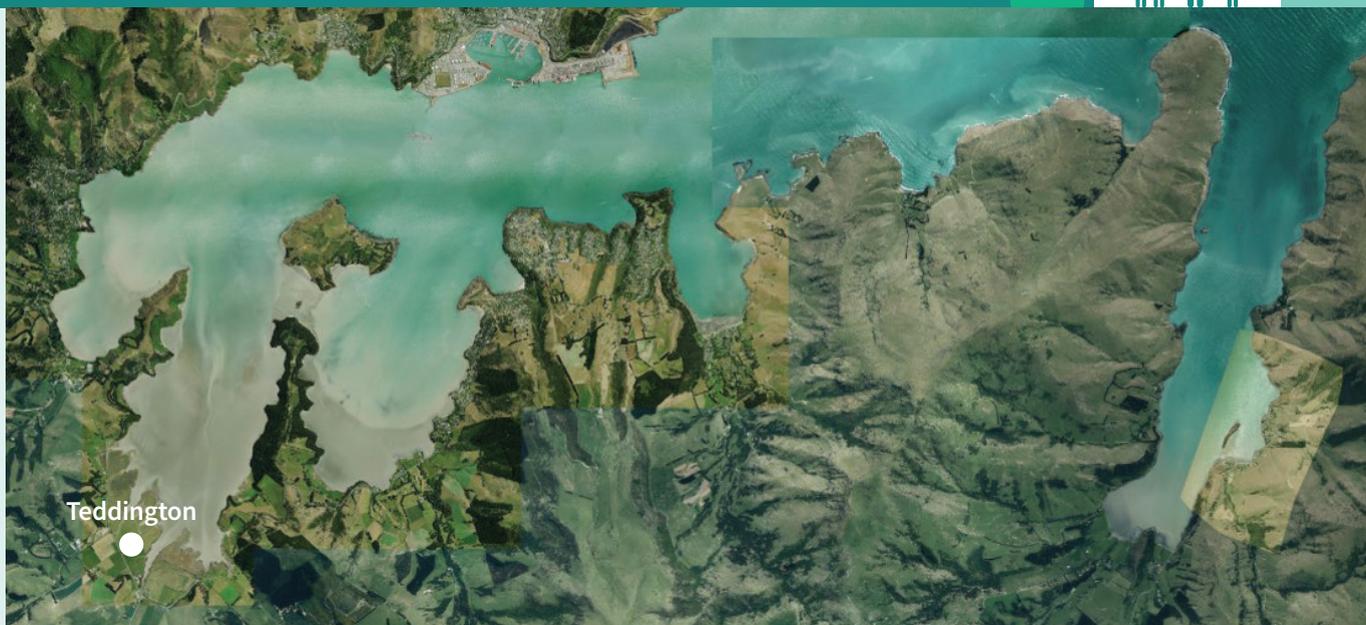


Teddington



Teddington is the largest area within Whakaraupō-Lyttelton Harbour at risk of coastal hazards. As sea levels rise, we should expect this area to become increasingly damp, as a result of more frequent flooding and a raised groundwater table. Future flooding will be deeper and last for longer due to the poor drainage but the area of land at risk of coastal flooding is unlikely to change a lot with rising seas.

Teddington is recognised as a place of ecological significance that supports a number of important ecosystems and species. The management of the Governors Bay Teddington and Charteris Bay roads will need to be considered within the context of the wider natural environment and the access it provides to communities across Whakaraupō-Lyttelton Harbour and to Koukourarata-Port Levy.

Te Hapū o Ngāti Wheke Inc is the Papatipu Rūnanga legal entity that represents Ngāti Wheke, the hapū with manawhenua status over the Whakaraupō basin and surrounding areas as outlined in the Port Cooper Deed. This entire area is culturally significant to Ngāti Wheke and sustains the hapū. Te Hapū o Ngāti Wheke has a strategic plan, a key part of which is the protection and enhancement of the whenua, moana and awa. Ngāti Wheke hopes to be a part of the leadership in climate action for future generations.

Mō tātou, ā, mō kā uri ā muri ake nei.
For us and our children after us.

Christchurch City Council recognises the rangatiratanga of Ngāti Wheke over its whenua and is working in partnership to plan for impacts on public assets and places of value.

	Short-term	Long-term
Coastal flooding	Red	Red
Coastal erosion	Yellow	Orange
Rising groundwater	Red	Red

The colours in this table* show how exposed this area is to each of the coastal hazards and are indicative only. Yellow refers to low exposure to the hazard, orange to moderate exposure and red to high exposure.

Environmental setting

Sitting at the head of Whakaraupō-Lyttelton Harbour, Teddington is particularly low-lying and is comprised of a large area of tidal flats that have been formed by the supply of silt from the surrounding hills. These flats support mahinga kai - areas of food gathering, valued habitats and diverse ecosystems. Inland of the tidal flats are areas of farmland, some residential properties and businesses, as well as significant saltmarsh and salt meadow ecosystems that have established as a result of coastal flooding and a high groundwater table.

It is recognised that the natural environment, including the mudflats, saltmarsh and salt meadow; act to mitigate coastal hazards by reducing wave energy, storing water and stabilising land.

The mudflat areas located at the head of Whakaraupō-Lyttelton Harbour are classed as regionally, nationally and internationally significant as a bird habitat and also support a variety of native mollusc, worms and crustacea species.

* The table is intended to provide a sense of what hazards are most relevant to the location and how severe the impacts might be. The colouring has been informed by Christchurch City Council's 2021 Coastal Hazard Assessment and data held by the Council about risks to assets.



The image shows that the land is moving up in the west and down in the east, at Teddington.

Rising seas

Sea level rise

The long-term record at Lyttelton Port tells us that sea level rose by around 30cm between 1901 and 2018, at a rate of 2.2mm/year. Over this period the rate of sea level rise increased slightly.

Projections from the Intergovernmental Panel on Climate Change (IPCC) indicate that we should expect between 17-23cm of sea level rise to occur by 2050, and 52cm-1m by 2100 depending on how significantly we are able to reduce greenhouse gas emissions.

The amount of sea level rise that we experience can also depend on where we are located within New Zealand, because the land that we stand on also moves.

Vertical land movement

The NZ SeaRise Programme (www.searise.nz/) has estimated local rates of land movement that help us understand where land is going up (uplift) and where it is going down (subsidence). These changes in land level, known as vertical land movement, can slow local rates of sea level rise in areas experiencing uplift and speed up sea level rise where land is subsiding.

When thinking about how we can adapt, it is useful to understand ‘relative sea level rise’ which includes the effects of local vertical land movement.



Highly variable rates of land motion exist in Teddington. The eastern-end has been experiencing subsidence (-2mm/year), whereas the western-end of the bay has been experiencing uplift (+2mm/year). If we consider how this might affect sea level rise over the next 30 years (to 2050), we see that the eastern-end of the bay could experience nearly twice the amount of relative sea level rise as the western-end of the bay, if the past rates of land motion continue into the future.

Land is moving up in the west and down in the east, at Teddington (Source: NZ SeaRise). There is uncertainty associated with this data, so this information should be considered indicative only.

Coastal hazards in Teddington – today

Coastal flooding & rising groundwater

Teddington Bay is relatively sheltered due to its location at the head of the harbour. However, this area can be affected by storm surge, which is a temporary rising of water levels that results from a low-pressure weather system. Spring and king tides, can also result in flooding, particularly when these conditions occur at the same time as storm surge and/or heavy rainfall. Similarly, the flat land is prone to surface ponding because of high groundwater levels. The combination of flat land and a high groundwater table means that water struggles to drain away and the area can stay wet for long periods of time after a flood or rainfall event.

Coastal erosion

Because water depths are shallow and there is no direct route from the harbour entrance to Teddington, it is not heavily impacted by swell waves from the open ocean. Waves generated locally by wind are more likely to affect this area, but the shallow water depths in the bay limit wave energy and therefore the potential for coastal erosion at Teddington is low.

You might have photos or stories about previous storms in this area. If you would like to share these with us then please get in touch at coastalcommunities@ccc.govt.nz

Coastal hazards in Teddington – the future

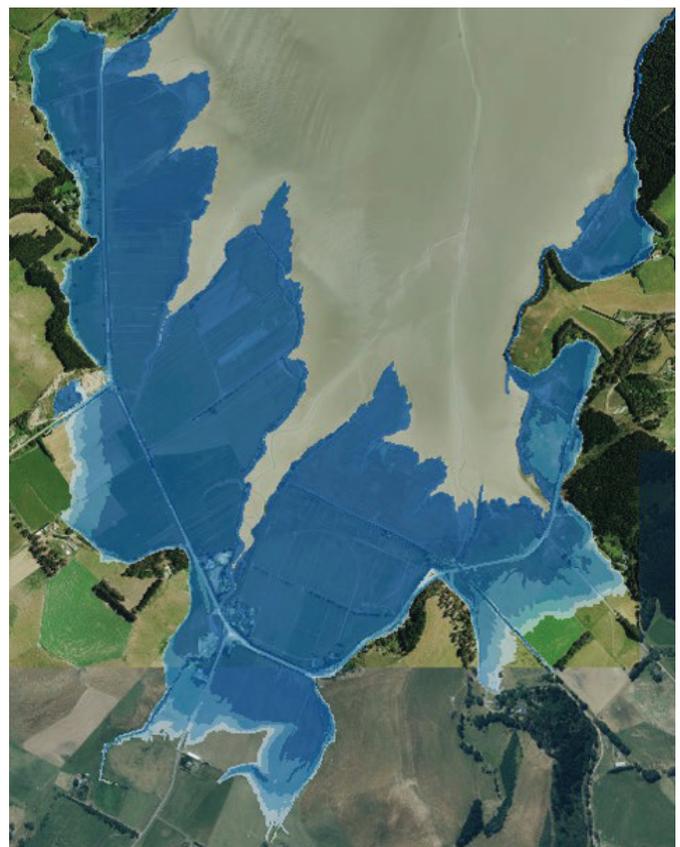
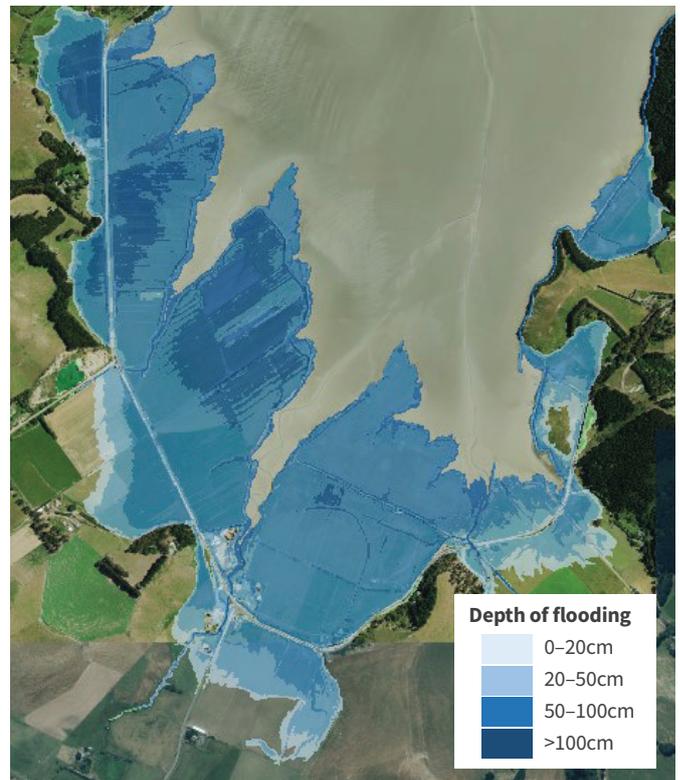
Coastal flooding & rising groundwater

Coastal flooding and rising groundwater are expected to remain the primary hazards affecting Teddington. As sea levels rise, flooding events (storm surge and large tides) will be able to reach further inland. This will result in increased flood depths and will mean that day-to-day water levels will be higher, drainage will be slower and surface water (ponding) will remain in place for longer.

The images to the right show the projected coastal flooding extents and depths with 40cm of sea level rise (top) and 1m of sea level rise (bottom). Flood depths are expected to increase considerably as sea levels rise, as shown by the darker blue colour. However, the flooding extent is not expected to change much between 40cm and 1m of sea level rise because of the steep hills that surround the low-lying land.

Coastal erosion

With higher sea levels in the future, slightly larger waves will be able to reach the Teddington shoreline and erode the coast. However, due to the extensive mudflats lowering wave energy, coastal flooding and rising groundwater are the more relevant hazards. The image on the following page shows the erosion distances we can expect with 40cm of sea level rise. The maximum erosion distances are around 30m, meaning that this much land could be lost to coastal erosion. *Please see images on the next page.*



Coastal flooding extent and depths with 40cm (top) and 1m (bottom) of sea level rise during a rare (1 in 100 year) storm event – sourced from Coastal Hazard Assessment 2021 (Tonkin & Taylor).



Coastal storm erosion distances with 40cm of sea level rise – sourced from Coastal Hazard Assessment 2021 (Tonkin & Taylor). The orange areas show the areas potentially prone to coastal erosion.

What is at risk?

A range of public assets are impacted by coastal hazards now, with these impacts set to increase with rising sea levels. In particular, the main Governors Bay Teddington and Charteris Bay Roads which provide important access for a range of communities around Whakaraupō-Lyttelton Harbour and Koukourarata-Port Levy are vulnerable to coastal flooding. Stormwater infrastructure will be also impacted by rising groundwater and flooding. Residential properties and farmland are also at risk of flooding and rising groundwater, as well as other hazards such as the salinisation of soils.

The Teddington mudflats and saltmarsh areas are places of significant ecological and cultural significance. With rising seas, we expect these environments to be placed under increased pressure as they become squeezed between the sea and inland infrastructure (i.e. roads). The ability of these environments to adapt to rising seas and migrate landward will depend, in part, on whether space is provided to enable this.

Where to find out more:

- Christchurch City Council webpage on coastal hazards and adaptation planning ccc.govt.nz/adapting-to-coastal-hazards/
- Christchurch City Council coastal hazards portal gis.ccc.govt.nz/hazard-viewer/
- NZ SeaRise webpage, for information on sea level rise and vertical land movement www.searise.nz/