

## Questions from Adapting to sea-level rise webinar – Teddington and Charteris Bay 15 November 2023

### **What about property owners who have affected land but no houses?**

Establishing a system for compensating private property owners who need to retreat from hazards is a central government responsibility. The previous government launched a Select Committee Inquiry into Community-led Retreat which closed on 1 November 2023. They were seeking feedback about how to manage retreats, who should pay, and how much should be paid to compensate private property owners for retreating from at-risk areas. The Council put forward a submission to seek urgent clarity on these matters because we know private property owners are increasingly concerned about risks to their assets. When the government established its inquiry, it published a report from an Expert Working Group which proposed a compensation approach for owner-occupiers, with less generous but similar arrangements for owners of rental or commercial properties however there was no clear proposal for compensation for people with land, but no property. These proposals were just ideas that were floated by the working group to the last government so we're not suggesting this is what will happen in the future, but this is the only advice we have to answer that question at the moment.

### **Has the information the Council has sent property owners on the risks Council is aware of been updated on those properties LIMS?**

No, we already updated LIMS at the end of 2022 to reflect the information we from the [Coastal Hazards Assessment](#) which was completed in 2021. The letters to property owners recently were direct communications between Council and those individual property owners and they have not gone onto the LIMS.

### **What evidence do you have that the sea level has risen by 10 cm in the past 15 years and that any changes weren't brought about by the earthquake or subsiding land?**

We use information from Lyttelton Port, which is one of New Zealand's longest standing sea level records. Sea level recordings from this site are observations and not predictions. We also look at the record at Sumner Head - both NIWA and LINZ hold sea level information from a gauge at that site as well.

In terms of the confidence that the recorded rates of sea level rise are not attributed to the earthquake or subsiding land, the Lyttelton Port gauge is corrected for local land movements.

### **How will tectonic factors affect future relative sea level rise?**

Have a look at [searise.nz](#)

Here you can look at the local relative rates of sea level rise in different parts of New Zealand's coastline. Every two kilometres there is a dot you can click on and it will tell you the global (absolute) sea level rise rate. You can also turn on vertical land movement, which is the tectonic factor and it will show you the resulting change or the way that subsiding or uplifting land might influence that rate of sea level rise. Keep in mind that the NZ SeaRise website using data from before the Canterbury earthquakes, which are known to have influenced land movement.

As many people would know, there were large areas of liquefaction and associated subsidence in many parts of Christchurch (resulting from earthquakes), so it would be fair to say that the sea level rise rate will be accelerated locally in locations where those sorts of conditions have occurred.

### **With an 80cm sea rise and 1:100 year storm, do you have a comment on the duration of time the road will be flooded. Is this only going to be affected near or at high tide, with storm surge?**

The short answer is we don't know exactly. Our flood mapping has extent and depth information but doesn't give us duration. What I could tell you from my experience as a coastal scientist is that the tide would be a significant control on this, as would the duration of storm surge conditions.



The 1:100 year storm that's shown on our mapping is a combination of different factors, such as the coincidence between storm surge (low atmospheric air pressure leading to swelling of the ocean and waves that wash in through the harbour), and elevated tides. I would expect in most cases, at least for lower-level flooding, that the flood levels would likely recede in combination with the outgoing tide, so there might be flooding for 10s of minutes to a few hours in the most likely circumstance, but with higher amounts of sea level rise, that duration would increase.

The other thing that would influence this is if there was heavy rainfall at the same time, the ability for water to drain away would be reduced and Teddington is not the most free-draining location so that could affect it also.

**Also is a 1:100 year event an assessment pre CC (climate change) modelling and is more likely to be in 1:10 years with a .8m rise**

The 1:100 year storm event is defined at the point of the coastal hazard assessment being undertaken in 2021 and it doesn't include a dynamic or shifting storm intensity so those 1:100 year events are essentially static. With one metre (for example) of sea level rise (in the [Coastal Hazards Portal](#)), the 1:100 year event is the same event. But you're right that in the future, because of a warming atmosphere, for example, we might see the increase in certain wind conditions or other climatic or weather-related changes that could change things and mean that what we define as a 1:100 year event today may be closer to a 1:10 year event in the future.

It's very difficult and costly to understand, analyse and include that in this kind of assessment but when the Council does undertake a future revision of coastal hazard mapping and assessment, that would be the opportunity to revise what a 1:100 year event is.

**What opportunity do the public have to interact with public officials on the claims of sea level rise. 10 cm in 15 yrs is 6.67 mm/yr. NOAA has compiled records from sites all around the world including Auckland which has a linear increase of 1.29 mm/yr since 1905, Brest in France experienced 1.04 mm/yr since 1807 and Sydney 0.80 mm/yr. All linear, so how did we get 6.67 mm/yr in 15 years. Highly unlikely without seismic changes, and I have looked at the NZ Sea Rise website & I can't see where it supports 10 cm in 15 years.**

The Intergovernmental Panel on Climate Change (IPCC) and the Ministry for Environment (MfE) are responsible for providing projections and guidance on future sea level rise (respectively). Council's role is to respond to the direction provided by these organisations and to plan for the impacts that might result. Keep in mind that we work with the full suite of sea level rise projections, from lower to upper-end scenarios and this is how we plan for the range of possibilities and the associated uncertainty.

Relating to the numbers referenced in your question, the '10cm in 15 years' is not a sea-level rise projection, but rather is from local observations (records) of sea level rise. This is shared in the following [article](#) and the [associated report](#). The report shows a recent shift towards accelerated rates of sea level rise, between 4 and 7mm/year. You are correct that seismic changes in the form of vertical land movement could also affect the sea level record but note that this record is of 'relative' sea level rise, so accounts for vertical land movement (as one contributor towards local relative sea level rise).

We can't comment on the sea level records from other parts of the world as we don't work with this data, or have a local understanding of the sites. However, sea level can vary significantly in different parts of the globe, as a result of various weather and climate systems that warm and cool oceans for example. Therefore, referring to a historic record of sea level rise in France means very little when it comes to observed rates of local relative sea level rise here in Christchurch.

**Worst storm surge for Teddington / Charteris Bay would be coincident with an easterly - comment on frequency of easterly direction winds and storms**

We don't have a comment on that in particular. The surge or swell event might come from the east, but places like Charteris Bay is a little bit different in its orientation (sheltered), so wind waves from the NW can also impact the shorefront. A storm from the east could impact Teddington more directly, with swell waves entering through the harbour.



**Is there a double standard where council allows armouring of their assets (road) but private properties are not permitted to protect their sea water frontages?**

Both of those situations (Council and private asset protection) would be subject to a consenting process. Council still has to go through a process. For example, if our transport team wanted to fund and construct a section of rock armour along a low-lying coastal road, and then they would go through the appropriate process of consenting works, mitigating effects - reducing them where possible. I would expect that the consenting party, which might be Environment Canterbury or Christchurch City Council itself, may consider things like the criticality of that road route (being protected) and other factors, like the availability of alternative options.

**As sea level rise at the Charteris Bay boat ramp would surely be a benefit - as it's currently unusable at low tide (for anything other than a dingy).**

In the short term, you might be right that slightly higher sea levels might allow the facility to be used for more parts of the day (tide). However, with higher sea levels the access to the facility and the parking area itself will become impacted.

**Has Council done work on the probability trigger points are hit on multiple locations around Christchurch making the work difficult to achieve in a timely manner?**

We're starting our adaptation planning in Lyttelton Harbour and Port Levy. This is one of the seven adaptation areas across the district. We're not resourced as a team to deliver an adaptation process across the district all at once, so we don't yet have a full sense of the trigger points that might be met. But the kinds of situations or circumstances that impact the assets in Whakaraupō will do the same to other assets around the district so our ability to intervene in a timely manner will certainly be a challenge.

Our Coastal Panel will also have the responsibility to work through the process of prioritising some of the pathways that they have been developing in case particularly triggers occur to different assets at the same time.

**What are the possible routes for the relocation of both Charteris Bay and Teddington roads?**

At the western end of Charteris Bay (Marine Drive), we could be looking at an alignment further inland around the vicinity of the Tennis Club and the Golf Club (Orton Bradely Park). This would avoid the pinch point we have at the moment with the eroding shorefront.

The other part of the road (to the north) could be even more difficult, there is 20 metres of road corridor on Andersons Road but it is not particularly easy to utilise because its narrow and has challenging topography. On paper, however, there is sufficient width reroute a main road onto Andersons Road. That's just one option, however, there are other options that will be looked at. The main value of something like Anderson's road that it can be used as an emergency route, if in the short to medium term, Marine Drive happens to be closed, Anderson's road is available to be utilised.

In Teddington, if an alternate road route were to be used, it would need to avoid the low-lying (flood-prone area) so would need to be placed on the surrounding hillside, or lower slopes. We appreciate that this would come at significant cost, so may prove to be unfeasible.

When thinking about possible future road routes we look at paper road routes and where these could be utilised. In the case of Charteris Bay and Teddington, paper road routes are unlikely to be useful in addressing coastal hazards.

Another thing the Coastal Panel has been working on is the roads as a network and recognising that many people depend on many parts of the road in order to get from A to B. There is a need to understand the network as a whole and also understand the importance of some of our marine infrastructure, boat ramps and jetties, that provide access over water. In the future there could be situations where it's extremely difficult to retain all of the road routes and their existing locations and it might be better to have a more robust ferry service, for example, that could provide a more resilient form of transport. You can find out more about these concepts and provide your feedback [here](#).



### **Can the beaches be re-seeded with sand to protect their use as an ongoing asset for as long as possible?**

It sounds like you are referring to beach nourishment. It's one of the options in the [Catalogue of Coastal Hazards Adaptation Options](#) that the Coastal Panel has been considering.

There are two parts to this question. The first is whether beach nourishment is a good way to provide a buffer to coastal processes and protect the landward area. Rāpaki is probably one of the locations where you could consider this option, but it could be difficult to find a suitable sand source and it can be quite environmentally damaging and expensive to maintain. Beach nourishment is often most appropriate, on small pocket beaches where sand is not easily eroded and removed from the beach system.

Beach nourishment can also be used to provide recreational benefit, through the building of a wider/sandier beach.

There has been some nourishment in parts of Whakaraupō in the past - Sandy Bay, over near Governors Bay has had some of that nourishment. So yes, beach nourishment could be used in an attempt to retain sandy beaches, although the cost of doing so will increase with rising seas,

### **How many people on the Coastal Panel are from Teddington / Charteris bay?**

We have 13 members of the Coastal Panel and two either live in Teddington or used to live in Teddington.

You might be interested to know how we found the Coastal Panel members. We ran an Expressions of Interest process and while a number of people put their names forward, none were from Charteris Bay. In our selection process we tried to get a range of people from different locations across Lyttelton Harbour Whakaraupō and Port Levy Koukourarata and we also sought a range of ages, with a focus on young people.

### **The Head to Head walkway was mentioned, How does this fit into this whole picture?**

Our coastal hazards adaptation planning team at Council are responsible for giving advice to our parks team, and then through to groups like the Head to Head working party, around the appropriateness of existing and future locations for access tracks. In a place like Charteris Bay where I appreciate there is a long standing history of interest and discussion around preferred routes, if there was a choice through this process to look at retaining the existing road route along that shoreline, that would require bolstering of the existing defences - so essentially lifting the road in the long term and potentially additional protection. Through a of program of work like that, it's likely that for safety reasons, the carriageway might need to be widened, and through that there might be opportunities to explore co-benefits that could relate to things like the Head to Head walking route.

We're well aware of the limited pedestrian access along Marine Drive and of the informal usage which has been occurring. Significant work would be required to widen the carriageway for pedestrians and cyclists and ideally that would be done as part of a far larger capital works job such as upgrading the coastal protection (sea wall). Pedestrian and cycle facilities would be part of any considerations to do with rebuilding that particular section of road.

The speed limit has been reduced in recent years and that has helped with pedestrian movements. But we certainly acknowledge that there are limitations with that particular section of road.

