

REPORT ON PROCEEDINGS BEFORE

**SELECT COMMITTEE ON THE PROPOSAL TO RAISE THE
WARRAGAMBA DAM WALL**

PROPOSAL TO RAISE THE WARRAGAMBA DAM WALL

CORRECTED

At Jubilee Room, Parliament House, Sydney, on Monday 7 June 2021

The Committee met at 09:30.

PRESENT

Mr Justin Field (Chair)

The Hon. Wes Fang
The Hon. Shayne Mallard
The Hon. Taylor Martin
The Hon. Rod Roberts (Deputy Chair)
The Hon. Adam Searle
The Hon. Penny Sharpe

CORRECTED

The CHAIR: Welcome to the fifth hearing of the inquiry of the Select Committee on the Proposal to Raise the Warragamba Dam Wall. Before commence, I acknowledge the Gadigal people, who are the traditional custodians of this land. I pay respects to the Elders past, present and emerging of the Eora nation, and extend that respect to other Aboriginal people present or watching today. I also acknowledge that the proposal that we are considering is on Gundungurra land. We acknowledge those who might be watching from that area. Today we will be hearing from a number of stakeholders, including academics and representatives from the insurance industry and government. I thank everyone for making the time to give evidence to this important inquiry today.

Before we commence I will make some brief comments about the proceedings. Today's hearing is being broadcast live via the Parliament's website. A transcript of today's hearing will be placed on the Committee's website when it becomes available. There may be a short delay to that. In accordance with the broadcasting guidelines, media representatives are reminded that they must take responsibility for what they publish about the Committee's proceedings. While parliamentary privilege applies to witnesses giving evidence today, it does not apply to what witnesses say outside of their evidence at the hearing. I therefore urge witnesses to be careful about comments they may make to the media or to others after they complete their evidence. Committee hearings are not intended to provide a forum for people to make adverse reflections about others under the protection of parliamentary privilege. In that regard, it is important that witnesses focus on the issues raised by the inquiry terms of reference and avoid naming individuals unnecessarily.

All witnesses have a right to procedural fairness according to the procedural fairness resolution adopted by the House in 2018. If witnesses are unable to answer a question today and want more time to respond, they can simply take the question on notice. Written answers to questions taken on notice are to be provided within 21 days. If witnesses wish to hand up documents, they should do so through the Committee's staff. In terms of the audibility of today's hearing, I remind both Committee members and witnesses to speak into the microphones. For those with hearing difficulties who are present in the room today, please note that the room is fitted with induction loops compatible with hearing aid systems that have telecoil receivers. Finally, everyone should turn their mobile phones to silent for the duration of the hearing. I now welcome our first witnesses to the first session today. I remind Mr Austin, Mr Cinque and Mr Kearns that, as you have appeared previously before the Committee to give evidence, you will be examined on your former oaths for today's hearing.

CORRECTED

PETER CINQUE, Principal Advisor, Hawkesbury Nepean Strategy, NSW State Emergency Service, on former oath

DANIEL AUSTIN, Deputy Commissioner, Operations, NSW State Emergency Service, on former affirmation

ANDREW KEARNS, Manager, Strategic Planning, Hawkesbury City Council, on former affirmation

ROBERT McMASTER, Elected Member, Executive Committee, and Welfare Officer, Hawkesbury City Chamber of Commerce, sworn and examined

PATRICK CONOLLY, Mayor, Hawkesbury City Council, before the Committee via videoconference, sworn and examined

The CHAIR: I invite witnesses to make a short opening statement to the Committee if they wish. Please keep it to no more than a couple of minutes. I know you represent different organisations. You might want to put those positions.

Mr AUSTIN: Thank you, Mr Chair. I will make an opening statement. I appear before the Committee today in my capacity as Deputy Commissioner, Operations for the NSW State Emergency Service. I understand that you would like to hear from the SES about forecasting, warnings and local response following the March 2021 flood event in the Hawkesbury-Nepean Valley. I appear with my colleague, Mr Cinque, who is the principal adviser for Hawkesbury-Nepean in the metropolitan operations area. We both appeared before this Committee on 30 June 2020 to discuss the SES response to the flooding that occurred in the Hawkesbury Nepean-Valley in February 2020. The SES is an emergency and rescue service dedicated to assisting the community. We are a volunteer-based organisation that provides emergency assistance to the people of New South Wales 24 hours a day, 365 days a year.

The major responsibilities of the SES are for flood, storm and tsunami emergencies. However, we are the majority of the general rescue effort in rural parts of the State and act as community first responders to support the ambulance service of New South Wales in isolated communities. In March 2021, the State of New South Wales was impacted by a flood emergency, which also included the Hawkesbury-Nepean Valley. It is important to provide you with information about this event so that you can understand the context from the SES response in the valley. From 10 March 2021, a series of severe storms began to impact New South Wales, bringing significant wind, rain and flooding. Across these events, over 30 river systems were in flood, 868 warnings were issued by the Bureau of Meteorology, 98 locations across New South Wales were affected, over 62,000 people in New South Wales were subject to evacuation warnings, and over 25,000 people were subject to evacuation orders.

Most floodwaters had receded by early April 2021. However, western New South Wales continued to be impacted by significant flooding as waters moved down through these systems. That flooding continues to this day. The SES led the emergency response to these severe weather events from 10 March to 6 April. The SES managed over 14,000 requests for assistance, including over 1,000 flood rescues. There were almost 3,500 SES volunteers in the emergency response, evacuation, resupply and incident management roles, with an estimated 38,000 volunteer hours dedicated to the response. The response was also assisted by the NSW Police Force, Fire and Rescue NSW, NSW Rural Fire Service, Marine Rescue, Surf Life Saving as well as over 350 members of interstate agencies.

Floods across the State did reach extreme levels. Floods in Taree were just below the one-in-100 chance per year levels. Floods in Wingham were just below the one-in-200 chance per year levels. Natural disaster declarations were issued for 63 local government areas [LGAs] impacted by the floods, including 18 local government areas in the Sydney metropolitan area. The Hawkesbury LGA was declared a natural disaster area on 21 March. This was the largest flood in the Hawkesbury-Nepean Valley since August 1990—for over 30 years. However, it only represented between a one-in-10 and a one-in-20 chance per year flood, with the river level at North Richmond peaking at 14.6 metres and Windsor at 12.9 metres.

This is almost seven metres below the largest flood on record, which peaked at 19.7 metres at Windsor in June 1867. Following this flood, the SES commenced an after-action review. The outcome of this review has not yet been finalised. The SES is also undertaking a strategic level review of the event, which is being conducted under the auspices of the Australasian Fire and Emergency Services Authorities Council [AFAC] through their independent operational review guidelines. AFAC is the peak body for public sector fire, land management and emergency services agencies in Australia and New Zealand.

The experience of this flood highlights the importance of the work that is being done across government through the Hawkesbury-Nepean Valley Flood Risk Management Strategy. One of the key elements of the strategy is the Community Resilience Program, which is a partnership between Infrastructure NSW and the SES.

CORRECTED

This program aims to increase community awareness of the flood risk within the valley and support communities in building capacity to respond when flooding occurs. We are in a unique position to do this work ahead of a large flood, which is usually only ever prioritised after a significant flood has been experienced. The community resilience program has 19 projects, some 40 project partners, and over 300 organisations are involved. It has included three rounds of the "Floods. The Risk is Real" public safety campaign, a comprehensive education package, and capacity-building activities for local leaders and local communities.

A suite of resources has been developed, including a flood awareness mapping tool for the whole region, educational videos and animations, information in key community languages and teacher resources focused on flooding in the valley. While the flood review is still underway, we have heard from local stakeholders that this work improved their understanding of the flood risks, strengthening their local networks and gave them the confidence to know what to do ahead of, and during, a flooding event. Our communities are better prepared now than they were five years ago. However, we do acknowledge there is work to do and there always will be work to do.

The CHAIR: Thank you, Mr Austin. I might ask either Councillor Conolly or Councillor Kearns if they would like to make an opening statement.

Mr CONOLLY: First of all, thank you for the opportunity to present before the Committee today. Flood mitigation for the mayor of Hawkesbury is one of the most, if not the most, important responsibilities given the huge threat that it poses to our LGA. We have got the worst unmitigated flood potential in Australia at the moment. The current council's view on the raising of the Warragamba Dam wall is that we are waiting for the environmental impact statement [EIS] before we will make a comment on whether or not we are supporting the proposal. But what I wanted to stress to the Committee today is how important it is for our community that the EIS is finalised so it can be considered and something happens.

In March, as we have just heard, there were predictions that we were getting a one-in-50-year event. In the end, we did not get quite a one-in-50-year event; we got about a one-in-20-year event when measured. But the damage was still incredibly significant, and it is worth just reiterating that this is nowhere near the worst event that we could experience. Flood recovery is underway. Preliminary estimates from just preliminary numbers are that just for council's own assets we are looking at about \$24.5 million of damage. For privately owned properties, 600 properties were affected; 236 of those are inhabitable and 61 were completely destroyed, and that is across Windsor and South Windsor, Richmond, Freemans Reach, Cornwallis, Wilberforce, Ebenezer, Sackville, Cumberland Reach, Lower Portland, Leets Vale, Lower Macdonald, Webbs Creek, Pitt Town, Pitt Town Bottoms and McGraths Hill—so fairly widespread.

Obviously we are still very much in the aftermath. We are still going through the process of ongoing inspections of those properties to ascertain the full impacts and quantify what the losses are, but I think it is just worth considering that a 100 event is an extra 4.3 metres on top of the peak we experienced at Windsor. As we have just heard, if you look at the 1867 event, we were 6.7 metres short of the peak that we could experience than what we have in this recent event. In a one-in-50 flood, 1,600 properties would be inundated and we would have \$184 million of damage; these are figures from our flood risk management study and plan. In a one-in-100 event, we would have 3,200 properties inundated and an estimated damage worth \$403 million. So huge potential for damage.

The other ongoing concern of the council is the evacuation of residents, especially those residents west of the river, which have not potentially had that much focus before this event. But during this event the Bells Line of Road was closed, which meant that while we also had it in our minds that people west of the Hawkesbury River could just go to the mountains if they ever needed to get out, that route was completely cut—Putty Road was cut, which meant we were choppering in essential supplies; if people had to get to hospital, we were taking them by SES boats. We were very fortunate that that event was not prolonged any further because that situation would become unsustainable very quickly. So as well as looking at the proposal to raise the Warragamba Dam wall, we also need to be talking about evacuation routes and funding those so that our residents have the opportunity to evacuate.

Overall, the council's position at the moment is that we are waiting for the EIS in order to make a call as to whether we support this particular proposal, but I would drive home that the *Resilient Valley, Resilient Communities* report identified I think nine flood risk mitigation opportunities, one of which was the Warragamba Dam proposal which the Government is taking forward. It seems like, on reading through that, that makes the most sense. But if there is an indication that the Government may not proceed with that, if it does seem like the Government intends to continue to take a long time to consider this, we have got to make a decision. Our community needs the Government to make a decision one way or another—either go ahead and push through with this proposal or, if not, we need to get back to square one, look at what those other options were and pick another

CORRECTED

one and start to advance it. Because we cannot just sit around waiting without doing any of the flood mitigation options that have been identified.

The CHAIR: Thank you, Councillor Conolly. Mr McMaster, do you have an initial statement before we get on to questions?

Mr McMASTER: Thank you for inviting the Hawkesbury Chamber of Commerce to come along and present its position here. I have been on the chamber of commerce now for five years. For the last two years, I have been on the executive, and the past 18 months, I have been elected as the welfare officer for the chamber of commerce. I have lived in the Hawkesbury for 40 years and I have been pretty active in the flooding, so I understand the situation. On accepting the invitation here, we sent an email out to all our members, which is 80 members, asking for their position on what their thoughts were around the raising of the height of the Warragamba Dam. That was about two weeks ago, three weeks ago.

From our 80 members, unfortunately, we only got one response, and I have got that response here if you would like me to table it. That response is heavily skewed towards the environmental side. The chamber has not had any discussions about this at all. It has had no people come in and talk about it. So really the chamber has no position on what should happen and what should not happen. The members have been affected. Nothing serious—it is more around lost time due to the flood. If you live in the Hawkesbury, that is what you expect. Floods are part of life out there, unfortunately. If you are below 19 metres, you have got to expect to get wet feet. That is all I have got to say at this stage.

The CHAIR: Thank you very much, Mr McMaster. Mr Kearns, I will give you a chance unless you are happy with—

Mr KEARNS: No. The mayor has provided the council's address.

The CHAIR: Mr Austin, I am not sure if you have seen—the Government has provided us with quite a detailed overview of the March 2021 flood event. We have only received this this morning. Just having a look at it, it says in here that the Bureau of Meteorology [BOM] as at Wednesday 17 March was only forecasting a small probability that Warragamba Dam would have a minor spill. It seems that the forecasting was pretty out with regard to the flood risk from this event. Has that been interrogated at all? I know one of the things we have talked about previously at these hearings is the role of forecasting and trying to improve decision-making for your organisation and the Government more generally.

Mr AUSTIN: Yes, it has been looked at. As we discussed I think the last time we were here, the reality of the forecasting is that it starts on a fairly wide window and, as the event gets closer and closer, it does narrow down until you actually get what happens on the day.

The CHAIR: This was the day before though, right?

Mr AUSTIN: Yes. The bureau undertakes a review. As I said, we are undertaking an after-action review. The bureau, I do know, is undertaking its own review into the event itself, and they would need to speak to the outcomes of that, obviously. But what we did do during the event is we have talked previously about having an embedded meteorologist within our State command centre. We also, for a significant portion of that, had an embedded hydrologist as well—so having additional resources who are able to monitor and work very closely with the incident management teams around the State to actually look at the individual catchments as they were reacting.

The CHAIR: When will your after-action review be completed?

Mr AUSTIN: Our current estimation is around about July at this stage.

The CHAIR: Will it be a public document?

Mr AUSTIN: It will ultimately be on public record, yes.

The CHAIR: Ultimately how long after it is completed would you expect it to be on the public record?

Mr AUSTIN: Once we have been through it and once we have actually assessed it and accepted it, then it will be available.

The CHAIR: We might come back to this but before I offer it up to the other members, Councillor Conolly, you mentioned in your opening statement that there had been predictions that you would get to a one-in-50-year event. I am just wondering where they came from, because the BOM was not forecasting that and I think everyone was a bit surprised by the event. Do you recall where those predictions came from?

CORRECTED

Mr CONOLLY: Yes. I think it was around 27 March. It was from the Bureau of Meteorology and the SES giving out warnings saying to expect an event similar to the 1961 event, with a height of [inaudible] metres, which was a one-in-50 event at Windsor.

The CHAIR: You mentioned also—and we have heard this before—in a one-in-100-year event that your own modelling assessment is 3,200 properties would be inundated and there would be \$403 million in damages. We also know from the initial assessment of this project that it will not prevent that level of flooding; it will only delay the peak. Maybe it will reduce the peak by a little bit. So those properties that are at risk regardless of the dam wall raising. After the flood event there was a lot of discussion about potential buybacks and what the Government should be doing to move people off the floodplain and prevent further development on the floodplain. Has the council got a formal position on those ideas?

Mr CONOLLY: No, the council's position is to wait for the EIS on the Warragamba Dam proposal, it being the proposal that is being advanced by the Government. I could make some personal remarks that I do not think it sounds very feasible with the buybacks, given the number of properties you would have to buy back to make a potential difference. It does not sound like it would be feasible at all in regards to this proposal. I would also probably slightly disagree that the raising of the dam wall would not make a difference to the one-in-100 level. It would make a significant difference as to what these events would be like. One other point I will just make is that 3,200 properties are the ones being inundated. You have got to remember also the huge logistical challenge, regardless of what routes are in place, of evacuating everybody else at risk in that event, which would be tens of thousands of evacuations out of our area.

The CHAIR: Yes, understood.

The Hon. PENNY SHARPE: My question is probably to Councillor Conolly in the first instance. I first just want to acknowledge how difficult it has been for your community. I know that work is ongoing. There are people not in their houses and I know that council plays a big role with that, so I just want to first up acknowledge that and I understand that is still going. I was very interested in the issue around the evacuation routes and the failure when the Bells Line went down. Are you able just to talk to us a little bit about that? But also, what are the options around an evacuation route given that you have said it is not something that has really been thought of before in any great depth?

Mr CONOLLY: Sure. Thank you for that. First of all, I do understand that while we are here now I think the State Government and the Federal Government are announcing a bridge option, which I am very keen to go and have a look at, across the Hawkesbury River at Richmond.

The Hon. PENNY SHARPE: Yes.

Mr CONOLLY: That is obviously quite relevant. I might also throw this question to Mr Kearns in a moment around what are the options. But just to your initial point there around what happened, so the Bells Line of Road went out and the Richmond Bridge was out fairly early on. The Windsor Bridge and the new Windsor Bridge gave us a few extra hours of access, but of course in this kind of event it also goes under water. So essentially that community was completely isolated by road and, as I said, we had to rely on helicopters and boats, which is not sustainable. I think ultimately we need some way of getting those people out. Either the Bells Line of Road corridor needs to be fixed so that it is not going to go—it was affected by storm rather than flood, obviously being quite high. So either that road needs investment or you need to look at bridges across the river. But I might let Mr Kearns talk to that, if that is okay.

Mr KEARNS: I reiterate what Councillor Conolly has highlighted there, that the bridges across the Hawkesbury River have a relatively low flood immunity so they do go out very early in flood events.

The Hon. PENNY SHARPE: Just to be clear, the new bridge flooded?

Mr KEARNS: The Windsor Bridge flooded, yes.

The Hon. PENNY SHARPE: The replacement Windsor Bridge flooded, yes.

Mr KEARNS: But it was never built as a flood-free bridge. In order to be flood free it had to be built essentially to Wilberforce, so several kilometres.

The Hon. WES FANG: Could I just confirm please that the surrounding roads go underneath before the bridge does?

Mr KEARNS: In the case of around Wilberforce?

The Hon. WES FANG: The Windsor Bridge.

CORRECTED

Mr KEARNS: That is correct, yes. The bridges go under very early, so those residents west of the river—and for the Hawkesbury that is approximately half of our population, so almost 30,000 people for us in that instance. I guess the assumption has been that they have always had the ability to exit to the west, so across the Blue Mountains, Bells Line of Road and Putty Road. As Councillor Conolly highlighted, in this particular event that was not available. I guess in terms of other options to consider, if those routes that are to the west are not secured in a more realistic way to enable people to evacuate in times of flood then we need to be looking at the flood immunity of new bridges and new infrastructure that is provided—recognising though that a lot of the Hawkesbury does become flood islands, so just building a bridge to a higher flood immunity does not necessarily mean that residents can get out all the way to right out of the flood zone, if you like.

The Hon. PENNY SHARPE: I think this question is to Mr Austin and Mr Cinque. You said that there were 25,000 evacuation orders, is that right?

Mr AUSTIN: People subject to.

The Hon. PENNY SHARPE: People subject to, yes. Can you just explain what the difference between those two is?

Mr AUSTIN: An evacuation warning is effectively, as the name suggests, putting people on notice that at some point in time the situation is deteriorating and there is the potential for an evacuation to be required, whereas an evacuation order is the notice to move, if you like, to say that, from our assessment and all the intelligence that we are getting, it is time to have those people relocate. Broadly, about 62,000 people were subject to evacuation warnings.

The Hon. PENNY SHARPE: Sorry, this was just in the Hawkesbury or was this across the State?

Mr AUSTIN: No, this was across the State and about 25,000 for warnings.

The Hon. PENNY SHARPE: Can you break that down to the Hawkesbury area?

Mr AUSTIN: Yes, so, 11 evacuation orders—around about 3,000 people—and about 14 evacuation warnings, so that is still about 60,000 people.

The Hon. PENNY SHARPE: Given the issues with the forecasting—obviously it must be one of your greatest frustrations, trying to work with that—when you are giving a warning, what is the time frame that you are working to in terms of people (a) becoming aware, (b) taking action and (c) leaving?

Mr AUSTIN: It is a good question. There is a range of triggers built into the plans, so it does vary from location to location. The aim is obviously to give people the maximum lead time so they can prepare themselves. It is not just simply a matter of obviously moving yourself from point A to point B. It is also about potentially doing some last-minute property preparation.

The Hon. ADAM SEARLE: Just in relation to this particular event, what were those time frames?

Mr AUSTIN: The specific time frames?

The Hon. ADAM SEARLE: Yes, and how did they work? We have got a real-life event and we just want to understand how the policies and procedures that you have got in place worked in a real-world situation.

Mr AUSTIN: What I can talk to is places—so Pitt Town Bottoms, as an example. There was a warning on 20 March at 8.30. The order was on 21 March at 1.50. That is an example. They vary quite dramatically and they vary quite dramatically based on the rate of rise in a number of cases. So whilst it is done with every intent of providing maximum lead time and provided with every intent of not doing evacuations post-sunset and after dark, there is an unfortunate reality that that is not always achievable either.

The Hon. ADAM SEARLE: How did it work in this case with the evacuations?

Mr AUSTIN: In most instances there were fairly significant lead times between the evacuation warning and the evacuation order. There were some—

The Hon. PENNY SHARPE: When you say significant—I mean, Pitt Town Bottoms, from what you said it was 24 hours between warning and evacuation order. Is that right?

Mr AUSTIN: Correct. There are a number that are exactly the same and there are a number that are much shorter time frames.

The Hon. PENNY SHARPE: How much shorter? Hours?

Mr AUSTIN: Yes.

CORRECTED

The Hon. ADAM SEARLE: Were the evacuations able to be effected safely?

Mr AUSTIN: Yes. As a rule, yes. There were certainly people that were assisted to evacuate. But you have to remember that this was an event that we were talking about for a number of days, so it was not just the evacuation order being issued. There were flood warnings and flood bulletins being issued, a significant amount of media had been undertaken, the use of social media and a whole range of things and a lot of local network media as well. So whilst from a State level and an incident management level you are providing, I guess, broad summaries, there is a lot of more detailed information that is being provided closer to the specific event at any time.

The Hon. ADAM SEARLE: But your incident management framework worked effectively in this situation?

Mr AUSTIN: Look, they are subject to the after-action review. If there are lessons to be learnt we will certainly learn lessons down the track, but it would not be right to comment and pre-empt what will come out of an after-action review.

The Hon. SHAYNE MALLARD: I might add some questions related to the evacuation. Thank you for the work that the SES does. I appreciate it and have had the honour of giving out various awards over the years with various Ministers to volunteers and workers. Mr Searle and I are both from the Blue Mountains and it is a community in the State that is an exemplar of resilience and preparedness for bushfires. Is the community in this area of threat, which comes sort of every 30 years, so it is not like bushfires every summer, does it not need some energy or some resources put into building up resilience and preparedness for evacuations and cooperation with your services?

Mr AUSTIN: I guess there are a couple of parts to that particular question. In terms of when does it flood, yes, this is the biggest flood in 30 years. However, if you look at some of the literature that was provided to—I think it was the June 2020 hearing—you can see it is quite cyclic, where a number of events occur depending on whether we are in the drought phase or in the wet phase of the cycle. Yes, they tend to not occur—

The Hon. SHAYNE MALLARD: We have just gone through the drought phase.

Mr AUSTIN: We have just come out of the drought phase.

The Hon. SHAYNE MALLARD: So living memory has been drought, really.

Mr AUSTIN: Correct. If you remember, the February 2020 event was very much literally the breaker of the fires.

The Hon. SHAYNE MALLARD: The first one, yes.

Mr AUSTIN: We have put a significant investment into the Hawkesbury-Nepean. Not just us; it has been a broad effort including council and other government agencies. There is significant anecdotal evidence around the number of people that have made at least one change or taken one action as a result of the "Floods. The Risk is Real" campaign that was actually running up until and including the start of March. We were literally on the ground with people working through forums and working through those kind of things at the time. So there is, and there continues to be, an investment by us and our partner agencies in the Hawkesbury-Nepean Valley to continue to build that knowledge and that confidence. Given, like most communities, there is a reasonable turnover of people, that work will always be ongoing.

The Hon. SHAYNE MALLARD: It is significant in the Hawkesbury, yes. More so than in the Blue Mountains. Would Councillor Connolly like to comment on that as well? Would you like to see us recommend that more resources be allocated to building community resilience in these flood prone areas?

Mr CONOLLY: Of course I would like you to recommend that. Having said that, I have to concur with Mr Austin that there has been a huge investment and a really big campaign on radio, TV and online around increasing the flood awareness of our community. Anecdotally—I do not know what evidence we can point to—I can tell you that I think we are aware. One of the side effects of this event is that we are very much aware now. I would also like to pick up on that point and make sure people understand that it is cyclical. If you look back over the last 200 years, you will have periods of 30 or 40 years where you get a flood annually or more often, and then long periods of dry. We have had a couple now within a short period of time so we have to—

The Hon. SHAYNE MALLARD: We are complacent.

Mr CONOLLY: We have to be ready now to experience one every year if that is what is coming or it is not. But that is what has happened in the past.

CORRECTED

The Hon. PENNY SHARPE: Mr Cinque, we have spent a lot of time with you driving around, having a look at all of those areas. I accept that you are doing a review and I am not being tricky or catching you in any of this. I am just interested in, the way that this flood occurred, given that we have been working off modelling and it has been presented to the Committee, if there is anything that you noticed in terms of the difference? Did things happen that had not been predicted that you think we should be aware of in terms of the way it rolled out in March?

Mr CINQUE: I think that the flood largely proceeded as we expected because the timing—the rate of rise—is always highly variable and the forecasting can be highly variable because it relies on forecast rainfall. These days the bureau gives us a range of outcomes, not just one outcome, and some of those outcomes looked bigger. I suppose the only concern we had was with the Colo River in predicting a much higher level of flooding there. That was something a bit new for us. But those rarer sorts of predictions have to be validated by a council flood study, which is going to be starting soon. It will give us a bit more certainty about the flood behaviour in the Colo. But largely on the whole river system, it was proceeding as we expected. It was just the timing, which is all ways highly variable.

The Hon. PENNY SHARPE: Can you provide to the Committee the experience—maybe for you, Councillor Conolly or Mr Kearns—of evacuating people, particularly by road? Obviously there has been a lot of discussion about the evacuation routes given the short period of time that some people were given to evacuate. Are you able to talk us through how that went? Where the clearly pinch points are that became obvious very quickly. Just a general sense of how that went, leaving aside the more dramatic helicopters and boats, which are obviously very serious. The road evacuation is what I am very interested in.

Mr CONOLLY: It is probably more of an SES question, but from my perspective of what I observed, there were no issues with evacuation in this event. We had to evacuate people. I guess for me it was more the fear of what was going to happen if we had that extra couple of metres. What is important to understand is that a couple of metres makes a lot of difference. The people who were evacuated—not that they are used to being evacuated but they are in low-lying areas and are probably mostly aware of that. They probably had plans in place for the most part. I certainly spent a lot of time in evacuation centres and we hardly saw anybody because people knew where they were going, and they were not coming to evacuation centres. The fear is that next level of—once you start getting into our urban areas and evacuating large suburbs of people, some of whom may not be fully understanding of their flood risk, that is when it becomes really dicey. We have got flood evacuation routes. We know where to send people but I do fear about traffic and what that would have actually looked like.

The Hon. PENNY SHARPE: Obviously this is something the council has thought about a lot. Where is the extra work that needs to be done to make sure that those can cope in the future?

Mr CONOLLY: As I said, I think that west of the river we need to be looking at Bells Line of Road, that corridor, and also flood [audio malfunction] bridges. This side of the river, we are seeing people jam Windsor Road and Richmond Road, and that both need to be considered in the long-term as to whether they are keeping up with demand. I do not know if Mr Kearns has anything else on that in terms of evacuation routes.

Mr KEARNS: Only to highlight that the evacuation from the Hawkesbury LGA is—council recognises it is a very complex matter. Whilst we undertake modelling in terms of our flood events and modelling of multiple scenarios, no two floods are the same.

The Hon. PENNY SHARPE: Correct.

Mr KEARNS: An evacuation model that is very complex in terms of how it addresses the potential for flooding and different circumstances—council is obviously very keen to understand more about the emergency flood evacuation model 2, or FEM 2, that is being undertaken at the moment in terms of the various land uses within the Hawkesbury-Nepean Valley. That will feed into a new model in terms of evacuation from the valley.

The Hon. PENNY SHARPE: Probably one of the best lessons very quickly within the community was to realise and understand—for them to evaluate themselves about how prepared they are. I assume that your review will show that. Are you thinking at the moment—will you actually be measuring that kind of awareness? Are there baseline measures around action and what that means? Will you be able to say the difference before the flood and after the flood in terms of awareness? I think you mentioned before, Mr Austin, you have already had some feedback about people taking one action previously, and that was obviously prior to the flood. How are you going to be able to measure all of that?

Mr AUSTIN: I will let Mr Cinque talk to the specifics of it in a minute but what we have already engaged in is a number of community forums, not only within the Hawkesbury but also up on the mid North Coast, which was also significantly impacted. We are planning for others around the State. That is a vital part of

CORRECTED

it because it does give you that opportunity to go back and reassess the messages and the way people have learnt them. In terms of the specifics, I will let Mr Cinque talk.

Mr CINQUE: The community engagement efforts over the last 10 or more years, we have had various baseline measurements. I think 2006 and 2012 come to mind and also recently in the last couple of years with the campaign that has been conducted. After the event, as we continue the campaign, we are going to be measuring it again. So we are trying to get that measurement of change in behaviour, not just of awareness, over those time frames to see an improvement. So that work is going to continue.

The Hon. PENNY SHARPE: Obviously it was sort of a real-life test in relation to, yes, radio and television, but I suppose the less traditional but very important—in terms of community—social media links, have you been able to measure the reach of your messaging through social media? My sense is that the community shares it with everyone and everyone is talking about it, so it sort of gets there. But are you able to do that kind of measurement as well?

Mr CINQUE: Social media was a very important part, and there was quite a bit of activity—we have got some figures to quote—and also our website received a huge amount of use on the material. Because of the work in the last couple of years, we have got a lot more material on the Hawkesbury-Nepean, and also radio and TV and also doorknocking and telephone trees. All of those methods combined to provide that information, because no one method is the silver bullet.

The CHAIR: Mr Austin or Mr Cinque, there was quite a bit of debate immediately after the event about whether or not there should have been pre-emptive releases from Warragamba Dam. As I understand, there are legislative barriers to doing that, but 130 gigalitres was released for operational reasons in advance of the event. Has your organisation got a position about whether pre-emptive releases to create airspace should be enabled to mitigate some of these risks?

Mr AUSTIN: No, it does not. The operation of the dam is subject, obviously, to the operation of WaterNSW. They are the experts in it and they are the ones we look to to provide comment on that.

The CHAIR: Obviously it would be helpful to give you a bit more time, I would have thought. This is one of the options that has been actively canvassed through the flood plain discussion.

Mr AUSTIN: Like I said, the reality is WaterNSW needs to comment on the operation of the dam. As we have said previously, NSW SES supports actions that mitigate the risk of flooding, but in terms of the specifics of the operation of the dam, that is for WaterNSW.

The CHAIR: Councillor Conolly, has Hawkesbury council got a position on pre-emptive releases?

Mr CONOLLY: I do not think we have got a formal position, but I guess my view would be that we would not want to see anything happen that is going to flood the Hawkesbury for longer. So if you let out enough water out of the dam to make a tangible difference in a major event, you might lower the overall peak, but you are going to have our bridges closed for significantly longer, most likely, which means that those isolated communities potentially are going to be in isolation for a longer amount of time. I think we have got to—I would not be seeing that is an easy answer or a silver bullet. That is going to also have a significant impact on our community if we start letting water out early.

The CHAIR: That goes to my next point, because we know there was about 450 gigalitres a day going over the dam wall I think at the peak. As I understand it, it would have taken about 2½ days before it would have filled up the airspace in a 14-metre dam wall raising, which would have meant near on 1,000 gigalitres of water would have needed to be released over two weeks after the event, which would do exactly what Councillor Conolly is concerned about: continue flooding in the Hawkesbury for up to a fortnight after an event. Have you done any analysis on this event or will you, as part of your review, about how a dam wall raising would have affected the long-term flooding of the Hawkesbury-Nepean? The question is primarily to SES to start with.

Mr CINQUE: I think that is a question for Infrastructure NSW and WaterNSW this afternoon. They will certainly be looking at the event and analysing it.

The CHAIR: But it has a substantial impact on your ability to operate, so I appreciate Mr Austin's last position that the operational rules for the dam is an issue for WaterNSW. If a dam wall raising is about flood mitigation, you are the ones that deal with the impact on the ground, have the operational rules been discussed or determined? Are you involved in those discussions? To me, that has a substantial impact on the ability of the wall to do what the Government wants and it also changes the potential upstream impacts. Have those operational rules been worked through yet?

CORRECTED

Mr AUSTIN: All in all, there are something like 19,000 flood models that are run. I am not going to pretend to sit here and tell you I can give you every one of those 19,000. It also depends on where in the catchment that rainfall was actually falling, hence why such a volume of flood models needs to be done because the catchment reacts differently depending on where that occurs. If you look back again, as I say, at the February 2020 event, we still saw quite an amount of flooding through the valley of which the dam played no part in. So there is a whole range of things. We do work exceptionally closely with WaterNSW. They keep us abreast of the height in the dam and how much available space is there. If they going to do pre-emptive releases, then they do let a whole range of stakeholders know who need to be aware of that at any given time.

The CHAIR: Just to be clear, there were flood warnings and evacuation warnings—I am not sure if there were evacuation orders; maybe you can let us know—in place for parts of the Hawkesbury-Nepean before Warragamba overtopped. Is that right?

Mr AUSTIN: I would have to take that on notice to review the timeline exactly when it spilled compared to what warnings were in place at the particular time, if that is all right.

The CHAIR: I might just flag I will have some questions on notice. The Government has canvassed some of the timeline in their document, but I am really interested in how that timeline played out because of that question. One thing that is also used in the Government's documents and seems to have informed the debate is the contribution of the various parts of the catchment to a flooding event. Of course, these events happen over sometimes quite a prolonged period of time, yet the percentage figure is given as to the contribution of a particular part of the catchment to the flood event. I am just trying to work out how meaningful that is for us in trying to form some judgements here, given a flood peak happens at a point of time but a percentage contribution seems to be the contribution over the entire flood event. Is there any way of being able to give us a sense of the contribution of a particular catchment at the point of the peak of the flood? Isn't that the key point? This, to some degree, does not help us to really understand how to mitigate flood risk when you weigh up the entire event and put it on one slide.

Mr AUSTIN: I would suggest that is a question you want to raise with WaterNSW and Infrastructure NSW afternoon. They are the ones who would be able to provide the specifics in that regard.

The CHAIR: With regard to the discussion around evacuation—actually, I might put those on notice to avoid any confusion, because it goes to the timeline as well.

The Hon. WES FANG: My one question is to Mr McMaster. You said you have got one response from the survey and it was quite heavily skewed. In talking to your members, do you think—I will use the word—apathy towards the survey is because they believe the Government is going to do this and so they do not feel like they need to contribute to it, or is it that there is a view that this inquiry itself may be skewed one way or another?

Mr McMASTER: I am not too sure how to answer it. I do not think—they do not have all the information on hand and their priority is running their business day to day. Something like this that happens once every blue moon is not a priority in, I don't think, business owners' minds. It is really a position of the council and the Government at this higher level. I mean, there were a lot of businesses impacted along the riverbanks that are not represented in our association, like the Turfgrowers Association or the caravan parks—there is a group there too I think.

The Hon. PENNY SHARPE: I have only two more questions. You have basically got a plan—a communication plan, a resilience plan—about building resilience within the community. Is there anything, given this most recent event, that you think is missing and that you think will end up in the review and needs to be picked up that has not been done before?

Mr AUSTIN: I think I probably need more in regards to—

The Hon. PENNY SHARPE: I suppose when you are in the middle of the event all of these things are happening. Is there something that you think we haven't really thought about this before; this needs to be part of our thinking in terms of the way that we talk to the community or the way in which we do our future preparation? Maybe it is too early and that comes out of your review, but I am just trying to understand if there are things—you have had a real-life event and there is a lot to learn out of that, so I am just interested in whether there are things that you think are not currently covered in relation to your communications plan or anything really?

Mr AUSTIN: I guess, the whole sphere of community engagement—or, as we refer to it, community capability—is still evolving, but it is one of those things. Many years ago emergency services probably did not work as closely hand in glove with communities as what they do today. There is an absolute expectation today that you do engage with the community and you do work with the community. I guess that is highlighted by the investment that we have made, not only before even the 2020 flood but certainly before this one, and in the fact

CORRECTED

that we are also running those community engagement workshops and actually listening to the community's feedback along the way as well. So is there more to do? Absolutely, there always will be.

Is the science changing around how we can work with communities? Yes, absolutely, there is always something new coming out. As I said, the community is changing at a rate of knots. I think the figure is about a quarter of that community turns over about every five years or so, so there will continue to be work to do. There has to be work to do. We have to have people on the ground working with those people but also working out the different ways in which people learn and take things in. We have seen a shift over the years from literally a street meet—you know, you stand on the corner of the street with someone or knock on their door. A lot of people now go down the online version. Our work continues to move and take in all of those but also work on the theory of how broad a parameter can you—how many different ways can we do what we do.

The Hon. PENNY SHARPE: My final question is how many people refused to undertake the evacuation order? Who refused to evacuate? Do you keep numbers on that?

Mr AUSTIN: No, we do not. We do not have that. I do not have that in front of me. I can take that on notice.

The Hon. PENNY SHARPE: If you could take it on notice, yes. I am just interested in the kind of pushback that you received.

The CHAIR: I just have a couple more questions. Going back to the start, if I could, Mr Austin, where you were talking about bringing in some capacity from the Bureau of Meteorology into your organisation and I think also some hydrological support as well, could you just talk to when that is likely to be in place and how that will work in with the BOM and other organisations?

Mr AUSTIN: We have had an embedded meteorologist for a number of years now. I think, off the top of my head, it is about four or five years now. We have had that position in place for all that time. We work very closely with the bureau office here in Sydney anyway, even outside of I guess what you would refer to as office hours. We have had that arrangement even predating the embedded hydrologist. The use of the hydrologist this time was something that we had been working towards and we have trialled it. On a very quick and dirty review of that process, both the bureau and ourselves think that added value to what we did, so we will look to embed that even more and make that more of a part of our standing arrangements. But the embedded meteorologist, as I say, has been there for a number of years already.

The CHAIR: Sorry, is the hydrologist a BOM person who is embedded?

Mr AUSTIN: Correct, yes.

The CHAIR: I would imagine that since we saw a lot of these floods back in the nineties there have been substantial changes to the landscape, hard surfaces and the like. Is that the sort of role they play, trying to understand how the water is moving in the landscape more accurately?

Mr AUSTIN: Correct. Yes, so they are the experts with the scientific background around how that water interacts with the catchment and what it does up and down the catchment and so on and so forth, so they provide that to us. Our job then is to translate that into the consequence side of things, which is where we can—

The CHAIR: Just with regards to the Windsor Bridge flooding, it seemed to surprise a lot of people that this brand new bridge went under water. For those of you that work in this space, you know that it goes under at a certain level so that was not surprising. People had assumed it was part of the answer to evacuation, so this misunderstanding of the capacity of the bridge to be available for people to evacuate, how did we get that so wrong do you think?

Mr AUSTIN: I do not know that we got it so wrong. I think what happens is people believe when they see an investment in things that that is a silver bullet and, as Mr Conolly said before, it is a suite of options that needs to be there. Did it buy more time? Yes, it did. Was that what it was designed to do? Yes, it was.

The CHAIR: What day did that actually go under? Did that go under before or after Warragamba Dam overtopped?

Mr CINQUE: It would have been after Warragamba.

The CHAIR: It would have been after, just after.

Mr CINQUE: Yes.

The CHAIR: Councillor Conolly, do you have a view on that? I know it was a controversial piece of infrastructure but it does seem that a lot in the community were surprised that it went under.

CORRECTED

Mr CONOLLY: No, I do not think that is correct actually. I think there is a lot of beat-up because it is a very political issue. I think most people who had been paying attention understood that Windsor Bridge—anyone who lives in the Hawkesbury, looking at it, you can tell it is not going to be flood free. I mean, it cannot be flood free unless it went for kilometres and kilometres. So I think there is some political commentary from opponents to the Government around that, but I do not think that the community actually felt that it was ever going to be flood free. I think people understood what that infrastructure was for.

The CHAIR: I think that is all from the Committee. Thank you very much for everyone's time. I think there were some questions taken on notice and I flagged that I would have others. I think we mentioned at the start there will be 21 days to respond to any questions on notice. Thank you.

(The witnesses withdrew.)

CORRECTED

KYLIE MACFARLANE, Chief Operating Officer, Insurance Council of Australia, sworn and examined

ANDREW HALL, Chief Executive Officer and Executive Director, Insurance Council of Australia, sworn and examined

The CHAIR: I now welcome our next witnesses. Thank you for attending the hearing today. Mr Hall, in the first instance, would you like to make an opening statement?

Mr HALL: I am the CEO of the Insurance Council of Australia [ICA]. The ICA is the representative body of the general insurance industry. Our members provide a range of products including home building and contents, and a range of cover for small businesses and large businesses. I am joined by Kylie Macfarlane, the ICA's Chief Operating Officer, who manages the Insurance Council's catastrophe coordination response on behalf of our members. Insurers provide cover and protection through the 43.8 million businesses and household policies issued to Australians every year and we pay out more than \$166 million in claims every working day. The Australian Prudential Regulation Authority's general insurance data showed that the industry recorded a net profit after tax of just \$35 million last year, highlighting the current challenging market conditions for general insurers both here and globally.

The sector has experienced a continual decline in profitability of 30 per cent per year, on average, over the last four years. These losses have been driven by the number of high impact natural disasters. Over the past three years insurers have paid out \$7 billion in natural disasters claims, with \$4.72 billion paid out due to the devastating 2019-20 bushfires. This number does not yet include the recent east coast flood and storm event. On 22 March the ICA declared the New South Wales storms and floods an insurance catastrophe, and I think it would be helpful to provide a quick update on the industry's response, in particular the impacts to the Penrith and Hawkesbury-Nepean valley which I know is of interest to the Committee.

The ICA's catastrophe declaration prioritised claims from affected policyholders, directed urgent assistance to those worst affected, mobilised ICA personnel to work with local agencies and policyholders, and put disaster response specialists on the ground to assist with customers' claims and their assessments. We continue to work with the affected communities and local government areas in recovery and rebuild. As some Committee members may be aware, the ICA recently held a briefing here at Parliament House to update members on the weather event. I can confirm to the Committee that as of today there have been 51,000 claims lodged at a cost of \$702 million. While the impact of the event was most significantly felt on the mid North Coast, for the Penrith and Hawkesbury-Nepean valleys specifically there were 4,100 claims at an estimated cost of \$63 million. This represents approximately 10 per cent of the total impact of the event coming from that catchment.

The rain event in March again reminded us all that the flood risk for the Hawkesbury-Nepean flood plain is one of the most significant, unmitigated exposures in New South Wales. Of the 150,000 home building insurance policies in the flood plain, 5,510 are for homes with a 5 per cent annual risk of flooding. A further 6,500 policies are for homes with a 1 per cent to 5 per cent annual risk of flood. We have a common objective to see mitigation measures put in place to protect communities in western Sydney and, as part of that, we believe that exposure should not be increased through further development on areas that are at risk of flooding. We have welcomed the announcement this week by the planning Minister to give local councils more flexibility to make decisions on land planning and development controls in flood-prone areas.

With regards to the specific idea of raising the Warragamba Dam wall, the ICA's 2019 submission to this inquiry acknowledged that the construction of permanent fixed flood mitigation can have secondary environmental effects and that the cost-benefit analysis should always be accompanied by rigorous study and consideration of these potential impacts. Over recent months the ICA has engaged with a range of community representatives, consumer groups, and those who would be impacted upstream. We have gained a greater understanding about their concerns around the assessment process, as well as the potential upstream impact on the natural environment and cultural heritage sites.

Unfortunately, with a comprehensive EIS yet to be released, our members are not in a position where they can fully assess and understand the impacts of the proposal. We remain in favour of exploring all options for flood mitigation, but in a process that means that all the impacts can be understood, costed, and done in agreement with the impacted stakeholders. The Insurance Council remains committed to working with the New South Wales Government and local government to find solutions to protect lives and property, and ensure that any impacts are fully assessed and addressed. We are happy to answer any questions the Committee may have, including about the particular rain and flood event.

The CHAIR: Thank you, Mr Hall. Ms Macfarlane, have you got a statement as well or are you happy with that?

CORRECTED

Ms MACFARLANE: No. I am happy with that, thank you.

The CHAIR: Mr Hall, you recently wrote a letter—and I guess some people saw it is changing the position of the Insurance Council of Australia on the dam wall raising. You highlighted the need to look at the alternatives more closely. What are you envisaging there and what sort of process do you think is appropriate to go through?

Mr HALL: As we have done all along with the New South Wales Government, we are very prepared to pair with government agencies to understand what all the options are and—effectively, what is going to give us the best return on the investment, both to the impacted communities but also for the whole purposes of mitigating flood. There are obviously a range of solutions. We are not hydrology experts and this is a decision ultimately for government to make. But again, we would stand ready to work on—as we did in the past—looking at various flood modelling and what those impacts would mean for those communities and how it plays out for insurance.

The CHAIR: I get the sense that you may feel a little excluded from some of the consideration and decision-making around this and how the Government have arrived at this option as a primary tool. Would that be fair to say?

Mr HALL: I do not think we feel excluded. I think at the end of the day we are often asked for our opinion on something that we are not the experts in necessarily, and we do not have the completed reports to be able to make the sort of assessments we need. Our members are looking at what is the process that has been undertaken. We are receiving a lot of input from other stakeholders who have got various views. It is a little difficult and challenging to back one idea if the work has not been done to be able to explain the full range of the impacts.

The CHAIR: Given you just mentioned the need for your members to fully understand the options and the potential costs and benefit, you would be in favour of the business case being released in advance of any decisions being taken?

Mr HALL: I would encourage the Government—and it is a decision for the Government—to be as transparent and open as possible through the work that they are doing because at the moment all we are reading is reports that are leaked—media reports—and a range of opinion and otherwise. I think what the insurers like to operate from is a fact base that has had a robust assessment done to it, and that we know that out of all the options this option may or may not be progressed for whatever reasons. It really is predicated on seeing a robust and thorough EIS released. I have been in this role since September last year so I have had to go back and re-read a lot of the history around this process. It seems that the EIS has been quite delayed in coming forward. As that delay happens, time evolves, and more views and issues are put on the table. I think it is important and incumbent on the Government to stay in front of them.

The CHAIR: There were some comments early on in the public discussion about the potential for this project to see insurance premiums reduced across the Hawkesbury-Nepean. Given what you are saying now about not necessarily having all information to be able to make decisions, how are those figures arrived at? Do you have an idea about the potential to reduce premiums as a result of this project?

Mr HALL: Whatever work is done that can mitigate a risk will obviously bring downward pressure on the cost of the pool. We have seen living examples of that in places like Launceston and Roma, in Queensland, where insurance was simply unavailable to the town and a flood levy was built around the town and insurance was once again available. In fact, the affordability level is what you would expect in any flood-proof area. When we are provided with maps, which we have been in the past, as I understand it—I am advised that we have been provided with various maps, not linked to any one piece of mitigation but just linked to mitigation generally, so we are not sure what is being proposed to drive down the flood risk, but we are able to calculate from those maps the number of homes and policyholders in those areas that would be impacted and give a better assessment of where you would find natural premium relief occurring because a 5 per cent risk of a flood in any year may be reduced, or whatever the number is that you are using to calculate. So we can do that.

The CHAIR: But you do not know at this stage—and you mentioned, say, 5,100 properties are in the 5 per cent risk area—how much that will be reduced as a result of this particular project?

Mr HALL: No, and I would say that those homes are in such a high-risk area that there will continue to be an increased cost for those perils. It would be very difficult to promise that everybody who lives in that area would get the premium relief they were hoping for.

The CHAIR: Regardless of a dam wall raising?

CORRECTED

Mr HALL: In the reading that I have done over the last six months, I recall that there was a report prepared in 2013 that highlighted there was not one single answer to flood-proof the Hawkesbury-Nepean. Obviously that is going to require a range of measures, including dredging and local levies, which I do not think should be disregarded. If levies can provide local relief for certain areas, they should be properly considered. But if it is not the full solution, then there will be areas that could still be impacted. What we saw in these most recent flood events actually was the water came down the Colo River. The flood was largely down the northern end of the basin towards the Sackville Gorge. I think all of the reports I have seen highlight the fact that the water ingresses from six different water systems into the valley.

The CHAIR: With regard to those options, there was a suggestion of, say, a roundtable to get industry, local government and other government stakeholders together to actually sit down and talk through these options in a bit more detail. Would you be supportive of that idea?

Mr HALL: Yes. We have always been willing to and we will continue to participate. We can pull policyholder data to be able to understand where the impacts would be best felt. The last amount of work that I can see that was done on this would probably now be four or five years old, so it is probably timely that insurers get back and examine what is on their books. We are very happy to work in a roundtable.

The Hon. PENNY SHARPE: I have a quick follow-up from that. Mr Field asked you about modelling that you have seen that has then been used to apply what would notionally be downward pressure on premiums. Can I just confirm that you have been given maps for the Hawkesbury-Nepean from the Government and from there, there has been some extrapolation? Did I understand that?

Mr HALL: As I understand it, in 2015—again, this is before my time, so if I get this wrong I will correct the record with the Committee—we were on the task force and asked to provide analysis of two generically named possible mitigation reductions. So they were not necessarily linked to any one piece of infrastructure. They gave two scenarios in which we were able to map and have a look at potential positive effects on premiums, and that was the data that was produced back then.

The Hon. PENNY SHARPE: It was 2015 and it was this sort of generic plan A, plan B. Run your numbers. What does that look like?

Mr HALL: Yes. I am advised that is what it was.

The Hon. PENNY SHARPE: But you would not then say that as a result of this project you cannot apply that in any way to what was likely to happen with premiums?

Mr HALL: No, because at the end of the day premiums are calculated on a range of factors. At the moment we are going through an even bigger study around North Queensland and cyclone. The Federal Government has made an announcement around the creation of a reinsurance pool for cyclone and cyclone-related flood in northern Australia. Again, whatever you can do to reduce the peril still remains at the heart of how premiums are priced. So even with a reinsurance pool for cyclone, for example, the Federal Government's \$600 million in resilience funding is really welcome because we simply have to strengthen the homes that are existing in those regions. Roofs need to be strengthened, floors need to be raised—a range of measures will have to take place on existing housing stock in northern Australia. I think the same can be said for the Hawkesbury-Nepean Valley. If we are looking to reduce the peril, there is not just one answer here and there is a range of them, including potentially relocating homes out of harm's way.

The Hon. TAYLOR MARTIN: I have one small question to start with. In your submission from 2019, this chart on page 3—excuse my ignorance, but what is the abbreviation PMF event?

Mr HALL: Probable maximum flood.

The Hon. TAYLOR MARTIN: Is it fair to say that the Warragamba Dam wall raising is the most effective option in reducing the flood risk?

Mr HALL: It will mitigate flood. It will mitigate floodwaters coming down, but, again, we have not seen the detailed work to understand how that would work and how it would operate. We are not experts in it in terms of the hydrology piece. We look to others to give us that advice. But it is possible that it would be a very effective mitigant for extreme floodwater events. So the next step you move to is ask the question, "This is the option. What are the secondary impacts?" That is where at the moment we do not have answers to those questions to fully understand what the secondary impacts are and what would be a plan to be able to mitigate those issues as well.

The Hon. TAYLOR MARTIN: What kind of secondary impacts come to mind, Mr Hall?

CORRECTED

Mr HALL: Well, there would be impacts on the environment. There would be impacts on, potentially, cultural heritage. There are impacts on community. I think that all needs to be fully understood in a proper process.

The Hon. TAYLOR MARTIN: But just getting back to the primary impact, so to speak, of flooding the wider area of Hawkesbury and western Sydney, would raising the Warragamba Dam wall not be the best option to then provide premium relief to residents in western Sydney?

Mr HALL: It could be one of them and there will be others as well, which is why I think the task force idea is quite a good idea. I think we stand ready to come back together with government to examine options if required, and we can do that.

The Hon. WES FANG: Mr Hall and Ms Macfarlane, thank you very much for appearing today. Mr Hall, just leading on from my colleague's questions, talking about the effectiveness of raising the Warragamba Dam wall, would you agree that in a severe flood event that the raising of the Warragamba Dam wall will buy extra time for people to be able to evacuate should the need arise, and it is really the only mechanism that is available other than creating further airspace in the dam and reducing our water supply that we have in order to provide that?

Mr HALL: If that is the consideration that the Government is making and it is a priority, which is understandable—which would be protection of lives—I do not disagree with that. From an insurer's point of view, though, life protection is obviously the first and foremost but also we are insuring property. Even with the world's best evacuation routes, your single biggest asset is your family home and you do not want it flooded. So the question goes to whether the land planning was done in the right way in the first place, were people fully informed when they bought their homes about the risks that they have in front of them and what are the suite of options that can be employed. It could be Warragamba Dam could eventually be the answer. What we want from the Government is to see the assessments and the reports so that we can fully understand what all the impacts are.

The Hon. WES FANG: Just on those issues, a lot of those have been raised during this inquiry as to whether the approvals for those developments were appropriate or not. Regardless, the Government still has a responsibility to ensure the safety of people. Obviously insurance and mitigating damage is one issue, but if the preservation of life in a major flood event is the primary concern, can you see any other mechanism with which the Government could control the flood waters—

The Hon. PENNY SHARPE: Do not build on the flood plain.

The Hon. SHAYNE MALLARD: It is a bit late to say that.

The Hon. PENNY SHARPE: Not with what you are planning.

The Hon. SHAYNE MALLARD: Your Government did it, not just ours.

The CHAIR: Order!

The Hon. PENNY SHARPE: Sorry.

The Hon. WES FANG: After my colleagues have finished arguing, I will continue asking my question. Can you see any other mechanism with which the Government can control the flood waters in order to buy extra time for people to escape?

Mr HALL: In the reports that have been done—the numerous, voluminous reports that have been done over the last decade—there is one, I think it was in 2019, that did a whole list of the assessments. It was one of the ones that talk about Warragamba being one of the most effective. It all depends on the measure you are trying to achieve. I guess the first measure was to flood-proof. You are now focusing on the evacuation and preservation of life, which is critically important, but it all depends. There were about a dozen things that were listed in there and they are decisions for the Government to make about which ones it would look to prioritise. I guess, from our position, we are very happy to help with all the data that we can around the cost of insuring in the flood plain where we see the damage being the highest and the like. We are not in a position though to make assessments on if—we have not yet seen the reports on the preferred options.

The Hon. SHAYNE MALLARD: Apologies, I was monitoring the hearing on the television before I came down. I was in a meeting. Building on Mr Fang's question, the mental health, the wellbeing and the safety of our community, in my view, has to be a priority. Secondary to that is the economic impact of property loss and the ongoing significant economic productivity impacts of a major flood in the basin. Balancing that is what we seem to be having to do, offsetting that against environmental impacts and cultural impacts. Is there a middle ground there? Do you think there are offsets available that can allow us to protect the community and give it the security it requires but compensate for the impacts on the environment and culture?

CORRECTED

Mr HALL: Mr Mallard, I think that that is at the heart of what the governments must be obviously trying to work through at the moment. I would say that these are not easy decisions. I read in the paper today about the population pressures that Sydney is trying to manage, that people have got to go somewhere, so they are not easy factors. I think, if you are going to arrive at decisions, the proper work and a robust assessment needs to be done and as part of that I would expect that probably Cabinet and others would consider what compensation would need to be paid if there is a going to be a loss of environment or cultural heritage. I would just encourage the Government to move forward in a robust and transparent fashion around all of those factors with those impacted stakeholders.

The Hon. SHAYNE MALLARD: Is it right to say that households are opting out of flood insurance because of the addition that has on—I think I read somewhere that it was up to five times the national mean, the cost of insurance in the valley now. Are people opting out of flood insurance? I do not think I can opt out of bushfire insurance in the mountains. I think you have got to take it. But is that happening? Is that significantly happening?

Ms MACFARLANE: Yes, approximately 13 per cent of New South Wales does not have insurance of that type, which is higher versus some other States.

The Hon. SHAYNE MALLARD: Sorry, they have household insurance for an electrical fire or—

Ms MACFARLANE: Have chosen not to, yes.

The Hon. SHAYNE MALLARD: —a fire full stop, frankly, but not for flooding?

Ms MACFARLANE: Sure—so, flood from some insurance providers. We do have some of our members who provide flood opt-out, others do not, and in a competitive market you would want to see both types of home and contents insurance being provided. People will make an assessment based on a number of factors: one, their own self-assessment of the risks; two, the cost; and three, their ability to self-insure. There are probably other factors that feed into that as well. We are very mindful that affordability and availability are two critical factors for any household and any commercial claimant, or any commercial insured, and people will make those decisions on their own. But, of course, we do have members who do allow for that opt-out and if people are looking to opt out of flood insurance to reduce the cost of their overall insurance, they can take advantage of that. However, of course, they then lose the opportunity to be covered for flood in an area, particularly in the Hawkesbury-Nepean area where we have people who do have quite high levels of risk around annualised flood, between one per cent and five per cent.

The Hon. SHAYNE MALLARD: I apologise to my colleagues for going back to the Blue Mountains, I mean, we do not really—we do have some flooding sometimes, but the bushfire issue is our issue and one of the things that has emerged is underinsurance. The cost to rebuild is much more than the house that was there because of new fire rules. So we really have a serious underinsurance issue in the Nepean and Hawkesbury flood plain, which, when the inevitable flood occurs, will be loaded onto the community and to the Government to come to the rescue of these distressed homeowners and property owners.

Mr HALL: I think we probably have to take on notice the actual question around underinsurance in the Hawkesbury-Nepean, if we have those actual numbers. They are very hard to measure. But we do know that across the State of New South Wales that underinsurance is around 13 per cent, whereas in Victoria it is around seven. We think the main driver for that, unfortunately, is the stamp duty and the Emergency Services Levy [ESL] because 40 per cent of your premium in New South Wales is taxes; 20 per cent in Victoria is taxes. So, naturally, you end up in Victoria with a higher sum insured for the cost of the premium than you do in New South Wales.

The Hon. SHAYNE MALLARD: We did try to reform that but it did not go too well, the Emergency Services Levy.

Mr HALL: I am hopeful though that the State Government's consideration for reforming stamp duty on land purchases could also take up the insurance that covers that land, because I think it is an issue for New South Wales to go back and readdress. Particularly in areas like the Hawkesbury-Nepean, to bring down the cost of premiums, the first thing we could do is get rid of the ESL—well, replace it with another system.

The Hon. SHAYNE MALLARD: Again, we did try that, but thank you for your answer.

The Hon. PENNY SHARPE: I think you might need to take these questions on notice. I am following up from Mr Mallard's questions. The 13 per cent figure, Ms Macfarlane, that you quoted, that is insurance holders that do not have flood, is that right?

Ms MACFARLANE: I apologise, Mr Hall corrected that number later in his advice there, so it is the—sorry, do you want to repeat that?

CORRECTED

The Hon. PENNY SHARPE: The 13 per cent is people that you think are underinsured?

Ms MACFARLANE: Are underinsured.

Mr HALL: Yes.

The Hon. PENNY SHARPE: But it does not tell us whether it is flood or not, it is just general.

Ms MACFARLANE: No.

The Hon. PENNY SHARPE: That is a statewide figure?

Ms MACFARLANE: Yes.

The Hon. PENNY SHARPE: In terms of Hawkesbury-Nepean particularly, I am interested in the number of households that have no insurance—

The Hon. SHAYNE MALLARD: Yes, I'm here!

The Hon. PENNY SHARPE: —the number that are obviously underinsured around flood and then obviously those that do have flood. Are you able to provide the Committee with some information about that?

Mr HALL: We can take it away and have a look.

The Hon. PENNY SHARPE: We accept that it might be a bit difficult, but even close?

The Hon. SHAYNE MALLARD: And businesses too.

The Hon. PENNY SHARPE: Yes.

The Hon. ADAM SEARLE: Presumably you get your premiums by—policies by postcode.

The Hon. PENNY SHARPE: Policy by type or whatever, yes.

Ms MACFARLANE: We can certainly look at that. Measuring underinsurance is extremely difficult because obviously we insure to a value that is prescribed to us by the household and there is work that needs to be done at a nationwide level to ensure that customers and communities understand that the cost of rebuild is not necessarily the value you paid for your home. To the comment that was made before that construction codes change—

The Hon. SHAYNE MALLARD: There are good web-based calculators from the insurance industry.

Ms MACFARLANE: Yes, there are web-based calculators but we can certainly look at the other elements of that question.

The CHAIR: Are there any areas of the flood plain where insurers simply will not ensure property for floods?

The Hon. PENNY SHARPE: That was my next question.

The CHAIR: Sorry. Are there any areas where your members just will not insure?

Mr HALL: There are areas where individual members may have a low appetite for taking on additional policies and that could be for a variety of reasons. As a brand they may be a bit oversubscribed, for example, for risk in one area or another. That is when they start to adjust pricing accordingly, which is why we say to customers, shop around. Even though you may have one or two brands of insurance in mind, it could be that another one is quite actively looking for new business in your area. So it all depends. It goes into a range of factors and, of course, at the moment there is a market—the insurance market globally is in a cycle called "hardening". We are seeing more challenges to find cover for a range of risky propositions than we did maybe five or six years ago. That appetite has really significantly reduced.

The CHAIR: This is the insurers getting reinsurance?

Mr HALL: Getting reinsurance but also even just finding insurers willing to go into the market, full stop.

The CHAIR: Going back to the northern Queensland example that you gave earlier, where the Federal Government is tipping in some money for an insurance pool, you suggested it might be something that would be valid, potentially. I see buybacks have been discussed. Could you talk a bit more to what you think are some of the other options like that are available in the Hawkesbury-Nepean flood plain that might be suitable?

CORRECTED

Mr HALL: I do not want to leave the impression that I think a reinsurance pool should be made available for the Hawkesbury-Nepean. It is a functioning market. Insurers can get reinsurance and it is a very competitive market. The situation in North Queensland for some people is very different around the risks up there. Resilience and mitigation is always the first part of the recipe for getting insurance affordability and availability back on the table, so whatever can be done in a proper way that reduces the risk is clearly the option. There have been options presented over the years and they are all very difficult choices to make for government and it could be that something needs to be—maybe there are some areas that have been built on that need to be reconsidered as to whether their use of that land has changed over a period of time. We saw in Brisbane the 2011 floods. It was not so much that Wivenhoe Dam managed to moderate the flood—but they still had a flood because development had happened in a whole tract of area that will always be flood exposed in Brisbane. So I think ultimately the question is how do you get proper land planning use? The announcement made—even though it is opt-in for local councils—by the Minister for Planning and Public Spaces this week was a good one.

The CHAIR: How do you envision that being implemented, though? Someone said to me it is a model of graduated flood development controls, where different types of development might be allowed at different places. Do we have anything like that currently operating for the Hawkesbury-Nepean you are aware of?

Mr HALL: I would have to take that on notice. I am not familiar necessarily with the detail around what councils have been deciding around developments. But different types of land uses would make sense in, particularly, land that flood once every five years—and that is probably not going to be homes built on slabs, where the water will go straight through them. It is probably farming. It is probably light industrial.

The CHAIR: We do know that there are plans for more development on the flood plain, possibly not down at that level but a bit higher up. Does your organisation have a position with regard to development on the flood plain itself?

Mr HALL: Our position starts and ends with the right land planning decisions. Again, it would be a shame in this day and age to move people into harm's way when it does not need to happen.

The CHAIR: I know you are not hydrologists, though I would expect you have got some very clever people working out where you are exposed to risk. How do we make a judgement—with climate change adding to the risk—about where to draw that line? Typically it has been one in 100 years and we have just used that as a hard judgement. That does not preclude these inevitable more extreme events, so how do you think governments can deal with that question?

Mr HALL: This is always a question of weighing up, properly assessing risk and having a view about what the risk appetite should be; and perhaps not allowing development to occur where it should not or giving a false sense of security by telling people that there is mitigation that could work for one event but may fail in another. It is a balancing act of risk management by the Government. We fully appreciate the Government has got a tough task on its hands to try to find where population can grow in Sydney, but doing it safely should be the number one factor and that risk assessment needs to be taken in for future land planning decisions.

The CHAIR: Thank you, Mr Hall and Ms McFarlane. We really appreciate your attendance here today. I think there were some questions taken on notice. It might be useful for members to clarify in writing exactly what those questions were. If you could get those back to us within 21 days it would be greatly appreciated.

Mr HALL: Thank you.

Ms MACFARLANE: Thank you.

(The witnesses withdrew.)

CORRECTED

CHAS KEYS, Former Deputy Director-General, NSW State Emergency Service, on former affirmation

JAMIE PITTOCK, Fenner School of Environment and Society, Australian National University, on former affirmation

SAM KERNAGHAN, Director of Resilience Program, Committee for Sydney, affirmed and examined

The CHAIR: I welcome our next witnesses to the inquiry today. Professor Pittock and Dr Keys, I remind you that you have both appeared previously before this Committee to give evidence so you will be examined on your former affirmations for today's hearing. Mr Kernaghan, would you like to make a short opening statement? I will make the same offer to all of you. Please keep it as short as it needs to be and then we can get to questions.

Mr KERNAGHAN: Thank you for the opportunity to provide evidence to this parliamentary inquiry. The Committee for Sydney is a champion for the whole of Sydney, providing independent thought leadership beyond the electoral cycle. We advocate for good public policy that enhances the economic, social, cultural and environmental conditions that make Sydney a competitive and liveable global city. With this in mind, for the committee the complex issues around raising the Warragamba Dam can be simplified into two areas of policy. One is life safety: the safe evacuation of residents and workers in the event of a flood. The second is the rising costs to households of living in the flood plain: risks to property, the economic value that residents of the flood plain have tied up in those assets, and the rising cost of insurance. I have spent the past 15 years working across the Asia-Pacific and beyond on the issues of climate change and resilience—with the term "resilience" being used more and more to mean how we survive, adapt and thrive in the context of future uncertainty. Note that urban or city resilience is not about how well we recover from disaster.

Australia is a world leader in disaster relief and recovery. While we should be proud of this, would it not be better if we were a world leader in disaster prevention and preparedness, effectively reducing the number of people in harm's way and reducing the incidence of natural hazards coming into contact with urban populations? The focus of the committee's policy advocacy around flood risk in the Hawkesbury-Nepean flood plain has been to ensure that, firstly, we do everything in our power to reduce the risk to life and property for the current residents of the flood plain; and, secondly, we do everything in our power to reduce the future growth of development in the flood plain that would put more people at risk. I am happy to go on but I am conscious of how much time—

The CHAIR: No, do not let me stop you. You did not make a submission to the inquiry, so if you have got additional information that explains your organisation's position, go right ahead.

Mr KERNAGHAN: We know the Hawkesbury-Nepean currently hosts 134,000 residents and workers. We know that there are plans for that number to double in the future. We know that around 60,000 of those 134,000 would need to evacuate in the event of a major flood. And we know that the current evacuation arrangements cannot guarantee that these thousands of residents would be able to safely evacuate due to lagging flood evacuation infrastructure. We also know that there would be over \$5 billion in damage and only some of this would be insured. We know that it would take months to restore infrastructure services, not to mention rebuild the property and livelihoods that would be affected. But the first issue is safe evacuation.

As a city, we have been chasing our tail trying to catch up with evacuation infrastructure to match the growth of development in the north-western sector. Some of this development is in areas that are flood liable, above the one-in-100 flood line but below the probable maximum flood, and some of it is outside the PMF but in areas that would be cut off by floods and hence needing evacuation. We know that if there was a major flood today, there would be a problem trying to evacuate all these residents; some may not make it out. There is much good work going on today to develop models and plans to improve flood evacuation infrastructure and improve life safety for existing residents and businesses on the flood plain, and we 100 per cent support these efforts. But intertwined with this first issue of evacuation is the second issue of future development.

We know that residential precincts at Marsden Park North and Alex Avenue have been put on hold by the Minister for planning due to evacuation risks. While it is important to note that evacuation concerns are pausing development, these are also just the tip of the iceberg. As evacuation infrastructure is improved, the case for zoning more land for residential—the highest value use—will become stronger, putting councils and the State Government in a difficult position to say no, especially in a growing and expensive city. We are not in that position yet and are unlikely to be for some years.

But why start the cycle again? Why rezone land ahead of evacuation infrastructure or, better yet, why zone land that creates additional evacuation risk at all? The planning for the aerotropolis has started by drawing a line for the probable maximum flood and working from there, using spatial planning to reduce hazard risk rather than chasing their tail with evacuation infrastructure. As climate change increases flood risk and insurance becomes smarter, it will be increasingly challenging for residents of the flood plain to afford insurance—

CORRECTED

anecdotally, upwards of \$40,000 a year—to afford to build flood-resilient housing or to afford to rebuild every time their property is damaged.

It is difficult to undo these decisions of the past, but we do not need to make them again. We need a plan that sets a clear vision and action for how the Government will reduce the number of people at risk to floods across the Hawkesbury-Nepean flood plain. Through zoning, tradeable development rights and upgrading evacuation routes, the plan must reduce the risk to current residents, stop adding new ones where there is additional risk and through a buyback policy, for instance, providing a safety net for those unable to afford insurance and to rebuild post-disaster or exit the flood plain. We have previous media statements that provide more detail on what I have just said, if I can put those into evidence.

The CHAIR: Yes, we can accept those. Thank you, Mr Kernaghan.

Professor PITTOCK: I have had the opportunity, as you know, to provide a submission and give evidence at the previous hearings. I support the eloquent words of our colleagues from the Committee for Sydney and would just like to add some extra comments on developments since I last gave evidence. Obviously we have had a moderate flood in the Hawkesbury-Nepean valley earlier this year. I stress that it was only a moderate flood. This flood peaked at only 12.9 metres, whereas we have got historical experience of floods at 19.7 metres. Even though it was just a moderate flood, there were over 4,000 houses inundated and peoples' lives disrupted. Those 4,000 homes are going to flood time and time again, regardless of whether the dam is raised, regardless of whether the full supply level is lowered. They will flood because they are in the historical one-in-100-year flood zone or subject to more frequent flooding.

There is nothing in terms of an engineering fix that will prevent those homes from being damaged time and time and time again. I would put it to you that society is better off by supporting those people to relocate to safer ground. This might sound outlandish in terms of having a buyback program that addresses the 5,000 homes that are below the one-in-100-year flood return interval, but this has been a common practice in Australia for a range of reasons. Members will no doubt recall the buyback of 147 homes in Sydney that were afflicted by aircraft noise from Sydney airport. One of the largest relocations in Australia was actually for penguins. The Victorian Government bought back 774 properties over a period of 22 years at a cost of around \$40 million on Phillip Island.

These buyback programs do not have to be immediate. They can be spread out over a number of years to spread out the cost and the impact on people in society. In many of these cases, these programs have proceeded with some sort of State planning policy that has prevented new developments in terms of new houses, in terms of renovations of existing properties and enable the residents to take their time to choose when they relocate under their own circumstances. Given that the proposed raising of the dam looks like it will have a cost somewhere between \$1 billion and \$3 billion, I would suggest that those funds would form a substantial basis for this sort of decade-or-plus buyback of those homes that are most in harm's way. That does create a more resilient society. It means that those people who cannot afford insurance or insurance is no longer offered can receive capital payback to relocate their homes and their businesses to places that are safe where they will not suffer from those risks.

I would point out also that these buyback programs overseas have actually been tremendously beneficial for many of the communities involved. In my research, I have studied those particularly in China and in Europe. Take, for example, the Room for the River program that the Dutch Government has implemented over a series of decades around cities like Arnhem and Nijmegen, where they have purchased back those homes at greatest risk. They have done that in partnership with industry—for example, with the sand and gravel industry—to supply those crucial building supplies of which there is a shortage in cities like Sydney and to re-modify the flood plain landscape to increase flood safety. Those lands have then been rededicated for things like agriculture. These are some of the most important agricultural lands in the country for things like recreation and nature conservation.

In the case of flood plain buyback in places like the Netherlands in a region called Millingerwaard near Nijmegen, this has been tremendously beneficial for the local rural economy in terms of diversifying the economy, supporting more tourism through recreation, through high-value niche agricultural products and by reducing flood risk. Let me conclude by saying the flood that we have just seen is only moderate. We, as a society, do need to prepare for much, much worse. I would urge the Committee to consider a mixture of interventions that involve preventing further development below the one-in-500-year or so flood mark by a buyback program for the most flood risk homes and by investing in local roads for evacuation routes and to improve the amenity of the communities in western Sydney.

Dr KEYS: Thank you for inviting me back. I am not sure I deserve it; I am yesterday's man in terms of working in this sort of area. It is a long time since I retired, but I have retained an interest in emergency management—things like evacuation—but also I am very interested in and have followed flood mitigation in New South Wales for something like 30 years. I have researched it back further than that for a book I have written about flood mitigation in this State. It is worth saying that New South Wales is or has been a national leader in

CORRECTED

flood mitigation. Many communities, urban and rural, have benefitted from investment in flood mitigation and have their interactions with flooding made less serious in terms of danger, cost and the like.

That said, there have been some mitigation projects that were ill advised. I will just mention two very briefly. One is on the North Coast of New South Wales at the bottom of the Clarence River where the wily farmers of that area manipulated flood mitigation grants to create farmland from wetland. To me, that was something of a denigration of the purpose of genuine flood mitigation. On the Hunter, a serious case of environmental damage for little flood mitigation benefit was caused by alleged flood mitigation on the Hexham swamps, since reversed by allowing the tides back into that area.

But I think it has got to be said that the case of the proposal to raise Warragamba Dam for flood mitigation purposes is a more serious misstep than any of these. It will be, as far as I can see—and I think this is fact, not opinion—extremely costly per unit of mitigation achieved when genuinely big floods strike. I note here Professor Pittock's comments about the flood we had two months ago which was, if you like, a mid-range flood in terms of severity and vastly worse is known in European times. It was the sort of flood we can expect to see probably once every 10 to 20 years on average in the Hawkesbury. So in the lifetime of someone living in that valley you would be likely to see it several times. It was not a particularly severe flood, regardless of the fact that many people have suffered grievously from it. Much more severe flooding can occur, has occurred and will occur, and with certain configurations in terms of which tributaries are active there will be terribly serious floods way worse than that one. The dam, or a raising of it, will provide for some of these floods very little mitigation at all.

The raising of the dam is beguiling. It makes a kind of popular sense but it is not necessarily highly productive of mitigation, especially in rare genuinely big floods which will be the most consequential. You might get some mitigation of the flood that occurred a couple of months ago but, as I say, that is relatively small beans, and we need to be focusing on the hugely catastrophic floods of considerably more magnitude than that one. The pressing need, I think, is to stop the problem of community flood vulnerability from getting worse. We should focus on restricting development in this valley. We should focus on building more evacuation routes and we are going to have to do that even if the dam is raised. We should focus on lowering the full supply level of the dam to create flood storage capacity. We should focus on buying back the worst affected properties—and my predecessors have spoken on those things.

This valley is unique and uniquely dangerous in terms of potential flood consequence because of the extraordinarily high reach of floods there and everyone in this room would have heard of the bathtub effect and the choke on the river downstream of Windsor which has led to that situation. We need a different approach in this valley from the standard approach across New South Wales. Our generation has an opportunity to manage flooding more effectively than any earlier generation and to stop the legacy problem from getting worse. My suggestion, as the centrepiece of that approach, in this most developmentally dangerous valley in which you could easily kill hundreds, possibly thousands, of people in an individual event such as 1867 or worse, is to raise the flood planning level from the current—and I will use a Windsor figure here, other figures apply elsewhere—17.3 metres at Windsor to the level of the 1867 flood which actually occurred. That would raise it by 2.4 metres above the current developmental standard, which says nothing about risk.

Now I do not for a minute deny the political difficulties that will create, but raising flood standards is not unprecedented. It was done in this very valley in the late 1980s and it would stop the gradual increase in flood vulnerability that generation after generation we have been creating and we are still intending to create if one looks at current government policy as outlined in Infrastructure NSW's report three or four years ago of a doubling, virtually, of the population in this valley below the PMF by the year 2050. We need to stop adding to the legacy generated by several past generations. Some generation must grasp that nettle at some stage. This will be better than a flawed mitigation strategy of high cost and little benefit in big floods on tributaries entering the system below Warragamba. I will leave it at that for now.

The CHAIR: Thank you, Dr Keys. I do not know if you can pick this graph up, but we see the various contributions of the tributaries to any particular flood event. This most recent event is described as a major flood level event—is the way the Government describes it, compared to moderate, once it gets over a certain level. It is just over major. But obviously an event hits a peak at a time. It works up to the peak and it works down from the peak, but these models suggest a contribution of a tributary for the whole flood event. I am trying to work out the degree to which that is a useful representation of the flood risk so we can understand it. Because obviously Warragamba contributed a lot at the end of the flood event and then ongoing, but the other tributaries contributed a lot to building up to the peak. So I am just wondering, particularly for you, Dr Keys, and probably you as well, Professor Pittock, can you speak to how useful this sort of contribution analysis is to us understanding the risk and the benefit of the Warragamba Dam wall raising?

CORRECTED

Dr KEYS: Certainly. Yes, it is useful. In every flood, different tributaries to a river will contribute different amounts. I have not seen the figures for the event of two months ago. I am out of the work scene and I do not have access to data as I used to, but I am well aware that there are big differences flood to flood in the contributions of the different sub-catchments of the Hawkesbury. I will give you something about 1867 which counts. I mean, this is the worst flood seen. Given how long ago it was, we know a surprising amount about it. It has been much studied. It was something of the order of a 100-year flood—to use that dreadful and misleading term but it is hard to get around it—at Penrith, but it was much rarer at Windsor. Now that says that something happened between those two locations. It must have been the Grose, which has not always been a significant contributor.

I gather that the dam, which commands what was the Warragamba River, commands something like 70 per cent of the catchment. That does not mean that 70 per cent of the floodwater comes down there in individual events. It might in some cases be 20 or 30 per cent and the upper Nepean and the Grose might be more. So average contribution is not much use. One needs to think here about what can come down individual tributaries. My point is that we are going to get floods periodically in which the serious contributions will be unaffected by whatever happens at Warragamba Dam because the water will come down the Nepean, the Grose, the South and Eastern creeks, et cetera.

Professor PITTOCK: If I could just add a couple of comments. I completely agree with Dr Keys. You will have seen those graphs and they say that somewhere between 40 and 60 per cent of floodwaters and many historical floods have come from tributaries downstream of Warragamba Dam. Now that is likely to change over time and become more dangerous for a range of factors. One is changes of land use in the catchment. So as urbanisation increases the area of hard surface in places like the South Creek catchment it is likely that any rain that does fall is likely to run off more quickly and create a high peak and be more dangerous. With a warming climate we are seeing frequent storms of higher intensity, in many cases more localised, that dump a lot of water in a small place, and so it is likely that we are going to get intense storms in the catchment downstream of Warragamba Dam that cause extreme flooding.

The key point is that Warragamba Dam may not control the bulk of the floodwater. With the biggest floods, that empty air space that it might have to capture some floodwater will control a smaller and smaller portion of the floodwater and have less and less impact. The houses that are currently below the one-in-500 or the one-in-100-year flood return interval, particularly below the one-in-100-year interval, they are going to get flooded time and time again purely from floodwaters coming below Warragamba Dam. So if one of the Government's prime concerns is to reduce economic damage and risk to people, then dealing with those people in harm's way below the one-in-100-year historical return interval is a key first step.

The CHAIR: Professor Pittock, I think that in your original submission to the inquiry you talked about an alternative of lowering the full supply limit. There was some debate about that. Various Ministers seemed to disagree about whether or not we should have taken that approach in advance. I take it you would be supportive of changing the operational rules for the dam to try to maximise the mitigative capacity of the existing dam at the moment. Firstly, would that still be true? And based on this most recent event, do you have any suggestions or recommendations for whether it has changed your view about the capacity of the existing dam to be modified to be flood mitigation as well.

Professor PITTOCK: It is true, I think, that that is one minor portion of a suite of solutions—lowering the current full supply level to provide some flood retention capacity in the dam. It will only ever be a minor portion of a flood control strategy because that air space can be very quickly filled in a major flood. There are a number of reasons why I think that that option will become more attractive from a water supply point of view. With climate change and increased frequency of drought, the actual portion of the time that Warragamba Dam is full is going to be reduced, and Warragamba Dam is going to become less and less reliable as a source of drinking water for Sydney. So a true resilience strategy would seek to diversify the drinking water supplies for Sydney, and that will make augmenting supply options from things like desalination or from recycling wastewater more and more attractive and more reliable, and leave the existing Warragamba Dam infrastructure free to make some modest contribution to flood control.

The CHAIR: I think that is useful. Having been involved in some of those discussion and debates about water supply and water security, it seems to me that there is a real dovetailing of different areas of government policy here. We heard this morning other evidence from the Insurance Council of Australia that suggested that there is a need for a coming together of all the stakeholders and key experts here to have a bit of a round table about how we bring these options together. I am interested in your views, from the three of you, about whether or not you think there is a gap here. The Government has taken a particular direction, and we really have not weighed up how all of these different options either could work together or should be working together. I would be interested in your view about whether you support that sort of round table of key stakeholders idea.

CORRECTED

Professor PITTOCK: Perhaps if I could lead off, I would say yes. I think the current Hawkesbury-Nepean strategy was prepared with an extremely narrow range of stakeholders and that all the options were not truly considered. For example, the benefits of options that were rejected—like improving arterial roads—was not counted into that process. So, yes, bringing together a broader range of stakeholders would help. I am obviously at a university in the Australian Capital Territory. There is a tremendous amount of expertise in New South Wales universities—experts who could be brought to bear on this and really flesh out a much more sophisticated strategy that brings together reliable drinking water supply for Sydney, greater flood risk reduction in western Sydney and sustainable economic development in western Sydney.

Mr KERNAGHAN: I think the simple answer is yes. They are both really complex areas of policy development. The water supply one may be getting outside the focus of our submission, certainly. But separately, I think we do need to be focused on how we provide a resilient water supply to the greater metropolitan Sydney. We have seen the growth numbers this morning in the intergenerational report, we have seen historically the risk of drought and the risk of Warragamba not being able to provide that water supply consistently, and we have seen investments in things like desalination and in the opportunity to use recycled water potentially. I have spent the last five years living in Singapore so I have been drinking recycled water for those five years.

The Hon. PENNY SHARPE: I am glad to see you are still alive, Mr Kernaghan.

Mr KERNAGHAN: I am okay.

The Hon. PENNY SHARPE: It is good to see. You are looking well.

Mr KERNAGHAN: It is possible to think about how we use our water much more effectively, I think. So if there are opportunities to have that drinking water supply discussion, which then has multiple benefits, I suppose, for the flood risk discussion, I think that would absolutely be worthwhile having.

The CHAIR: Dr Keys, do you have a view on that?

Dr KEYS: Yes. And part of my view is that some people in the Lower Hawkesbury—I think Richmond—are already drinking recycled water. But I have a view on the business of having a round table. It reflects the fact that I think the best mitigation of flooding is multifaceted. It is not just levees and raising dams; it is education, it is evacuation routes and it is land management practices. There is a dozen families, if you like, or subfamilies, that contribute to the mitigation of flooding. We often think of just purely structural, but it is not. I think there is a real danger of overestimating how much the structural measures can contribute. I will give you one example of that in New South Wales. As I said before, we have had levee building here for a long time. It has been our major flood management strategy in terms of structures and building things.

Since 1990, five towns in New South Wales have had their levees overtopped or breached. That is only 30 years. Nyngan, in 1990, was the first of them; Kempsey, in 2001, was the second; in 2012 North Wagga got flooded because its levee was overtopped; and in 2017 Lismore and Murwillumbah had their levees overtopped. I make the point simply to say that it is all very well to put your eggs in the basket of flood mitigation structurally defined, but you are going to get found out from time to time. That is not a statement against levees. Levees have played a major role in mitigating floods in New South Wales, and so have dams. There are dams on the westward flowing river that have, as is slated for a raised Warragamba, flood mitigation capacity created above what is called full supply level for irrigation, water supply, et cetera.

I simply say that, yes, we do need a round table. We need to make sure that a wide range of stakeholders is incorporated in this, and we need to recognise particularly that the publicly popular approach—physical mitigation by structures—is only a part of the game, and sometimes a surprisingly small part of the game in terms of what can realistically be achieved.

The Hon. ADAM SEARLE: Dr Keys, I just want to understand your evidence. I think you were saying that the raising of the Warragamba Dam wall may have some beneficial effects on mitigation, but we do not really know exactly how much, and that because the floods can come from other directions its utility may well be not that great. It is obviously a considerably expensive proposal. In terms of the risk return or the cost return, do you think it is a good investment of public money or do you think that in terms of the mitigation outcomes it is an awful lot to actually not really be able to mitigate and properly protect those properties that might be at risk? Or is it just not knowable?

Dr KEYS: Parts of it are known, but I have covered that partly by saying that it depends on the configuration of an individual flood event. If it does not come down the Warragamba River through the dam, the raising of the dam is going to do nothing in an event of that sort. In most significant floods all of the tributaries will contribute to some degree, but you cannot predict which tributaries are going to be most involved in a particular flood so you cannot predict what Warragamba will do in terms of mitigating it. I would say that in

CORRECTED

general terms there will be some mitigation achieved by that measure, but I caution that it is not likely to be great in many floods, particularly very big ones—which of course are the worst—and particularly in floods that have the wrong configuration. I said before that I am for mitigation, but it has got to be sensible.

I think what we have got here is a report driven by the notion that physical mitigation is the key element of flood mitigation and I increasingly, in my career in the State Emergency Service, came to question that. That is not a comment against mitigation; it is a recognition that structural mitigation is a part of the job, and there are many other parts of the job that need to be done. One is flood education. Frankly, we have done an appalling job of that in New South Wales over decades. We have fiddled at the edges, but we still find during floods people demonstrate that they did not understand that they lived on a flood plain. They did not understand what was going to happen as a result of living on a flood plain. They did not understand the flood warning system. They tend to say things like, "We got no warning," when they did. They did not necessarily get it in terms that were comprehensible to them and they had not been educated as to what to be understanding when they did get flood warnings. I make the point again that this is a multi-pronged effort and we should not overestimate the traditional area of focus.

I will just say one more thing here. When I wrote a book 12 years ago on flood mitigation in New South Wales, I calculated that the amount of money that had been spent over the previous 40-odd years since the sixties in this State on flood mitigation was in the order of \$1.3 billion. Not a vast amount of money, but a lot of communities benefited from that. That was \$1.3 billion in 2008, so that might be \$1.5 billion now. We are looking probably at least that for one structural mitigation effort, the raising of Warragamba Dam, which will have some at times marginal impact on one valley. That might answer your question, Mr Searle. You sort of asked a question about the cost effectiveness. I am saying that there is an enormous amount of money being spent here. We have spent that sort of money benefiting many communities over 40 years and we are about to splurge a huge amount of money on something that might have very little impact on very serious floods, particularly those which have the wrong configuration from a human point of view.

The Hon. ADAM SEARLE: I think you have already answered this last question, but I just want to make sure I understand it. Based on the history of which tributaries flood, it is more often the case that they all flood rather than just Warragamba. Is that the case?

Dr KEYS: Yes. In most floods you would expect all the tributaries to make some sort of contribution, but some might make 2 per cent or 3 per cent and some might make 80 per cent in individual flood events.

The Hon. PENNY SHARPE: My questions are to Mr Kernaghan. What you have tabled, I am not sure if we will include it as a submission from the Committee for Sydney. Are we able to do that? I think it should be a submission actually.

The CHAIR: We will deal with that at the end.

The Hon. PENNY SHARPE: There are just a few things that you spoke about that I want to ask some more questions about. You talked in your submission about there being good work being done on developing models and plans to improve evacuation infrastructure. Where is that occurring? Who is doing that work?

Mr KERNAGHAN: It is being done by Infrastructure NSW. I am not part of that process, but they are doing what is called an agent-based modelling process looking at how people in cars move around the flood plain in response to the particular flood events, trying to model all this complexity and how people actually would.

The Hon. PENNY SHARPE: From March they would be looking at how that worked as a moderate flood as we keep talking about. That has been picked up. I suppose we have talked about bringing more expertise into that. Are they just doing that in-house? Is that the way you think that is happening?

Mr KERNAGHAN: Under the Hawkesbury Valley resilient landscapes process, part of that was to create a future land planning framework, and to underpin that they needed to then model what that would look like in order to look at what those land uses would be. The 2019 process is still ongoing.

The Hon. PENNY SHARPE: But it is basically done in-house. It is not doing what we have talked about this morning, which is bringing some outside expertise in to look at that.

Mr KERNAGHAN: No, not that I am aware of.

Dr KEYS: Can I add, Mr Chairman, to that answer by saying that I hope that what Infrastructure NSW is doing involves NSW State Emergency Service whose legislative responsibility it is to manage that evacuation on the day. It is all very well to do modelling—and I am absolutely not opposed to it—but again it just makes the point about the round table idea that if we do not have appropriate inter-agency communication here, it would be

CORRECTED

a bit hard to understand how that modelling could be maximally effective on the ground if it is leaving out the agency that has to manage that thing on the day.

The Hon. SHAYNE MALLARD: We can ask them in the next session.

Dr KEYS: I am not saying it does, but I am not aware of—which is partly because I have been out of the scene for a while—where that is.

The Hon. PENNY SHARPE: We will ask this afternoon. Mr Cinque is still in the room. We cannot call him back to ask him whether they are doing that but we can ask that on notice.

The Hon. SHAYNE MALLARD: Bring him back; he is still under oath.

Dr KEYS: Sorry, who is that again?

The Hon. PENNY SHARPE: Mr Cinque is just sitting there. He can probably answer the question. A few people have raised today that the Minister for Planning and Public Spaces has pressed pause on the Marsden Park North and Alex Avenue development. Again, your submission talks about that just being the tip of the iceberg. This sort of suggests that the Department of Planning is actually doing the work that would look at where there are other places that could potentially be in the same situation. Is that your understanding, Mr Kernaghan?

Mr KERNAGHAN: My understanding is that there are two processes going on. One is the one that we have just spoken about on the regional approach, which we have been very adamant needs to happen.

The Hon. PENNY SHARPE: Just to be clear, that focus is on existing development as opposed to future development.

Mr KERNAGHAN: No, it includes future development as I understand it, and that is critical I guess as to what our submission outlines. The issue is—and this is partly anecdotal, partly land that is already zoned—there is development. Penrith Lakes is one example, which is obviously constrained by its evacuation. If that evacuation infrastructure was improved then that business, that landowner, would be representing its shareholders appropriately to seek the highest value of that land which would be residential.

The Hon. SHAYNE MALLARD: It should be a business park in my view and the local member's view.

The Hon. PENNY SHARPE: Thanks for that, Mr Mallard.

Mr KERNAGHAN: An example. Either way, there is land where some of it is below the PMF, some is above, but all of it is constrained by this evacuation risk that we have. The risk that I guess we are concerned about is that any improvement or any raising of the dam, if you like, could create a green light, if you like, to development which is currently constrained by evacuation risk.

The Hon. PENNY SHARPE: In effect you are saying really that the only break on development is a recognition—and this is only relatively recent, even where there is an acceptance that there is a risk regarding evacuation. But that is really the only lever that the planning Minister has in terms of putting a pause on some of that development. Is that right?

Mr KERNAGHAN: I cannot speak for the Minister for planning.

The Hon. PENNY SHARPE: No, I know that.

The Hon. SHAYNE MALLARD: Flood levels.

The Hon. PENNY SHARPE: No, I know that.

The CHAIR: Just to pick up on that, is your concern more there is sort of this false sense of security created by this infrastructure that then the developer or the landholder goes to government to say, "Hey, even if there is not a big event, we have delayed the flood peak. You have more time to evacuate. This sort of development is appropriate." You are worried that that actually escalates the risk across the broader flood plain.

Mr KERNAGHAN: Exactly. This issue of chasing your tail basically. You create a bit of capacity in your evacuation structure and that is immediately filled by potential development.

The Hon. SHAYNE MALLARD: Tailing onto the same issue, the Government has committed to no rezonings in the flood plain. If any land is being applied for to the Minister, is that not already zoned but it has all those impediments or restrictions like evacuation routes and flood levels? We have put a moratorium on any rezonings that are affected by the flood plain.

Mr KERNAGHAN: This was the second part of the conversation. What happened last week was the department released the flood-prone land package, which provided flexibility for councils to plan beyond the

CORRECTED

one-in-100—the flood planning level being the one-in-100 or the 1 per cent flood—and said, "You can actually change your flood planning level to anything below a historical flood, up to and including a historical flood." That puts the responsibility on local government then to look at their flood planning and their flood plains and make a determination about what land they would then propose to the State Government, which has the responsibility for that rezoning to take them to account. All of those things, as you say, need to be considered—the flood evacuation, risk to property, all those kinds of things, cost of infrastructure—but that is back in the hands of local government to make those determinations and that submission about which land should be rezoned.

The Hon. SHAYNE MALLARD: And the State will then review that.

Mr KERNAGHAN: Absolutely.

The Hon. PENNY SHARPE: It will be very hotly contested.

The Hon. SHAYNE MALLARD: That was the way it used to be done, too.

The Hon. PENNY SHARPE: I am not complaining. I have two more questions; one more for you, Mr Kernaghan. When talking about tradeable development rights—you have talked about zoning—that is not something this Committee has had brought to us. Can you take us through how that works?

Mr KERNAGHAN: Sure. The example I have shared is from Norfolk, Virginia, in the US. They undertook a process called Vision 2100. The city of Norfolk is actually slowly sliding into the sea due to geological conditions, but also rising sea level. They took a long-term approach to their land use and brought all of their stakeholders—including the navy, which is one of their major stakeholders—into the tent to talk about, "What does the future of our city look like?" They recognise that they are going to experience higher sea levels and therefore they need to change their land use. What they did is identified four zones—effectively, if you like, a traffic light system.

They identified areas that were of high economic value, and therefore they needed to invest in protecting, and which were at risk; other areas which were not at risk and therefore could accept a higher intensity of development and therefore could receive a higher density; and those areas which were at risk which were of a lower economic value, which still had development rights or development potential. So you could actually set up a process where development potential was traded or taken and put into another place. The development potential of the city remains the same or can increase, but those people who own land in areas at risk can realise that development value somewhere else which is away from that hazard risk. It is set up as a market mechanism, but it is also a long-term process—effectively there is an equity approach to it—so that you are reducing exposure and enabling development.

The Hon. PENNY SHARPE: Terrific, thank you. I have one question for Professor Pittock. When talking about the buyback issue, I am conscious that 5,000 properties is a lot more than the 137 at Sydenham. I was involved in that, so I am quite familiar with that buyback system. You are talking about 5,000 homes in the one-in-100. How many are there in the one-in-500? Do we know?

Professor PITTOCK: There are an additional 7,000 homes, so 12,000 in total below the one-in-500-year flood return interval.

The Hon. ADAM SEARLE: Twelve thousand?

Professor PITTOCK: Yes.

The CHAIR: I had a question that was following on from that. Dr Keys, your suggestion was to raise flood planning levels up to the height of the 1867 flood. That is considered to be the one-in-100, though, is it not? The 4,000 existing homes might be captured in that level, but you would be suggesting no more building below that. The 1867 level—you said it would be adding 2.4 metres to the flood planning level. Do you know how many additional homes are in that? Any buyback plan would also probably incorporate those properties over time, I assume.

Dr KEYS: I have no idea of numbers, Chair, but there would be additional houses there. You might have misspoken there; the 1867 flood is not the one-in-100 or 1 per cent. It is something between the 200- and the 500-year, whatever the percentage is of that. At Windsor—and there are different values elsewhere—the one-in-100-year level, better called the 1 per cent level, is 17.3. I am suggesting jacking it up by 2.4 metres for the general Windsor area. Now that involves some sterilisation. It would also capture more existing houses than what Professor Pittock is talking about for that subset of the valley.

We were talking about very serious numbers of houses already. Part of my presentation was about—in this most developmentally dangerous of all valleys in New South Wales by far. It is already very heavily populated; I guess the only one that is more populated is the Georges in southern and western Sydney. There is a

CORRECTED

form of madness in continuing, as we do, generation after generation, to increase the numbers of people at risk in this valley. That is why I say that sooner or later some generation is going to have to grasp this. It will be grasped one day, probably because of a disastrous flood. It would be better if we were to do it before that.

The CHAIR: The police Minister—I think it was at the end of March, just after the recent event—said of the Warragamba Dam wall raising, "It means that we can probably release more land in the north-west for construction and development." He said at the time that he opposes development in that area at the moment because it is flood-prone, but suspects that the raising of the dam wall and adding new infrastructure would make that land more developable.

Dr KEYS: Yes.

The CHAIR: I do not want to give you a free kick here, but I take it from your evidence today that that is the sort of madness you are talking about, Dr Keys?

Dr KEYS: Yes. He is also the emergency services Minister, which is a little bit interesting, because that is perhaps more relevant than the police ministry in the context of this. What we are talking about here is the so-called levee paradox, which can also apply to raising dams. I can be very long-winded about this and I will try not to be. It works like this: Communities are affected by floods. They put up with the pain. They lobby councils and governments—whatever—to provide protection. Councils and governments do, typically in the case of levees. It could be raised dams; it could be all sorts of things. Then a bigger event comes along than the mitigation is designed for and you wind up losing more lives, property and infrastructure et cetera than you would have had you done nothing.

I think what Minister Elliot has said there, possibly in an unguarded, careless moment—he said we could probably increase the amount of land released. You made a comment before, Mr Mallard, about zoning and no zoning changes being proposed. I am not sure what the zoning of land we are talking about is. But he very clearly made the point that if we raise this mitigation, this dam, we could "probably"—that was the word he used—release more land. He must be talking about low-lying land which he thinks has been made less flood-prone by the raising of the dam. I am saying that that logic is flawed to begin with and it is the very thing that will lead to greater costs.

There are many cases of the levee impact, the levee paradox, around New South Wales. I have done quite a bit of work in the Maitland area. A council there, because of levees, has lobbied to redevelop areas at higher density with more intensity of development behind levees that are bound to be overtopped at some stage. There is a psychology here that is undeniable and it is seen all over the world and it is potentially disastrous. It undoes our attempts to make communities more resilient; it makes them more vulnerable. Maitland City Council is actively seeking to recreate the vulnerability of the past in that most flood-prone of New South Wales cities. That is madness if ever I saw it.

The CHAIR: Professor Pittock, you look like you wanted to make a contribution there.

Professor PITTOCK: Your question is getting to the heart of—where does society choose to draw the line in terms of limiting development in the interests of safety? To a large degree, that is a value judgement based on how much society or the Government chooses to put people at risk. I would argue that the one-in-100-year flood return interval is far too risky in this area for two reasons. One is that there are a lot of people already in harm's way who are being hit by repeated floods and will probably not be insured in the future, and that puts them at grave risk in terms of their livelihoods and so forth. The second is that this is a uniquely dangerous flood plain where floodwaters can rise very high, very quickly. For those reasons I would argue that New South Wales as a society and as a government should choose a much, much harder standard in this valley in particular. Dr Keys has proposed the 1867 flood level; that has the merit of representing historical experience. We know what got flooded then. It provides one good line in the sand that could lead us as a society to make better decisions about where to develop and where not to because of the risk.

The CHAIR: I am interested in going back to your positive suggestion. There are a lot of buybacks. It is going to be hard for a lot of people having to sell homes and move. But you expressed earlier in your testimony the evidence that, where this has been done in other places, there have been positive impacts on a community, where they have been able to sculpt the landscape to be able to handle flood events. It brought back agricultural industries or environmental values which have also helped mitigate flood as well as provide other community benefits. Could you explain a little bit more where some of those examples are? Do we do that anywhere in New South Wales or Australia, well or at all? How is that concept of graduated flood development control being built into our planning system? What is the positive side of the solution here?

Professor PITTOCK: The positive side of the solution is much greater safety for people so their lives are not interrupted. Many of these buyback programs have led to government investment in communities in safe places, so they end up with perhaps a higher density of development on safe ground, which leads to improved

CORRECTED

government services. I have seen this, for example, in China and in Europe, where, as part of this program, governments have invested in better schools and medical services. There is the opportunity with that higher concentration of people to have more local businesses that provide a much more diverse lifestyle. The diversification of the economy has been important in these places—supplementing the previous agricultural economy with development of low-volume, high-value niche agricultural products that brings people into the district; also in terms of tourism and recreational industries. So the sorts of places that this is happened: the flood plain of the Yangtze River in China. Perhaps some methods or policy solutions there that the Government would not—

The Hon. SHAYNE MALLARD: That is not a very good example—if you want us to send the army in and tanks and clear it out.

Professor PITTOCK: They did not use the army or tanks.

The CHAIR: Mr Mallard, we might let—

The Hon. SHAYNE MALLARD: It was not a terribly compassionate clearing of the population.

Professor PITTOCK: There were places there where levee banks broke and towns were flooded for months and months on end. In those places the Chinese Government did support the relocation of those towns to higher ground. Perhaps more akin to an Australian approach would be places like the Rhine River and the Danube River, where governments have mapped the most low-lying flood plain areas, have over a period of time supported relocation of the most flood-prone houses, and done this in conjunction with local industries—so, in particular in the Danube, with, for example, the fishing and timber industries, using those flood-prone lands for high-value products.

In the case of the Netherlands, they focused particularly on tourism—densely populated country needs open space, much akin, I would suggest, to what Sydney might look like with 8 million residents. The United States is another interesting example, where a lot of US Federal Government assistance to local and State governments is predicated on a degree of buyback and relocation. So disaster relief packages are paying for a lot of redesign of local communities so they are flood safe, have got more diverse economies and are not living with the spectre of the big flood hanging over their head.

The Hon. SHAYNE MALLARD: Can I—

The CHAIR: I will throw to you but just—

The Hon. SHAYNE MALLARD: Half past is the time, and the Government has not had any questions.

The CHAIR: I am sorry if I did not—it has been pretty open. Go for it.

The Hon. SHAYNE MALLARD: Thank you for that. Just on the back of an envelope I calculated that probably you are looking for the buyback proposal for the 5,000 properties—not the 12,000, the other figure—at \$2.5 billion. That is on half a million each. When you buy back—I have been involved in that in the past—you pay for all the taxes and relocation costs, so it is actually more than the commercial value. That is a huge amount of money, even greater than the amount proposed for the raising of the wall. I come back to what I have said to other witnesses today about communities. Mr Searle I live in the very fire-prone upper Blue Mountains. I am right on the fire zone. We do not talk about buybacks for our properties. We talk about community resilience. We live with the risk. That is the situation, in my view, that we are looking at with the flood plain in the catchment.

The wall raising not the silver bullet—I agree with you, Dr Keys. It is the whole range of mitigations that we should be looking at. Would you agree, then, that people accept that they are going to live in some risk? That might be for affordability or accessibility for the people in the flood plain. In the mountains it is probably the environment. But people do take risks. When I was a young bloke I used to wonder why people lived in San Francisco where there was an impending earthquake. I thought, "Why would you live there?" Being there, of course, you would not want to live anywhere else if you were in America. So people accept some risk. Whether that is for economic reasons or social reasons, they accept some risk in their decisions. Isn't the role of the Government, rather than just buying back and wholesale moving them all out, to try and balance that risk up to an acceptable level?

Professor PITTOCK: Yes, Mr Mallard. You gentlemen do live in obviously a highly fire-prone region and your communities have developed some wonderful adaptations to manage that risk. The Rural Fire Service, the education programs, the building standards—all those sorts of things manage the risk.

The Hon. SHAYNE MALLARD: The risk is still there, though.

CORRECTED

Professor PITTOCK: It is still there. I would suggest in the case of the Hawkesbury-Nepean Valley there is a more severe degree of risk than for even the severe fires that we saw in the last few years. Now those fires were incredibly severe and damaging—

The Hon. SHAYNE MALLARD: Evacuated three times; Mr Searle was once.

The Hon. ADAM SEARLE: Yes.

Professor PITTOCK: —but there is no ready adaptation to a 20-metre-deep flood. You cannot build a fire bunker, you cannot remove the fuel from around the house, you cannot have all the right sprinklers and spray gear that is going to save you from a 20-metre-deep flood. There isn't an equivalent. So for that reason I would argue that in this particular valley the buyback of the most flood-prone properties is warranted.

The Hon. SHAYNE MALLARD: I will put it to you that I do think there are similarities. If we get a catastrophic fire warning we are told to leave, "Turn your sprinklers on and have the place ready." I am in the Fire and Rescue volunteer unit but we are told, "Get out," as I said, three times in the last fires and Mr Searle at least once, I remember. So there is a parallel to the risk issue and the decisions communities, governments and councils make to manage that risk at an acceptable level.

Dr KEYS: Can I just add very—

The CHAIR: We are going to have to end there, I am sorry, Dr Keys. If there are other questions, members are welcome to put those on notice. I am not sure if there were any taken on notice but if any come through you are asked to try to get those answers back within 21 days. Thank you very much for your time and your evidence here today, gentlemen.

(The witnesses withdrew.)

CORRECTED

The Hon. STUART AYRES, Minister for Jobs, Investment, Tourism and Western Sydney, before the Committee

BRETT WHITWORTH, Deputy Secretary, Greater Sydney, Place & Infrastructure, Department of Planning, Industry and Environment, on former affirmation

SIMON DRAPER, Chief Executive Officer, Infrastructure NSW, on former affirmation

MAREE ABOOD, Head of Hawkesbury-Nepean Valley Flood Risk Management, Infrastructure NSW, on former affirmation

FIONA SMITH, Executive Manager, Water and Catchment Protection, Water NSW, on former affirmation

MARK BABISTER, Managing Director, WMAwater, on former affirmation

The CHAIR: Thank you for your attendance today. Minister Ayres, I remind you that you do not need to be sworn today as you have already sworn an oath to your office as a member of Parliament. All other witnesses have appeared previously before this Committee so you will be examined on your former oath for today's hearing. Minister, would you like to start with an opening statement to the Committee?

Mr STUART AYRES: Mr Draper is going to provide an opening statement.

The CHAIR: On behalf of the Government as a whole?

Mr DRAPER: On behalf of all the agencies.

The CHAIR: Thank you, Mr Draper.

Mr DRAPER: Thank you, Chair. As the CEO of Infrastructure NSW I make these remarks on behalf of my colleagues in the New South Wales Government agencies represented today. You heard earlier from the NSW State Emergency Service. I would like to provide some further information and context on the March 2021 flood. I think a presentation has been provided to the Committee; the data and the analysis contained in that are as of today. It is ongoing work, but it is the most current work available. As previously discussed, the unmitigated flood risk for people who live or work on the flood plain, numbering around 140,000, is the highest in Australia and is increasing with climate change. Each year there is a one-in-100 chance of a flood occurring that would reach the planning level of 17.3 metres at Windsor. By comparison, the March 2021 flood peaked at around four metres lower than that flood planning level at Windsor.

The March flood had a likelihood of a one-in-10 to one-in-20 chance per year across most of the flood plain. The flood arose from heavy rainfall along the New South Wales coast associated with a low-pressure system that developed on Thursday 18 March and persisted for several days. Dangerous rainfall on the mid North Coast on 18 and 19 March tracked south while weakening, shifting the heavier rain to the Hunter, Central Coast and Sydney regions on 20 and 21 March. The weather system did not reach the intensity to be classified as an east coast low. The heavy rain fell against a backdrop of relatively wet conditions associated with a La Niña over previous months. As soils were more saturated and dam storage levels were generally high, flooding was more widespread and severe than during the broadly comparable rain event in February 2020.

In the March 2021 flood the Warragamba catchment contributed nearly 60 per cent of the floodwaters to Windsor, with the other catchments contributing around 40 per cent. This ratio is consistent with historical records as well as the contemporary hydrological modelling. Warragamba Dam was 96.3 per cent full when the event started and began spilling on the afternoon of Saturday 20 March. Water peaked at 1.54 metres above the full supply level on Sunday 21 March. The dam remained above full storage for around 12 days in total. The scale and impacts of the flood varied across the flood plain. At Wallacia, near the junction of the Nepean and Warragamba rivers, the peak was the highest since 1990 but still in the minor range. At Penrith, at around 24 metres, the peak was the highest since 1925; however, as the floodwaters were largely contained within the banks of the Nepean River, it was classified as moderate. Further downstream at Windsor the flood peaked at 12.9 metres, the highest and first major flood since 1990.

There is an almost 100 per cent chance of a flood of this height or greater occurring at Windsor at least once in an 80-year lifetime. In the lower Hawkesbury, the flood was comparable with the last major flood in 1990. We have seen the devastating impacts of the flood on communities in low-lying parts of the Richmond-Windsor and lower Hawkesbury flood plains. It is important to note that there have been 14 larger floods at Windsor since the records began; the largest of these was the 1867 flood. Generated by a severe and widespread east coast low, this flood peaked at around 19 metres above the normal river height—that is around seven metres higher than the recent event. There are some reported inaccuracies about the 1867 flood that warrant correction. That event, like all the largest floods in the Hawkesbury-Nepean, was dominated by inflows from the Warragamba catchment, not

CORRECTED

the Grose River catchment or any of the smaller catchments. It is simply not possible for the other catchment contributions, even in combination, to generate a flood of the scale of the 1867 event.

It is tempting to think that large floods like that will not happen again. That is not the case; more floods are inevitable. The Hawkesbury-Nepean experiences flood-dominated and drought-dominated cycles lasting 30 to 50 years. We are more than 30 years into a drought cycle. When we enter the next flood-dominated regime, there will be more floods and there will be bigger floods. While we cannot stop floods in this river valley, their impacts could be significantly reduced through mitigation. Preliminary modelling has shown that with a raised dam wall, the peak of the March 2021 flood would have been around 3.5 metres lower at Windsor and lower still at Penrith. The flood scale and impacts would have been reduced to those similar to the smaller event in February last year, which benefited from lower storage levels in the dam. The dam wall raising does provide benefits for smaller floods. However, the greater benefits of the dam wall raising are directed to the larger, more dangerous and damaging floods: those with between a one-in-50 and one-in-1,000 chance per year.

With the raised dam, in a one-in-100 chance per year event the peak would be delayed, keeping evacuation routes open and the flood height reduced by around four metres at Windsor. This would significantly reduce risk to life, reduce the number of people to be evacuated from around 55,000 to around 14,000, reduce the homes impacted from 7,600 to 2,500 and decrease flood damages by around \$2.5 billion. Floods also have upstream impacts. Areas upstream of the dam are already inundated for up to four days during floods when the dam is full. However, the March 2021 flood did not produce significant upstream inundation. That said, stream flows in some of the upstream Warragamba catchment tributaries were notable. A record peak was set at Cedar Ford on the Kowmung River, exceeding the previous record set in 1978. The gauge at that location has been operating since 1968. The large and rapid tributary inflows caused erosion and damage to catchment access roads and trails, as well as some water monitoring and gauging equipment.

Water quality within the storage deteriorated due to the inflows but, through effective management of the dam and distribution system, water quality in Greater Sydney was not impacted. There have been suggestions that releases could have been made from the dam in the days leading up to the flood. There are good reasons why that was not the case. WaterNSW cannot legally undertake prereleases in the way suggested by some stakeholders. Even if legislation did allow for it, due to the evolving nature of the forecasting of this event it would not have been until Friday morning that dam operators would have had sufficient certainty that the rainfall was going to fill and spill the dam. Had prereleases begun at that time, there would have negligible benefits—less than a 10-centimetre reduction in peak levels at Windsor. There have also been suggestions that the dam wall raising would not work and would make no significant difference to the March 2021 flood or future major floods.

With these claims, the community is being asked to believe that an ability to temporarily hold back 1,000 billion litres of water would make no difference to the level of the flood, the extent of the flood or the time that authorities have to respond and assist people to evacuate. That claim is wrong. The measure of success for the dam wall raising is not that floods never occur in the Hawkesbury-Nepean; that is not possible and has never been the objective. Instead, we aim to minimise the loss of lives, homes and businesses when major floods do happen. Every metre of water matters. Every extra hour for evacuation matters. To summarise, the March 2021 flood, while devastating for low-lying communities, largely did not impact urban residential, commercial or industrial areas, or trigger mass evacuations; much larger floods can and do happen; and the proposed dam wall raising would have made a material difference, reducing the flood height by around 3.5 metres at Windsor to a scale similar to the February 2020 event.

The CHAIR: Thank you, Mr Draper. Is the raw data behind the modelling that you mentioned available for other experts to scrutinise and test?

Mr DRAPER: I might have to refer to Ms Abood.

Ms ABOOD: The data that we are currently reviewing is part of an ongoing review process and peer review process. That is part of the standard practice. I would have to take that on notice about whether that information will be publicly made available because it is partly WaterNSW information and partly other organisations.

The CHAIR: Your claims are pretty substantial in terms of the ability to mitigate impacts on landholders. This is a highly contested question and goes right to the heart of the cost-benefit analysis of this particular project. Minister, perhaps you could give us an undertaking here that all of that information will be made public so that independent experts can scrutinise that data?

The Hon. WES FANG: Point of order: Ms Abood has said that she will take it on notice. She is entitled to do that and reply accordingly.

CORRECTED

Mr STUART AYRES: I do not think you need an expert to tell you that 1,000 billion litres of water would make a difference. No expert is required to know that 1,000 billion litres of water makes a difference.

The CHAIR: I am sure it does make a difference but my question was will you make the information public?

The Hon. PENNY SHARPE: Good to get your grab in early, Minister. I will follow that up. Will you make the information public?

Mr STUART AYRES: Ms Abood said she would take them on notice. I am happy to do the same.

The Hon. PENNY SHARPE: You are the Minister. You are able to make the call.

The Hon. WES FANG: Point of order—

Mr STUART AYRES: I just answered the question.

The Hon. PENNY SHARPE: That is fine.

The CHAIR: Are you taking a point of order?

The Hon. WES FANG: No.

The Hon. SHAYNE MALLARD: She has accepted it.

The Hon. ADAM SEARLE: Exactly.

The Hon. PENNY SHARPE: I have accepted it.

The CHAIR: So you are not prepared to give an undertaking that the information that is out there now—you have put it on the public record here today about the ability for the dam to have mitigated the recent flood to a very particular level. You are not prepared to give an undertaking to put that information—the data behind that—into the public realm?

The Hon. SHAYNE MALLARD: Point of order: It is the same point of order. Ms Abood made the point that she has to consult other agencies with other Ministers responsible, so she cannot give a commitment. She said she would take it on notice.

The CHAIR: I am asking the Minister.

The Hon. SHAYNE MALLARD: It is the same principle. He said Ms Abood—

The CHAIR: Every time I ask questions of Government Ministers about this, they refer me to Minister Ayres, so I am asking Minister Ayres now. I think that is quite reasonable. If he does not want to give that undertaking—I am just clarifying, you do not want to give that undertaking to make that information public today?

The Hon. WES FANG: You are not clarifying; you are trying to verbal the witness. The witness has taken the question on notice, as they are entitled to do.

The Hon. ADAM SEARLE: To the point of order: Minister Ayres is the responsible Minister. He can answer any way he likes but—

The Hon. WES FANG: And he already has.

The Hon. SHAYNE MALLARD: He already has.

The Hon. ADAM SEARLE: —members of the Committee are entitled to press, to at least a certain degree.

The Hon. SHAYNE MALLARD: To at least a certain degree, Adam.

The Hon. WES FANG: Yes, I will remember that ruling.

The CHAIR: For the benefit of all members, I would like to just give the Minister the ability to answer and then I will move on. I will not press any further.

Mr STUART AYRES: I do not have anything to add to my earlier answer.

The CHAIR: Okay. Minister, is the EIS and the business case going to Cabinet today?

Mr STUART AYRES: The EIS will be released publicly in the middle of the year, as we have stated numerous times in the past.

The CHAIR: Will the business case be released publicly?

CORRECTED

Mr STUART AYRES: The EIS will indicate an indicative pricing, as is the requirement under the publication of that EIS, so people will be able to see those costings.

The CHAIR: Yes. I am asking about the business case. Will the business case be made public?

Mr STUART AYRES: We will release business cases as we normally do under Infrastructure NSW guidelines, which would normally be a summary of that business case.

The CHAIR: When will that summary be made public?

Mr STUART AYRES: We are releasing the EIS out for public consultation. As I indicated, as part of that, there will be an indicative pricing associated with that. It is a requirement of the EIS.

The CHAIR: Yes, but we want to see the business case with alternatives. We have heard a lot of evidence today that the alternatives have not been adequately considered. The business case, we would assume, would consider those. Why can the public not see the business case that underpins the Government's decision-making?

Mr STUART AYRES: The options report around alternatives has been in the public domain for a long time now. It is available on the Infrastructure NSW website.

The CHAIR: We have had the insurance industry here today and other experts seriously question the adequacy of the assessment of the options. The business case will look at those options and make value judgements about different options, including the Government's preferred one. Why can the public not see the business case?

Mr STUART AYRES: We have assessed a wide range of options. We have been quite open about those options. They are presented in the options report on the Infrastructure NSW website. We have indicated which option performs best—that is the raising of the dam wall by 14 metres. That forms the basis of the EIS that the Government is taking forward.

The CHAIR: So you will not make the business case public?

Mr STUART AYRES: I have said time and time again the EIS will be made public and it has the indicative pricing associated with it.

The CHAIR: Minister, I am not talking about the EIS. I am talking about the business case. We have had this debate round and round about major government projects and eventually the upper House has been able to uncover business cases which have told quite a different story to the story that governments have told publicly about different projects. Why can't we just see the business case? You are the one saying it is the best option. Why can't we see the business case?

Mr STUART AYRES: This project has had assessment of multiple options. Those options are in the public domain right now. You can jump on the Infrastructure NSW website and you can download the options report. Everyone has that available to them.

The CHAIR: The Insurance Council have to some degree changed their position about this project. They would like the Government to look at other options more fully. They have reiterated that today and said that they would support a roundtable of various stakeholders and experts to come together and look at how the different options could work in a coordinated way to mitigate flood risk across the flood plain. We have heard that from other experts as well here today. Will you support a roundtable to bring together stakeholders and experts to more critically look at flood risk on the Hawkesbury-Nepean flood plain?

Mr STUART AYRES: I think this project and flood risk on the Hawkesbury-Nepean has been spoken about at length. I think the time now is for governments to make a determination around proceeding with this project. Part of that is ensuring that the public gets an opportunity to assess the environmental impacts of raising the dam wall against the downstream impacts on communities. We received, quite frankly, nature's warning in March about the severity of downstream impacts of flooding in this community. I think the time for talk is largely over. It is giving the public an opportunity to see those environmental impacts and weigh them up against what are scientifically backed understanding of flood impacts downstream on communities. You have heard that from—almost every speaker today has spoken about the areas that will be impacted by floods now and into the future, and climate change will continue to play an impact on that.

The CHAIR: Yes, but I think that those people here today would also like to see the raw data behind your analysis and also the business case too.

Mr STUART AYRES: I am very comfortable with what is in the public domain.

CORRECTED

The CHAIR: Minister, you say we heard nature's warning. It seems not all members of the Government heeded that warning. Minister Elliott, the Minister for Police and Emergency Services, said after the flood, "It means that we can"—this is raising the dam wall—"probably release more land in the north-west for construction and development." Wouldn't that be a highly risky thing to do on such a flood plain as the Hawkesbury-Nepean?

The Hon. TAYLOR MARTIN: He is also not the relevant Minister.

Mr STUART AYRES: I have been very clear about this. Raising the dam wall will not allow any new areas that currently are not permissible for development to be developed. In fact, the Department of Planning, particularly under the leadership of Minister Stokes, continually restricts the areas in which high-risk communities—to ensure we do not put more communities in harm's way of floods. What the raising of the Warragamba Dam wall will do is it will reduce the impact on those communities that are already living in low-lying areas. These are largely legacy issues of past governments that have allowed development in locations that we simply would not allow today. It is a complete falsehood to suggest that raising the Warragamba Dam wall will allow development in high-risk locations.

The CHAIR: But it is true, is it not, that even with a raised dam wall floods are inevitable in the Hawkesbury-Nepean flood plain? That would flood homes that are proposed to be developed on the flood plain.

Mr STUART AYRES: I do not agree with that statement at all. I cannot think of an area where we are proposing to develop below the one-in-100 flood level as it currently stands. Raising the Warragamba Dam wall will substantially reduce the impact of floods. Where there are locations above the one in 100, whilst there is a risk, councils are also provided—in fact even recently—with more latitude to make determinations about their own local flood modelling. So the idea that the Government or local government are going to continue to facilitate development in locations that will flood, I think is also an incorrect statement.

I think it is important to recognise—and in fact in Mr Draper's opening remarks he spoke about the diversity of the flood impact in March. In Wallacia it was considered a minor flood. In Penrith it was considered a moderate flood. In Windsor it was considered a major flood. There are locations right across the Hawkesbury-Nepean flood plain, as we like to use that terminology, that actually will not be subject to flooding unless you had a flood that was—well, in fact, will not be subject to flooding. I will just keep my evidence at that level. There is no reason why the Government should sterilise that land that provides a perfectly reasonable place—and a safe place—for development to take place.

The CHAIR: But you are not suggesting that the raising of the dam wall will mean that areas currently below the one-in-100-year event level will never be flooded again?

Mr STUART AYRES: No, I am saying that raising the dam wall will not allow for development to take place in those locations.

The Hon. ADAM SEARLE: Except that development is already proposed in some of those locations.

The CHAIR: That is right.

The Hon. ADAM SEARLE: It is not a question of allowing it. It is about development being already allowed and obviously if it actually happens then those new homes will be put at risk.

Mr STUART AYRES: We have a flood planning level of one in 100, the 1 per cent flood planning level. Raising the dam wall will not allow development in those locations.

The CHAIR: The question was do you accept that raising the dam wall does not remove the risk of flooding above the one-in-100-year level? That is the point.

Mr STUART AYRES: Nothing removes 100 per cent risk, but raising the Warragamba Dam wall will substantially reduce the number of floods that impact from below one in 100 to above one in 100 and will substantially reduce the impact of those floods. So the incidence of floods would be reduced and the size of those floods would be reduced.

The CHAIR: I do not think anyone is disputing that; they will dispute the degree. I was asking the question because we just had evidence and suggestions that with a highly risky flood plain like the Hawkesbury-Nepean we should have a different flood planning level such as perhaps the flood level set in the 1860s or we should have buyback regimes that at least look at houses above the one-in-100-year level. So it is about understanding that and being able to express that to the community because I think there is a concern that the discussion around the Warragamba Dam wall raising is that it reduces so significantly flood risk as to solve much of these problems. That was the reason for asking it. That was what the clarifying question was about.

CORRECTED

Mr STUART AYRES: I think it is very clear that raising the dam wall is one part of a multidimensional strategy for making the Hawkesbury-Nepean a more resilient community. It is not the only solution. In fact, planning controls are a critical part of that, increasing awareness around how floods function and flood evacuation routes—even signage around flood evacuation routes—and engaging with the community about what the long-term impacts are. In this recent flood event we have seen largely that this is the first flood that many adults have experienced in their entire adult life, so there are lots of things that we have to do to make this community a more flood-resilient community. Raising Warragamba Dam is by no means a single-bullet or a silver-bullet solution; it is just one of the most effective ways of reducing the incidence of flood in this community and the impact of floods in this community.

The Hon. ADAM SEARLE: Minister, just on that point, we have received evidence in this inquiry, including today, that when we have these floods, particularly big ones, the water comes from a number of different directions, so the mitigative capacity of raising the dam wall is actually quite small potentially or uncertain because the floods can come from other directions as well. So it seems like an awful lot of resources to commit to one of the solutions, which may not yield much benefit.

Mr STUART AYRES: It will yield substantial benefit—

The Hon. ADAM SEARLE: But we do not really know how much—

Mr STUART AYRES: Yes.

The Hon. ADAM SEARLE: —because you have not committed to releasing the data you just relied upon.

Mr STUART AYRES: Could I say this: The impacts of raising the dam wall will reduce literally the amount of water that is in these communities. It allows us to hold up to 1,000 billion litres of water behind the dam wall. If there are other tributaries impacting a flood in the Hawkesbury-Nepean—

The Hon. ADAM SEARLE: Which there usually are.

Mr STUART AYRES: —then holding that water behind the largest and single most important tributary to allow those smaller tributaries to have that water flow out to the ocean is the reason holding water behind Warragamba has such a substantial impact. In the most recent flood about 60 per cent of the water flows into the Windsor community or the lower Hawkesbury community came from the Warragamba tributary. That is consistent with most moderate to major floods that happen across this community. It is almost impossible to contemplate that not holding water behind the largest single tributary would not make a difference to flooding.

The Hon. PENNY SHARPE: Minister, there are around 134,000 residents and workers currently in the Hawkesbury-Nepean, and we know that by 2050 basically the plan is to double the number of people who are living on that flood plain. Can you clarify to the Committee how your zoning system will work so that there will not be new development in harm's way in relation to the one-in-100 and beyond?

Mr STUART AYRES: The figures that are often stated relate to the natural population increase that will happen across western Sydney. As I have said before, this is quite a complex flood plain. There are areas across this flood plain that will not be impacted by floodwater.

The Hon. PENNY SHARPE: Minister, so you are saying that something like the intergenerational report that came out today, which again reinforces the number of people who are coming to live in this area—that somehow the Hawkesbury-Nepean has a special context that means there will be this break on development across these areas because of the flood plain?

Mr STUART AYRES: No, I am saying very clearly that our planning system allows for us to make decisions and allows communities to make decisions that allow for the safe growth of those communities in areas that are not impacted by floods. However, there are communities across the Hawkesbury-Nepean that live below one-in-100 or are in communities that are impacted by flood evacuation routes. It is important that we create appropriate flood mitigation for those. Raising the dam wall does not allow development to happen in places that are not safe. No-one is proposing that. So any suggestion—

The Hon. PENNY SHARPE: You are using very specific wording here. There is already land that has been rezoned that is in the path of danger that will have new housing developed on it. Are you saying to us that is not going to occur?

Mr STUART AYRES: I am saying that raising the dam wall will not allow development in locations where it is currently not permissible.

CORRECTED

The Hon. PENNY SHARPE: I think that is a bit tricky. You are going to double the population in that valley, and you are saying that there will not be new housing and development in areas that are in danger in relation to the plain. Are you saying there will not be a new house built somewhere on the plain?

Mr STUART AYRES: No. To come back to the point, this is not about development across the entire Hawkesbury-Nepean area. This is about making sure we restrict development in those locations that are at high risk of being flood prone.

The Hon. PENNY SHARPE: Will the EIS be very clear in relation to those areas that will not be developed? Will there be a map of that?

Mr STUART AYRES: That information is already publicly available, so to use an example—

The Hon. PENNY SHARPE: No, I think it is not. Let us talk about Marsden Park North.

Mr STUART AYRES: Sorry, can I just—

The Hon. PENNY SHARPE: Let us talk about Marsden Park North.

The Hon. WES FANG: Point of order: The Minister is providing a very detailed answer. I ask that the Hon. Penny Sharpe allow him to finish it. It is quite interesting, and I would like to hear it.

The CHAIR: They were working together to narrow down an answer to a useful one. The Minister seems to be comfortable with that.

Mr STUART AYRES: My point here would be, using Penrith as an example, you are talking about—and the Chair has already used—the 1867 flood level. That exists at roughly Woodriff Street in Penrith. You are not possibly suggesting that everything east of Woodriff Street cannot be developed or cannot have greater density because you have created a flood level of one in 500.

The Hon. SHAYNE MALLARD: Knock down Panthers.

The Hon. ADAM SEARLE: No, I think what the Hon. Penny Sharpe was doing—

Mr STUART AYRES: If you decide to sterilise all of those—

The Hon. PENNY SHARPE: No, I am just trying to unpick your claim that no development will go on the plain. You are saying that anywhere in one-in-100 will not have anything built on it. I just do not think that is correct. That is not the current planning and it is not the current rezoning.

Mr WHITWORTH: Can I interject?

Mr STUART AYRES: Feel free, Mr Whitworth.

The Hon. PENNY SHARPE: Yes, Mr Whitworth, please.

Mr WHITWORTH: The ministerial direction—the flood-prone land planning package—that has recently been updated, planning law going back to the introduction of the Environmental Planning and Assessment Act 1979 and the first flood-prone land packages in the 1970s have all identified that there should not be development below the one-in-100 chance per year flood. That is a line that is used. Marsden Park, when it was rezoned, was rezoned with a control that said there shall be no development below the one-in-100 chance per year flood. Marsden Park North, West Schofields, when we exhibited those draft land release areas, had no development below the one-in-100 chance per year flood. It is a planning standard that is applied, and what we have recently done is recognise that there are places where there is an increased risk and that councils need the greater flexibility to be able to plan for that and come up with appropriate controls—it is not to say that there would be a prohibition but appropriate controls—to ensure that development and development-accompanying infrastructure is appropriate to the risk in that area.

The Hon. PENNY SHARPE: Yes, that is good because that gets on to my next point, which is about evacuation routes. Minister, how much money is being spent in relation to planning and development of evacuation routes, separate to the raising of the dam wall?

Mr STUART AYRES: Our funding package includes raising the dam wall. It also includes investigating flood evacuation routes. I would have to go—

The Hon. PENNY SHARPE: Just to be clear, there is not money specifically for that, separate to—I understand we are talking about the Warragamba Dam wall raising as that is your preferred option. Every expert and your own department say that evacuation routes are important. I am trying to get an idea of how much money is being spent on that. You are saying it is just money for investigation, not actually for doing.

CORRECTED

Mr STUART AYRES: To be clear, the work that we are doing now around Warragamba Dam wall is exactly the same thing. There is an appropriation of funds for construction of Warragamba Dam wall. As it currently stands, this is the proposal that we are taking forward. The work that Infrastructure NSW has done in conjunction with Transport for NSW and the Department of Planning, Industry and Environment has also investigated a number of flood evacuation route roads and impacts that need to be improved. We are leading that piece of work so that that can form future budget submissions for those upgrades to roads, which will be an important part of making this a more resilient valley. The one thing I would say at this point is that flood evacuation routes are good at evacuating people but they do not stop the flood, they do not stop water. It allows you to exit an area of risk but it plays no role in reducing the amount of water that flows into communities.

The Hon. SHAYNE MALLARD: So it is not either/or; it is a package of approaches.

The Hon. PENNY SHARPE: That is good.

The CHAIR: Just for the record, they were nodding "yes"—just for Hansard.

The Hon. PENNY SHARPE: Minister, there have been suggestions around changing the operation of the dam wall in relation to flood mitigation. Some of your ministerial colleagues have had very strong views about that. What is your view in relation to the need to change the rules around the way that Warragamba Dam operates?

The Hon. ADAM SEARLE: In particular its licensing.

Mr STUART AYRES: Warragamba's critical function is to provide Sydney's drinking water supply. I do not believe that we should put Sydney's drinking water supply at risk unnecessarily to provide flood mitigation when an option to raise the dam wall provides us with both solutions. We have an opportunity to sustain 100 per cent of Sydney's drinking water supply—that is an incredibly valuable asset to us—but also build in flood mitigation capability. I have no doubt that over time we will continue to augment the water supply that comes into the Sydney Basin. I cannot see under any circumstances where another dam could be built in Sydney, so clearly we have to augment Sydney's drinking water supply. That will be a combination of expansion of desalination offerings. It will also include bulk recycled water. These will continue to be a key part of the Greater Sydney metropolitan water strategy, but it should not come at the expense of the existing drinking water supply that we currently have available. That is a huge price for, quite frankly, the taxpayer to pay to forego that asset.

The Hon. PENNY SHARPE: Just to be clear, you basically do not support the use of Warragamba Dam and changing the rules under which that operates and the licensing arrangements to provide flood mitigation in some circumstances?

Mr STUART AYRES: You would need to reduce the storage of the water supply dramatically. You would need to reduce it by 40 per cent to have a—

The Hon. PENNY SHARPE: I understand what I am asking. I am just trying to get clarity. This has been a serious discussion and your colleagues Mr Barilaro and others have had a view about this.

The Hon. SHAYNE MALLARD: It is your policy. It is Labor policy.

Mr STUART AYRES: Perhaps I might explain it this way then. When we entered the flooding period of 2020, we entered that period of time with a drinking water supply at around the low 40s per cent—about 42 per cent, 43 per cent. Had we started that cycle at 60 per cent, there would have been no drinking water available in Sydney. That is not an acceptable position to me and it is definitely not an acceptable position to the people of Sydney, that you would put all of our drinking water supply at risk.

The Hon. PENNY SHARPE: I hope you have communicated that to the Deputy Premier.

Mr STUART AYRES: What is also very clear is that there were no augmentation options available to be delivered in that period of time.

The Hon. PENNY SHARPE: Minister, do you have support for this project from your Cabinet colleagues?

Mr STUART AYRES: This is a project that is subject to all of the standard approvals of government. We have an EIS process to go through. It will be subject to a funding allocation of government. That will take place after we have completed our EIS. I have absolutely no doubt that this is the right project to deliver and it is a project that will go through the standard approval practices, both with the public and internal of government.

The Hon. PENNY SHARPE: Just to be clear, in terms of the release of the EIS, that is going to have to go through Cabinet?

CORRECTED

Mr STUART AYRES: The release of the EIS will be something that the Government will approve. It is a standard practice for us before we release major projects for public consultation.

The CHAIR: Can I just clarify, the response that you gave was quite specifically different to Ms Sharpe's question.

The Hon. PENNY SHARPE: That has been a theme today.

The CHAIR: You have said before that the EIS will be approved by Cabinet before it will go on public exhibition. I think you have said that explicitly before. Is that still the case?

Mr STUART AYRES: No. We will go through a standard practice before we release documents into the public domain. Cabinet will approve the release of those documents. Cabinet does not approve the EIS.

The CHAIR: I am not saying they approve the EIS.

The Hon. PENNY SHARPE: Yes, we understand that.

The CHAIR: They approve it being put on public exhibition.

Mr STUART AYRES: That is correct, because it is a document that is there to guide a discussion and allow the community to understand the environmental impacts of this particular piece of infrastructure.

The Hon. PENNY SHARPE: Mr Draper, what is the current cost estimate of this project?

Mr DRAPER: The last public costs we had was the one that was released in the strategic business case in 2015.

The Hon. PENNY SHARPE: Which is why I am asking.

Mr DRAPER: Yes. It was \$690 million, I think it was, back then in 2015 dollars. We have not released an updated cost estimate yet but that will be, as the Minister has already foreshadowed, part of the process of releasing the EIS. As he said, our standard practice is to release a summary of the business case and to put that on our website.

The Hon. PENNY SHARPE: Just to be clear, that summary business case will happen at the same time as the EIS is released? Is that the expectation?

Mr DRAPER: No. We usually publish it within, I think, 90 days of it being approved, something of that—

The Hon. PENNY SHARPE: The EIS being approved—

Mr DRAPER: No, not the EIS.

The Hon. PENNY SHARPE: The project being approved? So we get the business case at the end, just to be clear?

Mr DRAPER: It is not linked to the EIS; it is linked to the approval of the business case. A lot of the information that is in the business case is also part of the EIS process.

The Hon. PENNY SHARPE: Sorry, I am confused now.

The CHAIR: Are you saying it would be released within 90 days of the project being approved or of the business case being approved by Cabinet?

Mr DRAPER: To be clear, our process for publishing business cases, this is not specific to the Warragamba or any others—

The Hon. PENNY SHARPE: No, it is a standard.

Mr DRAPER: —is that we publish the business case within 90 days of the business case itself being approved by government.

The Hon. PENNY SHARPE: And that is by Cabinet?

Mr DRAPER: Yes. It is a Cabinet process, that is correct.

The Hon. PENNY SHARPE: Minister, would you expect that the EIS and the business case would be put forward to Cabinet at the same time?

Mr STUART AYRES: No, I do not because the EIS will guide the final proposal that goes to government. Almost certainly off the back of that EIS there will be alterations or minor adjustments to the proposal

CORRECTED

to reflect the changes that come from engaging the public. That will be reflected in the business case, which will be used to guide the final investment decision of government. That is one of the reasons why the business case gets released, after government makes a decision to invest.

The CHAIR: Hang on, does that not mean that you will not be able to make a judgement call on the final business case until you know what conditions of consent might be determined by the planning system so that we will not actually see the business case until after the approval of the EIS or the project is done? Is that what you are saying?

Mr STUART AYRES: It is a standard practice. We are continuing with what we do all the time.

The CHAIR: This goes back to my initial question. We will not see the business case until after the project is approved or decided upon, essentially.

Mr STUART AYRES: I think the biggest concern here is for—you want to utilise the business case to undermine the assumptions that are built into this project, which have been clearly articulated through—

The CHAIR: I do not want to undermine it. I want to see the basis of you thinking it is the best idea. That is all. I think the public wants to see that too.

Mr STUART AYRES: Indeed, and those options—

The CHAIR: I do not want to belabour that point. I think we are pretty clear now: We are not going to see the business case.

Mr STUART AYRES: Yes, and those options continue to be in the public domain.

The CHAIR: I am happy to hand over to the Government.

The Hon. TAYLOR MARTIN: Well, why don't we hear from the Minister?

Mr STUART AYRES: No, it is alright.

The Hon. PENNY SHARPE: The cost was \$690 million in 2015. Obviously there have been figures thrown around publicly that were upwards of \$1.2 billion. Are you able to comment on that?

Mr DRAPER: Not in numerical terms. I am happy to say it is very clear that a number that is released in 2015 in 2015 dollars and we are in 2021, and the construction period, should it proceed, will be more like between 2022-23 over several years. There is a lot of escalation that would occur in that. That is clearly the case. But certainly it is going to be a higher number than \$690 million.

The Hon. PENNY SHARPE: Just to be clear, the \$690 million did not take into account things like any offsets that would be required for the project either?

Mr DRAPER: I believe that is correct. I do not think it included any—is that correct?

Ms ABOOD: Yes, that is correct.

Mr DRAPER: That is correct, yes.

The Hon. PENNY SHARPE: Again, there are escalation costs plus there is the offsetting that is required, if that was decided to go ahead. That has been suggested I think at about \$900 million the last I saw.

Mr DRAPER: I am not going to speculate on that. Both the costs of the project and the estimates of benefits of the project have had to be recalculated and both of those have gone up.

The Hon. PENNY SHARPE: There have been significant concerns raised about Aboriginal cultural heritage in relation to this project. The Committee has been down with the Gundungurra people looking at the importance of the songlines and we have raised concerns with the Insurance Council and others. How do you believe the Government can deal with these matters given they are fairly intractable and inundation would seriously damage the few very significant parts—the songlines of the Gundungurra people.

Mr STUART AYRES: There is no doubt that there is a difficult choice that is before Government and the people of New South Wales. What we know about this community is that it is a high-risk community. We know that there are 5,000 homes that are below the one-in-100 flood level. The cost of buying out those homes far exceeds \$4.5 billion. That is before we even contemplate what the social cost and dislocation cost is. There will be an environmental impact for raising the dam wall, but I think it is important to recognise that environmental impact primarily only takes place—in fact, I will say only takes place—when we are preventing a flood. Unlike a road or a school or a rail line, where a biodiversity offset is paid for at the completion of the infrastructure because that project has removed that biodiversity, this project will not do that. At the completion of the dam wall

CORRECTED

there will be no impact behind the existing dam wall and there will be no higher water storage, so there will be no biodiversity impact until a flood arrives. This is why we say that the nature of these biodiversity impacts are infrequent and so they should be valued as such. I often think—

The Hon. PENNY SHARPE: Sorry, can I just stop you there, Minister? I hear what you are saying, but isn't the point that once these are destroyed, they are destroyed at the time? So no biodiversity offsets need to be factored in until they are destroyed and then we will pay for the offsets, is that what you are suggesting?

Mr STUART AYRES: Biodiversity offsets, by their nature, happen exactly that way. If you build a road and you take away a biodiversity impact, you offset that at the completion of the infrastructure project. So if there was a biodiversity cost associated with this beyond the actual physical infrastructure site where there may be some impacts on some environment, primarily what people—

The Hon. PENNY SHARPE: Endangered species being one of them.

Mr STUART AYRES: I am talking about the physical—

The Hon. PENNY SHARPE: Regent honeyeaters.

Mr STUART AYRES: The physical built asset—

The Hon. TAYLOR MARTIN: They do not live on the dam wall. The Minister is talking about the dam wall.

Mr STUART AYRES: I am talking about the dam wall.

The Hon. PENNY SHARPE: They live where they are going to be inundated and there are only 400 left.

Mr STUART AYRES: The only time that there is a biodiversity impact is when you are stopping that water from being in people's living rooms, in their local communities and in their local businesses. There is no doubt there is a trade-off here. We have to determine whether the infrequent flooding behind the dam wall is worth paying the price of making sure that we keep thousands of people protected from floodwaters downstream. There is no doubt that there is a trade-off in doing that, but we have assessed all of the alternatives that we think could provide flood mitigation options and this is the best option. That is not to say that it will not have an environmental impact. That is why releasing the environmental impact statement in a transparent way that allows everyone to see those impacts gives them the opportunity to weigh up those infrequent impacts behind the dam wall against the very high cost but also infrequent impacts downstream.

The Hon. PENNY SHARPE: You include the cultural heritage within that.

Mr STUART AYRES: Yes, that is correct.

The Hon. SHAYNE MALLARD: Thank you, Minister, for coming in today and for the presentation. I want to move away from business cases and talk about impacts upon individuals and families and people. The images you showed us are the impacts for Penrith—you are the member for Penrith and, as everyone knows, I was born and raised in Penrith and had a property at Emu Plains and Castlereagh. I am conscious of the fact that we always had in the back of our minds this notion that there could be a flood. The Victoria Bridge there—I have not seen it that high in my life that I can remember.

Mr STUART AYRES: It is the highest I have seen it too.

The Hon. SHAYNE MALLARD: Yes, and it looks like it is about to top the bank at River Road to go onto the properties in Emu Plains.

Mr STUART AYRES: Some areas of River Road did have water across them and there were some minor impacts.

The Hon. SHAYNE MALLARD: I heard it was moderate, but if it had been backed up it would have gone over the banks. Between I think you said Woodriff Street back to the river there is the Panthers, a big retirement village and a private hospital down there on the riverbank. I want you to reflect as the local member on the anxiety that the community must have been feeling during that flooding.

Mr STUART AYRES: Yes. This is where every metre counts. For someone who sits in this Committee or says in the public domain that raising Warragamba Dam wall only saves one metre or in this case 3.5 metres, which we saw in Windsor—if you are a person standing on your front doorstep, the difference between one metre and no saving is the difference between the water being at your waist or the water being above your head. That is the difference between life and death. If you are talking about 3.5 meters in some locations, that is the difference between water kicking at your doormat or water flowing over the top of your roof. That is also the

CORRECTED

difference between life and death. For people that live in this community, they understand that exposure and they know more so now than they probably have in the last 30 years because the impacts of the way our climate functions in this particular part of the world is we go through long periods of drought followed by long periods of floods. We have seen that consistently over the last 200 years of record keeping.

In many respects, I think it is important to recognise the impact of climate change here. Climate change is a two-sided coin. When climate change is impacting in the drought period, the drought is more intense. There is less water in the dam and drinking water security is under duress. On the other side of that coin, you have more intense rains and more intense floods. The impact of climate change does not just impact the drought; it impacts the flood as well. People know that and they can see that. After what we saw in March, many of those communities—if you were under the age of 50 you had never experienced a flood as an adult, never had to make a decision about your family, never had to have the discussion about where you went on a flood evacuation route and never had to work out when the bridge was going to be cut. You now have that lived experience. Ultimately, I would like to see our communities be as aware about flood risk as what they are about bushfire risk.

The Hon. SHAYNE MALLARD: I agree with that. I made that point earlier to the SES. I am asking this question but I do not know the answer. Were there evacuation orders put in place for the low-lying areas of Penrith?

Mr STUART AYRES: There were some evacuation orders in and around Regentville and the lower areas there, but most of the flood evacuation orders took place in the northern part of the Penrith LGA through the Rickabys Creek area of Londonderry where the water flows back down through the Hawkesbury. But most flood evacuation orders took place in the low-lying areas of the Hawkesbury.

The Hon. SHAYNE MALLARD: Mr Draper's presentation, which I found quite informative—we have heard since the beginning of this inquiry about the bathtub effect of the Hawkesbury-Nepean Valley. The water cannot get out as fast as it flows in. So if the water had flowed in faster from Warragamba Dam and it backed up, it would have topped the banks in Penrith and become a major flood issue. There are photos of High Street, Penrith, being flooded, I think, in the sixties.

Mr STUART AYRES: Yes. I think the important point here is that we got a warning. We got a one-in-20 flood without any flood mitigation capacity at the dam. I mentioned earlier 1,000 billion litres of water makes a difference. If you are able to hold that 1,000 billion litres of water back behind the dam, that is a longer period of time for people in low-lying areas to cross bridges and evacuate. That is also areas that will not be flooded because you are holding the water back. So those other tributaries that would fill parts of the flood plain forward of the dam, that provides more time for the water to make its way through the narrows—particularly the areas around Sackville—and allow the water to make its way out to the ocean.

Time is what is absolutely critical here. There are always going to be areas that will be impacted by flood. Even raising the dam wall you will still see areas where we cannot stop a flood. What we have to do is decide across the range of options that we have at our disposal what is the best option for the social and economic benefit of western Sydney, bearing in mind that when you make that decision there will be an environmental impact. This is really, in many respects, about making the least worst decision. We know that this area is a high flood risk area. We know there are large amounts of legacy planning issues. The cost and dislocation of, quite frankly, destroying communities versus making an investment and making them more aware of their risk is a much more prudent and better course of action.

The Hon. SHAYNE MALLARD: My second line of questions is that we heard from the Insurance Council earlier today—they have taken it on notice, I acknowledge that, because they could not give us the exact information. Approximately, insurance in the flood plain catchment is about five times the Australian mean average for insurance. Was it 13 per cent they said? They were going to come back to us.

The Hon. PENNY SHARPE: That is statewide.

The Hon. SHAYNE MALLARD: Yes, 13 per cent statewide are not insured.

The Hon. PENNY SHARPE: Underinsured.

The Hon. SHAYNE MALLARD: Underinsured. They are coming back to us about people who do not take insurance. They are not certain on that figure. People are opting out of flood insurance because some companies are offering that option to get their price down. My question is more of a broader government economic question because I know the issue is the same in the Blue Mountains with the bushfires and all around the State—underinsurance or no insurance. Is it a concern to the Government that there might be underinsurance or lack of insurance for households and businesses in the flood catchment?

CORRECTED

Mr STUART AYRES: I have got no doubt that there are people who just simply cannot afford insurance, particularly in low-lying areas. Often you will find people from lower sociodemographic communities who are living in those locations. They are making a conscious choice about where they allocate their precious household dollars and they are taking a risk. The more we can reduce that the better. The one thing that I can say with absolute confidence is that if you do not reduce the incidence and impact of flood in the Hawkesbury-Nepean, the only thing that can happen to insurance premiums is they can go up.

The Hon. TAYLOR MARTIN: Minister, I will stay on the topic of insurance and ask for your response to the Insurance Council's additional submission or correspondence, rather, to the inquiry effectively backpedalling on their earlier support for the raising of the Warragamba Dam wall.

Mr STUART AYRES: I think that the Insurance Council and the insurance owners and operators across the market want to see the EIS. I think that is a fair point for them to want to look at that. I know lots of local governments are waiting to see the EIS so that they can weigh up those environmental impacts against the downstream benefits, whether they be for insurance premiums or risk. That EIS will provide a clear understanding around what the environmental impact will be. There is no doubt that when you are holding that 1,000 billion litres of water behind the dam wall so it is not in people's living rooms, it will have an environmental impact. We just have to make a decision of where we are prepared to make the trade-off.

The Hon. TAYLOR MARTIN: Could I ask what your view is of the buyback proposal that has been floated in these hearings?

Mr STUART AYRES: I mentioned earlier that the cost to buy back 5,000 homes in western Sydney would be well in excess of \$4.5 billion. That figure far exceeds any cost of raising the dam, so I think financially it is immediately at a disadvantage. The second point I would say is even beyond the consideration of that hard cost of literally buying a home—just some basic economics—you would obviously put a large amount of upward pressure on housing prices because you have removed 5,000 homes out of supply in a particular location. So that would make it incredibly difficult for those people to be able to buy back and stay in their community. That is just an economic fact. The second point I would make here is that the dislocation and the social impacts of removing so many people—and these are 5,000 homes, so let us conservatively call it 10,000 people. To remove 10,000 people from their castle, I just do not think that is an acceptable position for government. There is no doubt that there is a risk there, which is why we are looking—we have considered the option of buying back, but we do not think that it performs anywhere near as well as raising the dam wall.

The Hon. SHAYNE MALLARD: Earlier on we heard the Yangtze River used as an example in terms of the Chinese Government moving communities. In all seriousness, with 5,000 homes, and up to 12,000 if we went up to the 100-year flood level, you cannot buy them back overnight and move the whole community. I am putting this to you and you can comment: It still would not change the risk. It would have to happen over 10 years, 20 years.

Mr STUART AYRES: I am not using Communist China as a benchmark for the performance of the New South Wales Government for starters. Secondly, that is correct—

The Hon. SHAYNE MALLARD: I agree.

The Hon. PENNY SHARPE: To be fair, I do not think that the people giving evidence were doing that either.

The CHAIR: They also gave as examples in Europe—the Netherlands, specifically—and the US.

The Hon. SHAYNE MALLARD: Let the Minister answer the question.

Mr STUART AYRES: I think the issue here is about what is the best option for government. We know there are communities that are in higher risk locations. Investing in an appropriate level of flood mitigation to hold large volumes of water behind the dam in association with better planning controls, improved flood evacuation routes, greater knowledge of how floods impact the community and awareness amongst the community is a multidimensional suite of making this a more resilient flood valley and a more resilient community. That is what we are proposing to do. We are not saying you do one thing over another; you have got to do lots of things to make this community a safer place to live.

The Hon. TAYLOR MARTIN: Minister, I just want to jump back a bit. I was quite intrigued by your answer around the biodiversity offset. Do we require the RFS or National Parks and Wildlife Service to factor in a biodiversity offset when they, for instance, conduct a hazard reduction burn?

Mr STUART AYRES: I am not aware, but I think it is a perfectly reasonable analogy to make here that we—

CORRECTED

The Hon. PENNY SHARPE: No, it is not. Nice try, Taylor.

The Hon. TAYLOR MARTIN: Well, it is about—

The CHAIR: What are you talking about?

The Hon. PENNY SHARPE: He is just trying to be a bit silly.

Mr STUART AYRES: I just want to make this point. We spoke about floods and droughts earlier. The high present emergency impact that exists during drought is bushfire. We do not charge a biodiversity offset when we do hazard reduction in World Heritage locations like Blue Mountains National Park. Why is temporary inundation by water any different?

The Hon. PENNY SHARPE: This is a new argument against biodiversity offsets. I love it.

The CHAIR: You have got to wonder what happens at these right-wing Liberal party dinners. They come up with these great ideas.

The Hon. SHAYNE MALLARD: Point of order: The question was legitimate. The Minister was just giving an answer.

The CHAIR: You were the one talking about Communist China over there, Shayne. We will keep going.

Mr STUART AYRES: I would make the point, though, that I think it feeds this issue about not having knowledge of how floods impact communities. If you lived in western Sydney or the Blue Mountains or the South Coast of New South Wales or any location that has seen significant bushfire impacts since pretty much the last flood period ended in 1990, we then entered a period of about 30 years of substantial, effectively, drought which meant bushfire became the dominant factor. People are well aware of bushfire planning. They create bushfire survival plans. They have discussions around their table at home. They know what they would do. They know how they would react. We invest substantially in reducing and mitigating the impact of those bushfires by conducting hazard reduction burns. The same process exists for flooding. The principle of holding water back and creating inundation from a regular and temporary basis behind the dam wall is doing exactly the same as what a hazard reduction burn does for the RFS. Why would we treat the hazard reduction burn and the holding of water back temporarily any differently when it comes to biodiversity impact? I do not understand why we would do that.

The CHAIR: Minister, you keep saying a thousand billion. That is a huge number; it sounds like a lot of water. We know though that about 450 gigs a day—that is 450 billion litres—were going over the dam wall, I think, at its peak. The reality is that in two and a bit days the capacity would have been taken up. We know that the event in March was much smaller than we have seen possible in those valleys. The reality is that even with the dam wall raised, it could be overtopped relatively quickly and then there is a substantial amount of water still coming downstream. I am just checking that you understand that, firstly.

Mr STUART AYRES: Yes, I understand that. I also know that the river system that already has water in it still continues to flow. So every day that you hold that water back, that means the peak of the flood must be lower.

The CHAIR: Good. Excellent. We understand that. Have the operational rules for how the dam, if raised, will be actually operated been decided yet? Will that be in the EIS?

Mr STUART AYRES: No. The operational arrangements for a raised dam would be developed by WaterNSW.

The CHAIR: How are you going to release a thousand billion litres of water—and you have said before it will be released within a two-week period, unless that has changed and you can update us if it has changed. How are you going to release a thousand billion litres of water over two weeks without having substantial ongoing downstream impacts? How can you possibly make assessments about the benefits or the costs, upstream and downstream, for this project without those operational rules being decided?

Ms ABOOD: As part of the ongoing, I guess, detailed concept design for the raised dam, there are some rules associated with how the dam might operate, but it is a continuous improvement. It is an optimisation process. There are assumptions underpinning the release of water. I might hand over to Mark Babister. He will explain.

Mr BABISTER: Under the current draft rules that we are working with, what would happen is—and this is a tricky event because it was double peaked, so it would depend on the call the operators made—basically you would be discharging for about 11½ days, and depending on which call I made because of the double peak, you would either have two to three days where the Windsor Bridge was shut, potentially, or just lapping at the bottom of the bridge and then it would be open for the remainder of that period, or it would be just under the

CORRECTED

bridge for that whole 11½ days. It was on the trigger of those two things. That would allow a lot of people to get back to their life and start their clean-up, but lots of farms and other places would be inundated for a substantial period.

The CHAIR: Is that presuming that no water is coming down other tributaries at the time?

Mr BABISTER: That is accounting for all the tributary flows. You would start pretty late when the tributary flows had nearly finished.

The CHAIR: So the intention still is that within 14 days the full 14-metre additional capacity will be emptied?

Mr BABISTER: Yes.

The CHAIR: That is assuming no more rainfall events to the east coast lows come back to back like it happened in Brisbane.

Mr BABISTER: Yes. That is why you empty it in 14 days because we have no history of east coast lows that produce floods turning up in the same location within two weeks.

The CHAIR: But those specific rules will not be in the EIS?

Ms ABOOD: Not explicitly, no.

The CHAIR: No. So it is still quite difficult to make assumptions about how the upstream impact in particular will be dealt with?

Mr DRAPER: I think this relates to my opening statement to you, Chair. Two days of holding water behind a dam wall is two days extra for people to evacuate. That is not a small amount.

The CHAIR: No, Mr Draper.

Mr DRAPER: If you are packing up your home and trying to get your family out, that is a lot of time.

The CHAIR: No-one one was suggesting that.

Mr DRAPER: Good, thank you.

The CHAIR: But I would also just say, even in your own submission to this inquiry you highlight flood models where there is almost no benefit in terms of delay nor reduction in peak under certain scenarios in your own EIS. The Minister always talks about reducing by three metres and delaying by a certain number of hours, but you know there are models of flood flows that do not deliver that benefit at all. You go to the best case and I am saying that that is not always the case.

Mr STUART AYRES: Mr Field, the type of flood event that you are talking about is the rarest of rare events. What we know from this year is that the one-in-20 event has a 5 per cent chance of happening every year. The event that you are talking about is something that might operate in a 0.002 per cent chance each year. So, yes, there is always going to be a point in time when the theoretical level of water is going to require us to keep releasing water. But that does not exclude the substantial benefit that exists for the absolute majority of flood events that people would experience in their life.

The CHAIR: And that is exactly what this conversation is about, Minister. Because the evidence that we have heard today from other witnesses is: We should be thinking about those most extreme because of the really significant consequences they have on the communities that live there and making sure evacuation routes, planning controls, dam configurations and the like, including the water—

Mr STUART AYRES: But that is exactly what we are doing.

The CHAIR: Well, that is what they disagree you are doing—that is the point. That is why we are asking these questions. To that point, Ms Abood—this is one for you—I note that Penrith council has raised concerns about the failure to deal with the Castlereagh Connection and you wrote to them on 26 May 2020. I would seek to table both the letter from the Penrith council and your response to them. You say, "I understand that, while a significant flood has high impact, given its low probability it is difficult to justify the economic benefit when compared with the high cost of building the Castlereagh Connection." I will pass it on to be tabled. My point is that I think the community is a bit confused about what exactly is being prioritised here other than the dam wall raising, which will not actually fix the problem in the worst circumstances. But things like that still need to be done to do that.

Mr STUART AYRES: Sorry, I am just going to take this. The Castlereagh Connection is an important road that would have substantial flood evacuation benefits. However, it does not matter how well the Castlereagh

CORRECTED

Connection road performs evacuating people from a flood if you have made no effort to reduce the size of the flood to begin with. I am a strong supporter of governments, both here in New South Wales and the Commonwealth, investing in a project like the Castlereagh Connection because it improves the flood resilience of the community. But we should not just focus on one thing over the other. You need to be able to do things like the Castlereagh Connection as well as raise Warragamba Dam wall so that everyone benefits from it.

The CHAIR: But that is what the community sees you doing: prioritising the dam wall raising over the other things that can be done. That is the sense that is out there.

Mr STUART AYRES: That is because the dam wall will reduce the amount of water in a community and a road will not.

The CHAIR: Except in those extreme events, which is exactly the challenge that we are having here.

Mr STUART AYRES: And you consistently ignore, over and over again, the flood events that happen between the 5 per cent chance each year—let's use this year as an example—and the 0.002 per cent chance each year. You should not ignore that.

The CHAIR: I do not ignore those—

Mr STUART AYRES: These are real people and they're real homes—

The CHAIR: —but I do not pretend the others do not exist. That is the point.

Mr STUART AYRES: —and real lives. The Government cannot sit here, knowing full well what that risk is, and listen to people lecture them about why their home and their life is not as important as something that is sitting behind the dam wall. They deserve—

The CHAIR: But how often do those events happen? One in every five years?

Mr STUART AYRES: —to be able to make that assessment themselves.

The CHAIR: Minister, would you agree then, given this most recent event, which was a one-in-five-year event—

Mr STUART AYRES: Someone has to be the advocate for western Sydney in this argument.

The CHAIR: Do you agree then that in this event, which was a relatively common event—

Mr STUART AYRES: One in 20; a 5 per cent chance each year.

The CHAIR: Five per cent chance. But it will have filled up that dam wall capacity, that additional capacity, within two days. So those upstream impacts are actually not so rare at all, are they? That is the point. They are not so rare at all. You made out that they are unlikely.

Mr STUART AYRES: Sorry, a 5 per cent chance each year is still a relatively rare event. But we should be reducing the impacts. We just heard—

The CHAIR: The point is you cannot have it both ways, Minister. You cannot claim it is so rare upstream but it provides all these ongoing regular downstream benefits. That is the challenge here.

Mr STUART AYRES: No. You just heard the evidence that indicated that in this flood event you would have been able to keep Windsor Bridge open for 11 days longer than what we were able to do in this circumstance. I stood on that bridge. I spoke to the people who looked across the river at their completely inundated property. I think if we were able to provide either evacuation opportunities or the chance for them to get back and start repairing their homes, they would appreciate it. Someone has got to be the advocate for western Sydney.

The Hon. PENNY SHARPE: Minister, I want to come back to the flood mitigation aspect of your evidence today. You suggested that you do not support flood mitigation at all. There have been documents provided to this Committee—

Mr STUART AYRES: I think I am the most passionate advocate for flood mitigation.

The Hon. PENNY SHARPE: Sorry—it has been a long day—changing the rules of the way in which Warragamba Dam wall operates to use flood mitigation to drop the levels. This Committee has been provided with documents today that suggest that the Government was provided with information in 2014 and 2017 that has this option as a much cheaper option. As I said, some of your ministerial colleagues have put that. Do you just want to tell the Committee today about why you have rejected that?

Mr STUART AYRES: Yes. So, to be clear, it is not a cheaper option. If you are—

CORRECTED

The Hon. PENNY SHARPE: It said it was. What has changed? Why is it not?

Mr STUART AYRES: It is not a cheaper option. If you raise the dam wall, it has a price associated with it. If you reduce the amount of water in the dam, there is still a price associated with that. That price is augmenting the Sydney drinking water supply with a lot of infrastructure, whether that be by way of extra desalination plants, you can contemplate recycled water—

The Hon. PENNY SHARPE: Minister, has that been costed and is that something you have thought about?

Mr STUART AYRES: Yes. This is in the options report.

The Hon. PENNY SHARPE: Some of it is.

Mr STUART AYRES: We have said this time and time again. This is why the raising of the dam wall performs better. If you reduce the amount of water in the dam, you are flushing two years of Sydney's drinking water supply. The value of that asset is flushed down. That is a lost asset to the people of New South Wales. It does not come for free. There is a cost associated with that, and there is a cost associated with finding ways to make that water somewhere else because you are no longer storing it in Warragamba Dam. It is a complete falsehood to suggest that you can reduce the amount of water in Warragamba Dam and not augment the supply of water. If you believe that, you are living in fairyland.

The Hon. PENNY SHARPE: Sorry, no-one here has suggested that. I am asking you about the use of that. Your colleagues have advocated very loudly in relation to that.

Mr STUART AYRES: If you wish to augment the supply of water, then the cost of that augmentation must be weighed up against the price of the dam wall. There is not a zero-cost and a high-cost. I know that might suit a political narrative but it is just not true.

The Hon. PENNY SHARPE: No. I am talking about advice that has been provided in terms of managing flood risk. That is what I am talking about. I accept that you have chosen a different option. I accept that. I am just trying to get you to explain that.

Mr STUART AYRES: My point is that if you create airspace—both solutions are about trying to create airspace. One solution is about increasing the height of the wall so that Sydney can maintain 100 per cent of its drinking water supply and have 14 metres of airspace. The alternative option is to flush Sydney's drinking water supply down the river so it is gone forever and create airspace. I am choosing the option that says we can have flood mitigation and water security too.

The Hon. PENNY SHARPE: And you do not see any point where you would have to do it. You are just happy to let it overspill and deal with it then rather than to try to do releases.

Mr STUART AYRES: If you release water into an already flooded catchment, you are increasing the height of the flood.

The Hon. PENNY SHARPE: Correct.

Mr STUART AYRES: Yes. But if you prerelease water—and we gave this evidence earlier that if you waited for the period of time, because you would make this decision based on weather forecasts, if you made a prerelease of water, you would have lowered the level of water by 10 centimetres. The only alternative you could have is to take the amount of water releases for months in advance, trying to accurately predict when this weather event took place, and then do away with 40 per cent of Sydney's drinking water supply on a weather forecast that you would be able to refill it. That is an incredibly brave member of Parliament who is prepared to put two years or 40 per cent of Sydney's drinking water supply at risk because of a prerelease.

The Hon. PENNY SHARPE: I hope you tell the Deputy Premier that when you go to Cabinet.

The CHAIR: That is how they manage most western rivers actually.

The Hon. WES FANG: Minister, I just wanted to give you the opportunity to outline how an extra 48 hours might be of benefit to those in western Sydney who do need to evacuate in the event of a one-in-20-year flood?

Mr STUART AYRES: It does not really matter what the size of flood is; time is everything. Our modelling around flooding is actually quite accurate. What we saw around our one-in 20-year flood event this year is that, based on where the rain fell, we could accurately model where the water was going to go. That is why you saw the SES providing quite timely flood notifications and evacuation warnings followed by evacuation orders, because we are able to quite accurately predict where the water is flowing. If you know that water flowing

CORRECTED

through a particular tributary is going to lead to an area where people's lives might be put at risk, then the earlier you can provide that warning, the longer the roads stay open and more people are able to evacuate to a safe location. In some cases, hours are hugely beneficial. If you could extend that to two days—just think about standard Sydney traffic. If you have got two days to disperse people out of populated locations the traffic is going to be substantially less than if everyone is trying to leave at one particular time.

The CHAIR: Minister, before we go, I have to ask, did you have to do an inquiry rehearsal before you came today?

Mr STUART AYRES: No, I do not think I had to do an inquiry rehearsal.

The CHAIR: You did not? Ms Abood, did you hold any inquiry rehearsals for your team?

Ms ABOOD: We always just prepare.

The CHAIR: I am just wondering who played me in the rehearsals. Anyone?

The Hon. WES FANG: Are you serious?

Ms ABOOD: No, we do not have rehearsals. It is preparation for any meeting.

The CHAIR: Maybe it is just the planning team.

The Hon. WES FANG: I want to know who played me.

Mr STUART AYRES: I hear Chris Hemsworth is in town, maybe you would have been happy with that.

The CHAIR: Maybe. I wonder who played you, Minister. Thank you everyone for your attendance today. I am not sure that any questions were taken on notice but there might be some put forward. If you get those back within 21 days that would be great.

(The witnesses withdrew.)

The Committee adjourned at 13:47.