOD:** We can work that through. The terms of reference of the inquiry relate to the event itself, so that is why we modelled that event. There is a lot of work in doing that, so that is why we focused on doing that. But we have done some very high-level initial assessment of the 1 per cent AEP 2024 model and the potential impact of the wall on that. What the initial analysis shows is that for the Maribyrnong township and the like, it would be similar types of increases in depth as what was highlighted in the analysis of the 2022 event. But what it also highlights is for some of those other areas that are shown as inundated now that were not in the past, like Kensington Banks, there is not an impact of the wall on those areas. That is a very high level initial assessment at this point in time, but that is the data that we have at this point.

**David ETTERS HANK:** So, can I just qualify –

**The CHAIR:** Yes, yes.

**David ETTERS HANK:** In terms of when you say it is a very high level assessment, do you mean that you do not have a lot of confidence in what has actually been reported? Sorry, I am not having a go at you, I am just curious about what that means.

**Tim WOOD:** No, we have got full confidence in the modelling, but, as you can understand, the focus of the modelling to date that is to really get the outputs that were provided, which is I guess our obligation to provide.



But then obviously you can cut and dice the modelling many different ways depending on what questions you ask. One of the questions that we are looking at, post the detailed review of the model, now that we have got the detailed dataset, is to understand the impact of certain aspects within the catchment, and one of the ones you have highlighted there is obviously the impact of the wall.

**The CHAIR:** All right. Thanks, Mr Ettershank. Ms Bath.

**Melina BATH:** Hello from a good Gippslander who is learning very much about this situation. I would like to talk about dissemination of information, communication to the public and the other bodies that are there – the Bureau of Meteorology and the SES, and I will say SES hierarchy as opposed to differentiating between the volunteers on the ground knocking on doors and doing amazing work. One of the Pagone recommendations talks about consulting with the BOM to develop rainfall forecasts more frequently than 6 hours. I will take that as an intro part that you can speak to, but then I want to go more into how you are going to improve communications with the public. Because you can do all the modelling in the world – I heard you say the modelling is on the VICSES website and councils and da, da, da – people need information and to be able to make choices when there are floods imminent.

**Nerina DI LORENZO:** I might just begin, then I will hand to my colleague for a bit more detail.

**Melina BATH:** Thank you.

**Nerina DI LORENZO:** We have been working with the bureau. The 6 hours is a national standard, and it is an issue of how possible it is to re-run the models that they run from a weather perspective. We know that they are looking at further technology that helps them shorten that time frame, but that is a technology question, so they are working their way through that. We have not been able to change that standard, but we have been discussing that with the bureau in part of the transition discussions that we are having with them at the moment. Perhaps I might hand to Craig for the community engagement aspect.

**Craig DIXON:** Yes, I will just add a wee little bit, if that is okay, to Dr Di Lorenzo's answer there. Whilst the flood forecasting is fundamentally premised on a rain forecast, for which the Bureau of Meteorology have that 6-hourly capability at the moment, additionally, in a flood event – just as occurred in October 2022 – we have people 24/7 monitoring what is actually happening with the river. If we see a difference, be it an hour after the last forecast was issued, we will update the forecast accordingly. If we suddenly see the river is rising faster than what would be expected based on the rainfall forecasts we were given, we will then make an adjustment to the rating, so we can do more than 6-hourly if we see different behaviour.

**Melina BATH:** I am just going to pop in there, Craig. On that, when you say 'We have people', are they –

**Craig DIXON:** Melbourne Water.

**Melina BATH:** Melbourne Water people.

**Craig DIXON:** Yes.

**Melina BATH:** This is something that we heard in the Latrobe Valley about trusted sources of expertise, and there is always a danger there. Do you recognise the expertise in the community to be involved in – not necessarily paid – these emergency situations, in an ICC type of event as well?

**Craig DIXON:** I am not sure if we do.

**Melina BATH:** Anyway, you keep going. At this stage it is your Melbourne Water people.

**Craig DIXON:** Yes. We have got our 29 river gauges; we have got our people in monitoring those. On the community front –

**Melina BATH:** Do they go out?

**Craig DIXON:** They can go out. All the gauges have got remote telemetry, so you can watch them remotely, which is what occurred on the night.

On the community front – and you are absolutely right, that is one of our key focus areas – just to lead in, we did a survey back in 2021 more broadly across the Melbourne catchment and found that only about 19 per cent of people who were exposed to flood risk even knew they were exposed. So herein lies our challenge, and that is despite previous decades of effort by Melbourne Water, the VICSES and local government to drive an increase in that awareness. So that I guess sets the scene for what we need to do. Since the October 2022 event we have run a campaign under the leadership of the SES called Know Your Flood Risk, which started in August last year. That involved letterbox drops to 3000 residents who at the time were understood to be impacted by that risk. That included doorknocking, that included community drop-in sessions. It included a social media campaign to really drive that increased awareness. So that is the hook to get people in.

**Melina BATH:** Is that an improvement on previous –

**Craig DIXON:** It is more contemporary methodology. It is an improved methodology, and it seems to be getting the cut through. That campaign had about 120,000 hits – that is people who have hit and then engaged with the content – 30,000 of which were people who engaged through the other community languages avenues that were equally set up.

**Melina BATH:** Yes, CALD was going to be my next question.

**Craig DIXON:** We had about 30,000 of the 120 000 come through that way. So they are the things that we have done to drive that. That is a new methodology – there is a broad suite that has been piloted – and the plan is to start to roll it out across the rest of Melbourne in the period ahead. Since the new model dropped a week and a half ago, whenever it was, we have done a further follow-up. So we have done a 5000-letterbox drop, we have done community sessions et cetera.

**Melina BATH:** Yes, okay. Good. Is it the hierarchy of VICSES, or is it also the volunteers that are being engaged with by Melbourne Water?

**Craig DIXON:** It is both.

**Melina BATH:** Because – I will put it out there – my belief is it needs to be the volunteers as well. Thank you.

My time is limited, but I will just go to the Flemington flood wall – and I think you have made reference in relation to that, and there will probably be more. Flemington racecourse flood wall – an increase in flooding around there by 1 per cent, properties; I think you mentioned that. You may have mentioned the quantum of properties, so just put that for me again. Then a 2 per cent flood depth – this is on your modelling. So speak to that once I have asked my question, if you do not mind. Is the flood wall doing its intended purpose? I am not going to stand here and advocate for it to be removed in any way, but I guess I am asking: in looking at these values, are there any alterations into engineering solutions that could be done to protect the houses, the properties, more without damaging the racecourse, noting that the racecourse is a huge employer and a very important asset? Is there any way? What technologies are around, or what do you need to know to investigate those engineering technologies?

**Nerina DI LORENZO:** I will open quickly, and then my colleague might be able to unpack that. But to reiterate those numbers – and we are talking about the most sensitive uses here; that is why we talk about that particular cohort – it is 240 residential homes which were subject to 80 centimetres prior to flood wall, and we found that the flood wall contributed an average of 1.7 centimetres to 80 centimetres of pre-existing flood depth. That is what we meant by the 2 per cent – it is a 2 per cent difference. One of the things that we also saw in the report was that the mitigation methods functioned in some places but did not function as well as they ought to have. So it is an area that we have lots of scope to understand further and work out if they can they be strengthened, but also we have an 80-centimetre flood risk that we really need to consider, and this is the mitigation work that we need to do next. That considers not just the 1.7 centimetres but the 80 centimetres that is there. So we are really focusing now on the mitigation. Perhaps my colleague may be able to answer that.

**Craig DIXON:** Yes, just really quickly, because I know you are short on time: we have started a process now to do an extensive review, a restudy, of mitigation options for the Maribyrnong catchment. We are sending that out to the specialist market, and that will be beyond just local as well, to seek the most contemporary expertise we can. That will be a significant piece of work. But the most important thing to note is it will now be

based on a model projecting a 2100 risk, which we have never had before. We have not had that forward projection-type modelling, so we can consider what options are available that not only provide that mitigation today but will have the resilience against climate change in the future.

**Melina BATH:** Thank you. A final question: how will that be reported to the public? Is that something you are keeping behind closed doors?

**Craig DIXON:** No.

**Melina BATH:** How will you report that to government or to the public?

**Craig DIXON:** Two ways. We have already started a conversation with the respective local councils, so they will be involved. We will share the scope of that before that goes to market so they will have an opportunity to provide input. A critical part of the brief will be that it involves community input, so we need the community to come on the journey and bring the knowledge of the local context that they have into that process and also be invited to see progressively the outputs of that and be able to provide again comment and input.

**Nerina DI LORENZO:** Can I add one more thing to that. You hit on something that is really critical. Any infrastructure that is physical can sometimes have a range of other impacts. For example, when you are considering whether it is levees or that type of infrastructure, there may be community impacts as well. We need to test these and make sure they are also acceptable from a community perspective so that we are not just saying, 'Well, here's the engineering solution,' and we plough on and do those things. We really need to do that with community because there will be other things that we will need to consider for every solution. That is why physical mitigation is always so difficult.

**The CHAIR:** Ms Ermacora.

**Jacinta ERMACORA:** Good morning and hello, everybody. Sorry I missed the opening; I was in another meeting. My name is Jacinta Ermacora, and I am a Member for Western Victoria Region. I am based in Warrnambool, and I have had quite a bit of involvement with flooding from a CMA perspective, from a local council perspective and from a water board perspective, so I like your three approaches.

Starting out at a fairly high level, those three approaches that you mentioned, I just want to clarify what they were. There was community preparedness, and that is a very big piece of work with a lot of agencies, not just yourselves. Then there is the statutory land use planning approach, with it being incorporated into planning schemes, and then there was the climate change mitigation. Was that number three?

**Nerina DI LORENZO:** It was physical infrastructure where it is feasible, so building things.

**Jacinta ERMACORA:** That is flood mitigation.

**Nerina DI LORENZO:** Yes.

**Jacinta ERMACORA:** With those three, it really does seem to me that – I guess I am making an observation – in some regard this issue has variables that are both very granular, which is the incorrect word because you are talking about a square metre of volume, so very incredibly detailed, through to the climate change impact, which is really subject to what we do as a global community, not just in Maribyrnong or that community. There are a lot of moving parts. Am I correct in making that comment?

**Nerina DI LORENZO:** Yes. Definitely.

**Jacinta ERMACORA:** And then there was a mention earlier about variation in local rainfall, that 6-hour Bureau of Meteorology capability versus local. Can I just clarify: sometimes you can see rain happening at the end of your street or over a hill but it is not happening where you are. Is that the kind of localised variation that can happen with some of these bigger rainfall events?

**Nerina DI LORENZO:** What we are hearing – and we have been hearing about that even as late as last week from a global perspective – is the new or emerging phenomenon of cloudbursts and intensity. Intensity can change in different places, so from a local perspective that is some further variability that maybe the bureau might be in the best position to advise on. But from our perspective, the local monitoring that happens on the

ground is what we are closest to, so we then can see it but only after it happens. That is when we are able to pick it up.

**Jacinta ERMACORA:** And do you have, just to go further upstream – the subject area is in my book a very small area, because I come from a large region or community with much bigger flood catchments than that – measuring capabilities to give early interventions?

**Tim WOOD:** We rely on BOM to provide that more regional rainfall advice and the like. We have detailed real-time monitoring for all of the streams within our catchment area, so in the Port Phillip and Western Port area. We might have access to some other gauges, but they would not necessarily impact the catchment that we are managing because there is no distribution of water between those catchments. We do rely heavily, obviously, on BOM for that rainfall data.

**Jacinta ERMACORA:** Yes, very good. I just wanted to clarify: are local governments required to translate or incorporate a later flood study in their area into their planning scheme, or is that perhaps not a choice but sometimes a resources choice? There are some councils that say they cannot afford to do an amendment to their scheme, even if there is the latest information.

**Craig DIXON:** Certainly we would always work with local government to get this sort of information into a planning scheme, and that work starts right back at the modelling stage. We actually work hand in hand in the Melbourne context with the governments to develop the models because local government owns part of the drainage system or has responsibility for that. It is actually a journey we go on together. You are right, there is variability across different local governments as to the maturity of their asset information and as to their funding, their budget, their capacity, their knowledge et cetera. That is, we have got 38 local governments that we work with in the Melbourne context. We support them however we can, recognising some have less capability, and we will support them additionally wherever we can, so we do what we can to support them.

I guess, in terms of your question, fundamentally we can put forward the planning scheme amendment request, but local government is best placed. They are the planning authority, so yes, they have that control over how that moves forward.

**Jacinta ERMACORA:** There is something that I often come across in the community engagement with flooding. It is really difficult to get that message across to community that whether you are in an LSIO area or whether you are not does not influence your risk of flooding. It is the same regardless of whether it is translated across. It is just the level of information that land purchasers and land sellers have that changes. Some people kind of ask that their property not be put in that area when in actual fact their property still is subject to flooding anyway.

**Nerina DI LORENZO:** I think that is precisely that point around the information is not the risk. The information helps you manage the risk. What we are trying to do is be really clear about the risk that exists or that we could predict exists, but it is not the information that creates a flood. It is not the risk in itself. That is precisely the phenomenon that is really tricky here in what we are balancing, and the position we take is that we think people deserve to have that information and should know and should have that access to that.

**Jacinta ERMACORA:** Just one last one, if that is all right, Chair.

**The CHAIR:** Yes, last one.

**Jacinta ERMACORA:** We have heard lots about the changes over time, whether that is the urbanisation which reduces the ferocity of the landscape, whether it is climate change and the increasing and unpredictably increasing flood and weather events, and I suppose population – all of those variables are changing. What would you say is the best practice for regularity of refreshed flood studies? Obviously with every flood there is always an opportunity for improvement in response, for improvement in knowledge et cetera. What is the best practice? Will you be able to start adding this study, say, in five or 10 years?

**Nerina DI LORENZO:** Yes. One of the recommendations from the Pagone review was that models going forward with this type of variability, knowing that things are changing more quickly, should be reviewed every five years and updated every 10 years. The review on five years also gives you the opportunity to decide if it needs an update at that time given the change. That is a clear recommendation from the Pagone review which

we take on board. The point made earlier about the technology is that we are now in a position with the technology we have to be able to do that more and more efficiently as time passes, and that is really what we will have our eyes on. Did you want to add to that, Tim, at all?

**Tim WOOD:** Look, I support that. Just to give you an idea, the flood modelling program that we are doing at the moment is going to produce something like 250 maps, I guess flood studies, across the whole region. In the past, due to the type of technology available at the time, we were managing something like 1200 individual models, so you can imagine how difficult that was to manage. So this program that we are putting in place will allow us to have those more frequent and effective and efficient review processes in place.

**Jacinta ERMACORA:** Thank you.

**The CHAIR:** Thanks very much. Dr Ratnam.

**Samantha RATNAM:** Thank you very much. Thanks very much for all the work that has gone on behind these updated models before us today. I was actually going to pick up where Ms Ermacora just left off, because my first question was about the regularity of these updates. Actually, going back firstly, given the amount of public interest post the 2022 flood events, the interest within the Parliament and this inquiry, do you think this kind of review and update of these models would have happened ordinarily after 2022, or was it a result of the worry and the interest from the community that has resulted in this and hearing the recommendation and heeding the recommendation? I am just interested to know: would it have happened anyway after the 2022 event?

**Tim WOOD:** We had already identified the opportunity and the need to move towards a more efficient and effective modelling process. That was really spurred on by the update of the ARR guidelines back in 2019. As soon as we had a view of those, that is when we started to obviously design the program and start to work with councils, because it is a joint modelling program to actually build that program moving forward. That is also when we obviously applied for funding and started to resource it, and we were successful in that. So we have really been designing and building this program since pretty much 2019.

**Samantha RATNAM:** Is it fair to say the work was underway and it was progressing but perhaps the 2022 event accelerated the outcome and its completion? Is that fair to say?

**Tim WOOD:** No, we always had a target of 2026, so that was already part of the program. I guess what the flood event did accelerate to some extent – and this is not unusual – is there are always a lot of learnings out of a flood event. That is the best information you can get to feed into a model. Particularly for a riverine catchment like Maribyrnong, when you have an event like that, you want to learn from that and you want to update your models. It is good practice to review those models after large events.

**Samantha RATNAM:** I know this might be hard to answer, but it is hard to see now the 2022 event without the context of what happened afterwards in terms of what happened to communities – the interest, the concern, what happened in the public pressure that was applied to agencies like yours and others about readiness and response. I know it is hard to see outside of it, but if there was not that kind of interest and pressure, do you think you would have completed it within this time frame anyway? I am just trying to understand –

**Tim WOOD:** So the modelling program itself?

**Samantha RATNAM:** Yes, and this kind of revising modelling and predictions.

**Tim WOOD:** We had already set the program; we were funded for it. We are working with our partners on that. It was already planned to be implemented by 2026.

**Samantha RATNAM:** Okay. I am interested then to know about the implications for other statutory organisations, whether they are water or others, that are managing this climate risk. We have got another inquiry coming up around climate resilience, which is going to go into more detail around it. But given you have now done flooding out to 2100 – quite significant impacts for the future – do you understand other statutory agencies like yours are going to apply that standard, or was that the standard anyway?

**Nerina DI LORENZO:** I can comment on that. From what we are seeing this looks like a nation-leading approach. We have not come across many other authorities interstate or in other parts of the nation. We have

some very clear signals, though, from a policy perspective. We have got a coastal inundation policy, and the planning scheme requires casting out to the year 2100 from a coastal inundation perspective. So we have signals in policy that set us down this path, and for us, we are very close to the water cycle and so we are in a position in doing modelling for the city to take those signals and extrapolate that forward and basically get ahead.

**Samantha RATNAM:** That is really interesting to know, because from our perspective, in terms of what we should be pushing for in terms of some of those policy parameters to guide this work and make sure that all the relevant agencies are doing this modelling as far as possible, it is important, so thank you very much for that. From the feedback around the modelling and its impact, particularly the wall, and knowing what we know now about how well or poorly the mitigation works performed and knowing that there was an impact on the community of the wall, from your perspective do you think the wall should have been built in the first place?

**Nerina DI LORENZO:** What we have been able to establish when we look at all the data is we can see how it was approved at the time based on that information. The information was very clear. The view at the time with that data was that it was a zero-flux outcome; it was to have no impact. We can see that, and so we can see the parameters of that. If we were in that same moment, we could not see a different outcome there. Basically, we cannot see evidence for saying that was an issue in terms of the way that decision-making happened and what that was based on. But what we do know is again 20 years later things have shifted. Today, if we were assessing that, we would have the 1.7-centimetre impact that we would then have to grapple with, and it would really be again those mitigations that we would be looking at. And if we look at development across the city, when people do work on their property, if there is an impact we will often be requiring mitigations to offset that, and so we would be addressing that. But it was the data at the time that was what drove the decision-making, and we saw that the data at the time said it should have had no impact. The mitigating should have offset that, and that is what we need to focus on.

**Samantha RATNAM:** So the question is then: if it is then the mitigation that did not perform as well as it should have, what are the implications for the future? Is it that the way we model the impact of mitigation has to fundamentally change or improve? Is that the failure that has happened here? Would you approve it now if it was before you, knowing that and knowing how those mitigation works worked?

**Nerina DI LORENZO:** We would be working those mitigations further, I think, and that is what this is telling us to do: review those mitigations, I think.

**Tim WOOD:** Yes. Look, the mitigations are modelled as part of the process, so now that we are seeing I guess a greater granularity of detail within those models. Then that greater degree of granularity will be brought to bear in assessment of any change in the catchment moving forward and any development applications. I think we are getting better information. We have got better models. We will make decisions based on that best available information now, as back then it was the best available information at that point in time.

**Nerina DI LORENZO:** And that is the key point, the granularity we have now for particularly, as I mentioned, that 1-by-1-metre grid – different situation to 2003, so we can see with less granular information what the decision-making was. We understood that. That surfaced through the Pagone panel, and now, with this further granularity, it means we can target those mitigations a bit further.

**Samantha RATNAM:** I am running out of time, so I might put this one on notice if possible. Given now these models are signalling that the racecourse will be flooded in a one-in-100-year event, I am interested to know whether the Flemington Racecourse is approaching Melbourne Water about thinking through how they prevent it? Are they asking for higher and more walls – mitigation – is my question. You can take that on notice if you want to.

**Nerina DI LORENZO:** There is no proposal before us. There is nothing.

**Samantha RATNAM:** Thank you.

**The CHAIR:** Thank you. Ms Broad.

**Gaelle BROAD:** Thank you. Thank you for coming in again today. I am just interested in learning a bit more about the studies that you talked about that you are going to be doing across the Melbourne catchment

area. It is ongoing work. Can you tell us how many different studies are required? How many catchments do you cover?

**Tim WOOD:** We are working with the 38 councils across our operating region. As I mentioned before, until we get into the detail of every single study, it is estimated that there will be something like 250 flood studies that will come out of that process. We have started that program. The program works by working with each individual municipality. We have already completed three of those municipalities. We have just completed the Maribyrnong riverine model. We are working and have active projects in place, with various stages of completion, with 19 of the other municipalities. In the remaining ones we almost have agreements in place, and there are a couple more of that we are still working with. So we are pretty confident that that program is well in train to be delivered.

**Gaëlle BROAD:** Okay, and how much funding did you receive and where from, and how long until they are completed?

**Tim WOOD:** Within our pricing submission we work within our economic regulator, the ESC, for a five-year pricing submission. In this current submission we sought an uplift of \$13 million for this program. We received that, and that is what we are using to roll the program out.

**Gaëlle BROAD:** Okay. Can you just talk to – because you mentioned with these studies, I understand, Jacobs undertook this modelling work, and you have also talked about mitigation studies being outsourced – this funding that you have received? Is that to help cover the costs of these contracts for that work?

**Tim WOOD:** Yes. That funds the program. It is not necessarily mitigation projects; they are separate. This is to actually model the current catchments as they are today in a regional context.

**Nerina DI LORENZO:** If I can just elaborate on that: that would cover the data collection work. That would cover all the bathymetry – all the sort of technical methods of collection. It would cover the work of the consultants who work with us. It would cover also program staff to run the program. It would cover community consultation and the things that we would be doing with councils. It funds the whole program. It was an uplift, this pricing submission, from \$3 million for the previous five years, so you can see this was a significant uplift. In terms of where those funds come from, we basically utilise water bills to fund the public work and the public infrastructure we do. As part of our pricing submission we need to test this with the community and make sure there is an appetite for the work, so that is what we mean by saying we were successful in having this conversation at the time with community in consulting on the pricing submission and then successful in being able to secure that funding and then fund this program.

**Gaëlle BROAD:** Okay. So the cost is really borne by people paying their water bills.

**Nerina DI LORENZO:** Yes, that is right. It is borne by the waterways charge.

**Gaëlle BROAD:** So this is a significant amount of work that is going to be ongoing for years to come. I am thinking of regional areas as well and just the cost and expense of doing these studies and how they can be afforded.

**Tim WOOD:** It is probably worth noting that not every flood study is the same, and the cost and effort for each flood study is different depending on the catchment. Some of our catchments, being in obviously a metro context, are quite complex. There is a lot more effort and a lot more work and a lot more cost involved in some of those, so it is not directly translatable.

**Gaëlle BROAD:** But you do have hydrologists at Melbourne Water to be able to undertake this work?

**Tim WOOD:** We have got team of flood engineers that oversee that program, yes.

**Gaëlle BROAD:** I am interested in Jacobs. This is modelling that you said has not been done in other parts of Australia. It is looking at forward projections, not necessarily historically at what has happened, so how can people rely on that?

**Tim WOOD:** Maybe a little clarification – I think what is different about what we are doing here is that we are doing it at scale across the region. I guess the adoption of the existing guidelines and standards in the

industry's approach is being used across the nation, so that is not necessarily new for us, but I think the scale at which we are doing is the new part.

**Gaelle BROAD:** And you talk about the 2100 increase – wetter wets, I guess. Are you also projecting increased development or building in the region? How is that factored into this model?

**Tim WOOD:** Currently, and that is one of the triggers for the review, we model for the catchment as it is today – that is at the 1 per cent AEP that we have remodelled for the catchment as it is today. The 2100 does not necessarily factor in any further development. What it does factor in I guess is the understanding or prediction of climate change impact at this stage. As we go through our review periods, then we understand not just the climate change element but also what is happening within the catchment from a development perspective.

**Gaelle BROAD:** Okay. But with increased development I guess my understanding is: more concrete, more run-off, more water flow. Are you saying the studies do not take into account that side?

**Tim WOOD:** The study is to take in some factors around that, but it does not take in specific forecast development.

**Gaelle BROAD:** I am interested, because in Kensington was it 850 properties? So if that goes into the planning scheme, can you just talk to the impact – what that actually means? I mean, that is a similar number of houses; there were slightly more in Rochester that were flooded. I have seen significant increases to insurance and the difficulty people are having with any value left in their properties. What is going to be the impact on that area?

**Nerina DI LORENZO:** I might start, and then I will hand to you. Going into the planning scheme will mean if there is a development on that property, it then gets referred to us. It means that we can take into consideration what the height of water is in the setting floor levels and making sure that building design for anything that happens in the future takes that into account. That is the main impact, and recognising it is 800 properties as opposed to 800 homes. It just depends on what the existing floor levels are of homes there. But effectively it guides future development.

**Craig DIXON:** Probably just to round that out, again, the depth of the water is one part of the equation; obviously the other part of the equation is the height of the floor. So in terms of impact to the property, it is down to an individual property level to understand what the floor height is relevant to that.

**Gaelle BROAD:** You talked about focusing on mitigation now. What do you see as the top priorities to help reduce that flooding in future?

**Craig DIXON:** In terms of top priorities, I assume you are referring to which mitigation solution. The study we are about to conduct is an open book, so we will look at whatever is possible. Again, we are reaching out beyond Australia to try and find intelligence, experience et cetera from other parts of the world who may be ahead of us on this. We will look at anything, so everything is on the table. Again, it is all subject to that journey we go through with community to understand not only what is technically viable but what is seen as an acceptable solution to community as well in terms of impact, because again, as Dr Di Lorenzo noted, most if not all flood mitigation infrastructure will have a potential downside, whether it be community amenity, whether it be impact on environment or whether it be impact on traditional owner values et cetera. These are all things we have to weigh up.

**Nerina DI LORENZO:** Some that we have done – for example, we recently, not too many years ago, increased pipe size to move water more quickly. They are the types of mitigations that do not have so much community impact. It will then be whether you can fit them and how that works, but also it will be how else you can create barriers to guide water. Again, we will work our way through that, but we have done –

**Craig DIXON:** So levee banks, retarding basins.

**Nerina DI LORENZO:** Yes.

**Gaelle BROAD:** I have some further detailed questions. Can I put them on notice to you?



**Nerina DI LORENZO:** Sure.

**Gaelle BROAD:** Thanks.

**The CHAIR:** Ms Watt.

**Sheena WATT:** Thank you, Dr Di Lorenzo and your team, for being here today and for all your work in preparing some really important documents. I had a question around councils, because I think you mentioned earlier there are four councils impacted with the modelling.

**Craig DIXON:** The Maribyrnong riverine modelling – you are right; there were four.

**Sheena WATT:** Yes, there were the four. I just want to ask: what can we do to ensure that councils adopt the updated flood modelling into their flood plans for their community?

**Craig DIXON:** I think to an extent we are not best placed, but I will answer as best we can, because we obviously are not in the best position to understand their constraints and capabilities.

**Sheena WATT:** No, I understand that. You are doing all this work, so I am sure you are wanting it to be –

**Craig DIXON:** Yes. I think it is just ensuring that we make sure that they are appropriately supported and appropriately resourced to be able to progress that. And look, we have these conversations. As I said, we have got 38 local councils who we work with. We work closely with every one of them; we look to see how we can help them however we can.

**Nerina DI LORENZO:** We often hear resourcing as the critical constraint.

**Sheena WATT:** Resourcing – is it access to expertise or challenges with the council?

**Craig DIXON:** Yes, that is right. To run a planning scheme amendment, there is expense involved. There is a significant amount of resources involved and capability.

**Sheena WATT:** I understand. What issues do you foresee with future flood planning and risk to councils, given the limitations that you discussed, considering the new flood modelling and their own planning schemes for the future? This has raised a few questions in my mind after hearing you say that earlier.

**Craig DIXON:** I think in the most fundamental sense the whole reason we need this information in the planning scheme is so that future development decisions are made with due consideration and management of that risk. In simple terms, if it does not get in the planning scheme, then the next development that occurs in that area does not have visibility and is not designed and approved to reflect and consider that risk.

**Sheena WATT:** Okay. That certainly is something worthy of our consideration as a committee. I wanted to ask about the progress of your updated flood modelling for the greater Melbourne area. Can you update us on how that is coming along? Are you expecting to hit the deadline, which I understand is 2026?

**Tim WOOD:** Yes, the end of 2026, which is actually a very ambitious deadline given the extent of the work but also obviously the amount of collaboration required with council particularly. The advantage of the program is just the fact that it is a joint modelling program so that we actually get a full picture of the flood risk within the whole area. We have completed three projects within three municipalities. We have also just released the Maribyrnong riverine flood model. We have got a further 19 projects that are actively underway. Some of those will be delivered within the next month or two, but some will be taking the full 12 months. Of the remainder councils, we are just about to set agreements in place to start projects with the rest of them.

**Sheena WATT:** That is across all the council areas that you are working with – the 38 councils that you are working with.

**Tim WOOD:** That is the 38 areas, yes.

**Sheena WATT:** Okay. Ambitious deadline there, but something for us I think to watch out for and consider in the future. Ms Broad was talking a little bit about the costs of these flood modellings. They are not cheap exercises, I can imagine. How are these funded, out of interest?

**Nerina DI LORENZO:** They are funded via basically the waterways and drainage charge on water bills. So that funds any work that we do on waterways, any work we do to mitigate any flood issues, and it funds modelling. So every service that we do on the 25,000 kilometres of river in Melbourne is funded through that charge. That is why every five years we undertake a pricing submission, we do community consultation about what we think we are looking like for the next program, we test appetite, we test willingness and we subject the program and our plans to that community scrutiny.

**Sheena WATT:** Okay. I just wanted to go to Rivervue. As you know, the committee went along to Rivervue, and I cannot recall what time of year it was, but I know many of us were very interested to see the impact on that community. I understand, when we were there, they discussed the LSIO that that site was subject to in 2003, and then later it was removed in – was it – 2016 by some amendments, and then of course we had the event in 2022. Do we know why that was changed and what triggered the 2016 removal? And is there any mechanism in which Melbourne Water feeds into that?

**Craig DIXON:** What triggered that change – it actually started somewhat unrelated specifically to where Rivervue sits. There was an update to what is called an overland flow model in the Moonee Valley area around that time – it might have been just before 2016. As we have just spoken about, once the model is updated there is the request for that then to go into the planning scheme. So that was applied for, and Moonee Valley City Council ran that planning scheme amendment. At the time of that planning scheme amendment – when it goes out for gazette, there is an opportunity for submissions for additions or changes – the property owners actually made a request that that LSIO removal be considered, and that was basically taken into account and picked up through that process.

**Sheena WATT:** Did Melbourne Water have any contribution to that as part of the engagement process?

**Craig DIXON:** That was sent back to Melbourne Water to make comment on, and as we have spoken about before, based on the modelling we had at the time and the state of knowledge we had at the time, it was considered appropriate not to object.

**Sheena WATT:** It was considered appropriate not to object.

**Nerina DI LORENZO:** Subsequent to that – again, now we have new models.

**Sheena WATT:** Yes, of course.

**Nerina DI LORENZO:** We also have the interim model that was updated in August last year. So we have done quite a lot of work with Rivervue. We have been onsite working with residents. We have had lots of assessments onsite. The flood risk management plan has been completed for the site, but also part of this work has been instigating LSIO for that site based on the current information and the new information that we have. As Mr Dixon says, the thing that guides all of these decisions is really modelling and data. And this is why the frequency of our future program, the technology that we have got and the granularity that we have got are so important, because then they can guide those decisions.

**Sheena WATT:** I believe that is my time, Chair. I am happy to conclude there, if that is all right.

**The CHAIR:** No worries. Mrs Tyrrell has told me that she does not have any questions. We have got about 10 or so minutes left, so I will just give people a chance to ask maybe one quick question and see how the answers go.

Just following on from Ms Watt's questions about when things change, obviously the model is not going to be static; you are going to be reviewing it over the course of the next 75 years and beyond as we get to 2100. That will have implications for planning schemes. For people living in this area it is not a fixed thing. There is obviously a point-in-time analysis of risk – that is basically what we are talking about – and things will trigger changes in the future. Is that right?

**Nerina DI LORENZO:** That is right, and I think that is a really important point. Using any of the examples where there are either new properties that come into LSIOs or properties that come out, if as we progress we find mitigation options, that then reduces the area of land subjected to inundation. Similar to the previous example, there are times where properties come in and out, depending on what has happened locally, and that

again is the point-in-time risk analysis, each time. So again, the critical thing, I think, that has come out of the changes in standard and also the continued collective focus on this is the frequent updates, or the more frequent updates, because we think, as one of the members said earlier, there are so many moving parts that as they change we need to be able to capture them. But it is a point in time, and that basically is what will continue happening every time there is a new model. It will increase in some places and it may decrease in others, depending on localised mitigation works, and so it would not be unusual to see a circumstance where things might also come out of an LSIO.

**The CHAIR:** So it would be fair for the committee to consider that people who live and work – residents, business owners – in these areas will need to be alive to the dynamic nature of the assessment of risk in their neighbourhoods?

**Nerina DI LORENZO:** That is right, and that is why the community awareness is so important. That is the commitment we talk about: to really make sure we are engaging, with the SES and with councils, to make sure there is a high level of community awareness, because we think this will be the ongoing, I guess, way of living in the natural cycle of the environment, in the same way that we have seen with bushfire risk and the kind of awareness that happens with bushfire risk. We are really saying that flood risk needs to be thought about in the same way – to have that type of awareness together – and we are very committed to doing that and to working closely with the community on that.

**The CHAIR:** Mr Ettershank.

**David ETTERS HANK:** Chair, thank you. I think I am just going to put some questions on notice, because we are not going to have enough time to get through them. There are just so many issues that we have not had an opportunity to address.

The first question would be whether I could ask you to provide the 2100 model on a sort of timescale basis, because people obviously look at it and go, 'That's 75 years down the track.' Can you actually provide us with a graphic representation of what that might look like in 10 years, 20 years and 50 years time and suchlike, rather than simply at the end of 75 years?

**Tim WOOD:** I would have to take that on notice. I am not sure that that is available –

**Nerina DI LORENZO:** We will take that on notice.

**Tim WOOD:** but I will take that on notice to see whether that could be produced.

**David ETTERS HANK:** Okay. That would be great. In terms of the impact of flooding, there is a question of levels. There is also a question of water velocity. Can I ask you to just respond to the committee on whether or not, in your modelling of the impact of the flood wall, velocity was taken into account. If not, why not? And if it did, what that impact would be?

**Tim WOOD:** The modelling of velocity was taken into account for that, and I will have to take it on notice around if there was a specific impact. I am not aware of one that was highlighted.

**David ETTERS HANK:** There is nothing in the report about velocity.

**Tim WOOD:** Yes, I will double-check, but velocity was definitely taken into account.

**David ETTERS HANK:** Okay. So I guess the question would be: did it affect velocity, and what did that mean? In terms of the Rivervue Retirement Village, I think the report says that 47 villas at the retirement village are now subject to flooding at on a 2 per cent AEP. I would be interested to know what the impact is on the 1 per cent. I am happy to give all these as questions on notice, because the Chair has indicated we have run out of time, if that is all right.

**The CHAIR:** If there is a clarification that the witnesses want to ask about or a correction they want to make to the question, I am happy to hear that, just so you get the answers that you are looking for.

**David ETTERS HANK:** Absolutely.

**Tim WOOD:** So we can take it on notice? We have got the numbers; they are just there when we need them.

**David ETTERS HANK:** But it is good to clarify. In terms of the response, you said, Dr Di Lorenzo, that you are continuing to work on all of the recommendations from the Pagone report. I am looking at recommendation 13, where you seem to have basically washed your hands of the Rivervue decision. I think you actually said, 'There are things that we still don't know and we accept that we may never know given that these are historical events,' as though this is actually metaphysical or something. I guess the question I would really like to see is: in terms of what is proposed, are you proposing to look further into how that terrible decision was made? And (b) if you could also provide us with some data on what you are proposing to do to address it. I see the report says you cannot do the one-way valves which were mentioned. But what are you going to do about this given the increasing number of villas that are affected to the point where I understand that most villas could not be sold within the last two years? People are just stuck with those villas now because of the ambiguity.

**The CHAIR:** We might just pause there. Dr Ratnam, do you have questions?

**Samantha RATNAM:** One question, and if we cannot answer it in time, that is fine. It is connected to Mr Ettershank's question and refers back to a point you just made about that timeline and process for Rivervue being excluded from the LSIO. From the modelling that you have provided us, you have said to us, 'The LSIO behaved as we had predicted.' The one area of flood that was not in the LSIO was Rivervue, and now we know that the LSIO was removed from that area, so we are interested to know that process and how we do not repeat it in the future.

You mentioned before that the property owners had approached Melbourne Water, or the decision-making with the council, for its removal. My understanding of the process from the previous evidence we have received was that after Tigcorp bought the site, in 2011 they said, 'We've done all the mitigation works that Melbourne Water put as a condition of our planning permit,' so Melbourne Water then approved the planning permit, saying all the conditions had been satisfied. I am unclear whether the acquittal of all those works was required for Melbourne Water to remove the LSIO. At the time when we were provided the evidence, it did not look like, 'If you do the works, you get your planning permit approval, plus you get the LSIO removed.' It seemed like it was a two-step process. I want to clarify what Melbourne Water said to Tigcorp. Did it say, 'If you do the works, you get your planning permit'? It sounded like that at the time. And then in 2015 the C151 process began. At that time Tigcorp and the developers said to us when they came before us, 'We never approached Melbourne Water to start this process. We just said to them, "We've done all the works. Now take the LSIO off us," and they used C151 to get that removed.'

I am just interested to know who started what. I know the process started well before, but there is some involvement of these property owners asking for it to be removed. Did Melbourne Water say, 'If you do all the mitigation works, you get your planning permit and you get your LSIO removed when we can'? Do you have any record of that or any record of what the developer asked you all for?

**Nerina DI LORENZO:** We will take both of those questions on notice, and we will respond to both of those.

**Samantha RATNAM:** Great. That would be good.

**Nerina DI LORENZO:** Just to be very clear in terms of the work we have done with Rivervue, we are representing what we have gotten up to with this investigation, so we are being open about what we are up to. But I just want to be very clear: we are working very closely. We have a flood site management plan in place. We have been looking at site-specific issues, we have done some local work and now we move into using this information on mitigation. I just want to make sure we are characterising that the right way. And we will absolutely provide a response out of here – take that on notice.

**Samantha RATNAM:** Thank you.

**The CHAIR:** Ms Broad, do you have anything else? Ms Bath?

**Melina BATH:** We have got some questions, but I will –

**The CHAIR:** Put them on notice?

**Melina BATH:** Yes, put them on notice.

**Gaelle BROAD:** I have just got one question. The Maribyrnong township historical flood pole – I have received a couple of photos that show it in 2023 and 2024, and there is a half-metre difference in the 1993 flood level. You are nodding. What is your response to that?

**Tim WOOD:** We have been made aware of that in the last week. There is an error there that we will rectify.

**Gaelle BROAD:** Okay. Excellent. Thank you.

**The CHAIR:** Thank you so much, Melbourne Water, for coming in today and for your very comprehensive evidence. There will probably be a few more questions placed on notice, and if you can come back with those reasonably expeditiously, that would assist the committee to finalise our deliberations. We thank you for your presentation here today. With that we will pause proceedings and be back in about half an hour.

**Witnesses withdrew.**