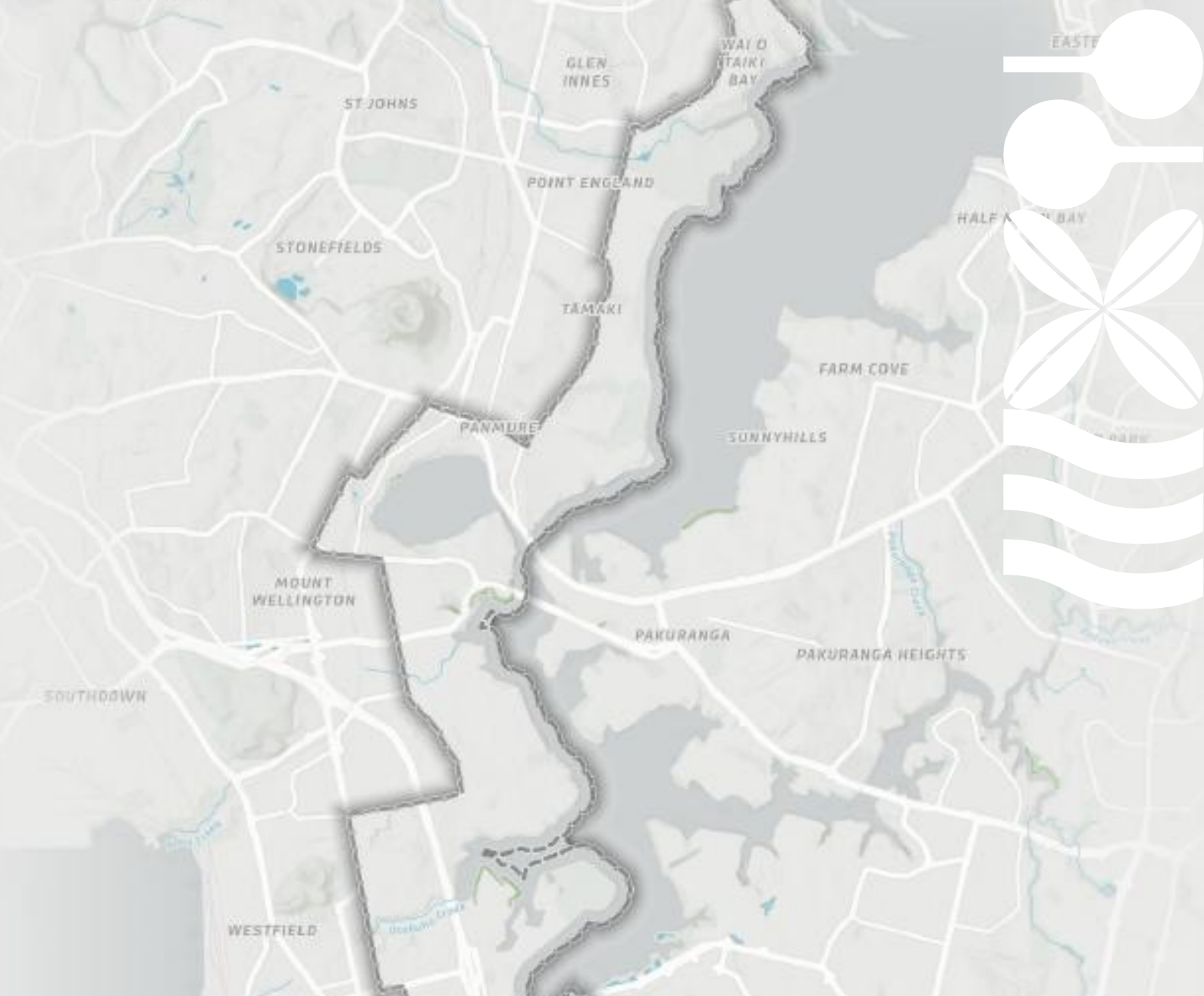




Ngā mahere whakaurutau mō te takutai

Shoreline Adaptation Plan

Tāmaki Estuary

Volume 3: Adaptation Strategies

July 2025, Version 1.0

2025



Shoreline Adaptation Plan

Tāmaki Estuary

Volume 3: Adaptation Strategies

July 2025

Auckland Council

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Front Cover

Shoreline Adaptations Plan area overview map for Tāmaki Estuary. Prepared for Auckland Council by Tonkin + Taylor 2025.

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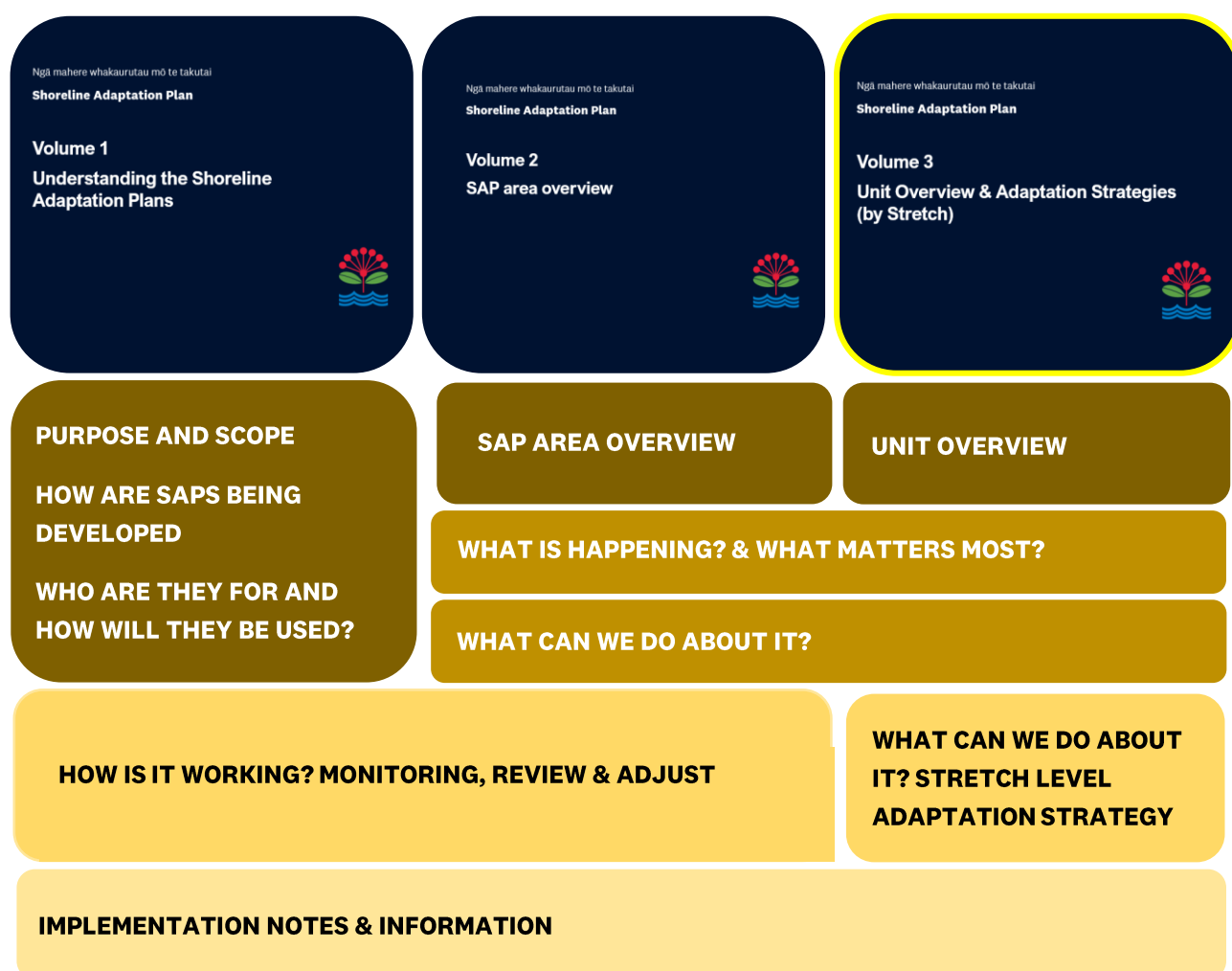
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Quick Reference

The Shoreline Adaptation Plan (SAP) programme is presented across three volumes of reporting:

- **Volume 1:** Understanding the Shoreline Adaptation Plans - programme and regional scale context
- **Volume 2:** Shoreline Adaptation Plan area specific overview – subregional scale (across 20 SAP areas)
- **Volume 3:** Unit (and stretch) context and adaptation strategies set for each section of Auckland's 3,200 km of coastline.



Glossary

Key terminology and infographics commonly used within this volume and all of the shoreline adaptation plan documents are outlined below.

Term	Definition
Adaptive planning	Adaptive planning encompasses the hazard assessments, the values and objectives and the vulnerability and risk assessments that feed into the dynamic adaptive pathways planning approach, and the measures to implement them through the Resource Management Act 1991, Long-Term Plans, asset plans and other Auckland Council plans, along with the monitoring framework for review and adjustment (Ministry for the Environment, 2024).
Annual Exceedance Probability (AEP)	The probability of an event occurring in any given year. For example, the 1% AEP has a 1% chance of being met or exceeded in any given year.
Biodiversity Focus Area (BFA)	Prioritised areas of ecological significance that guide a delivery of conservation activity and were identified as they protect a representative range of all indigenous species and ecosystems within the region.
Catchment flooding	Flooding which occurs when the amount of rainfall exceeds the capacity of an urban stormwater network or the ground to absorb it.
Climate hazard	The potential occurrence of climate-related physical events or trends that may cause damage and/or loss.
Coastal erosion	The removal of the material forming the land due to natural processes, resulting in the coastline moving inland over time.
Coastal inundation	The flooding of low-lying coastal land that is normally dry, due to elevated sea levels.
Council-controlled organisation (CCO)	Organisations in which Auckland Council has the responsibility to appoint at least 50% of the board of directors or trustees. Auckland Council has four substantive CCOs: Auckland Transport, Tātaki Auckland Unlimited, Eke Panuku Development Auckland, and Watercare.
Council	Auckland Council
Cultural Heritage Inventory (CHI)	An Auckland Council database which contains records for archaeological sites, historic buildings, historic botanical sites, shipwrecks, and other places of heritage interest in the Auckland region.
Dynamic Adaptive Pathways Planning (DAPP)	A decision-making approach to analyse the flexibility of options and pathways under conditions of uncertainty using scenarios for stress testing options and monitoring of signals and triggers for anticipatory planning (MfE).
Exposure	The nature and degree to which a system is exposed to significant climate variations.
Hazardscape	The net result of natural and man-made hazards and the risks they pose to an area.

Term	Definition
Indigenous biodiversity	A living organism that occurs naturally in Aotearoa, and the ecological complexes of which they are part of – this includes all forms of indigenous flora, fauna, fungi, and their associated habitats.
Nature-based solution	A collection of approaches to address societal issues, including climate change, through the protection, management, and restoration of ecosystems.
SAP	Shoreline Adaptation Plan
SAP area	An identified area for the purposes of the SAP development of Shoreline Adaptation Plans. There are 20 SAPs for the Auckland region.
SAP stretch	Each SAP unit is typically broken down into smaller stretches considering coastal processes, Auckland Council-owned land and asset location, public-land boundaries, and infrastructure considerations.
SAP unit	The SAP area is divided into smaller SAP units to enable a more detailed and comparative view of how risk is attributed across the subject area.
Sea-level rise	The increase in the level of the ocean, caused by the melting of glaciers and ice sheets and thermal expansion of water as it warms.
Significant Ecological Area	- Significant Ecological Areas (SEAs) have been identified by the Auckland Unitary Plan (AUP: OP) for terrestrial areas, and parts of the coastal marine area. Marine Significant Ecological Area (SEA-M): - Identified areas of important indigenous vegetation or habitats of indigenous fauna located in the coastal marine area, and are afforded protection under the AUP:OP. Terrestrial Significant Ecological Area (SEA-T): - Identified areas of important indigenous vegetation or habitats of indigenous fauna located on land or in freshwater environments and are afforded protection from the adverse effects of subdivision, use and development.
Site and place of significance to Mana Whenua	Sites and Places of Significance to Mana Whenua applies to sites and places in the Tāmaki Makaurau/ Auckland region that are protected for their significance to mana whenua. It acknowledges that sites and places have tangible and intangible cultural values in association with historic events, occupation, and cultural activities.
Statutory Acknowledgement Areas (SAA)	A statutory acknowledgement is an acknowledgement by the Crown that recognises the mana of a tangata whenua group in relation to specified areas – particularly the cultural, spiritual, historical, and traditional associations with an area.
Social Infrastructure	Facilities and assets that support social activities, interactions, and wellbeing within a community.

Shoreline Adaptation Plan Areas

Tāmaki Makaurau, Auckland, is a coastal city, bounded to the east and west by the South Pacific Ocean and the Tasman Sea. The region has around 3,200 km of dynamic coastline and encompasses three major harbours: the Kaipara, Manukau and Waitemata. Due to its location, much of the city's urban development and supporting infrastructure is concentrated in coastal areas and exposed to coastal processes such as erosion and inundation. These natural processes are considered hazards when they impact on things or locations of value. Climate change related to greenhouse gas emissions is contributing to rising sea levels, which have a range of impacts including increasing the frequency and magnitude of coastal hazard events. Auckland Council began developing a series of Shoreline Adaptation Plans (SAPs) in 2021. These area-based plans form the first step for the SAP programme in achieving a resilient future for Auckland's coasts. A more detailed discussion on the Shoreline Adaptation Plan Program can be found in *Volume 1: Understanding the Shoreline Adaptation Plans*. Twenty separate SAPs make up Auckland's ~3200 km of coast as follows:

- Aotea Great Barrier and the Hauraki Gulf Islands
- Āwhitu
- Beachlands and East
- Central Auckland
- Highbrook to Whitford
- Kaipara Harbour Moana
- Manukau Harbour East
- Manukau Harbour North
- Manukau Harbour South
- Orakei to Tahuna Torea
- Pahurehure Inlet
- Pākiri to Matheson Bay
- Snells Beach to Orewa
- Tāmaki Estuary
- Ti Point to Sandspit
- Waiheke Island & Hauraki Gulf Islands
- Waimanawa Little Shoal Bay mini SAP
- Waitemata Harbour West
- Weiti Estuary to Devonport Peninsula
- Whangaparāoa
- Whatipu to South Head

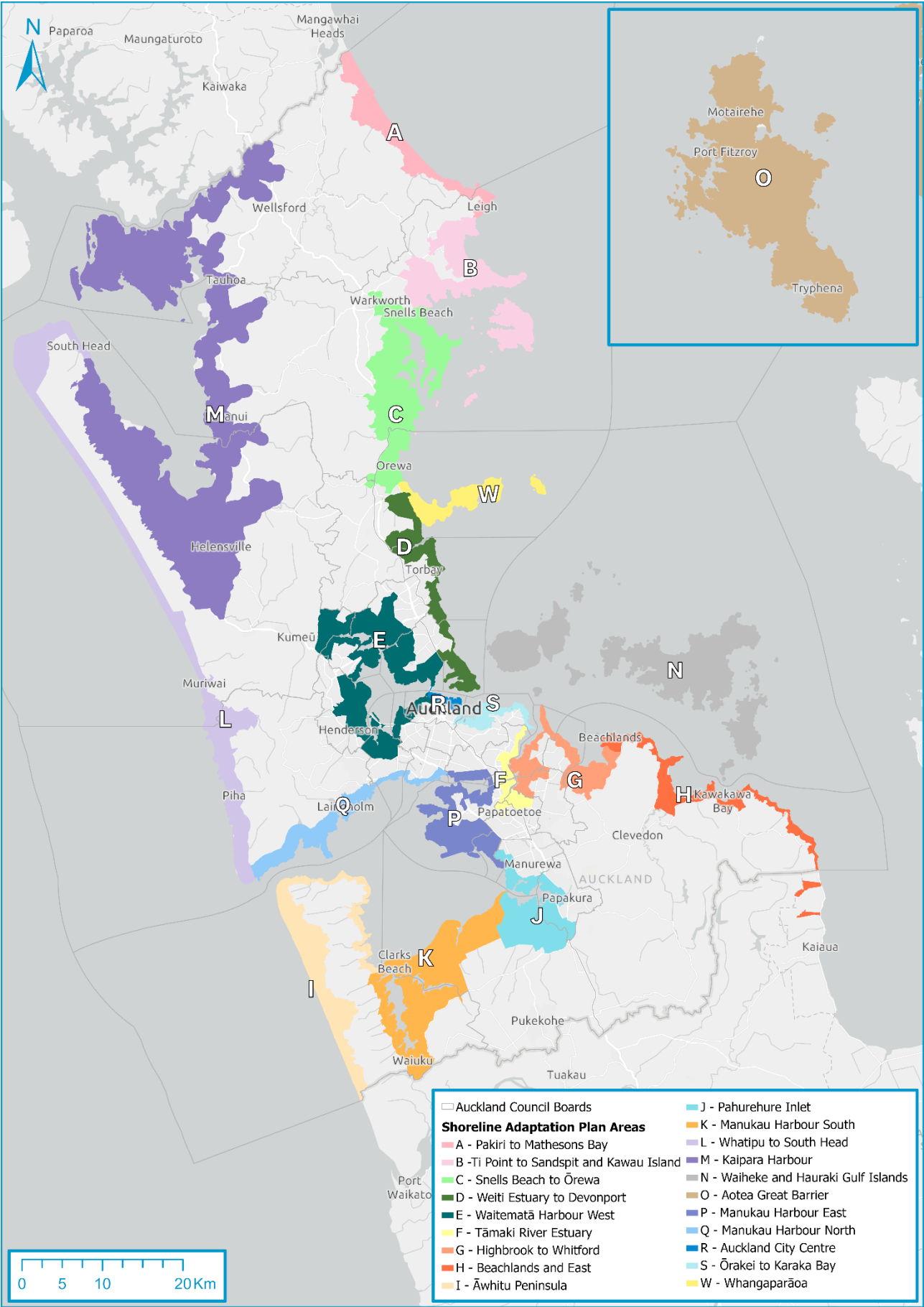
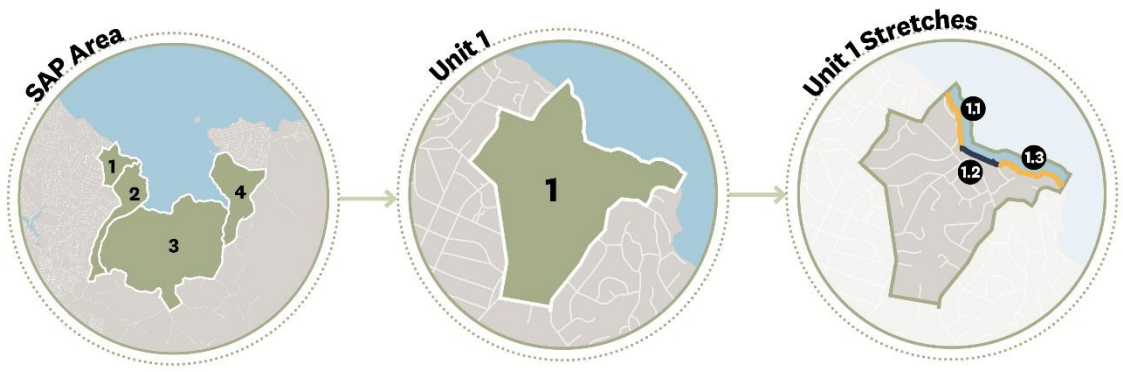


Figure 1: Regional Overview of Shoreline Adaptation Plans

SAP areas, units & stretches

Within each SAP area, the coastline has been broken up into coastal stretches based on coastal processes, Auckland Council-owned land and asset location, public land boundaries, and infrastructure considerations. Coastal stretches have been grouped into broader coastal unit areas. It is important to note here that coastal units and stretches do not strictly reflect the historical cultural boundaries which often extend over multiple units or coastal stretches. The figure below outlines the delineation of scale between each SAP area, its sub-units and stretches:



Climate change scenarios (timeframes for change)

For the SAPs, the following scenarios are used to evaluate how exposure to coastal inundation, erosion and instability and sea-level rise may impact coastal land and assets.

	 Sea-level Rise	 Coastal Inundation	 Coastal Erosion	 Catchment flooding
Low climate change	- Present day (relative) sea level - Up to 0.5 m	1% AEP storm surge event	- Erosion & instability susceptibility line '2050' (RCP 4.5) - Includes consideration of 0.28 m of sea-level rise)	1% AEP rainfall event + climate change projections for rainfall
Moderate climate change	0.5 m - Up to 1 m	1% AEP storm surge event plus 0.5 m of sea-level rise	- Erosion & instability susceptibility line '2080 RCP 4.5 and 8.5' - Includes consideration of 0.55 m of sea-level rise	
High climate change	1.0 m - Up to 2 m	1% AEP storm surge event plus 1.0 m, 1.5 and 2 m of sea-level rise	- ASCIE 2130 (RCP8.5 and 8.5H+) - Includes consideration of 1.18 m and up to 1.52 m of sea-level rise	

Auckland Council's adaptation strategies

High-level adaptation strategies are developed for each coastal stretch under a low, moderate and high climate change scenario (inclusive of sea-level rise projections), with an indication of how these choices reflect the escalating risk, considerations of infrastructure providers, and the values and objectives of local iwi and the local community. Importantly, strategies outlined within each unit and subsequent coastal stretch apply only to the area of Auckland Council-owned land and assets along the coastal margin. These recommended strategies do not apply to offshore activities (such as marine farms) or private property. Each high-level strategy provides flexibility for how it is applied to different assets. The value of the strategic approach is to ensure general continuity across asset management, acknowledging hazard risks and impacts of management of one asset class may impact on or have implications for others. Coastal adaptation strategies applied to each coastal stretch are described in further detail below:



No Action

- There are limited risks identified to Auckland Council land and assets as a result of coastal hazards and climate change.
- Natural coastal processes may be complementary to the natural coastal environment or its values.



Maintain

- Better decision-making today for Auckland Council land and assets.
- Actions manage risk, build resilience and support best practice coastal management outcomes.



Protect

- Uses and assets are maintained in their current location.
- Protection measures (mitigations) are required to manage risk, and nature-based solutions and hard protection may be utilised.



Adaptation Priority Area

- Auckland Council land and assets are exposed to hazard risk including the impacts of climate change.
- The value and importance of assets, complexity of the hazardscape and social, cultural or ecological values are present which requires further adaptation planning to determine a management response.



Unit 1

Tāmaki Estuary



Wai-O-Taiki Nature Reserve

Glendowie Bay

Tahuna Torea

Wai-O-Taiki Bay



Wai-O-Taiki Nature Reserve is highly valued by locals for its natural landscape and birdlife, along with walking tracks and coastal connections. Commentary highlighted community concern regarding the impact of coastal hazards (i.e. erosion) to walkways, wildlife, and cultural sites in the reserve



Ōmaru Creek



Wai-O-Taiki Nature Reserve

Tāmaki Path

View South from Point England Rd



Point England Beach

Point England Reserve



Community commentary highlighting issues of runoff in the estuary, contributing to sedimentation and declining water quality



Highly used/valued boat mooring zone with numerous clubs operating from this area (i.e. Panmure Yacht and Boating Club, Auckland Grammar Rowing Club and St George Rowing Club)

Coastal reserves in this unit are of high cultural significance to local iwi (i.e. Wai-O-Taiki Nature Reserve), with numerous sites of significance located along this coastline



Boundary West Reserve

Kayaking and other water-based sports along the estuary highly valued by locals



Mount Wellington War Memorial Park



Panmure Wharf Reserve



Panmure

Panmure Basin



Kings Rd

Allenby Reserve

Panmure Yacht and Boating Club



Wainui Sea Scouts

Panmure Wharf Reserve

Numerous private harbour access structures



Key transport access

Pakuranga Rd

Pakuranga Hwy

- Unit boundary
- 1.1 1.2 Stretch
- Walking tracks
- Informal recreation park
- Mooring management area
- Auckland Council owned land

0 500m 1km

Unit 1: Wai-o-Taiki Bay to Panmure

Located within the Maungakiekie-Tāmaki Local Boards area, Unit 1 covers approximately 5 km of the western shoreline of the Tāmaki River from Wai-o-Taiki Bay in the north towards Lagoon Drive, Panmure in the south. This unit includes the coastal portion of the Glen Innes, Point England, Tāmaki, and Panmure communities.

What is happening? Coastal context and hazardscape

The main Tāmaki River channel meanders closer to Point England and Panmure Point on the western shoreline through the middle reaches of the inlet. There are wide (300-500 m) intertidal flats in the Wai-o-Taiki Bay embayment and a large embayment between Point England and Panmure Point, with the intertidal area narrowing in front of these promontories. Ōmaru Creek discharges into Tāmaki River at the southern end of Wai-o-Taiki Bay and there are two small streams that discharge at the northern end of the embayment.

Due to the inner harbour location and protection afforded by Tahuna Torea, the western shoreline in this unit is predominantly a low energy setting. Localised, wind-generated waves with fetches from the east through to the south are limited by reduced intertidal water depths typically associated with estuaries.

Coastal erosion and instability

The ASCIE lines that indicate the area susceptible to coastal instability and erosion presents a low to moderate risk, reflective of the more sheltered environment of the Tāmaki Estuary (Figure 2). The predicted ASCIE is greater on higher elevated sections of coastline such as along the low cliff headlands, than the vegetated slopes in the sheltered tidal inlets.

Ōmaru Creek outlet at the northern end of Point England Reserve was significantly modified between 1959 and 1968, with the diversion of the outlet through a cliff cutting at the northern end of the reserve and the cut material used to form a bund across the existing stream outlet. The outlet straightening was intended to reduce erosion to the coastal edge north of the stream mouth caused by the stream meander. This change has enabled mangrove colonisation to increase at the southern end of the bay.

Coastal management through this unit includes significant coastal armouring and reclamations along the western shoreline of Tāmaki River between Point England and Panmure Wharf reserve. Some of the key features are as follows:

Wai-o-Taiki Bay at the northern end of this unit. A short section of rock masonry seawall constructed in 2021 to protect Tahaki Road is visible in the foreground. In the background, the coastline is largely in a natural state fringed by wide native coastal forest (The Wai-o-Taiki Nature Reserve) with grass reserve landward, although some remnants of previous failed protection works are evident between the two small stream outlets.



Tahaki Road end cul-de-sac armoured with masonry seawall (foreground) with densely vegetated margin along Wai-o-Taiki Nature Reserve (background) (Source: Auckland Council)

Point England Beach is backed with a stepped gabion seawall constructed at some stage prior to 1997. It is fronted by a renourished beach constructed in 2011 with imported sand sourced from Pakiri. An artificial reef groyne was built on the existing low-lying sandstone reef exposed on the intertidal area to control beach orientation and reduce loss of sediment to the south.



Point England Beach. Source: Auckland Council

South of Point England, the Riverside Reserve and Dunkirk Reserve shoreline is armoured with over 1.3 km of sloping rock revetment that was progressively reconstructed and upgraded from rock and rubble rip-rap during staged maintenance completed over 2017 and 2018.



Dunkirk Reserve section of rock revetment armouring. Source: Auckland Council

Mount Wellington War Memorial Reserve, low masonry seawall.



Low masonry seawall armouring Mount Wellington War Memorial Reserve. Source: Auckland Council

Panmure Wharf Reserve, low reclamation with concrete and ad hoc armouring.



Panmure Wharf Reserve. Source: Auckland Council

Coastal inundation

Areas most impacted by coastal flooding inundation within this unit are Dunkirk Reserve and Mt Wellington War Memorial Reserve. The walkway along Dunkirk Reserve will be impacted by predicted coastal inundation in the low climate change scenario. Most of the open space grass reserve adjacent to the stream gully and the low-lying part of Dunkirk Road are at risk to coastal flooding inundation in a moderate change scenario, with the entire reserve predicted to be impacted in the high change scenario.

The sports fields at Mount Wellington War Memorial Reserve are at risk to coastal inundation flooding in the low change scenario, with the extent increasing in the moderate to high change scenario to impact almost the entire reserve. Mount Wellington Tennis Club facilities, Marist Rugby Clubrooms and the Dunkirk Road Community Centre building are adequately elevated and will not be impacted even in the high climate change scenario.

The existing walkways around Wai-o-Taiki Bay, Point England Reserve and Riverside Reserve are elevated above the 1% AEP plus 1 m sea-level rise, however they could be impacted in the high climate change scenario.

At Panmure Wharf Reserve, over half of the reclaimed area that is utilised for boat haul-out hard stand is predicted to be impacted by coastal inundation flooding in the low change scenario, along

with two tenant-owned club buildings on community ground leases (St Georges Rowing Club and Panmure Yacht & Boating Club) and the seaward portion of Kings Road. The entirety of the reclamation and low-lying grass reserve area are predicted to be impacted in the moderate change scenario, with coastal flooding inundation in the high change scenario extending to the sealed accessway along the base of the cliff towards the rear of the reserve and toilet block.

Catchment flooding

Flooding in this unit is predominantly isolated to overland paths traversing the coastal margin, noting the catchment flooding is mainly further inland and limited to the lower-lying inlets where streams discharge to the coast. Stormwater management ponds are located within several more recently developed areas adjacent to Ōmaru Creek.

A series of shorter catchments drain east to Tāmaki River in the southern part of this unit, with floodplain and overland flow paths identified.

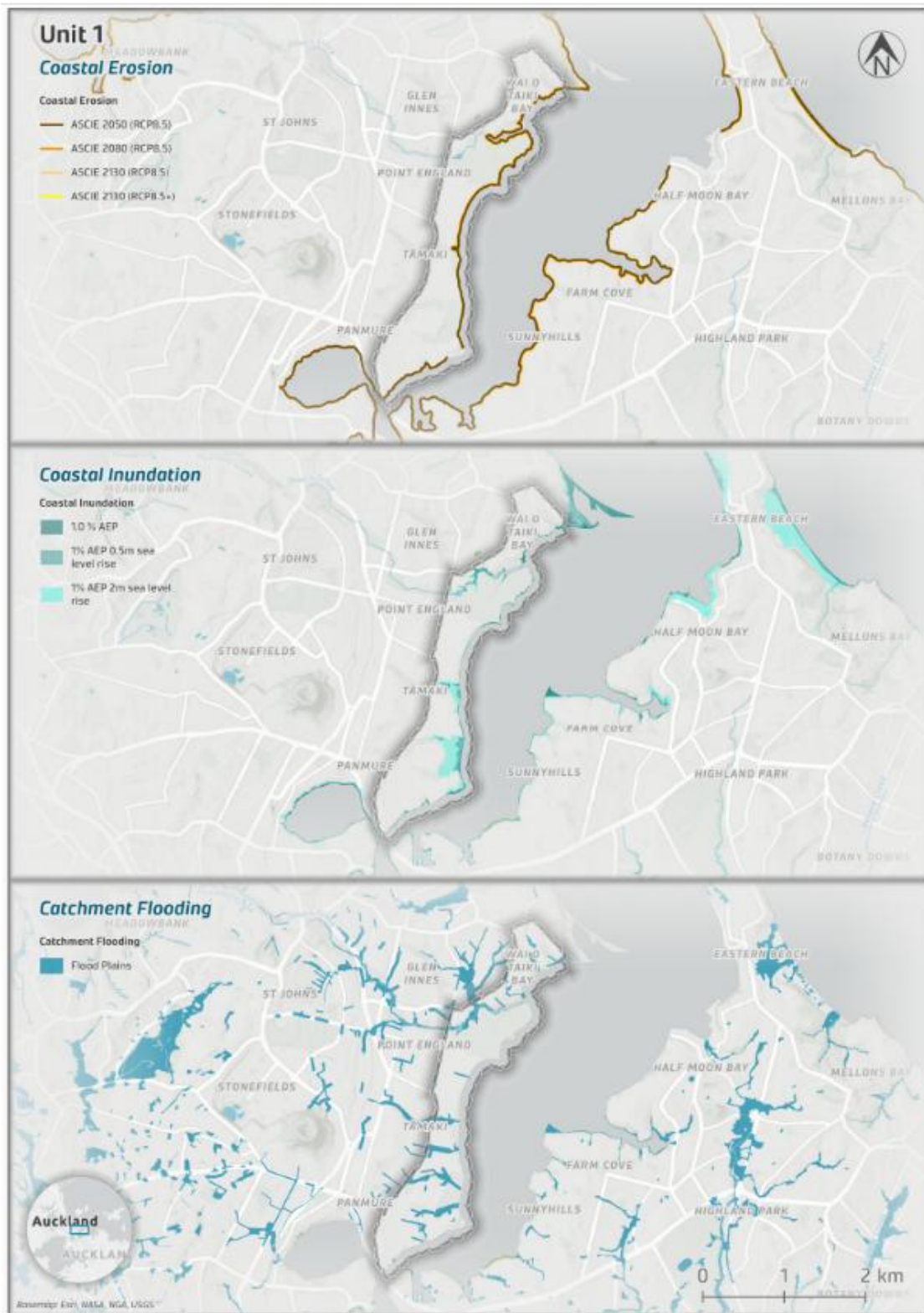


Figure 2: Coastal hazardscape for the Wai-o-Taiki Bay to Panmure Unit reflecting coastal erosion susceptibility for 2050, 2080 and 2130 considering RCP4.5 and RCP8.5 emission scenarios, coastal inundation for 1%AEP storm surge for present day and with 0.5 m, 1 m and 2 m sea-level rise and the identification of flood plains.



Risk assessment

The risk table represents key groups of assets (e.g. Auckland Council-owned land, buildings, road extents) which are supported by the regionally consistent data set.

The risk assessment provides a regionally consistent method for comparing risk to Auckland Council-owned land and assets allowing for identification of areas with highest risk for potential future assessment (e.g. Series 2).

The table below summarises the risk levels for Auckland Council asset types in the short, medium, and long-term using low, moderate and high climate scenarios.

Council-owned land			Council Community facilities			Transport infrastructure			Water infrastructure		
Park and reserve land, 88.2 ha			Park amenity structures, carparks, 2.3 ha Buildings, wharves, 22 No.			Bridges, 350.6 m ² AT roads 15.9 km			Water pipes, 97.2 km		
Short	Medium	Long	Short	Medium	Long	Long	Short	Short	Short	Medium	Long
Coastal erosion and susceptibility											
Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Low	Low	Moderate	Low	Low	Moderate
Coastal inundation											
Moderate	Moderate	Moderate	High	Very High	Very High	High	High	High	Low	Moderate	Moderate
Key											
None			Low			Moderate			High		Very High

What matters most



Auckland Council land and assets: This section identifies key Auckland Council-owned land and assets within this unit that may be impacted by coastal hazards (inclusive of catchment flooding) over changing climate scenarios.



- There is a significant amount of Auckland Council-owned land and infrastructure within this unit including reserves and parks: Wai-o-Taiki Nature Reserve, Point England Reserve, Riverside Reserve, Boundary Reserve, Mt Wellington War Memorial Reserve, Dunkirk Reserve, Panmure Wharf Reserve, Allenby Reserve.



- Public amenities** at coastal reserves (Point England, Panmure Wharf, Mt Wellington War Memorial, Dunkirk).
- Recreational and sports field facilities:** (Point England Park and Mt Wellington War Memorial Reserve).



- Wastewater:** Multiple wastewater pump stations located near the coastal edge and pipelines traverse this unit both on land and within the coastal marine area (sea), West Tāmaki Road, Dunkirk, Panmure Wharf Reserve, Tangaroa St, Bridge Street.



- Key pathway connections:** Tāmaki Path connecting the Wai-o-Taiki Nature Reserve with the Panmure Wharf Reserve; Ōmaru Creek walkways and kayaking.



- Harbour access:** Key access points Panmure Wharf Reserve (ramp and wharf).
- Smaller boat launching (Point England Reserve), small pedestrian ramps suitable for hand launching (Riverside Reserve & Dunkirk Reserve).

Social, cultural and ecological context: This section identifies key social, cultural and ecological matters, identified through the development of the SAP reports, that may be impacted by coastal hazards (inclusive of catchment flooding) over changing climate scenarios.



- Specific cultural values and outcomes for this unit will be developed through ongoing involvement with local iwi identified in Volume 2. Guiding objectives and outcomes which have informed the development of adaptation strategies have been identified in Volume 2.
- Ngāti Pāoa Iwi Trust and the Maungakiekie-Tāmaki Local Board have formed a committee to manage the future of Ōmaru Reserve (Point England Reserve). Additionally, as part of Treaty settlements, 40.6 ha of land at Ōmaru / Point England will return to Ngāti Pāoa ownership¹.



- Point England Beach is a popular recreational beach area, valued as a family-friendly destination with access to the beach, playground and BBQs.
- Outstanding Natural Feature (AUP) geological exposure Point England accretionary lapilli.
- Community lease Auckland Marist Rugby Football Club, Riverside Reserve sports fields, Auckland Grammar Rowing Club, St Georges Rowing Club, Tāmaki Outrigger Canoe Club, Panmure Yacht and Boating Club.



- Wai-o-Taiki Nature Reserve coastline is largely in a natural state backed by a native coastal forest with grass reserve landward. There is an area of regenerating broadleaved scrub in the Wai-o-Taiki reserves.
- Ōmaru Creek, a small mangrove-lined channel near Point England Reserve, is currently being restored due to the presence of inanga spawning habitat within the creek. Several native freshwater fish species have been recorded in the creek and its tributaries, including shortfin eel and banded kokopu (NIWA, 2023).
- Point England Reserve provides shorebird high-tide roosts and foraging areas for a variety of coastal avifauna, including SIPO.



Who have we heard from?

Feedback was received via digital platforms Social Pinpoint and 'AK Have Your Say', along with community submissions from the Tāmaki Estuary Protection Society, Wai-o-Taiki Bay Residents' Association and Wai-o-Taiki Nature Reserve Rangers. Key themes in community submissions included but were not limited to:

- Concerns regarding sedimentation within Tāmaki Estuary and erosion of unarmoured coastal margins, with specific reference to the 800 m section of Wai-o-Taiki Nature Reserve. Specific feedback from the Tāmaki Estuary Protection Society noted a strong advocacy for prioritising repair of the Wai-o-Taiki Bay walkway and mitigating perceived sediment run-off.
- Support the maintenance of coastal walkways (i.e Wai – Otaiki Bay coastal walkway), with strong support for community/ public connectivity to and along the coast (i.e. adding additional walkways along the coast, improving public safety for existing walkways).
- Community concern for the water quality of Ōmaru Creek which is perceived to be in a poor condition.
- Observations of slips along Ōmaru Creek in the vicinity of pedestrian bridges.

¹ <https://www.aucklandcouncil.govt.nz/about-auckland-council/how-auckland-council-works/kaupapa-maori/co-management-arrangements/Pages/omaru-joint-management-committee.aspx>

- Concerns for the integrity of coastal habitats with ongoing coastal erosion, sedimentation, and sea-level rise. Specific locations such as Wai-o-Taiki, Point England, and Tahuna Torea were highlighted. The loss of natural habitats, such as mangroves and seagrasses, was noted, along with the impacts on wildlife (i.e. shorebirds and shellfish). Concern for the loss of shorebird feeding, roosting and breeding habitat along Tāmaki Estuary because of sea-level rise and coastal squeeze was also highlighted.
- Community feedback highlighted the ecological significance and regional importance of ecosystems in this unit (i.e. within Wai-o-Taiki Nature Reserve) and the subsequent need to factor ecosystems and the species that they support into coastal management planning (supporting nature-based solutions where possible).
- Advocacy for ‘holding the line’ for the length of the Wai-o-Taiki Nature Reserve (feedback from the Wai-o-Taiki Bay Residents’ Association and Wai-o-Taiki Nature Reserve Rangers), with a perception that doing nothing will result in ongoing coastal erosion and sediment runoff into waterway.
- Ongoing monitoring of bird roosts and breeding habitats along the coastline must be factored into coastal management to mitigate the impacts of coastal hazards on wildlife, noting opportunities for nature-based solutions to accommodate ecological and community values.
- Investigate opportunities to restore roosting areas for shorebird populations across Unit 1 and the wider Tāmaki Estuary, whilst providing opportunities to protect existing roosting areas.

What can we do about it? Adaptation strategy summary for Unit 1.



1.1: Tahaki Road

This stretch begins at the southwestern border of Tāhuna Tōrea Nature Reserve and continues into Tāmaki River Inlet. It encompasses a small portion of West Tāmaki Road, and is adjacent to Tahaki Road, which backs onto the residential community of Wai-o-Taiki Bay.

Scenarios for change			
Low		Moderate	
High			
Maintain		Maintain	
		Adaptation priority	
Explanation			
Maintain provides for the continued management of risk to Council assets, including portions of West Tāmaki and Tahaki Roads, and wastewater pumping stations which are currently protected by a recently constructed masonry seawall. Under the high climate scenario, exposure of both water and roading assets to coastal erosion and inundation results in the transition to adaptation priority to ensure consideration of future risk management actions.			
Implementation Notes			
Management: Auckland Transport and Watercare, the asset managers, will monitor how coastal hazards may impact on operation of roading and wastewater assets and future implementation options.			

1.2: Wai-o-Taiki and Ōmaru Recreational Reserve (Point England Reserve)

This stretch begins at the end of Tahaki Road, near the turnaround, and continues south (along Ōmaru Creek) until the southernmost end of Ōmaru Recreational Reserve (Point England Reserve). It contains Wai-o-Taiki Nature Reserve, a nature reserve with pockets of native bush and grazing pasture. Wai-o-Taiki Bay suburb and beach are also situated in this stretch. Ōmaru Recreational Reserve (Point England Reserve) is managed by the Ōmaru Joint Management Committee, allowing for the reserve to be co-managed by the Ngāti Pāoa Iwi Trust and the Maungakiekie-Tāmaki Local Board².

This stretch is predominantly reserve and parkland. The large open space area has open pasture for grazing and is a key community asset. Ōmaru Recreational Reserve (Point England Reserve) has a varied shoreline with a low vegetated cliff along the northern reserve, and a popular recreational beach area in the small embayment between Point England and the headland to the north.

Tāmaki Path begins in this stretch, extending 7.2 km around the coast from Wai-o-Taiki Nature Reserve in the north through to Panmure Wharf Reserve in the south. The path is an important and well-used community asset.

² <https://www.aucklandcouncil.govt.nz/about-auckland-council/how-auckland-council-works/kaupapa-maori/co-management-arrangements/Pages/omaru-joint-management-committee.aspx>

Scenarios for change		
Low	Moderate	High
Maintain 	Maintain 	Maintain 
Explanation The Tāmaki Path is identified as susceptible to coastal erosion under the low to moderate change scenario, noting some sections include existing coast protection structures. Council assets are generally elevated and have limited exposure to coastal flooding inundation, with limited areas of the road network potentially impacted by flood hazards. Stormwater management ponds are located within several more recently developed areas adjacent to Ōmaru Creek. Maintain reflects that this area is a highly valued local destination with developed sports fields and park amenities (playground, picnic facilities). A maintain approach across all climate change scenarios reflects the continued management of risk to the Tāmaki coastal pathway and need for ongoing maintenance of coastal connections, including the well-used pathway and other valued assets located within coastal areas. Maintain provides for proactive management through design and location of assets including proactive management of risks to the path. This could include options that involve localised realignment of sections of the path to manage risk. It is recommended to limit the use of engineered coastal protection structures for this natural coastal area, responding to community feedback. Considering the diversity of values associated with this stretch of coast and future management intentions, a maintain approach over all scenarios adequately addresses local board concerns in relation to coastal hazard risks, working to maintain existing services and values whilst supporting natural landscapes and cultural landscapes/ land ownerships.		
Implementation Notes • Ōmaru Recreational Reserve (Point England Reserve) is managed by the Ōmaru Joint Management Committee, allowing for the reserve to be co- managed by the Ngāti Pāoa Iwi Trust and the Maungakiekie-Tāmaki Local Board³. Ongoing engagement with Ngāti Pāoa Iwi Trust and the Maungakiekie-Tāmaki Local Board will be required to further understand the cultural values associated with this site, management intentions and ownership arrangements and future aspirations and how this may impact adaptation strategies. • Cultural: Te Poho o Tāmaki Marae is located just outside of this stretch boundary. Future engagement may assist in understanding cultural values for the area and how this may influence future adaptation planning. • Ecology: Opportunities to support the ecological values of this stretch including bird roosting and breeding sites and fish spawning habitat and migration pathways of native freshwater fish (Ōmaru Creek) should be factored into future planning, to mitigate coastal squeeze. Additionally, enhanced vegetation cover to reduce exposed soils from weathering and restore biodiversity values is encouraged. • Community: Community feedback highlighted advocacy for protecting the coastline within the Wai-o-Taiki Nature Reserve and the importance of coastal walkways. A maintain approach acknowledges and responds to this feedback, enabling the ongoing maintenance of Council-owned assets within this stretch whilst supporting key ecological values associated with Wai-o-Taiki Bay Reserve.		

³ <https://www.aucklandcouncil.govt.nz/about-auckland-council/how-auckland-council-works/kaupapa-maori/co-management-arrangements/Pages/omaru-joint-management-committee.aspx>

1.3: Point England Road

Stretch 1.3 encompasses a small section of Point England Park and Tāmaki River Inlet. The stretch is adjacent to Tāmaki Path.

Scenarios for change		
Low	Moderate	High
Maintain 	Maintain 	Maintain 
Explanation The Point England Road end and carpark are valued local destinations that provide access to the adjacent large open space park (Point England Reserve) and Tāmaki Path. A maintain approach under all climate change scenarios reflects the need for the continued maintenance of access to the coast and the management of risk to assets and uses located within the reserve areas.		
Implementation Notes • Maintain supports continued management of risk to assets and uses located within the reserve areas (e.g. boat launching access) through the location and design of assets and supports the continued use of existing protection structures which support these uses.		

1.4: Point England Road to Mount Wellington War Memorial Reserve

This 2.5 km long stretch begins at the southern end of Point England Park and extends south along the Tāmaki River Inlet to the southern end of Mount Wellington War Memorial Reserve. The start of the stretch is adjacent to residential areas and Tāmaki Path. Most of this stretch includes Council-owned reserve, with continuous esplanade (Riverside Reserve) and large open space coastal parks developed with sports fields that are key community assets (Dunkirk Reserve, Mt Wellington War Memorial Reserve).

A significant portion of this stretch is armoured with a combination of engineered rock revetment, tipped rock and low masonry rock walls. The reserve areas (Dunkirk Reserve, Mount Wellington War Memorial Park) are highly developed with recreational and sporting facilities, and there are several local clubs/community groups that hold community ground leases for tenant-owned buildings. Sports facilities, recreational walking access, and boating access to Tāmaki Estuary are highly valued.

Scenarios for change				
Low		Moderate		High
Protect		Adaptation Priority		Adaptation Priority 
Explanation				
Existing coastal defences in this stretch mitigate coastal erosion hazards and provide for assets and access to important boat launching facilities; protect supports the continued maintenance of these structures and location of the coast in the low change scenario. The sports fields at Mount Wellington War Memorial Reserve are identified as being exposed to coastal inundation flooding in the low change scenario, with the landward extent (and depth) increasing in the moderate to high change scenario. While club facilities (Mount Wellington Tennis Club facilities and Marist Rugby Clubrooms and Dunkirk Road Community Centre building) are elevated, the associated fields and open space areas, which are highly valued and utilised, will be exposed over time. Adaptation priority is identified to signal the need for proactive planning for the management of risk and continued functionality of these facilities.				
Implementation Notes				
• Adaptation priority in the moderate scenario reflects the need to consider how increasing inundation exposure, including the potential for wave overtopping scour and inundation impacts can be responded to. It provides for proactive engagement with communities to consider future uses and management of Dunkirk Reserve depending on the frequency of inundation. • Ecology: A variety of endangered seabirds use this stretch for feeding, roosting, and breeding purposes. Engagement with the Ecology Team to seek advice on specific implementation actions to support ecological values is recommended. • Local Board and community: The Maungakiekie-Tāmaki Local Board has highlighted that the Marist Rugby Club is working through design for a multi-facility building/ upgrades for their current clubrooms. Discussions and ongoing engagement with the Club to ensure alignment in coastal management approaches will be required, noting that at present, the Marist Rugby Clubrooms are adequately elevated and not predicted to be impacted by coastal inundation flooding in the high climate change scenario.				

1.5: Panmure Wharf Reserve

This stretch covers the Panmure Wharf Reserve area. This is an important water access point and area used for maritime activities.

The low reclaimed reserve is armoured with a combination of engineered rock revetment and tipped rock. The site is developed with recreational and maritime related facilities. There are several local clubs/community groups that hold community ground leases for tenant-owned buildings (St Georges Rowing Club, Panmure Yachting and Boating Club) in addition to the commercial lease hardstand area east of the boat club building.

Scenarios for change		
Low	Moderate	High
Protect 	Adaptation Priority 	Adaptation Priority 
Explanation Boating access to the Tāmaki Estuary is highly valued, protect under the low change scenario indicates the continued maintenance of protection structures and the current alignment of the coast. Adaptation priority under the moderate and high change scenarios reflects the increasing exposure of these highly utilised areas to inundation risk and potential for increased damage to coast protection structures. Adaptation priority provides for proactive engagement with asset owners, users and communities to consider options to manage risks and consider potential options for alternative design and relocation of some of these facilities to retain their use.		
Implementation Notes - There are existing coastal defences in this stretch which can be maintained in the low change scenario to provide continued protection to assets and support access to important boat launching facilities. In the moderate climate change scenario, existing defences may not be sufficient to manage increasing erosion and inundation exposure. Ecology: This stretch provides important roosting and foraging habitat for shorebirds. Implementation of management strategies will need to consider identified ecological values.		

1.6: Kings Road to Lagoon Drive

Stretch 1.6 begins adjacent to Kings Road and extends down Tāmaki River Inlet until Lagoon Drive bridge. The stretch is predominantly residential with only one coastal esplanade reserve (Allenby Reserve).

Scenarios for change		
Low	Moderate	High
No action 	No action 	No action 
Explanation No action reflects there are few Council-owned assets exposed to hazards / risk along this stretch. There is a community ground lease for the Panmure Scout Group building situated on Allenby Reserve. The building is located landward of the identified erosion susceptibility area and is elevated with no identified inundation risk.		
Implementation Notes No action reflects the location of Council assets outside of coastal hazard areas. Coastal defences are not envisaged for this natural coastline. No action does not preclude the maintenance of wastewater infrastructure (Bridge Street pump station). No action does not preclude the management of risk to the seaward edge of the sealed carpark area at Allenby Reserve, including through landward redesign (if required). - Te Tira Hou Marae, affiliated with Ngai Tuhoe, is located within the stretch but is not exposed to hazards and is located back from the coast. Engagement with Ngai Tuhoe may assist in understanding the cultural values of the area.		

Unit 2: Panmure

Located within the Maungakiekie-Tāmaki Local Boards area, Unit 2 extends along the western shoreline of the upper reaches of Tāmaki River, from Panmure Bridge to the northern shoreline of Ōtāhuhu Creek in the south, including Panmure Lagoon and a coastal portion of Panmure and Mount Wellington areas. The predominant use of the coastal environment in Unit 2 is for open space activities, walkways, and recreational boating with several mooring areas and private jetties adjacent to Council reserve land. Land use is largely residential around Panmure Basin.

Significant transport infrastructure in this unit includes the South Eastern Highway and Pakuranga Highway. South of Pakuranga Highway Bridge, Bowden Foreshore Reserve is backed by industrial zoned land with several marine-based commercial businesses with associated private infrastructure.

What is happening? Coastal context and hazardscape

The main Tāmaki River channel narrows through the middle reaches of Tāmaki River and is confined between Mount Wellington in the west and Pakuranga in the east, before the river widens out to a sheltered tidal basin that branches out to the creeks in the upper reaches.

Through the middle reaches of Tāmaki River, the main channel is only 200-250 m wide. The western shoreline is characterised by low cliffs and with the deep channel located close to shore, there is only a narrow intertidal flat fronting the Mount Wellington/Ōtāhuhu shoreline. Due to the restricted fetch and shallow water depth, this is a low, wave-energy environment and a thin band of mangroves fringes most of the shoreline, with increasing density in embayments and infilling the upper Ōtāhuhu Creek inlet.

Panmure Basin is a tidal lagoon located on the western shoreline of Tāmaki River. The shallow basin is a highly sheltered coastal environment being a nearly entirely enclosed area, connected to Tāmaki River by a narrow entrance channel. The perimeter is characterised by exposed lava flows and lapilli deposits from Mt Wellington that mantle the northwest rim of the lagoon crater.

Coastal erosion and instability

The low cliff shoreline of the main Tāmaki River channel is within the predicted ASCIE over the low to moderate change scenario, and this is predicted to impact the full width of reserve in the high change scenario with the impacts of sea-level rise.

The regional ASCIE lines indicate that a narrow margin around Panmure Basin to be at risk to coastal erosion encompassing the seawall, parts of the walkway and the public toilet at Peterson Reserve, however the risk does not change significantly from the low to high change scenario.

At Ian Shaw Park, the Auckland Rowing Club building and majority of the open space reserve and parking is landward of the erosion susceptibility area in the high change scenario, however the ramp and landing pontoon approach is within the low climate change scenario ASCIE. The parking area at Flat Rock Reserve is also within the predicted ASCIE extent in the low change scenario, along with the southern reclaimed reserve area. The coastal edge along this section is armoured with tipped rock that extends to the north and south of the ramp and pontoon jetty.

Council assets (wastewater infrastructure and park amenities) along the northern shoreline of the Ōtāhuhu Creek embayment are set an adequate distance landward of the predicted extent in high change scenario.

Coastal management through this unit includes armouring around the perimeter of Panmure Basin and localised sections of tipped rock at Flat Rock Reserve. Native vegetation including established mangroves fringe the southern part of the shoreline in this unit. Some of key features include:

On the western shoreline of Panmure Basin, the reserve and Panmure Sailing Club facilities are armoured with a low seawall and several stormwater outfalls forming low groyne structures that retain narrow beach areas. Localised beach nourishment was undertaken in the late 1990s by former Auckland City Council to improve recreational amenity and facilitate beach launching.



Panmure Sailing Club located on the western shoreline of Panmure Basin (Source: Auckland Council)

The edge of Panmure Basin is armoured with a rock masonry seawall of varying height and condition. A circumferential walkway has been developed on the reserve around Panmure Basin that connects with Waipuna foreshore walkway to the south.



Panmure Basin walkway and basin perimeter armoured with rock masonry seawall (Source: Auckland Council)

The coastal edge along Flat Rock Reserve is armoured with tipped rock that extends to the north of the ramp and pontoon jetty and around southern reclaimed reserve area.



Flat Rock reserve edged with tipped rock armour. Source: Auckland Council

Coastal inundation

Coastal inundation flooding is predicted to impact low-lying sections of the Panmure Basin walkway along all but the more elevated section around the south eastern side of the basin. The inundation extent increases to the reserve area around Panmure Sailing Club building, children's playground and most of the parking area in the western basin. In the moderate to high change scenario, the flooding extent will impact the boat storage sheds. Lagoon Drive is within the coastal flooding inundation extent in the long term. At Peterson Reserve, part of the accessway and some carparks are within the moderate change coastal inundation extent, with a greater area of reserve impacted in the high change scenario that will affect more carparks, community lease building (Waipuna Ski Club) and the Panmure model railway.

Coastal inundation only impacts the margin of the steep low banks on the main Tāmaki River channel. At the Waipuna Road East access point, the most seaward row of dinghy lockers will be impacted in the moderate change scenario, increasing to much of the storage area in the high scenario with 2 m sea-level rise. The carpark in front of the Auckland Rowing Club building at Ian Shaw Park is within the present day 1% AEP coastal inundation flooding extent. In the low change scenario, the building will be impacted, with a greater extent in the moderate to high change scenario. Flat Rock Reserve carpark is within the predicted coastal inundation flooding extent in the low change scenario. The majority of the grass esplanade reserve area around Ōtāhuhu Creek will be inundated in a high change scenario.

Catchment flooding

Flood plains and overland flow paths are mapped to these generally lower-lying areas and areas further inland of the catchment.

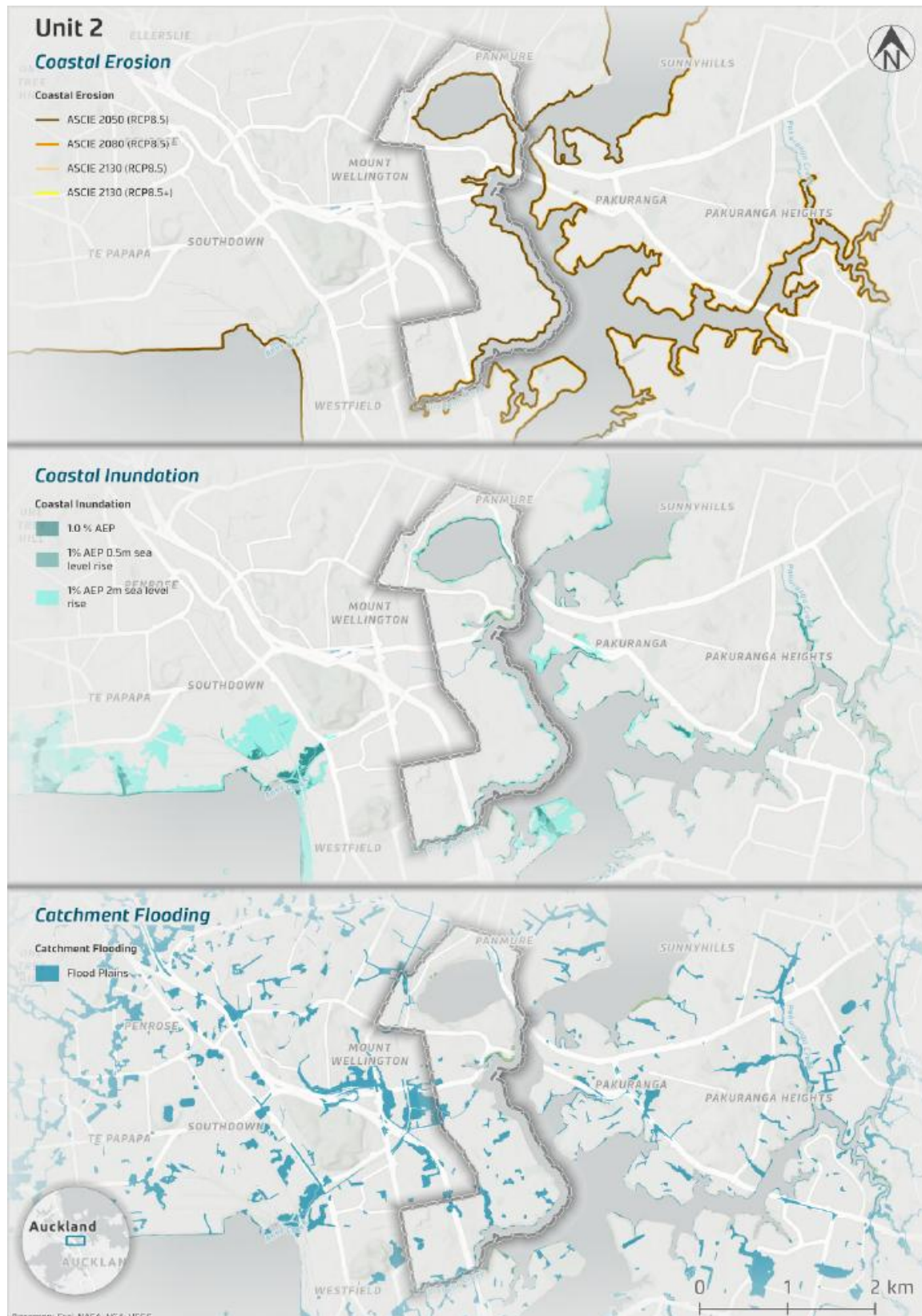


Figure 3: Coastal hazardscape for the Panmure Unit reflecting coastal erosion susceptibility for 2050, 2080 and 2130 considering RCP4.5 and RCP8.5 emission scenarios, coastal inundation for 1%AEP storm surge for present day and with 0.5 m, 1 m and 2 m sea-level rise and the identification of flood plains.



Risk assessment

The risk table represents key groups of assets (e.g. Auckland Council-owned land, buildings, road extents) which are supported by the regionally consistent data set.

The risk assessment provides a regionally consistent method for comparing risk to Auckland Council-owned land and assets allowing for identification of areas with highest risk for potential future assessment (e.g. Series 2).

The table below summarises the risk levels for Auckland Council asset types in the short, medium, and long-term using the low, moderate and high climate scenarios.

Council-owned land			Council Community facilities			Transport infrastructure			Water infrastructure		
Park and reserve land, 37.8 ha			Park amenity structures, car parks, 2.4 ha Buildings, wharves, 40 No.			Bridges, 2,558 m ² AT roads 25.4 km			Water pipes, 144.6 km		
Short	Medium	Long	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long
Coastal erosion and susceptibility											
Moderate	Moderate	Moderate	High	Very High	Very High	High	High	Very High	Moderate	High	High
Coastal inundation											
Low	Moderate	Moderate	Very High	Very High	Very High	Very High	Very High	Very High	Low	Moderate	Moderate
Key											
None			Low			Moderate			High		Very High

What matters most



Auckland Council land and assets: This section identifies key Auckland Council-owned land and assets within this unit that may be impacted by coastal hazards over changing climate scenarios.



- Numerous coastal esplanade reserves and inland parks (Panmure basin/Peterson Reserve), Waipuna Foreshore, Bowden Foreshore Reserve, Ian Shaw Park, Flat Rock Reserve, Portage Canal Foreshore Reserve, Walters Foreshore Reserve.



- Public amenities:** Panmure Basin and Ian Shaw Park, Rowing, Sailing Club Panmure Reserve.
- Other Auckland Council and/or tenant-owned buildings with Community leases include Auckland Rowing Club (Ian Shaw Park) Panmure Lagoon Sailing Club, Waipuna Water Ski Club, Model & Experimental Engineers building, and public amenity buildings / toilets.



- Wastewater:** Multiple wastewater pump stations located near the coastal edge and pipelines traverse this unit both on land and within the coastal marine area (sea), including Panmure Basin, Watene Road, Panama Road.



- Key road networks:** Lagoon Drive, Pakuranga Highway, Southern Motorway.
- Key pathway connections:** McCullough Walkway / Panmure Basin Path surrounds the perimeter of Panmure Basin, Portage Canal Foreshore Reserve.



- Harbour access:** Key access points at Panmure Basin (high tide only), Waipuna East Reserve (dinghy access to moorings), Ian Shaw Park ramp and pontoons (rowing facility), Flat Rock reserve (ramp and pontoon).

Social, cultural and ecological context: This section identifies key social, cultural and ecological matters, identified throughout the development of the SAP reports, that may be impacted by coastal hazards (inclusive of catchment flooding) over changing climate scenarios.



- Te Kai o Hikuwaru (Panmure Basin) is of high cultural significance to local iwi, as discussed in detail with Te Akitai Waihoua. In the time of Te Waiohūa, Te Kai o Hikuwaru was used as a waka carving and landing site and entire fleet of waka were sculpted and maintained at the whare waka for the paramount chiefs of Te Waiohūa through to the time of Kiwi Tāmaki. Te Waiohūa also occupied and cultivated the nearby lands at Waipuna down through to Ōtāhuhu to take advantage of both Manukau Harbour to the west and Te Wai-o-Taiki to the east.
- Specific cultural values and outcomes for this unit will be developed through ongoing involvement with local iwi identified in Volume 2. Guiding objectives and outcomes which have informed the development of adaptation strategies have been identified in Volume 2.



- The southern half of the Panmure Basin is designated for water sports. Panmure Sailing Club and Water Ski Club have facilities on the shore of Panmure Basin.
- Outstanding natural feature Panmure Basin volcano.
- There are numerous privately-owned jetties and moorings adjacent to Waipuna East Reserve.
- Access to important community facilities within this stretch include Lagoon Leisure Centre, public toilets, Swimarama Lagoon Pool & Leisure Outdoor Dive Pool, Mt Wellington War Memorial sports fields.



- The Panmure Basin Reserve is recognised as an important high tide bird roost. Colonies of red-billed gull (At Risk – Declining), pied shag (At Risk – Declining) and white-fronted tern (At Risk – Declining) at have been recorded utilising this roost.
- Van Damm’s Lagoon, a 0.4 ha *Machaerina* sedgeland is located to the west of the Panmure Basin Reserve.



Who have we heard from?

Feedback was received via Social Pinpoint and ‘AK Have Your Say’ survey. Key themes in community submissions/ responses included but were not limited to:

- A desire to see environmental restoration of Panmure Basin, including to address sedimentation.
- The coastline across Unit 2 and the wider Tāmaki Estuary is an important breeding habitat for native bird species such as pied shags, little shags, and red-billed gulls—all of which face increasing threats from sea-level rise. This needs to be taken into consideration in coastal management approaches.
- Coastal management approaches should protect and expand shorebird roosting and nesting areas to support vulnerable species and maintain ecological balance.
- Advocacy for coastal walkways and connections, noting a high degree of community feedback highlighted the importance of walkways around the Panmure Basin.
- Supporting community groups and water-based sports clubs that use Panmure Basin and the wider coastline in this unit to access the coast (maintain assets and facilities across this unit).
- Advocacy to move development away from flood-prone areas and educate people on flood risk to ensure locals can make informed choice about where they live.

What can we do about it? Adaptation strategy summary for Unit 2.



2.1: Panmure Basin (Lagoon Drive to Cleary Road end)

Stretch 2.1 begins at Lagoon Drive bridge and extends along the eastern shoreline of Panmure Basin to Cleary Road end. Panmure Basin is an important site for the local community, providing for informal recreation (walking, cycling and water sports) as well as being home to several community groups such as sports and boating clubs.

Scenarios for change		
Low	Moderate	High
Protect 	Protect 	Protect 
Explanation Panmure Basin is highly valued by the community. Historic coastal protection has modified the coastal edge, including through the development of key transport linkages. Protect recognises that ongoing maintenance will be required to existing coastal protection structures. Under the low change scenario, Council-owned facilities, including Swimarama Lagoon Pool, are not directly exposed to coastal erosion or inundation flooding risk. Under the moderate and high climate scenarios, consideration of how risk from coastal hazards may require the consideration of further adaptation measures with increasing coastal inundation from sea-level rise, in particular access to and along the coastal edge. Protect over all scenarios recognises the Lagoon Drive transport connection and key community facilities, and importance of continuity of access to these facilities (including proactive management of carparking areas). This strategy recognises future reserve edge enhancements to promote public access connections to and along the coastal margin. In the low to moderate climate change scenarios, protect indicates ongoing management and maintenance of existing assets including seawalls. In the high change scenario, increased exposure to inundation may impact accessibility and use. Consideration of the alignment and design of assets may be required to sustainably manage Council-owned land and assets alongside the continued maintenance of defences at the coastal edge.		
Implementation Notes • Cultural: Te Kai o Hikuwaru (Panmure Basin) is of high cultural significance to local iwi. Ongoing engagement with local iwi will be required. • Ecology: Opportunity to consider the incorporation of nature-based elements in the design of hard coastal protection responses as part of future reserve edge enhancements to promote public access connections to and along Panmure Basin. • Management: This strategy does not preclude localised interventions as required for roading connections. Auckland Transport, the asset manager, will monitor how coastal hazards may impact on operation of these assets and future implementation options. • Local Board and community: The Maungakiekie-Tāmaki Local Board has highlighted that the local community has started working on a Greenways Plan for this area. Discussions and ongoing engagement with the local board and communities to ensure alignment in coastal management approaches and future greenways plans will be required.		

2.2: Panmure Basin (to Cove Lane)

Stretch 2.2 begins west of Cleary Road and continues in an anti-clockwise direction around Panmure Basin, culminating adjacent to the end of Cove Lane on the southeastern shoreline. Panmure Basin is an important site for the local community, providing for informal recreation (walking, cycling and water sports) as well as being home to several community groups such as sports and boating clubs with community leases.

Scenarios for change		
Low	Moderate	High
Maintain 	Maintain 	Adaptation priority 
Explanation Maintain in the low and moderate change scenarios recognises the importance of walking access and recreational facilities adjacent to Panmure Basin. Future reserve edge enhancements that promote public access connections to and along the coastal margin will need to be adaptive and should seek to integrate nature-based elements, recognising the significance of the geological exposure and opportunities for ecological restoration. In the high change scenario, increased inundation exposure could impact accessibility and use of reserve areas and associated assets. Adaptation priority reflects the need for proactive engagement noting the highly utilised nature of the coastal stretch including walkways, park amenities and community lease areas noting there are a number of groups with facilities adjacent to Panmure Basin.		
Implementation Notes • Maintain reflects the continued maintenance of assets and protection structures which enable access and the importance of continuing public connectivity around the basin through local walkways. In the low to moderate climate change scenarios, management of risk may be through design and location of assets and through maintenance of existing assets including seawalls, utilising re-alignment where required. • Adaptation priority promotes consideration of the design and location of assets in collaboration with local user groups. • Cultural: Te Kai o Hikuwaru (Panmure Basin) is of high cultural significance to local iwi. Ongoing engagement with local iwi will be required.		

2.3: Cove Road to Waipuna East Road end

Stretch 2.3 begins opposite the Cove Lane cul-de-sac and extends east around Panmure Basin and then south along Tāmaki River Inlet until the end of Waipuna East Road. Land use along the coastal margin in this stretch comprises residential housing and there are numerous private jetties adjacent to the Auckland Council reserve. In the main Tāmaki River, there are several mooring areas within the sheltered mid reaches. Pile moorings along the western shore are accessed from ramp and dinghy lockers at the end of Waipuna East Road end.

Scenarios for change		
Low	Moderate	High
Maintain 	Maintain 	Maintain 
Explanation The coastal walkway along Waipuna Foreshore Reserve is a highly valued community asset. The road end at Waipuna East Road is an important access point to the estuary, with existing ramp and pontoon structures providing access to the adjacent moorings. Maintain reflects the importance of this access. Pile moorings along the western shore are accessed from ramp and dinghy lockers at the end of Waipuna East Road end.		
Implementation Notes • Maintain provides for flexibility for future management of the coastal walkway, and to ensure ongoing connectivity to Tāmaki River for boat launching and access to adjacent moorings. • Maintain does not indicate the need for, or use of, coastal defences within this stretch. Management of risk through design and location of assets is preferred.		

2.4: Waipuna East Reserve to Ian Shaw Park

Stretch 2.4 begins at Waipuna East Reserve and extends south along Tāmaki River Inlet until the boundary of Ian Shaw Park. Pakuranga Highway traverses the stretch. Land use along the coastal margin in this stretch comprises of residential and industrial / commercial zones. In the main Tāmaki River, there are several mooring areas within the sheltered mid reaches. Pile moorings along the western shore are accessed from ramp and dinghy lockers at the end of Waipuna Road East, and there are numerous private jetties adjacent to the Auckland Council reserve.

The upper inlet is lined with mature mangrove vegetation and there are multiple SEAs within the stretch. These areas are highly valued for the natural protection they provide by buffering the shoreline.

Scenarios for change		
Low	Moderate	High
Maintain 	Maintain 	Maintain 
Explanation Auckland Council-owned assets in this stretch include reserves/parkland and road ends with water infrastructure generally set back from the coastal edge. The strategies apply to Council land and assets only, and not privately-owned commercial land.		
Implementation Notes • Maintain provides for the continued management of risk to Council land and assets only, including the management of connections to the coast for Council assets. • Maintain does not indicate the need for, or use of, coastal defences more generally within this stretch. The preference is for nature-based solutions, such as support for natural mangrove buffers.		

Scenarios for change		
Low	Moderate	High
• Management: This strategy does not preclude localised interventions as required for roading connections. Auckland Transport, the asset manager, will monitor how coastal hazards may impact on operation of these assets and future implementation options.		

2.5: Ian Shaw Park and Flat Rock Reserve north

This stretch includes Ian Shaw Park and extends south along the Tāmaki River Inlet shoreline including the northern area of Flat Rock Reserve that has been developed with structures providing boat launching access.

Valued boat launching access is provided within this highly urbanised area, at Ian Shaw Park and Flat Rock Reserve. Ian Shaw Park includes club rooms and a public toilet building that is jointly owned by Auckland Council and Auckland Rowing Club.

Scenarios for change		
Low	Moderate	High
Maintain 	Adaptation priority 	Adaptation priority 
Explanation Maintain approach under a low climate change scenario reflects the need for the continued maintenance of access to the coast and the management of risk to assets and uses located within the reserve areas (boat launching access), including protection structures which support these uses. Maintain provides for ongoing use and functionality of the carpark and to allow access to the boat ramp. Considering increased exposure to coastal inundation under a moderate to high climate change scenario, along with community value of harbour access, adaptation priority is identified to provide for proactive engagement and collaborative management of Council land and assets exposed with local communities, asset owners and local iwi.		
Implementation Notes • Ecology: This stretch provides important roosting and foraging habitat for shorebirds. Engagement with the Ecology Team to seek advice on specific implementation actions to support ecological values.		

2.6: Panama Road South

This stretch includes the southern part of Flat Rock Reserve and extends west along the narrow strip of reserve-fronting residential properties, until the wider section of Flat Rock Reserve with the playground facilities.

Scenarios for change		
Low	Moderate	High
No action 	No action 	No action 
Explanation The reserve has a natural coastal edge. Public access is available along the reserve, however there is no formed walkway currently located within this stretch. No action reflects the low exposure of isolated Council-owned assets, including the Panama Road pump station that is set back from the coastal edge in this low energy environment.		
Implementation Notes • Future management: Informal connectivity along the coastal margin is identified for areas of this stretch, no action does not preclude the review of strategies should greenways connections be established in future. Noting that alignment of assets to avoid hazard areas is preferable. • No action does not preclude management of risk to water infrastructure to avoid or mitigate inundation risk in the high change scenario. • Ecology: This stretch provides important roosting and foraging habitat for shorebirds. This strategy does not preclude ongoing support for ecological values of the area.		

2.7: Flat Rock Reserve (Play facilities and SH1 Motorway connection)

This stretch includes central areas of Flat Rock Reserve (opposite Bernard Street) that have been developed with recreational play facilities and extends southwest including the Southern Motorway (NZ Transport Agency owned/operated).

This stretch includes the reserve landholdings and the narrow esplanade reserve between the playground and southern motorway being densely vegetated, limiting public access.

Scenarios for change		
Low	Moderate	High
Maintain 	Maintain 	Maintain 
Explanation Maintain relates to the management of risk to Auckland Council interests in major infrastructure (including shared path connections) and water infrastructure which traverses this stretch. Management of risk to existing assets, such as the playground, including basketball half-court, through landward setback from the coastal edge is encouraged.		

Scenarios for change		
Low	Moderate	High
Implementation Notes - A maintain approach under all scenarios recognises the Waka Kotahi Southern Motorway causeway (and associated Auckland Council/Transport interest in shared pathway connections) as a critical transport connection. Ecology: This stretch provides important roosting and foraging habitat for shorebirds. Implementation action may need to respond to ecological values.		

2.8: Te Tō Waka Ōtāhuhu portage

This stretch extends west from the Southern Motorway (SH1) along Walters Foreshore Reserve to the head of Ōtāhuhu Creek. The stretch encompasses both reserves and residential areas. A small section of Te To Waka Ōtāhuhu, which is a site of significance to mana whenua, overlaps into the stretch area.

Scenarios for change		
Low	Moderate	High
No action 	No action 	No action 
Explanation No action is reflective that Walters Foreshore Reserve is undeveloped and there is limited public access connection along the densely vegetated margin of the upper inlet until the head of the creek where there are limited walkways in Portage Canal Foreshore Reserve.		
Implementation Notes No action reflects the general absence of Auckland Council-owned assets requiring management of risk from coastal hazards. This does not preclude the maintenance of existing pathways and water supply infrastructure. Ecology: This stretch provides important roosting and foraging habitat for shorebirds. Opportunity for the exploration of how implementation action can support ecological values is identified for this stretch.		



Unit 3

Tāmaki Estuary

Culturally significant landscapes traverse the Tāmaki Estuary with portages of high significance to local iwi, historically used as key transport routes via water across Tāmaki Makaurau (e.g. Te Tō Waka Ōtāhuhu portage)



Tāmaki River



Seaside Park



Wildlife refuge



Taamaki ki Taatahi (Seaside Park) is of high cultural significance to local iwi, with the te reo name lodged as part of the Te Kete Rukuruku submission, courtesy of Te Ākitai Waiohūa & Ngāti Te Ata. Taamaki ki Taatahi translates to 'Taamaki to the seaside' which is in reference to the Tāmaki River. Although the site is a landfill site it was once part of the Tāmaki Estuary and a significant site for bird habitat and bird feeding

Connections to the coast highly valued; increasing demand with increasing population



Curlew Bay

Avenue Road End Wharf

Stingers Point Reserve

Sheltered inner estuary environment, mangroves provide natural buffer for wave energy



Royal Auckland and Grange Golf Club



Middlemore Hospital key health care facility



Important area community ambitions for more connection flood hazards portage



Middlemore Railway Station



Hospital Rd

Grange Rd

- Unit boundary
- Stretch
- Walking tracks
- Informal recreation park

0 500m 1km

Unit 3: Ōtāhuhu

Unit 3 extends along the south-western sub-arms of Tāmaki River around Ōtāhuhu Peninsula, covering the southern shoreline of Ōtāhuhu Creek and western shoreline of Middlemore Creek, including the small headland on which Taamaki ki Taatahi/ Seaside Park is located. This unit is within the Māngere-Ōtāhuhu Local Board area, with the exception of Stretch 3.6 that is within the Ōtara Papatoetoe Local Board area.

What is happening? Coastal context and hazardscape

The upper reaches of Tāmaki River are generally a low wave-energy environment. The narrow channel and surrounding landform limit fetch, and the wide shallow intertidal area limits depth for locally generated wind waves. Ōtāhuhu Creek and Middlemore Creek are southwestern arms of the Tāmaki River system approximately 12 km from the mouth of the Tāmaki River, with mudflats and dense mangrove habitat fringing the upper reaches. Estuarine environments are generally considered to be depositional due to the low-energy regime and the presence of mangrove habitat with sediment and vegetation accreting on the intertidal area.

Ōtāhuhu Peninsula was significantly modified by reclamation and the operation of the Brady landfill between 1959 and 1982. Over this period, 15.6 ha had been reclaimed which lengthened the peninsula by around 400 m to the northwest into Tāmaki Estuary. Within this unit, the most exposed section of shoreline is the headland at Taamaki ki Taatahi/ Seaside Park, although the fetch distance is small and wave energy is low.

Coastal erosion and instability

There is low overall risk of coastal erosion along the sheltered mangrove infilled embayments in the upper arms of the Tāmaki River. The reclaimed coastal margin of Taamaki ki Taatahi/ Seaside Park is armoured by a large rock revetment. However, there remains an ongoing erosion risk in the form of coastal structure degradation and erosion to any unprotected seaward faces from overtopping that will require ongoing maintenance and potential upgrades with ongoing sea-level rise.

Coastal management approaches in this unit include armouring the perimeter of Taamaki ki Taatahi/ Seaside Park, and Huia-tau / Schroffs Reserve. Along the Middlemore Creek shoreline to the south of Seaside Park there is a range of privately-owned coastal structures, some of which are consented, that provide for private access to the foreshore or limited erosion protection. Some key features are as follows:

Seaside Park (historic closed landfill) is armoured with rock revetment around the perimeter.



Taamaki ki Taatahi/ Seaside Park (Source: Oxcon. CLL Ltd)

Huia-tau / Schroffs Reserve is a triangular reclamation armoured with a masonry seawall, with two steep concrete access ramps. Abandoned clubrooms, previously Ōtāhuhu Sailing Club, are located in the coastal marine area to the east of Huia-tau / Schroffs Reserve.



Huia-tau / Schroffs Reserve (Avenue Road East). Source: Auckland Council

Coastal inundation

Coastal inundation flooding will have the greatest impact at Taamaki ki Taatahi/ Seaside Park and adjacent land to the west, including parts of Brady Road and Murdoch Street. In the moderate to high change scenario, coastal inundation flooding is predicted to impact a significant area of sports fields and associated amenity facilities at Taamaki ki Taatahi/ Seaside Park including community lease buildings and stormwater detention ponds, as well as along Brady Road and Murdoch Street. Huia-tau / Schroffs Reserve and low-lying areas of the golf course adjacent to Middlemore Creek are predicted to be inundated in the high change scenario.

Catchment flooding

Flooding in this unit is predominantly isolated to overland paths traversing the coastal margin. Flood plains and overland flow paths are mapped to these generally lower-lying areas.

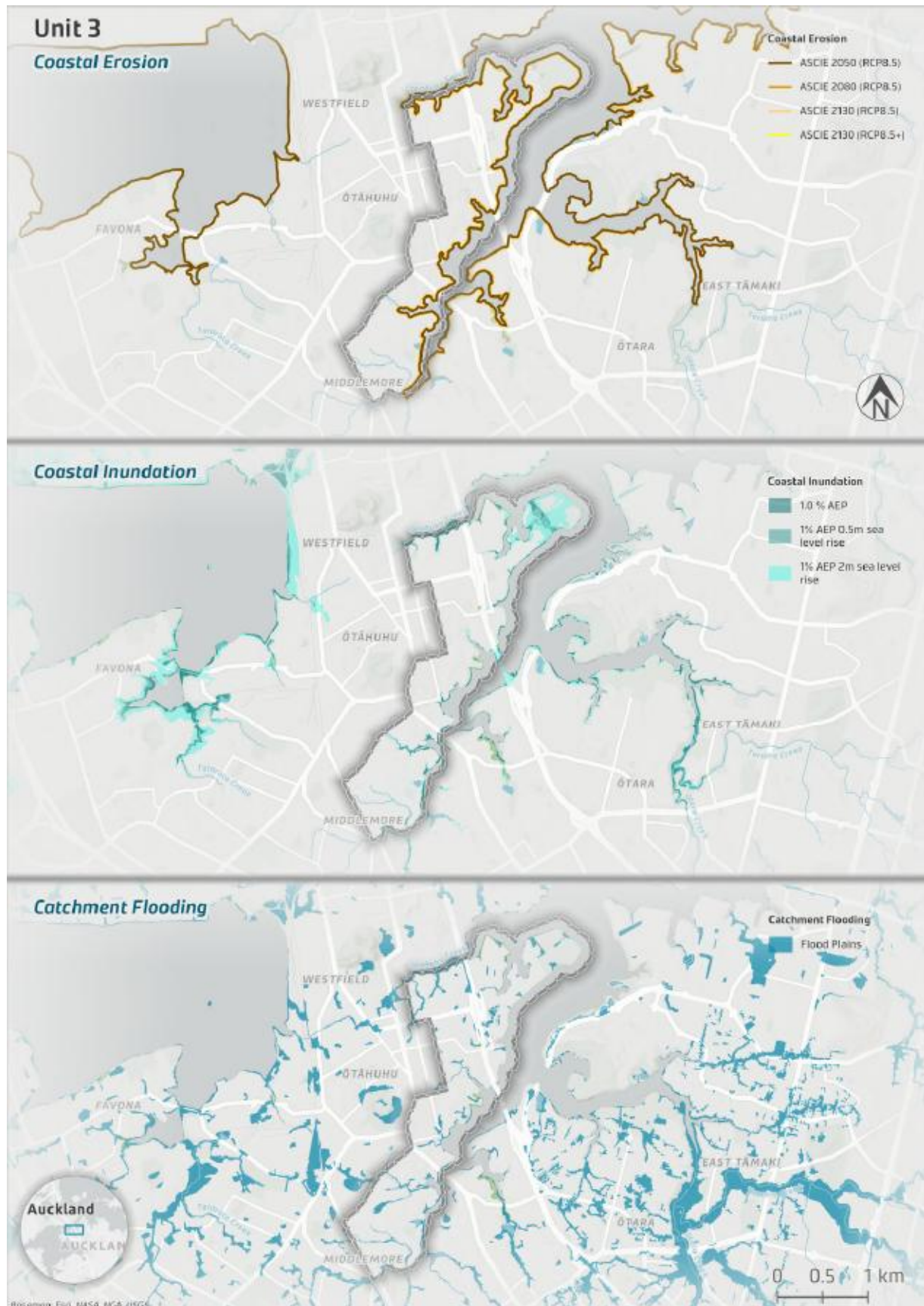


Figure 4: Coastal hazardscape for the Ōtāhuhu Unit reflecting coastal erosion susceptibility for 2050, 2080 and 2130 considering RCP4.5 and RCP8.5 emission scenarios, coastal inundation for 1%AEP storm surge for present day and with 0.5 m, 1 m and 2 m sea-level rise and the identification of flood plains.



Risk assessment

The risk table represents key groups of assets (e.g. Auckland Council-owned land, buildings, road extents) which are supported by the regionally consistent data set.

The risk assessment provides a regionally consistent method for comparing risk to Auckland Council-owned land and assets allowing for identification of areas with highest risk for potential future assessment (e.g. Series 2).

The table below summarises the risk levels for Auckland Council asset types in the short, medium, and long-term using the low, moderate and high climate scenarios.

Council-owned land			Council Community facilities			Transport infrastructure			Water infrastructure		
Park and reserve land, 24.4 ha			Park amenity structures, carparks, 0.7 ha Buildings, wharves, 12 No.			Bridges, 136.2 m ² AT roads 15.4 km			Water pipes, 98.7 km		
Short	Medium	Long	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long
Coastal erosion and susceptibility											
Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Low	Low	Moderate	Moderate	Moderate	High
Coastal inundation											
Moderate	Moderate	Moderate	High	High	Very High	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Key											
None			Low			Moderate			High		Very High

What matters most



Auckland Council land and assets: This section identifies key Auckland Council-owned land and assets within this unit that may be impacted by coastal hazards over changing climate scenarios.



- **Open space parks** near the coast: Taamaki ki Taatahi/ Seaside Park, Huia-tau / Schroffs Reserve, and Ō-kahawai / Stringers Point Reserve, Wai-makau / Joe F Stanley Park.



- **Park amenities:** Sports fields and toilets (Taamaki ki Taatahi/ Seaside Park), Ōtāhuhu Cemetery.



- **Closed landfills:** Seaside Park.



- **Water infrastructure:** Two wastewater pump stations located near the coastal edge (Joe Stanley Place; Jane Cowie Place) and multiple pipelines traverse this unit both on land and within the coastal marine area (sea).



- **Key road networks:** SH1 (Southern Motorway), Great South Road.
- **Key pathway connections:** Seaside Park Path.
- **Harbour access:** Boat ramps (Taamaki ki Taatahi/ Seaside Park).

Social, cultural and ecological context: This section identifies key social, cultural and ecological matters, identified through the development of the SAP reports, that may be impacted by coastal hazards over changing climate scenarios.



- Taamaki ki Taatahi (Seaside Park) is of high cultural significance to local iwi, with the te reo name lodged as part of the Te Kete Rukuruku submission, courtesy of Te Ākitai Waiohūa & Ngāti Te Ata.
- As described by Te Akitai Waihoua, the original headland - now roughly traced by the extremities of the extant residential properties to the north of Brady Road and the playground to the south - was of immense strategic importance to Te Waiohūa.
- Control of the headland meant control of trade and communications to Te Manuka, to the immediate west via the Ōtāhuhu portage, and to the south via portage routes now largely forgotten and unable to be distinguished due to land use change.
- Specific cultural values and outcomes for this unit will be developed through ongoing involvement with local iwi identified in Volume 2. Guiding objectives and outcomes which have informed the development of adaptation strategies have been identified in Volume 2.



- Taamaki ki Taatahi/ Seaside park sports fields provide for clubs and sporting facilities including; Badminton Club, Ōtāhuhu United AFC Club, Royal Auckland and Grange Golf Club.
- Historic heritage: St. Mary's Home and Chapel, including Jane Cowie building.



- Important critical and social infrastructure includes nearby Middlemore Hospital.
- This unit is characterised by areas of mangrove forest and scrub and intertidal flats which provide important habitat and feeding ground for wading birds.
- A raupō reedland wetland is located in a smaller area near Middlemore Hospital.
- A population of copper skink has been recently translocated to the vegetation surrounding Taamaki ki Taatahi/ Seaside Park.

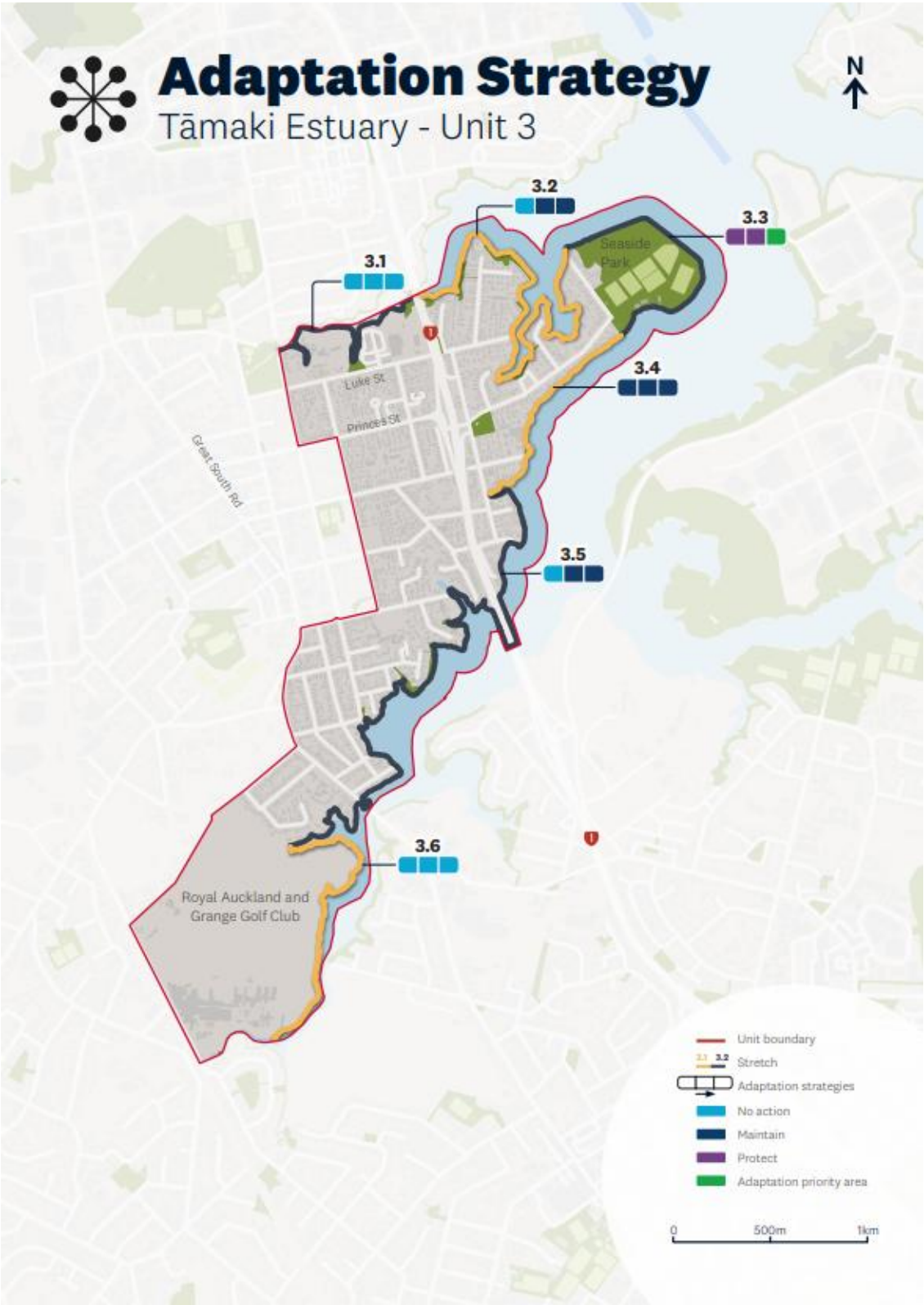


Who have we heard from?

Feedback was received via Social Pinpoint and 'AK Have Your Say' survey. Key themes in community submissions/ responses included but were not limited to:

- Community concern of flooding and erosion along the coastal margin impacting safe use of Council assets and facilities.
- Preservation of transport assets (roading connections) and the need to maintain ongoing public access to and along the coast via walkways and road networks.
- Development on marginal, flood-prone, and slip-prone land should be progressively phased out to reduce long-term risk to people, property, and the environment.
- Taamaki ki Taatahi/ Seaside Park is valued as a place to be close to the water, offering a sense of peace and a deep spiritual connection to the natural environment.
- A call for stronger enforcement measures to protect local marine life and to preserve the cultural heritage of the wider landscape in this unit.

What can we do about it? Adaptation strategy summary for Unit 3.



3.1 Te Tō Waka Ōtāhuhu Portage to SH1 Motorway

Stretch 3.1 begins at Te To Waka Ōtāhuhu portage, just west of Ōtāhuhu Intermediate School and ends at the western side of the motorway. There are unconnected esplanade reserves within the stretch, with limited accessibility for the public.

Scenarios for change			
Low		Moderate	High
No action		No action	
Explanation No action reflects there are few assets located within proximity to the coastal edge within the identified Council landholdings. The playground on Tōanga-waka/ Luke Street Reserve is elevated and set back from the coastal edge and the wastewater pump station in this stretch is also elevated. The predominantly natural coastal edge is both vegetated and the inlet fringed with established mangroves. Landscape and ecological values within this coastal stretch support maintenance of a vegetated and natural coastal edge.			
Implementation Notes No action does not preclude continued maintenance and protection of the ecological, cultural and heritage features within the stretch. No action does not preclude management of risk from catchment flood hazards to address local issues.			

3.2 SH1 Motorway to Taamaki ki Taatahi/ Seaside Park

Stretch 3.2 begins at the Southern Motorway (SH1) and extends east to the northern border of Taamaki ki Taatahi/ Seaside Park.

Scenarios for change			
Low		Moderate	High
No action		Maintain	
Explanation There are unconnected esplanade reserves within the stretch, with limited accessibility along the coast for the public. Parts of the local road network are predicted to be impacted by coastal inundation flooding.			
Implementation Notes No Action reflects the current limited accessibility and associated assets along this frontage. Maintain reflects the coastal flooding inundation risk to low-lying land in this section and impact to local roads (Murdoch Street and Brady Road) in the moderate and high change scenarios. The predominantly natural coastal edge is both vegetated and the inlet fringed with established mangroves. Modification of the coastal edge is not a preferred outcome due to the landscape and ecological values within this coastal stretch.			

3.3 Taamaki ki Taatahi/ Seaside Park

Stretch 3.3 encompasses Taamaki ki Taatahi/ Seaside Park on the northeastern side of Ōtāhuhu, accessed from Princes Street East and Brady Street. Seaside Park is a closed landfill that has been developed for both passive and active recreation, with an area of wildlife refuge.

Scenarios for change		
Low	Moderate	High
Protect 	Protect 	Adaptation priority 
Explanation The area is now known as Seaside Park Closed Landfill. It has been developed with sports facilities on the southern park utilised by Ōtāhuhu United AFC, Ōtāhuhu Badminton Club and Gambia Sea Cadets. A public boat ramp along the southern boundary provides access to Tāmaki River. The northern portion of the site is the area of the historic landfill and now includes a fenced wildlife area, raised viewing mounds, a stormwater detention basin, and a wetland area with public access paths.		
Implementation Notes • Closed landfills: The park is an historic closed landfill site and is managed separately through the Closed Landfill Asset Management Plan. • The coastal margin of Seaside Park is protected by engineered hard protection structures, in combination with areas of enhanced salt marsh habitat. Protect is appropriate over the low to moderate change scenario with the hard protection structures designed to hold the current location of the coastal edge. • Adaptation priority signals engagement with stakeholders to consider future options to enable continuation of services and activities within the recreational park land with regards to the future longer-term effects of sea-level rise in the high climate change scenario. • Cultural: As set out in the unit context, Taamaki ki Taatahi (Seaside Park) holds significant cultural value for local iwi. Ongoing early engagement with local iwi to understand cultural values associated with this stretch and the potential impact of management approaches will be required in the implementation of adaptation strategies.		

3.4 Taamaki ki Taatahi/ Seaside Park to Huia-tau /Schroffs Reserve

Stretch 3.4 begins at the southern border of Taamaki ki Taatahi/ Seaside Park and culminates at Shroffs Beach Reserve at the end of Avenue Road East. The stretch encompasses residential areas surrounding Princes Street East, along with Tauwhanga / Princes Street East Esplanade Reserve.

Scenarios for change		
Low	Moderate	High
Maintain 	Maintain 	Maintain 
Explanation Shroffs Beach Reserve within the stretch includes a boat ramp with access to Tāmaki River Inlet. There is currently no continuous esplanade reserve connection between Huia-tau/ Shroffs Reserve and Taamaki ki Taatahi/ Seaside Park, however aspirations for future greenways include this area.		
Implementation Notes - Avenue East Road end, boat ramp and associated carpark at Huia-tau / Schroffs Reserve are exposed in all time frames. Maintain is recommended reflecting the likely need for ongoing maintenance to allow for continued access, and potential realignment of the road end/carpark as the coastline recedes, including maintenance of existing protection structures. Cultural: While outside of the stretch boundary, there is a cultural heritage area inland from this stretch (Te Tapuwae o Mataaoho). Engagement with mana whenua may assist in understanding the cultural values of the area and how this may inform adaptation planning. Ecology: This stretch provides important roosting and foraging habitat for shorebirds.		

3.5 Frank Grey Place to Golf Course

Stretch 3.5 begins at the small side inlet that extends to Frank Grey Place ,extends over 2 km south along the western shoreline of the creek culminating at the head of the side creek bordering Grange Golf Course, at the boundary of the Māngere-Ōtāhuhu Local Board area. It encompasses Tai-karanga-manu / Curlew Bay and Ō-kahawai / Stringers Reserve and is traversed by the Southern Motorway. The area is largely residential with limited and unconnected esplanade reserves (Oo-tautuutuu / Frank Grey Esplanade Reserve) along this shoreline with isolated access points to the inlet.

Scenarios for change		
Low	Moderate	High
No action 	Maintain 	Maintain 
Explanation The shoreline of the upper inlet is largely natural and fringed with mangroves. There are relatively few Council assets within this stretch; critical infrastructure (Southern Motorway) traverses the stretch. No action is selected under the low change scenario reflecting the low energy environment. No specific actions are identified due to limited exposure. Maintain in the moderate to high change scenario is reflective of the major infrastructure that traverses the stretch (motorway and water infrastructure), highly valued local reserves (Ō-kahawai / Stringers Reserve), local road ends identified as potentially exposed to coastal instability and inundation in future scenarios. Management of risk through location and design is the preferred approach, limiting engineered coastal protection for this natural coastal area.		
Implementation Notes Community: feedback supports preserving, maintaining and restoring access to the coast for the wellbeing of the local community.		

3.6 The Grange Auckland Golf Course

This stretch covers the upper Middlemore Creek around the western shoreline of the Grange Golf Course to the unit boundary and is within the Ōtara Papatoetoe Local Board area.

Scenarios for change					
Low		Moderate		High	
No action		No action		No action	
Explanation					
The upper inlet is largely in a natural state with existing vegetation providing a nature-based buffer to reserve areas. The golf course is privately-owned land. Public access to the upper reaches of the Ōtāhuhu Creek is limited due to the Royal Auckland and Grange Golf Clubs. No action is reflective of the absence of Auckland Council-owned land and assets requiring management of risk from coastal hazards. Connectivity to and along key transport routes (rail) and road networks to Middlemore Hospital, located to the west of the Grange Golf course, is a high priority noting the significance of the public health infrastructure to the wider South Auckland community.					
Implementation Notes					
No action is reflective of the lack of Council landholding and assets at risk along the stretch. This strategy does not preclude any management of risk from flood hazards, specifically in relation to roads or aspects of transport infrastructure (i.e in relation to Middlemore Hospital), should this be required. Ecology: This stretch provides important roosting and foraging habitat for shorebirds. Local Board views: Although the current strategy is No Action, the Ōtara-Papatoetoe Local Board has emphasised the critical importance of maintaining connectivity along key transport corridors to Middlemore Hospital. Management: This strategy does not preclude localised interventions as required for roading connections. Auckland Transport, the asset manager, will monitor how coastal hazards may impact on operation of these assets and future implementation options.					



Unit 4

Tāmaki Estuary



Highbrook Reserve/Park

Community commentary highlighted the issue of wastewater runoff into the estuary

Explosion Crater

Tāmaki River

Highbrook Park

Ngāti Ōtara Park

Curlew Bay

Historic harbour modification and weir

Plan Change 90 redevelopment area



Key industry and critical infrastructure



Ngāti Ōtara Marae

Franklyne Rd

Gaye Crest Esplanade



Ngā Kete Wānanga Marae

Johnstones Rd

Highbrook Path

Ōtara Rd

Ōtara path



Whalora Marae

Ōtara Creek Reserve

Ngāti Ōtara Park

Grange Rd

Royal Auckland & Grange Golf Club

Middlemore hospital

Esplanade Reserves

Watercare facility

Ōtara Rugby League Football Club

Billington Esplanade

Curlew Bay

Highbrook Path

Ōtara Rd

Franklyne Rd

Johnstones Rd

Harold Rd

Grange Rd

Ōtara Creek Reserve

Ngāti Ōtara Park

Highbrook Path

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Unit 4: Ōtara

This unit includes the eastern shore of Middlemore Creek and the Ōtara Creek shoreline within the Ōtara Papatoetoe Local Board area, and the area of Highbrook immediately north of Ōtara Creek entrance.

What is happening? Coastal context and hazardscape

The shoreline in this unit is predominantly a very low-energy sheltered estuarine environment in the upper reaches of Tāmaki River where the main channel diverges, with Middlemore Creek branching to the southwest and Ōtara Creek branching towards the southeast. The shallow inlets are typical of depositional zones in upper reaches of tidal inlets infilled with fine muddy sediment and dense mangrove habitat.

Several areas of reclamation (closed landfill) have modified the southern shoreline of Ōtara Creek, with infilling around the perimeter of Ngati Ōtara Park and Mayfield Park, including the infilling of a small oxbow lake in the upper reaches of the southernmost arm. Infilling along the creek also occurred on the smaller side arm that branches towards the east forming part of Springs Road Reserve. Some reclamation (closed landfill) has infilled parts of side arms in the upper reaches of Middlemore Creek (Halycon Reserve and Laxon Reserve).

In 1968 when the Electricity Commission of New Zealand constructed Ōtāhuhu Power Station, a weir was placed across the waterway forming Ōtara Lake to provide a reservoir of cooling water for the plant. The tidal function of the waterway was disrupted and sediment and contaminants from the 3,500 ha stormwater catchment began to accumulate in the 50 ha lake. The site adjacent Ōtara Creek housed two power stations. 'Ōtāhuhu A' power station was closed in 2013, followed by the closure of 'Ōtāhuhu B' gas-fired turbine power station in 2015. Land was decommissioned in 2013. The Ōtara Waterways and Lake Trust, formed in 2016, aims to restore the mauri of the Ōtara waterways and reconnect people. The Strategic Action Plan provides for the restoration and rejuvenation of the Ōtara waterways and lake over a 30-year time frame.

Coastal erosion and instability

The sheltered upper reaches of Middlemore Creek and Ōtara Creek is generally at low risk to coastal erosion, with mangrove forests buffering reduced wave energy. Ongoing erosional processes can impact low-lying coastal edges with repeat wetting and drying over the tidal cycle contributing to weathering of exposed margins.

The most exposed section within this unit is the relatively short length of shoreline to the north of the entrance to Ōtara Creek that faces the main Tāmaki River channel. This low cliff section is exposed to very short fetch of 1.1 km to the north for locally wind-generated waves. The weak geology of the exposed cliffs are readily weathered by repeated wetting and drying with the tidal cycle. There is a thin fringe of vegetation along this section, with remnants of large trees that have fallen across the foreshore.

There are few developed Auckland Council assets adjacent to Middlemore Creek, including a wastewater pumping station at Billingtons Reserve that is within the predicted ASCIE in a moderate change scenario. There are more Auckland Council assets alongside Ōtara Creek, however these are largely set back from the shoreline. Some sections of walkway around the western margin of Ngati Ōtara Park are within the predicted ASCIE in moderate change scenario. Walkways along the northern shoreline of Ōtara Creek around Highbrook Drive Reserve and Highbrook Park, and the wastewater pumping station on Highbrook Park, are not at risk being located landward of the predicted ASCIE in a high change scenario.

Coastal inundation

Coastal Inundation is predicted to be largely limited to the periphery of the coastline, because of the steepness and height of the cliff coastline. This will not impact on the network of coastal walkways in the short to medium term.

In the high change scenario, some of the lower-lying sections of pathway through Ōtara Creek Reserve are predicted to be occasionally inundated during a 1% AEP with 2 m sea-level rise. In the moderate change scenario during a 1% AEP storm event plus 1 m sea-level rise, wastewater pump station infrastructure at Billington Reserve is predicted to be impacted by coastal inundation. The sports fields at Ngati Ōtara Park are not at risk being elevated above the predicted high change scenario coastal flooding extent with 2 m sea-level rise.

Flooding

Inland tributaries of Ōtara Creek are prone to catchment flooding. Through the Community Flood Resilience initiative of Making Space for Water, Healthy Waters has funded pilot projects with local environmental and community organisations across Tāmaki Makaurau in response to the needs of community and waterways impacted by the 2023 storm events. Ōtara Waterways and Lake Trust are working alongside Auckland Council's Healthy Waters Team on practical flood resilience projects across Ōtara and Papatoetoe. There has been extensive native restoration planting in the area immediately surrounding Ōtara Creek and clearance of culverts.

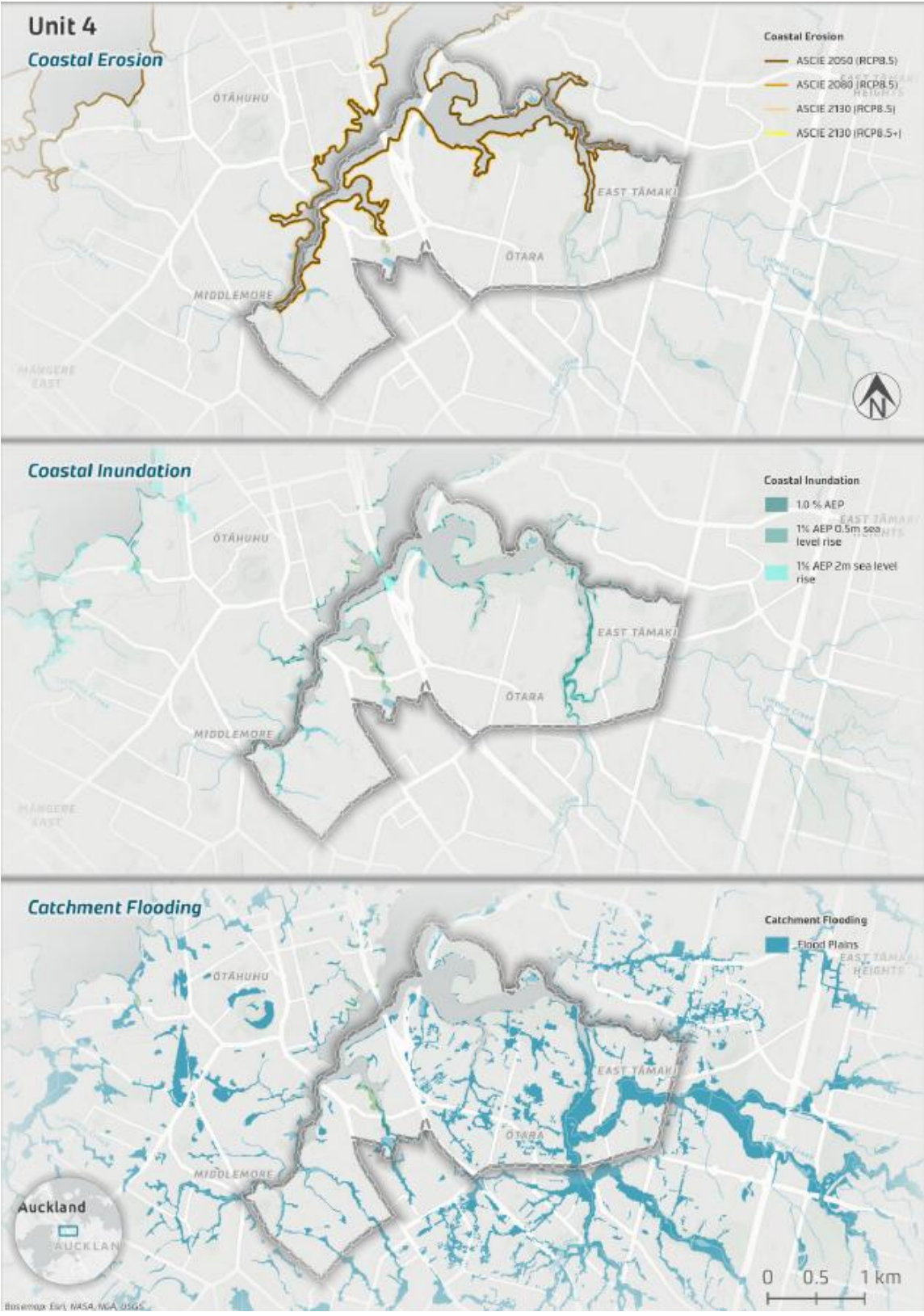


Figure 5: Coastal hazardscape for the Ōtara Unit reflecting coastal erosion susceptibility for 2050, 2080 and 2130 considering RCP4.5 and RCP8.5 emission scenarios, coastal inundation for 1%AEP storm surge for present day and with 0.5 m, 1 m and 2 m sea-level rise and the identification of flood plains.



Risk assessment

The risk table represents key groups of assets (e.g. Auckland Council-owned land, buildings, road extents) which are supported by the regionally consistent data set.

The risk assessment provides a regionally consistent method for comparing risk to Auckland Council-owned land and assets allowing for identification of areas with highest risk for potential future assessment (e.g. Series 2). The table below summarises the risk levels for Auckland Council asset types in the short, medium, and long-term using the low, moderate and high climate scenarios.

Council-owned land			Council Community facilities			Transport infrastructure			Water infrastructure		
Park and reserve land, 131.1 ha			Park amenity structures, carparks, 5.6 ha Buildings, wharves, 48 No.			Bridges, 2,867 m ² AT roads 40.4 km			Water pipes, 230 km		
Short	Medium	Long	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long
Coastal erosion and susceptibility											
High	High	High	Low	Low	Low	High	High	High	Moderate	Moderate	Moderate
Coastal inundation											
Moderate	Moderate	Moderate	Low	Low	Low	Very High	Very High	Very High	Moderate	Moderate	Moderate
Key											
None			Low			Moderate			High		
									Very High		

What matters most



Auckland Council land and assets: This section identifies key Auckland Council-owned land and assets within this unit that may be impacted by coastal hazards (inclusive of catchment flooding) over changing climate scenarios.



- Coastal esplanades with shared pathways, coastal access structures and associated amenities: Ngāti Ōtara Park, Mayfield Park, Pearl Baker and Highbrook Park, Āmio-kura / Gaye Crescent / Eccles Place Esplanade Reserve.



- Park amenities:** Laxon reserve basketball court.



- Water infrastructure:** Wastewater pump stations (Billington Reserve; Laureston Avenue) and multiple water pipe crossings.



- Closed landfills:** Wai-herenga/ Laureston/Halycon esplanade, Laxon Esplanade, Ngāti Ōtara Park, Mayfield Park, Springs Road Reserve.



- Key road networks:** Southern Motorway, Highbrook Drive.
- Key pathways:** Ngāti Ōtara Path, which connects from the Ōtara Town Centre at Otamariki Reserve to Ngāti Ōtara Park, Highbrook Path.

Social, cultural and ecological context: This section identifies key social, cultural and ecological matters, identified through the development of the SAP reports, that may be impacted by coastal hazards over changing climate scenarios.



- Local iwi (Ngaati Te Ata), advocated for the removal of a redundant causeway (Highbrook Drive Causeway) due to its ecological impacts and safety concerns. This is discussed further in Volume 2 and in Stretch 4.6.
- Specific cultural values and outcomes for this unit will be developed through ongoing involvement with local iwi. Guiding objectives and outcomes which have informed the development of adaptation strategies have been identified in Volume 2.



- Outstanding Natural Feature: Geological exposure Pukewairiki (Waiouru) tuff ring, Ōtara Creek.
- Important social infrastructure: Middlemore Hospital, Ōtāhuhu Cemetery.
- Social infrastructure can also play a pivotal role during extreme weather events, as a common meeting point and shelter during extreme weather and climate induced disasters, including those within coastal environments. Important community buildings include Wymondley Road School and Auckland Spinal Rehabilitation Unit. These include Sir Edmund Hillary Collegiate, Manukau Institute of Technology and several schools.



- This unit is characterised by areas of mangrove forest and scrub and saltmarsh – sea rush oioi along Ōtara Creek.
- There is also a small area of regenerating broadleaved scrub located in the upper reaches of Ōtara Creek.



Who have we heard from?

Feedback was received via Social Pinpoint and ‘AK Have Your Say’ survey. Key themes in community submissions included but were not limited to:

- Challenges with stormwater infrastructure are perceived to be contributing to declining water quality in the area.
- Mixed views on mangroves, their function and management practices.
- A desire to explore opportunities to improve connections to Highbrook for both work and recreational access which would add value to the area
- Concern about frequent flooding around Ngāti Ōtara Park, noting the impact on park usability, nearby infrastructure, and the surrounding environment. There is a strong desire for improved stormwater management and flood mitigation measures to protect this important community space and reduce the risk of damage during heavy rainfall events.
- Access to green space is highly valued by local residents for recreation, wellbeing, and community connection.
- Aspirations to see green spaces enhanced/ enriched with native flora that supports cultural practices associated with local marae, including rongoā (traditional healing), mahi toi (arts and crafts), and other customary uses. Community feedback noted that enhancing native

planting in reserves and along the coastline would also strengthen local biodiversity, restore ecological balance, and reflect the area's cultural identity and environmental values.

- Support for local schools to engage with and understand the cultural significance of parks, reserves, and waterways in the area. Education around the health and importance of local streams, such as water quality, ecology, and kaitiakitanga, was also highlighted as a priority.
- Concern about ongoing raw sewage overflows in the area. Community members have also raised concerns about wastewater discharges from the Highbrook development, especially given the current lack of capacity in existing wastewater infrastructure to manage increased demand.
- Dotterels are known to nest in this area, highlighting its importance as a sensitive and valuable ecological habitat. There is strong community support for measures that safeguard these habitats, such as restricting access during breeding seasons, managing predators, and enhancing surrounding natural vegetation to support wider biodiversity.

What can we do about it? Adaptation strategy summary for Unit 4.



4.1 The Grange Auckland Golf Course to Grange Road

This stretch covers the upper Middlemore Creek around the shoreline of the Grange Golf Course. There are no Council landholdings along the coastal margin of this stretch.

Scenarios for change		
Low	Moderate	High
No action 	No action 	No action 
Explanation Public access to the upper reaches of the Ōtāhuhu Creek is limited due to the Royal Auckland and Grange Golf Clubs. Connectivity to and along key transport routes (rail) and road networks to Middlemore Hospital, located to the west of the Grange Golf course, is a high priority noting the significance of the public health infrastructure to the wider South Auckland community. The upper inlet is largely in a natural state with existing vegetation providing a nature-based buffer to reserve areas. Limited assets are located within this area which are exposed to coastal hazard extents.		
Implementation Notes • No action: This strategy does not preclude the potential relocation / realignment any of Watercare structures or portions of road in the long term should this be required, noting that during a 1% AEP storm event plus 1 m sea-level rise, wastewater pump station infrastructure at Billington Reserve may be exposed to coastal inundation. • Ecology: This stretch provides important roosting and foraging habitat for shorebirds. This strategy does not preclude ongoing support for ecological values as identified for this stretch. • Local Board views: Although the current strategy is No Action, the Ōtara-Papatoetoe Local Board has emphasised the critical importance of maintaining connectivity along key transport corridors—particularly rail and road links—to Middlemore Hospital. • Management: This strategy does not preclude localised interventions as required for roading connections. Auckland Transport, the asset manager, will monitor how coastal hazards may impact on operation of these assets and future implementation options.		

4.2 Grange Road to east of SH1

This stretch covers the eastern shoreline of upper Middlemore Creek from Grange Road to the Southern motorway (SH1). There are relatively few Council-owned assets within the stretch that spans residential and industrial areas.

Scenarios for change		
Low	Moderate	High
Maintain 	Maintain 	Maintain 
Explanation The upper inlet is largely in a natural state with existing vegetation providing a nature-based buffer to reserve areas that have relatively few Council assets. In the moderate change scenario during a 1% AEP storm event plus 1 m sea-		

Scenarios for change		
Low	Moderate	High
level rise, wastewater pump station infrastructure at Billington Reserve is predicted to be impacted by coastal inundation. The majority of this stretch will not require any action due to lack of infrastructure and assets likely to experience damage along the stretch. Maintain reflects the exposure of water infrastructure providing for the ongoing maintenance to ensure ongoing functionality.		
Implementation Notes		
• Closed landfills: There are two historic closed landfills (Wai-herenga/ Laureston/Halcyon Esplanade Reserve and Laxon Esplanade Reserve) within this stretch; these will be managed through the Closed Landfill Asset Management Plan. • Ecology: This stretch provides important roosting and foraging habitat for shorebirds. Opportunity for the exploration of how implementation action can support ecological values is identified for this stretch. • Management: Transpower assets are located within this stretch and further engagement with assets owners/managers through implementation is identified.		

4.3 Highbrook Industrial redevelopment area

This stretch covers the southern shoreline of Ōtara Creek. It is a former industrial area that is currently subject to redevelopment planning for aspects of this area. As identified in the unit discussion, this stretch is adjacent to areas of the inlet modified by construction of the Ōtāhuhu Power Station; a weir was placed across the waterway forming Ōtara Lake to provide a reservoir of cooling water for the plant. The Ōtara-Papatoetoe Area Plan provides for the restoration and rejuvenation of the Ōtara waterways and lake over a 30-year time frame.

Scenarios for change		
Low	Moderate	High
No action 	No action 	No action 
Explanation		
This coastal stretch is within private ownership, subject to redevelopment and strategic policy direction. The upper inlet is vegetated and areas of mangroves provide a buffer for areas of the coastal edge. Limited Council land and assets are located within this stretch.		
Implementation Notes		
• No action is reflective of the lack of Council-owned land or assets along the stretch. This strategy does not preclude the removal of structures or infrastructure associated with the former land uses. • This stretch provides important roosting and foraging habitat for shorebirds. • Policy: The Ōtara-Papatoetoe Area Plan provides for the restoration and rejuvenation of the Ōtara waterways and lake over a 30-year timeframe.		

4.4: Ngāti Ōtara Park

Stretch 4.4 begins near the boundary of Ngāti Ōtara Park and encompasses the entirety of Ngāti Ōtara Park including the side inlets culminating at Johnstone Road north. Several marae are located within the area including Ngāti Ōtara, Ōtara, Ngā Kete Wānanga and Whaiora. Ōtara Park is a significant park in the local area and contains several Auckland Council-owned buildings and a closed landfill.

Scenarios for change		
Low	Moderate	High
Maintain 	Maintain 	Maintain 
Explanation Ngāti Ōtara Park is popular for a range of uses including rugby fields and walking tracks. There are multiple Auckland Council-owned buildings / community / recreation facilities within the stretch. Ngāti Ōtara marae is also located within the stretch. The coastal margin of Ngāti Ōtara Park is projected to be exposed in all three scenarios, however most assets are adequately set back except for several low-lying areas of coastal pathway that are predicted to be impacted by coastal inundation with sea-level rise. The vegetated margin and fringing mangroves provide a natural buffer. Management and restoration of the Ōtara Creek catchment is subject to multiple actions and aspirations, including voluntary work by the Ōtara Waterways and Lake Trust. There has been extensive native restoration planting in the area immediately surrounding Ōtara Creek and clearance of culverts. Maintain provides for the management of risk to assets within the park as well as realigning paths as required.		
Implementation Notes • Community: Work is being undertaken for this catchment through the Community Flood Resilience initiative of Making Space for Water, in response to the impacts of the 2023 storm events. The Ōtara Waterways and Lake Trust are working alongside Auckland Council's Healthy Waters Team on practical flood resilience projects across Ōtara. • Closed landfills: The park is an historic closed landfill site and will be managed separately through the Closed Landfill Asset Management Plan. • Mana whenua: Several marae are located within this stretch including Ngāti Ōtara Marae, Ōtara Marae, (both in close proximity to the coast) and Ngā Kete Wānanga Marae and Whaiora Marae located slightly further inland. Engagement with marae / mana whenua is recommended to determine the best adaptation strategies for this particular stretch. • Ecology: This stretch provides important roosting and foraging habitat for shorebirds. Opportunity for the exploration of how implementation action can support ecological values is identified for this stretch.		

4.5: Upper Ōtara Creek (Johnstone Rd to East Tāmaki Rd)

Stretch 4.5 begins at Te Wai-wharau / Antrim Crescent Esplanade Reserve adjacent to Johnstone Road end and extends east around the upper inlet to the head of Ōtara Creek adjacent to Tāmaki East Road.

Scenarios for change		
Low	Moderate	High
No action 	No action 	No action 
Explanation No action reflects that the exposure of Council land and assets within this stretch is limited. Te Wai-wharau / Antrim Crescent Esplanade is densely vegetated with limited accessibility. Walkways and playground facilities at Pearl Baker reserve are elevated and located beyond coastal inundation areas.		
Implementation Notes - The strategy of no action can be re-evaluated as and when future walkway connections develop. Ecology: This stretch provides important roosting and foraging habitat for shorebirds. Engagement with the Ecology Team to seek advice on specific implementation actions to support ecological values.		

4.6: Highbrook Park

Stretch 4.6 includes Highbrook Park, begins at the stormwater pond at Pukekiwiriki Place, continues west towards Highbrook Drive bridge and along Tāmaki River inlet for a brief section of coast. This stretch contains critical infrastructure including stormwater ponds, wastewater pumping station, Highbrook Drive and a local network of walkways (Highbrook Path) that extend through Highbrook Park. There are walkways along the northern shoreline of Ōtara Creek around Highbrook Drive Reserve and Highbrook Park.

Scenarios for change		
Low	Moderate	High
Maintain 	Maintain 	Maintain 
Explanation Maintain provides for critical infrastructure to be maintained in its current location, including Highbrook Drive as a key part of the transport network connecting across the Tāmaki Estuary between the industrial area and Ōtara community. Maintain reflects the importance to the community of Highbrook Path (a 9 km long path that winds along the Tāmaki River with views across the estuary). Maintain also responds to the management of risk to wastewater assets at Highbrook Park. Council assets (walkways and wastewater infrastructure) are elevated and are not identified as being impacted by coastal inundation.		

Scenarios for change		
Low	Moderate	High
Implementation Notes • Transport: Highbrook Drive is a major part of the transport network in this area, ongoing monitoring and maintenance as required to maintain connectivity. • Ecology: This stretch provides important roosting and foraging habitat for shorebirds. • Cultural Management: Ngaati Te Ata Waihoua advocates for the removal/ remediation of the causeway running alongside Otara Creek bridge, noting ongoing impacts to both the cultural and ecological environment, along with safety concerns with its ongoing degradation. • Community context: The local community has been advocating for a walkway connection along the existing esplanade reserve within this stretch of coast, connecting the west of the inlet to the east (options of a pedestrian lane along the Otara creek bridge to support community connectivity).		

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