Shoreline Adaptation Plan: Manukau South

2023

Report Series 1

May 2023 Version 1.0

Front Cover

Photo of pōhutukawa lined coastal edge at Clarks Beach (Source: Sage Vernall, 2022)

Shoreline Adaptation Plan: Manukau South. Report Series 1 2023

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Acknowledgement of Rangatira

“Ka whiti te rā ki tua o Rehua, ka ara a Kaiwhare i te rua.”
“As long as the sun shines on the West Coast, Ngāti Te Ata Waiohua will rise from the depths of the Manukau Harbour.”

We would like to acknowledge the contributions and recent passing of Ngāti Te Ata Waiohua leader and rangatira kaumātua, the late George Flavell, a staunch advocate of kaitiakitanga and environmental tikanga along the Āwhitu Peninsula and the wider Tāmaki Makaurau.

During the development of this report, the SAP team had the privilege of spending time with kaumātua George. He shared his, passion, humility, and extensive cultural knowledge of the peninsula and Manukau Harbour, continuing to raise awareness around cultural values, land conservation and coastal adaptation.

We envisage this plan, and its implementation will ignite much discussion, and in the words of kaumātua George “educate our next generation of rangatahi to keep the fires burning”.

Acknowledgements

This document was developed in conjunction with Ngāti Te Ata Waiohua, Ngāti Tamaoho, Waikato Tainui and Te Ākitai Waiohua. Te Ākitai Waiohua have been involved in this kaupapa as strategic observers and consulted throughout the development of this document. It was prepared by Resilient Land and Coasts, supported by advice from Healthy Waters, Parks and Community Facilities and numerous other Auckland Council departments, Auckland Transport and Watercare. As consultants to Auckland Council, Tonkin +Taylor led technical risk assessment input to the plan and RCP supported programme management and engagement. In addition, we would like to acknowledge and thank the Franklin Local Board for their ongoing support of the Manukau South area plan and the wider Shoreline Adaptation Plan Programme.

The Franklin Local Board and Ward Councillors have actively supported the development of this report, promoting and attending community events and providing valuable insights regarding the challenges for shoreline engagement in the Manukau South area. The project team would like to acknowledge their support for the programme, as well as the local community along the Manukau South coastline for their engagement, support, and ongoing interest in this Shoreline Adaptation Plan.

Mātauranga Protection Statement (Disclaimer)

The cultural information included within the Manukau South Shoreline Adaptation Plan is the intellectual property of iwi who have contributed to the development of the plan. Further engagement with iwi must be undertaken prior to reproducing any cultural information contained within this document.

Mihi

He hōnore, he korōria, he maungārongo ki te whenua, he whakāro pai ki ngā tāngata katoa. Ko te Atua tō tātou piringa, ka puta, ka ora, pai mārire.

Me whakahōnore ki tō tātou Kīngi Tūheitia Pōtatau Te Wherowhero Te Tuawhitu, te pouherenga ō ngā waka o te motu, e noho mai rā i runga ake i te ahurewa tapu i ōna mātua tūpuna, pai mārire.

E kore te puna aroha e mimiti ki a rātou, kua timu i te tai, arā, ko Dame Whaea Ngāneko Minhinnick, me ngā parekawakawa katoa kua ngaro atu ki te pō, haere atu rā koutou ki te pūtahi nui o Rehua, haere ki tua o Paerau, okioki ai.

Ka aro atu te whatumanawa ki a tātou te hunga ora, ko ngā uri whakaheke, kia mau ki ngā kōrero a ōu mātua, a ōu tūpuna, arā, ka pā taua, ko ngā kāhu pōkere me ngā kurī rangaunu o Tāmaki Makaurau e kore e ngaro i te hinapōuri.

Pai mārire.

Contents

Figures

Tables

Whakataukī

Local iwi have gifted the following whakataukī (proverb) as a guide and ultimate objective for this shoreline adaptation plan:

Toitū te marae a Tāne, Toitū te marae a Tangaroa, Toitū te iwi.

If the land is well and the sea is well, the people will thrive.

Summary statement

The Manukau South SAP has set the long-term strategic direction for the management of shoreline from Rauau Point at Waipipi / Te Toro in the west through to Karaka Point at the entrance to Pahurehure Inlet in the east. This includes some 91 km of highly indented shoreline of the Waiuku and Taihiki Rivers, and 40 km of the southern shores of the Manukau Harbour between Clarks Beach and the Pahurehure Inlet, including Whātāpaka Creek.

The development of these strategies is a starting point for dynamic adaptation planning for the Auckland region and also acknowledges Te tiro ā Māori ki tōna ake ao, a Māori worldview. This reflects the consideration of intergenerational time horizons as a fundamental part of addressing the impacts of climate change and sea-level rise. This also acknowledges the need to consider the tangible and intangible, the inter-relationship of all living and non-living things and the vital connection between people and te taiao (the natural environment) in which they live.

The adaptive strategies (Section 5.0) which guide how Council-owned coastal land and assets will be sustainably managed have been informed by:

- Local iwi, acknowledging the cultural values and associations of iwi which centred on supporting local iwi objectives and aspirations set out in Section 3.2.
- The objectives of the local community, identified through community engagement
- Technical inputs including hazard risk, coastal hazard and climate change projections, ecological and policy framing (as set out in Section 2.0)
- Advice from infrastructure and assets owners/managers (Auckland Council asset owners, Auckland Transport and WaterCare Services).

Council-owned land and assets within the Manukau South SAP can largely be managed in the short to medium term with '*no active intervention*' to '*limited intervention*'. The need to '*hold the line*' in select locations responds to the presence of critical infrastructure and high social value. In the longer term, areas will require '*managed retreat*' of assets and uses to manage risks from coastal hazards, rainfall flooding and the impacts of climate change. This provides the opportunity to support natural systems and maintain the highly valued natural character of the coastal environment. Changes in management strategies over time reflect not only the increasing risk over time but provides for a planned and adaptive management approach for Council-owned coastal assets and infrastructure.

Implementation of this SAP is a live and developing process which will require continued collaboration across multiple Council departments and Council-controlled organisations and entities. This will be undertaken alongside ongoing engagement with iwi to ensure that iwi have a partnership/co-management role in the project design, development, and implementation phases. Regional matters identified through the development of this SAP, including the management of risk to cultural values and sites; and the maintenance of public access to and along the coast (utilising Council-owned land); will require further detailed consideration and planning. Adaptation planning will more generally need to respond to national and regional legislative and policy changes (refer to Section 1.3) and transition to the use of signals, triggers, and thresholds in place of static timeframes (refer to Section 1.3.7.2).

Purpose of this document and navigation

Purpose

This Shoreline Adaptation Plan (SAP) for Manukau South has been developed to provide a strategic management approach for Council-owned land and assets located within coastal areas. It is a non-statutory plan developed in collaboration and consultation with local iwi, communities and asset owners.

As a first generational shoreline adaptive plan, it is intended as a long-term strategy of at least 100 years. As such, it will remain a living document subject to review and updated to ensure it remains dynamic, relevant and fit-for-purpose.

Audience

It is intended to be accessible to and utilised by a diverse range of users including asset owners and managers, planners and policy makers, local iwi and communities. While this document contains technical detail, a suite of supporting reports are available to provide further guidance to the reader.

Navigating this document

This document has five (5) key sections as follows:

Section 1	• Provides an overview of the Shoreline Adaptation Programme, the development process for area plans (of which this is one) and the general principles which inform the development of this SAP area plan.
Section 2	• Provides the cultural, social, physical, and ecological context applicable to the development of shoreline adaptation strategies for Council-owned land and assets within the Manukau South SAP area.
Section 3	• Identifies the outcomes of engagement with local iwi, including cultural outcomes, aspirations, and principles applicable to the development and implementation of this SAP report. • Includes the results of the technical physical risk assessment for Council-owned land and assets within the Manukau South SAP area.
Section 4	• Provides commentary of the development of adaptive strategies for the Manukau South SAP area and includes general guidance for the implementation of strategies identified in the Manukau South SAP report.
Section 5	• Includes the adaptation strategies as identified for each of the seven (7) units and 37 stretches within the Manukau South SAP area.

Associated and supporting documents

The following reports should be read in support of this Shoreline Adaptation Plan:

- Tonkin and Taylor (2023). Manukau South Shoreline Adaptation Plan – Risk Assessment Technical Report
- Community Consultation Summary – Shoreline Adaptation Plan: Manukau South 2023
- Cultural statements/value assessments as provided by iwi:
    - Ngāti Te Ata Waiohua Manukau Harbour Report. 2023. Shoreline Adaptation Plans: Manukau South and Āwhitu. *Guiding Principles and Cultural Values.*

Glossary

1% Annual Exceedance Probability (AEP)	• The probability of an event occurring in any given years, so this means there is a 1% chance in any given year of this event occurring.
AVD-46	• Auckland Vertical Datum – 1946 was the mean sea level established in 1946 and used to define the zero datum for land development.
Coastal Marine Area	• The coastal marine area is defined as the area of sea from the line of Mean High Water Springs (MHWS) to 12 nautical miles off the coast.
Fetch	• The length of an area of the harbour, estuary or sea in which waves are generated by wind, measured in the direction of the wind.
Embayed	• An indentation of the shoreline resembling a bay.
Highest Astronomic Tide (HAT)	• The highest level that can be predicted to occur under average meteorological conditions and any combination of astronomical conditions.
Mean High Water Springs (MHWS)	• The average of high levels of spring tide.
Significant Ecological Areas Overlay (SEA)	• Significant ecological areas have been identified in the Auckland Unitary Plan for terrestrial areas, and parts of the coastal marine area.
Significant Ecological Areas	• Identified areas of significant indigenous vegetation or significant habitats of indigenous fauna located either on land or in freshwater environments or in the coastal marine area.

Kupu Māori – Māori glossary

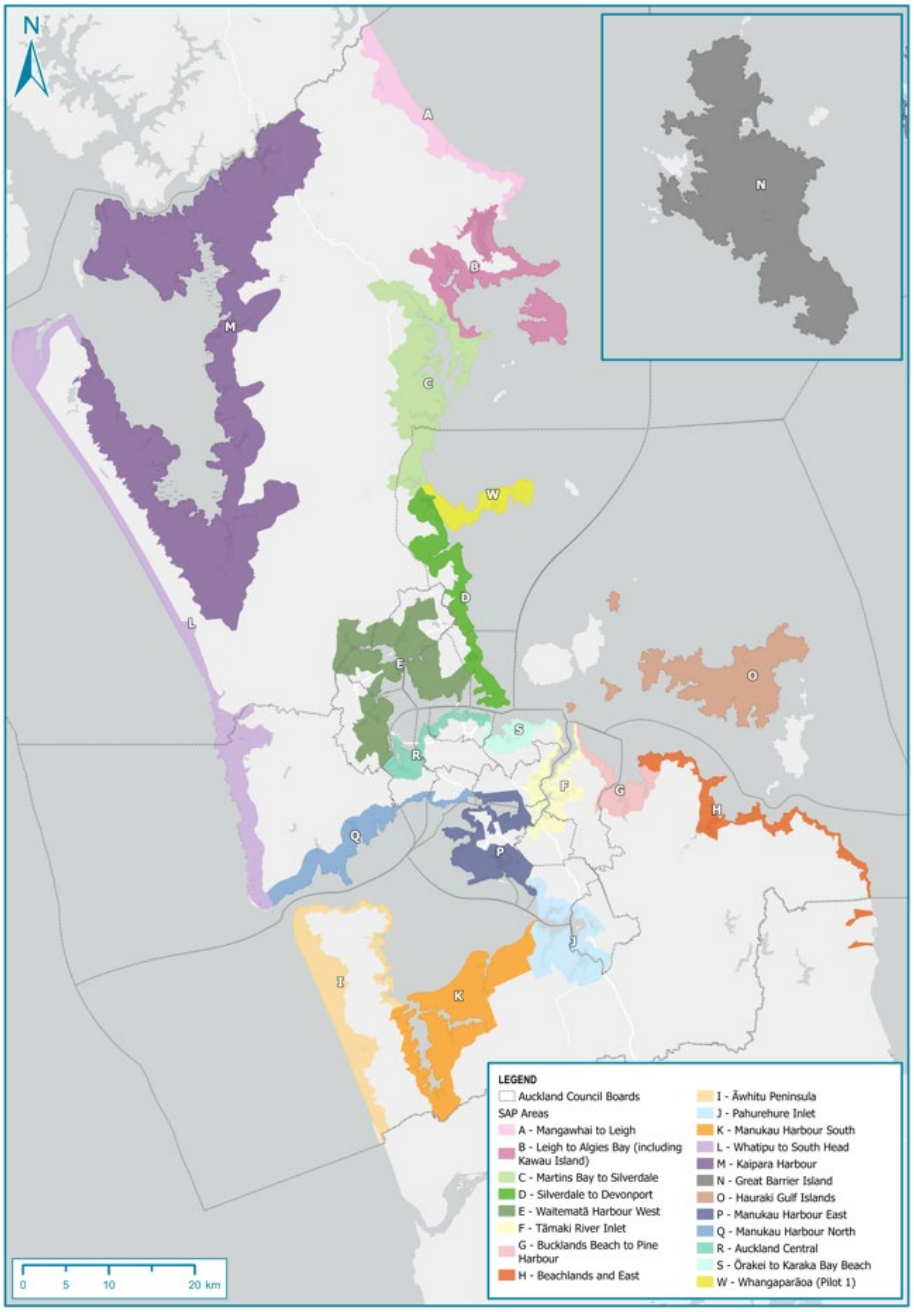
Local iwi advised that their tribal dialect utilises double vowels in place of macrons. In keeping with Auckland Council's Te Reo policy, we have generally maintained the use of macrons for consistency with Council documents and publications. Where iwi names and placenames are provided by iwi, these utilise double vowels.

Te reo Māori terms	Translation
Kaitiaki	Guardians, protectors.
Kaitiakitanga	Kaitiakitanga is the ethics and practice of protection and conservation of the natural environment and the resources within it, on which people depend. It is considered an obligation of mana whenua to care for their lands and waters to which they whakapapa (have a genealogical relationship).
Manaakitanga	Manaakitanga is a powerful way of expressing how Māori communities care about each other's wellbeing, nurture relationships, and engage with one another. Manaakitanga also extends to the whenua that needs care in order to ensure sustainability for future generations. The value of Manaakitanga is often expressed through the responsibility to provide hospitality and protection. Manaakitanga derives from two words - 'mana' and 'aki'. Mana is a condition that holds everything in the highest regard. Aki means to uphold or support. Extending Manaakitanga requires respect, humility, kindness and honesty.
Mātauranga	Mātauranga Māori literally translated means 'Māori knowledge'. It's a modern term that broadly includes traditions, values, concepts, philosophies, world views and understandings derived from uniquely Māori cultural points of view. Mātauranga Māori will articulate and include both physical and non-physical values (such as mahinga kai species, swimmability, sense of place, identity and relationships, and wai tapu) and the positive and negative influencers of these values.
Taonga	Treasures.
Tōnuitanga	Tōnuitanga refers to the process of restoring and revitalizing the environment. As kaitiaki, mana whenua has a duty of care, to seek balance and harmony within our surroundings.
Wāhi tapu	Sacred areas.
Whakapapa	Whakapapa is genealogy, a line of descent from ancestors down to the present day. Whakapapa links people to all other living things, and to the earth and the sky, and it traces the universe back to its origins.

1.0 The Shoreline Adaptation Plan programme

1.1 SAP programme

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.

Figure 1-1 identifies the 20 areas for which individual 'Series 1' plans will be developed. The purpose, scope and guiding principles for these plans are discussed in further detail below in Section 1.3.

Figure 1-1: Auckland Shoreline Adaptation Plan Programme Areas

1.2 Te Ao Māori

Te tiro ā Māori ki tōna ake ao, a Māori world view, acknowledges the tangible and intangible, the inter-relationship of all living and non-living things and speaks to the vital connection between tāngata whenua (Indigenous people) and te taiao (the natural environment) in which they live. Within te ao Māori, people, birds, fish, trees, oceans, rivers and streams, and weather patterns - are all interconnected, and these relationships stretch back into the past, sit within the present and look to the future.

The wellbeing of tāngata whenua (indigenous people) and the ecosystems that support them is interlinked with the concept of *'mai te rangi ki the whenua, mai te whenua ki te rangi'* (from Ranginui to Papatūānuku, from Papatūānuku to Ranginui), which underpins the holistic world view for many iwi / hapū of Tāmaki Makaurau, and how the traditional concept of kaitiakitanga is approached. Understanding inter-relationships and interconnectedness is a fundamental part of addressing the impacts of climate change and sea-level rise.

As an adaptation workstream within Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan, the SAP programme considers te ao Māori by giving effect to the Kia Ora Tāmaki Makaurau and Te Ora ō Tāmaki Makaurau frameworks, underpinned by the principles of te Tiriti o Waitangi, and recognising and providing for te ao Māori concepts. This is explained further at Section 1.4.

1.3 Shoreline Adaptation Plans: Series 1

1.3.1 Purpose and scope of SAPs

SAPs are non-statutory, strategic documents that support the sustainable management of Auckland Council-owned coastal land and assets (including but not limited to, reserves, coastal defence structures and public facilities), over the next 100 years.

These plans consider the potential impacts of coastal erosion, coastal inundation, rainfall flooding, and climate-change (including sea-level rise) and seek to provide an adaptive planning approach that responds to the changing nature of Auckland's coastal environment, asset and infrastructure owners' requirements, and the needs and values of local iwi and local communities.

1.3.2 Context and background

The SAP programme responds to two key parent documents:

The Coastal Management Framework 2017	• Adopted by Auckland Council in 2017[1], it provides the overarching regional philosophy to coastal management. • The Coastal Management Framework identified the need for SAPs to inform comprehensive long-term planning, guided by local iwi, infrastructure providers, and local community engagement.
Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan	• The SAP programme forms an important implementation pathway for Te Tāruke-ā-Tāwhiri supporting the outcomes focused on ensuring communities and individuals are prepared for our changing climate and coastline. • It informs the connection to Te Ora ō Tāmaki Makaurau, the wellbeing framework developed by the Mana Whenua Kaitiaki Forum in response to Te Tāruke-ā-Tāwhiri. • The Te Ora framework incorporates kaupapa Māori and mātauraunga-ā-iwi and is underpinned by the principles of te Tiriti o Waitangi, particularly the principles of partnership and active protection. This is discussed further in Section 1.4.1 below.

More broadly, SAPs reflect the New Zealand Coastal Policy Statement 2010, which directs councils to identify areas that may be affected by coastal hazards over a timeframe of at least 100 years. The SAP area plans provide a 'first generation plan' response to the Coastal Hazards and Climate Change guidance from the Ministry for the Environment[2]. SAP area plans provide a 'roadmap' for changing coastal management strategies over time (over three timeframes) which can be further developed to respond to the concept of Dynamic Adaptive Policy Pathways (addressed further at Section 1.3.7 below). The SAP area plans' development process also ensures consultation and the initiation of an

[1] Within the Coastal Management Framework, Shoreline Adaptation Plans were previously referred to as Coastal Compartment Management Plans

[2] Ministry for the Environment (2017). Coastal Hazards and Climate Change – Guidance for Local Government

opportunity for collaboration with mana whenua and communities to develop and implement the strategies identified in the SAP area plans. While this 'series' of SAP reports applies to Council-owned land and assets, the programme acknowledges the need for holistic 'systems' thinking both in relation to coastal management and adaptation. Section 1.3.8 identifies the limitations relevant to this report and acknowledges the need for further development of adaptation planning to respond to the interconnectedness and complexity of natural systems, cultural values, other land and assets on land and in the coastal marine area.

1.3.4 SAP area plan development process

The SAP area plan development plan process includes four key stages underpinned by engagement with ngā hapū me ngā iwi o Tāmaki Makaurau (the hapū and iwi of Tāmaki Makaurau). The four elements of this development process are identified in Figure 1-2 and discussed below in greater detail.

Scoping and development	• This stage includes the gathering of relevant information for each SAP area, including building an understanding of the history of shoreline management and the development of the supporting technical risk assessment for Council-owned land and assets.
Local engagement and events	• Engagement events both in-person and online support the community and wider public to engage with the identification of coastal uses, enjoyment and values.
Adaptation strategy development	• Adaptive strategies are identified for each coastal unit (or stretches within units). This selection is informed by the engagement undertaken, values developed and technical information and risk assessment. These strategies are refined through further feedback from local iwi and asset owners.
Endorsement and implementation	• As non-statutory plans, endorsement is sought from the Local Board(s) within the SAP area. The SAP area plans are then presented to the Governing Body Planning, Environment & Parks Committee for final approval by councillors.

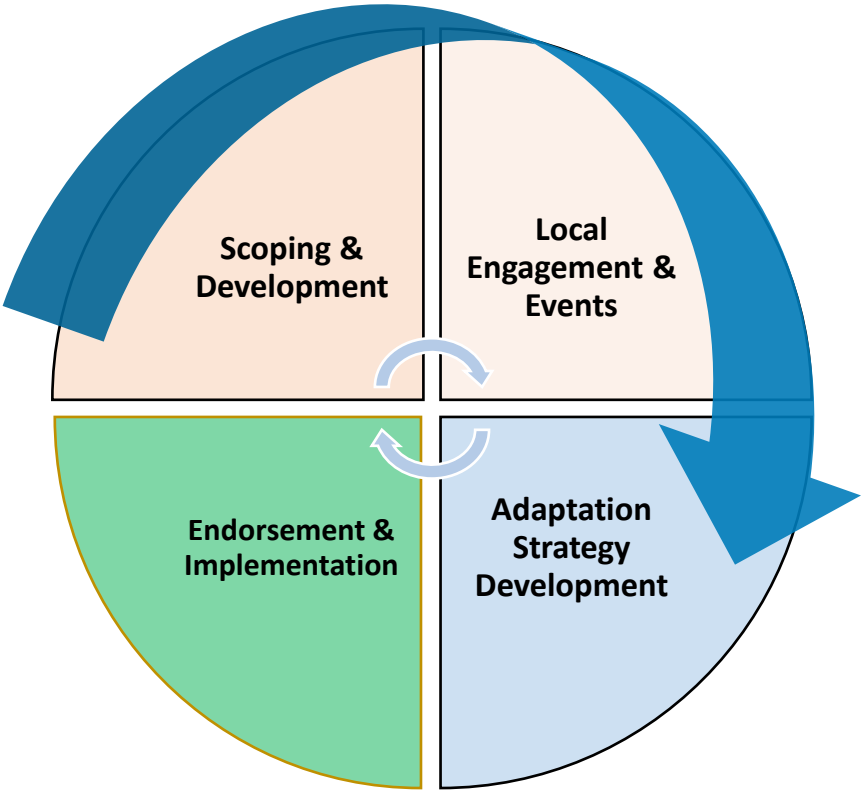


Figure 1-2: SAP Area Plan development process

Engagement with Ngā hapū me ngā iwi o Tāmaki Makaurau: engagement with local iwi supports all stages of plan development and follows the development of the SAP area plans to their implementation.

1.3.5 SAP area plan adaptation strategies

Four major adaptation strategies to set long-term management approaches are considered which are outlined below:

No Active Intervention (NAI)	• Natural processes are allowed to continue. • Includes no investment in the provision or maintenance of any defences. • This strategy is automatically selected for areas of the coastline that are not owned by Auckland Council.
Limited Intervention (LI)	• Limited works are undertaken to extend the existing asset life or to ensure assets remain safe, including localised realignment of individual assets. • This approach acknowledges that the coastline's position will not be fixed into the future and may include small-scale, nature-based measures (e.g. dune planting) to support the coastline's resilience.

Hold the Line (HTL)	• The coastal edge is fixed at a certain location, using nature-based options (e.g. beach nourishment) or hard structures (e.g. sea walls). • Nature-based options are the preferred method where possible.
Managed Retreat (MR)	• Assets and activities are moved away from hazard-prone areas in a controlled way over time. • Managed retreat allows greater space for natural buffers and reduces asset exposure to natural hazards.

1.3.6 Implementation

SAPs will be implemented through the integration of adaptive strategies into relevant Council plans and processes. Implementation planning is a live process reflecting the need to respond to national and regional legislative and policy changes.

Currently, two key pathways for implementation are identified over immediate and longer-term timeframes.

- Local implementation - short term: Once a SAP is endorsed, it becomes an Auckland Council document and can be used to inform local decision-making, investment and planning.
- Regional implementation: Following the completion of all areas plans (2025+), an understanding of regional risk to assets and land can be considered alongside the strategic response across all ~3200 km of Auckland's shorelines. This will enable consideration of regional prioritisation and funding at a regional level.

Tools for implementation may include both statutory and non-statutory plans alongside operational tools. Some examples of these include:

- Operational responses (such as post-storm decision-making and operational maintenance of coastal assets)
- Capital investment through the Coastal Renewals Programme which manages the renewal and maintenance of existing coastal assets such as seawalls, boat ramps, wharves, and other coastal structures (this may be supported at a local/short-term level where existing budget is available)
- Future asset management planning including through the Coastal Asset Management Plan and risk-based decision making
- Landowner and lease approvals for building and structures on Council-owned land, in coastal areas
- They inform the development of future statutory plans such as Local Parks Management Plans, required to be developed under the Reserves Act.

Note that many of these pathways to implementation interface with other legislative and policy requirements. These regulatory requirements will also need to be met, as applicable.

1.3.7 Review, evaluation and next steps

SAP area plans are being developed as non-statutory plans. They are supported by the best available hazards and risk information and informed by current understanding of asset records including condition, materials, age and extent (where land is included). This data is ever changing, as is the built and natural environment within which these land and assets exist. As such, updates to data and hazards and risk assessment may be required to ensure the outputs which underpin this reporting remain as accurate as possible. Likewise, cultural and social values change as communities grow and change and different challenges and opportunities present themselves.

These plans are long-term plans and will require review and updating to ensure they remain accurate and reflect the aspirations of mana whenua and the communities they support; and the asset owners and managers responsible for the assets and infrastructure to which this plan relates.

1.3.7.1 Review

The SAP area reports are currently anticipated to be reviewed on a ten-yearly cycle. This will enable updated information related to assets, hazard risk or changing cultural and social aspirations. Review may also be requested by iwi or required because of a specific trigger or signal being met which requires an accelerated need for change.

The review will incorporate any new information available for each SAP area, including coastal hazards, climate change and coastal asset data, signals, and triggers (including cultural and environmental), along with any changes to cultural values and associations (including cultural outcomes and objectives). The future review cycle will also enable any implications of legislative reforms to be addressed and appropriately reflected in the future scope and implementation of the SAPs.

1.3.7.2 Dynamic approach: signals, triggers & thresholds

Once an adaptation strategy has been identified for a given area, it may be implementable subject to various timeframes, leading to different pathway options. The need to switch from one management strategy to another is usually tied to a ‘signal’, an indicator that highlights the upcoming need for change, or a ‘trigger’, an identified threshold that requires an immediate change. The identification of appropriate signals/triggers requires a robust framework which may involve multiple scales and actors. This may include the need for monitoring and feedback associated with physical systems, indications of risk tolerance or other cultural or community-based indicators. Implementation at the asset level will also require development of specific ‘signals’, indicators that highlight the upcoming need for change, and ‘triggers’, identified thresholds that indicate an immediate change. The development of these signals, triggers, and thresholds will be progressed as a component of implementation planning.

1.3.8 Limitations

The SAP Series 1 reports are strategic documents which set a high-level direction for shoreline management and the assets within those areas. It is important to note there are limitations to the scope of these plans:

- They are not developed with the intention of applying directly to privately-owned land and/or assets within the wider SAP area
- They are developed with limited consideration of third-party land, assets, interests and values. This limits a 'whole of system' consideration across all values (social, cultural, ecological and economic)
- There are limitations to the multi-criteria, decision-making process which supports the selection of adaptive strategies. This analysis is supported by the best available information as set out in this report and supporting reports
- They do not consider site-specific options assessments for what may be delivered under each of the adaptive strategies
- They do not consider any site or parcel-specific legal mechanisms, covenants or requirements or identify specific conditions or actions associated with individual resource consents (such as consents for coastal structures or discharge consents associated with water infrastructure).

1.4 Guiding principles and outcomes

As identified in Section 1.2 and Section 1.3.2, the SAP programme is underpinned by an ambition to respect a Te Ao Māori approach and draws from its foundation documents, the Coastal Management Framework and Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan. This leads to the identification of guiding principles for the programme which inform the development of the SAP area plans. These are identified and discussed as follows:

- 1.4.1: Mana whenua/ Ngā hapū me ngā iwi o Tāmaki Makaurau objectives and outcomes
- 1.4.2: Coastal management principles.

1.4.1 Ngā hapū me ngā iwi o Tāmaki Makaurau

The hapū and iwi of Tāmaki Makaurau, hold important values as kaitiaki (guardians, protectors). These include their environmental and spiritual ties to ancestral lands, water, sites, wāhi tapu (sacred areas) and other taonga (treasures), and the wellbeing of the entire iwi.

Auckland Council, as set out in The Auckland Plan 2050, looks to recognise and provide for Te Tiriti outcomes. Treaty principles provide guidance for decision-making, partnership, and collaboration between the 19 iwi of Tāmaki Makaurau and government. This can include co-governance and co-management approaches, including for natural resources where holistic, integrated, and sustainable outcomes are sought.

The cultural values, associations, objectives, and outcomes communicated by each iwi involved in the development of each SAP will help to inform the selection of adaptation strategies within each SAP. Such cultural values and outcomes are anticipated to be developed through the ongoing involvement of iwi throughout the development of all 20 SAP area plans and their implementation. Guiding frameworks, principles for engagement and regional principles for SAP plan development which have informed the development of the SAP programme to date are set out below in Sections 1.4.1.1 to 1.4.1.3 and build on these regional principles, identifying those of local iwi who have been involved in the development of this plan.

1.4.1.1 Te Ora ō Tāmaki Makaurau Wellbeing Framework

Te Ora ō Tāmaki Makaurau is the wellbeing framework developed by the Mana Whenua Kaitiaki Forum in response to Te Tāruke-ā-Tāwhiri. It is a regional innovation that is built on generations of knowledge and reflects the world view of the various mana whenua, iwi, rangatahi Māori and Māori communities of Tāmaki Makaurau. Te Ora aligns with Te Ora Tāmaki Makaurau and supports the concept of Te Tātai. The Te Ora framework incorporates kaupapa Māori and mātauranga-ā-iwi and is underpinned by the principles of te Tiriti o Waitangi, particularly the principles of partnership and active protection.

Within Te Ora, there are three dimensions of wellbeing that form a holistic approach: **Taiao** (environment), **Whenua** (land, earth), **Tāngata** (people). When considered together, dimensions within the Te Ora framework (Taiao - environment, Whenua -land, Tāngata - people) can frame our adaptation to climate change by taking a whole living systems approach. Our response to climate change is also guided by the following values and principles:

- Manaakitanga
- Kaitiakitanga
- Whanaungatanga
- Rangatiratanga
- Mātauranga
- Oritetanga
- Tōnuitanga.

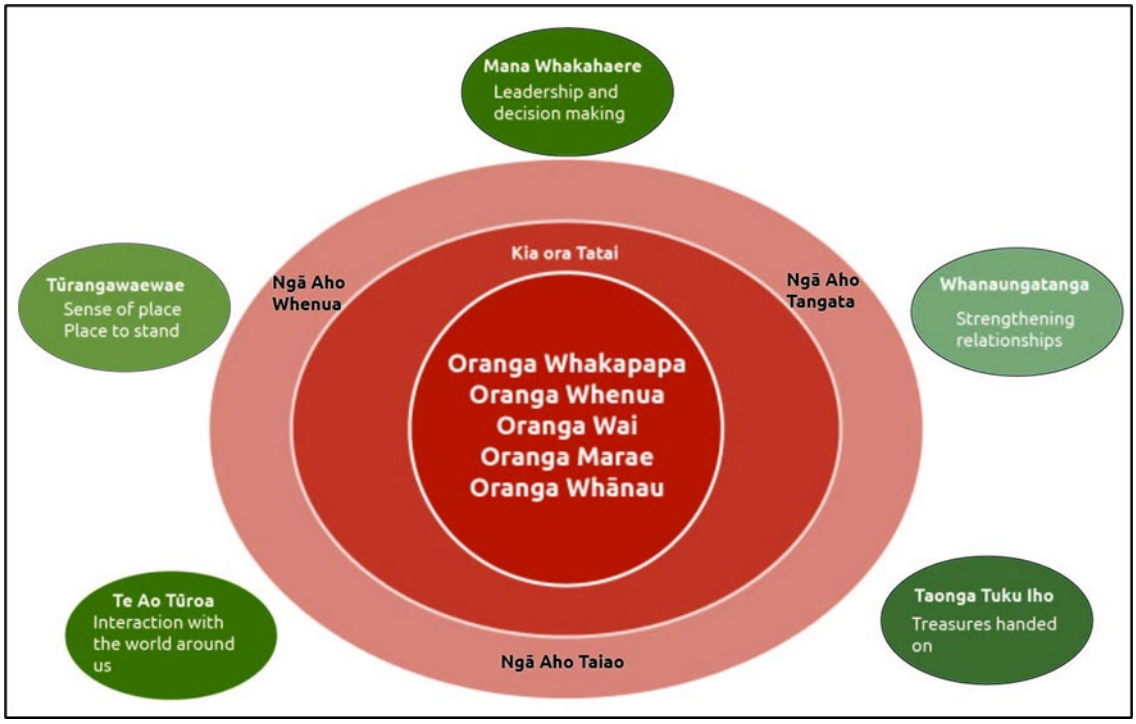


Figure 1-3: Graphic of Te Ora ō Tāmaki Makaurau Wellbeing Framework

1.4.1.2 Principles for Partnership for the development of the SAPs

While not exhaustive, other relevant cultural objectives and outcomes sought for the SAP programme include:

- Ensuring iwi are engaged to speak to and identify:
  - Their cultural values and associations of an area
  - Any impacts to their cultural values and associations
  - Any necessary mitigation and management of any impacts and effects on cultural values and associations.
- Prioritising the protection and recognition of wāhi tapu / sites of cultural significance within or adjoining the coastal area
- Recognising and providing enduring kaitiaki opportunities for tāngata whenua
- Supporting iwi to implement and maintain rāhui

- Proactively protecting and restoring nature's first line of defence for the coastline (prioritising nature's ability to absorb the effects of climate change)
- Respecting the role nature has in te taiao, allowing Tangaroa to take back the whenua, tāna mokopuna te ika, that was taken from him by Māui
- A return to native habitats - mangroves and dunes with native planting all around the coastal area, consistent with what was historically present. A planting regime should be commenced in advance of any potential risks
- Proactively protect and enhance taonga species and habitats
- Proactively protect coastal cliffs (pari) and coastal dunes
- Proactively protect and enhance coastal and inland wetlands, and indigenous habitats and biodiversity
- Prioritise protection of, and contribute to the enhancement of, kaimoana / shellfish habitats with a focus on the regeneration for mahinga mātaitai sites
- Make room for wai (water), enable natural processes where possible and naturalising aquatic environments where possible (e.g. daylighting of streams)
- Enhance existing and provide for new, natural connections and access points to the coastal environment
- Prioritise a 'te taiao (environment) centred' approach, over a 'human-centred' approach when implementing the shoreline adaptation approaches
- Ensuring there is a process to revisit the shoreline adaptation strategies into the future as technology and methodologies change.

How these objectives are realised within each SAP needs to be undertaken alongside local iwi. This must be provided for through further engagement.

1.4.1.3 Infrastructure and Environmental Services Mana Whenua Kaitaiki Forum regional guiding principles for Shoreline Adaptation Plans

In the spirit of partnership, the Auckland Council Infrastructure and Environmental Services Mana Whenua Kaitiaki Forum developed the following guidance principles for all SAPs:

- Responsive to iwi management plans
- Accept reversal of infrastructure to rectify hazard issues
- Naturalise, let nature take its course
- Look at emissions as well (if any)
- Whenua concepts are written up and understood by all in plans
- Protect koiora (biodiversity) and traditional mahinga kai (fish stocks, kaimoana)
- Protect heritage where possible.

These principles align with both the Kia Ora Tāmaki Makaurau and Te Ora ō Tāmaki Makaurau frameworks and help guide the SAP work programme and its implementation.

1.4.2 Coastal management

The Coastal Management Framework includes guiding principles which are relevant to the development of the SAP programme. These are summarised below and can be read in full in the Framework (refer to Table 3 of the Framework):

- Health and safety integral to decision making: To ensure all management options are safe
- Aligns with regulatory documents: Considers all statutory objectives and policies for an appropriate and balanced outcome
- A systems approach: The awareness that the whole system needs to be considered for a strategic outcome
- 100-year timeframe: The use of a longer time horizon to enable sustainable, strategic decision making
- Time or event-dependent options: The acknowledgement that the future vision for the coast may not be achieved in one step, and that interim measures are acceptable
- Climate change impacts embedded into approach: To ensure sustainability and resilience
- Appropriate technical solutions: Consider a range of effective solutions and communicate why they are or are not effective
- Principles need to be developed outside specific project issues
- Applies the coastal management framework.

2.0 Manukau South SAP area

Manukau South SAP area stretches from Rauau Point at Waipipi / Te Toro in the west through to Karaka Point at the entrance to Pahurehure Inlet in the east. This includes some 91 km of highly indented shoreline of the Waiuku and Taihiki Rivers, and then extends along some 40 km of the southern shores of Manukau Harbour between Clarks Beach and the Pahurehure Inlet, including Whātāpaka Creek.

Figure 2-1: Manukau South SAP area

2.1 Council-owned infrastructure, assets and land

Auckland's SAPs are directed at Auckland Council-owned coastal land and assets, including but not limited to, reserves, coastal defence structures and public facilities, roads, and water infrastructure. This includes infrastructure located within these coastal areas where it is located on, in, or under Council land or private land.

While the SAPs consider supporting infrastructure near the coast and identified areas of cultural and ecological value, these plans are not directed at the management of such assets and areas of value. However, the strategies (and associated guidance) may acknowledge these linkages at a unit or stretch-specific level. These plans included input from stakeholder partners such as Auckland Transport and Watercare for assets located in shoreline areas.

Table 2-1 includes a summary of both Council-owned assets and infrastructure and the area and the number of ecological and cultural features identified with the Manukau South SAP area. This is broken down by a series of units.

Within the SAP area, there are around 12 ha of parks and reserve land (including assets such as car parks, accessways and buildings) and over 150 km of transport corridor. Water infrastructure is concentrated in units with greater urban settlement such as Waiuku, Clarks Beach and Glenbrook. Reflective of the environments and rich cultural landscape, there are over 80 ha of 'Significant Ecological Areas' identified within the SAP area and over 370 mapped cultural heritage points.

Coastal management practices for the Manukau South SAP area respond to a range of physical environments from inner harbour beaches subject to higher energy environments at high tide, to more sheltered tidal inlets, with a range of coastal protection works including seawalls, beach nourishment and coastal revegetation along reserve frontages in areas of established communities, enabling access and recreation. There are a number of coastal works that facilitate coastal access with beach access steps, ramps and boat launching facilities.

Table 2-1: Summary of key Council-owned land and assets in each Unit

Unit name	Park and reserve land – Park structures, carparks, accessways, buildings (ha)	AT roads (km)	Water pipes (km)	Water assets (No.)	Ecological area (ha)	Cultural heritage assets (No.)
Unit 5	2.8	9.8	46.7	1,227	1.8	21
Unit 7	0.1	14.4	1.5	45	21.9	73
Unit 4	0.9	43.0	38.2	1,191	18.7	37
Unit 3	-	6.6	4.2	40	11.3	15
Unit 6	0.2	13.5	4.6	126	19.8	58
Unit 1	0.1	16.6	-	-	6.6	109
Unit 2	8.1	47.7	207.5	5,916	6.3	61
TOTAL	**12.2**	**151.7**	**302.7**	**8,545**	**86.5**	**374**

2.2 Coastal processes

Manukau Harbour is the second largest on the west coast of the North Island (Kaipara being the largest) and has an area of about 368 km^2 and the volume of water between high and low tides is around 918 million m^3 [3]. The harbour experiences a 3.8 m spring-tide range which results in around 140 km^2 of intertidal flats being exposed at low tide. There are two distinct physical settings for this SAP area (see Figure 2-2) within this harbour:

1. Harbour coast: The more uniform and regular southern shores of Manukau Harbour extending from Waiuku River to the west and the Pahurehure Inlet to the east.

2. River shorelines: The more narrow but highly indented shorelines along the Waiuku and Taihiki Rivers, and Whātāpaka Creek that extend some 12 km to the south from the south-western corner of Manukau Harbour, with length of shoreline around the many smaller inlets totalling over 90 km.

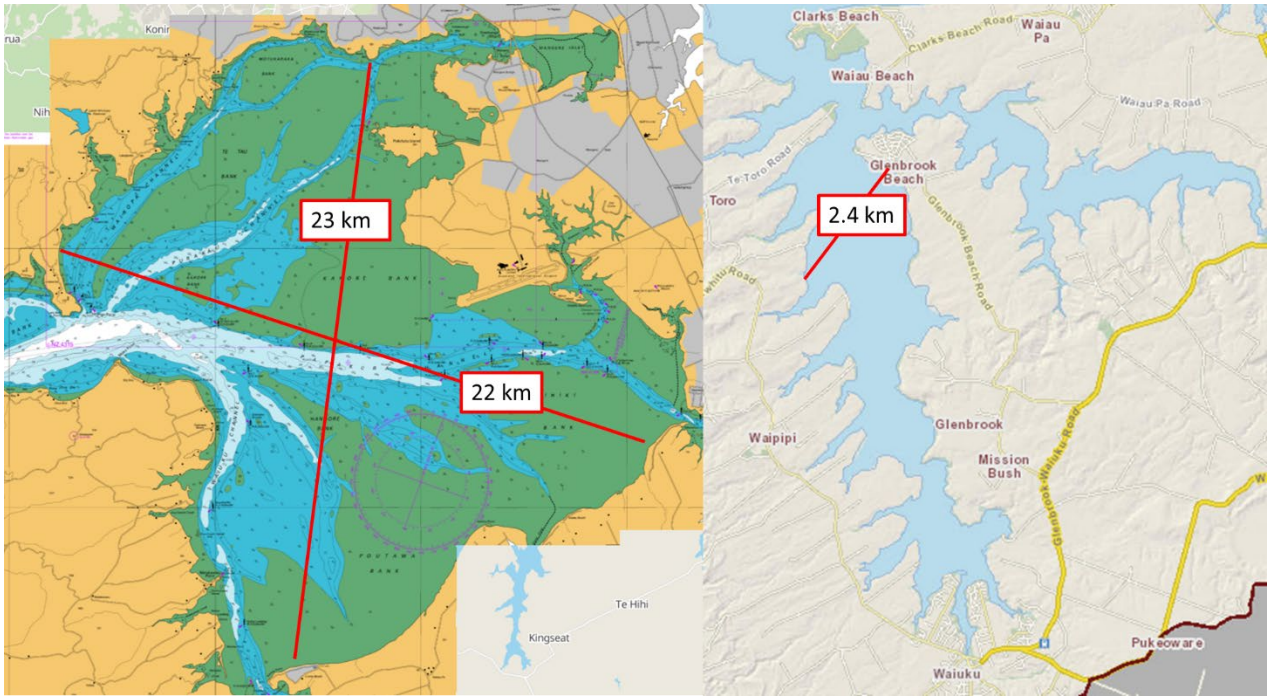


Figure 2-2: Fetch and exposure of Southern coast of Manukau Harbour and Waiuku River (Source: LINZ and AC GeoMaps)

Harbour Coast

The characteristics of the harbour coast are a narrow upper tide beach face and a gently sloping lower beach face (Figure 2-3) that connect to the broad sand flats that occupy a significant part of the southern harbour. These flats fringe the Waiuku and the Papakura channels that extend in the southern part of the harbour.

Sand along the rear of the beach is typically medium to coarse grained and light brown-yellow in appearance, largely comprising quartz and potash and soda-calc feldspars (Schofield, 1970) transported down the Waikato River when it used to discharge into the harbour. Sand becomes fine

[3] Bell et al., 1998. Hydrodynamics of Manukau Harbour, New Zealand, New Zealand Journal of Marine and Freshwater Research, March 1998

to medium grained on the lower beach profile and dark grey in appearance. Lower beach face material also contains trace silt and there are extents of sea grass meadows off the coast and stands of mangroves and intricately shaped shell banks along the intertidal area. Within Whātāpaka Creek, the intertidal flats are predominantly covered with thick stands of mangrove.

River shorelines

The Waiuku and Taihiki River shorelines are characterised by extensive intertidal flats extending to the main river channels fringed by low-lying cliff shorelines with some sandy beaches present in embayed areas. Cliff heights range from around 2 m to 20 m (based on LINZ topographic data). The range of cliff heights is due to a combination of maritime processes and varying geologic conditions. The beaches have a thin veneer of sand which gently grades from the intertidal flats to the base of the backshore cliff.

The source of sand sediment for these beaches includes predominantly quartz and feldspar rich medium coarse sands (Schofield, 1970) as well as sediment from local eroding cliffs, intertidal flats and from the predominantly sandy soils of the western catchments. Sediments generally range from predominantly sandy sediments within the main estuary area to mud/silt sediments in the upper reaches of the tidal creeks.

Figure 2-3: Characteristic cross shore profile of southern shores (harbour coast) of Manukau Harbour

2.2.1 Geology

Much of the present-day coastal edge comprises sands and muds from the Late Pliocene and Middle Pleistocene eras with some outcrops of Āwhitu Group dune material and East Coastal Bays Formation (Figure 2-4). All of these geologies are of low strength and susceptible to coastal erosion although the older formations are more cemented and have a higher residual strength.

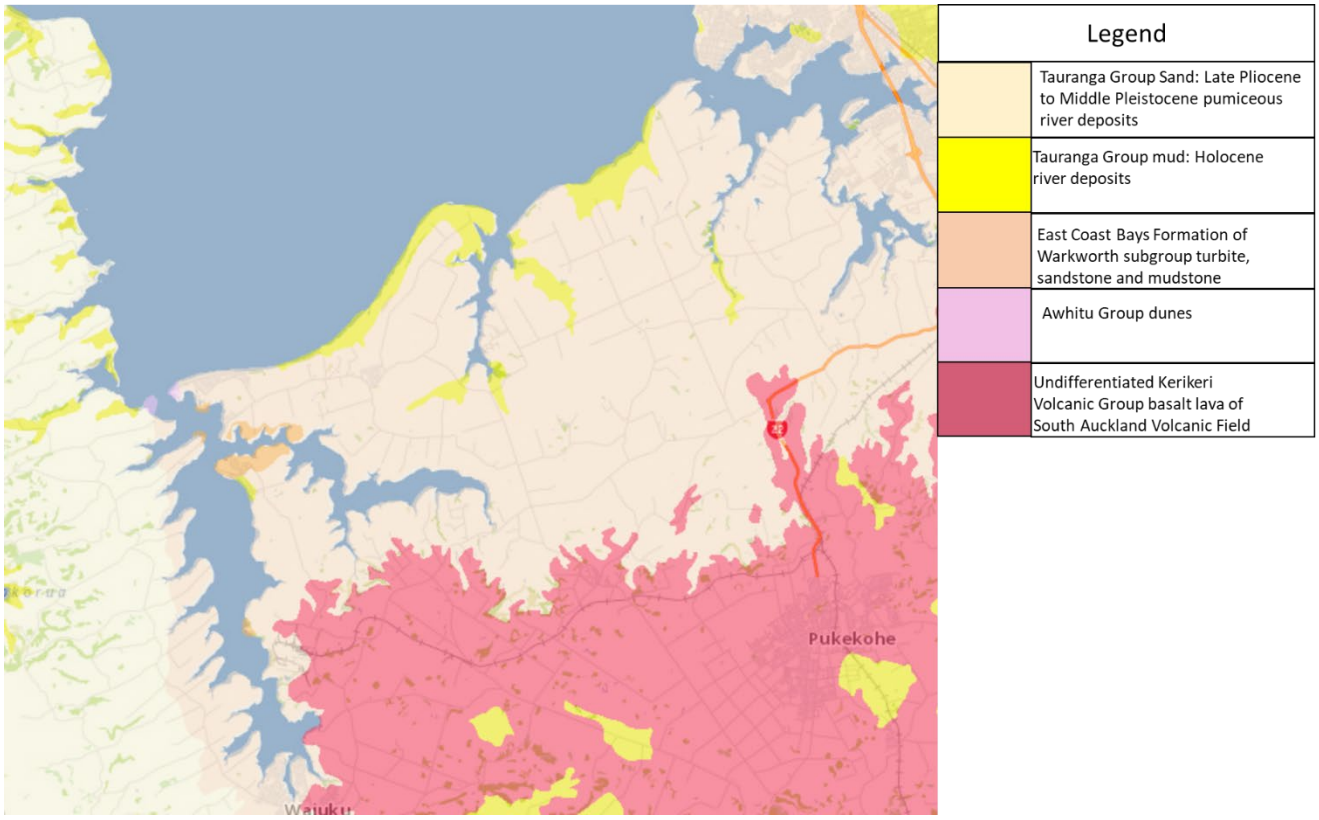


Figure 2-4: Geological setting Manukau Harbour South SAP area (source: Edbroke (2001)

2.2.1.1 Manukau Harbour formation

The harbour originated in events that commenced less than 10 million years ago. When sea invaded much of the North Island, a large bay formed in the Manukau – Port Waikato area, into which the ancestral Waikato River flowed, depositing sediments and slowly extending the coast northwards. At the same time, the current sweeping northwards along the west coast of the island was depositing sand in the quieter waters as it passed the threshold of the bay. The resultant bar grew until it emerged as Āwhitu Peninsula, which, because of the scour of the ebbing and flowing tides, has not connected with the resistant volcanic rocks of the Waitakere Ranges to the north.

About 3 million years ago, lava flows erupted from centres in the Pukekohe-Bombay area and diverted the Waikato River to the west, which at times almost certainly followed the course of the present Waiuku River but now discharges into the Tasman Sea at Port Waikato.

The strong, dominantly westward winds have drifted sand dunes up to the present height along Āwhitu Peninsula. Within the last half million years, the Manukau has been effectively sealed off from the Pacific Ocean (to the east) by volcanism around the Tamaki Isthmus, except for transient connections at times of high sea level. The modern-day extent of Manukau Harbour formed approximately 15,000 years ago by flooding of existing river valleys, and around 6,500 years ago the sea level stabilised to present day levels[4].

[4] Te Ara, 1966 https://teara.govt.nz/en/1966/manukau-harbour

2.2.1.2 Waves, currents and sediment transport trends

Hydrodynamic forces acting on these coastal areas are a function of the tidal currents generated by the rise and fall of the tide, as well as wind-generated currents and waves which are the strongest forces generally acting on the coastal edges.

Tidal currents within Manukau Harbour are largely confined to the channels, but the large flows that enter through the main channels could form circulation currents along the southern coast when combining with wind-generated currents and onshore wave action. Within the rivers, tidal flows are significant, but also confined to the main channels.

Wind data from Auckland Airport shows that winds are most persistent from the southwest and western sectors, although strong winds are also possible, but less frequent, from the north to northeast (see Figure 2-5). Due to the shallow depth of the harbour, waves that impact the shores along the southern part of the harbour are depth limited, although it is still possible during extreme onshore events at high tide to have waves of up to 2 m. Within Waiuku River and Taihiki River, the fetch lengths are an order magnitude shorter and water depths shallower, indicating wave heights are typically less than 0.5 m.

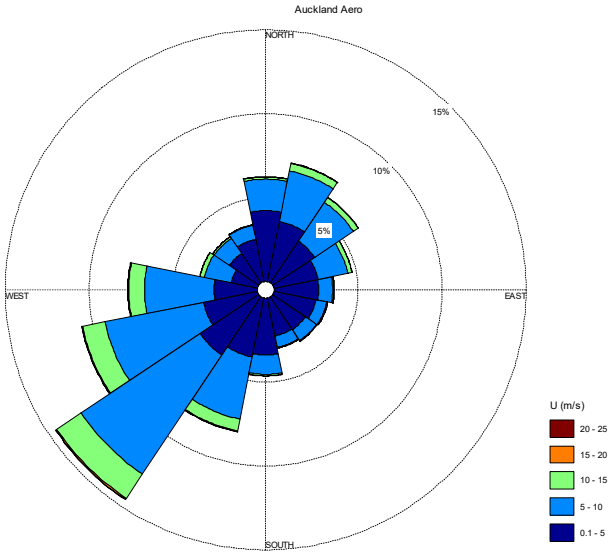


Figure 2-5 : Auckland airport wind rose (Celilo site C74082)

2.2.2 Historic erosional trends

The regional assessment of areas susceptible to coastal instability and erosion[5] considered long-term erosion rates, in terms of metres per century. The assessment considered most of the Manukau South SAP area as cliff coast, apart from Clarks Beach and Glenbrook Beach. Harbour coast erosion rates can be up to 10 to 15 m per century due to the soft geology. Beach erosion rates are typically low, ranging from 0 to 2 m per century, but are higher at Clarks Beach (10 to 19 m per century).

[5] Roberts, R., N. Carpenter and P Klinac (2020). Predicting Auckland's exposure to coastal instability and erosion, Auckland Council, technical report TR2020/021, December 2020

2.3 Hazards and climate change

Natural processes, such as coastal inundation and erosion, become hazards when they have the potential to negatively impact things of value. For shoreline areas with assets and infrastructure, or cultural heritage sites near the coastal edge (including recreational and environmental areas), the impacts of coastal hazards can be significant. Hazard mapping is therefore a key component of long-term, sustainable management of shoreline areas.

2.3.1 Coastal inundation

Previous studies by NIWA, STANTEC and DHI were compiled to derive coastal inundation levels at the shoreline around the Auckland region and are included in TR2020/24[6]. They considered present-day extreme storm-surge conditions, including a 1% Annual Exceedance Probability (AEP) event (equivalent to a storm surge with a 1% chance of occurring in any year, or 1 in 100-year return period) and this event with 0.5 m, 1.0 m and 2.0 m sea-level rise added to the present-day storm surge levels. Figure 2-6 shows the key parameters for coastal inundation and the change in inundation that will occur with increases in sea level.

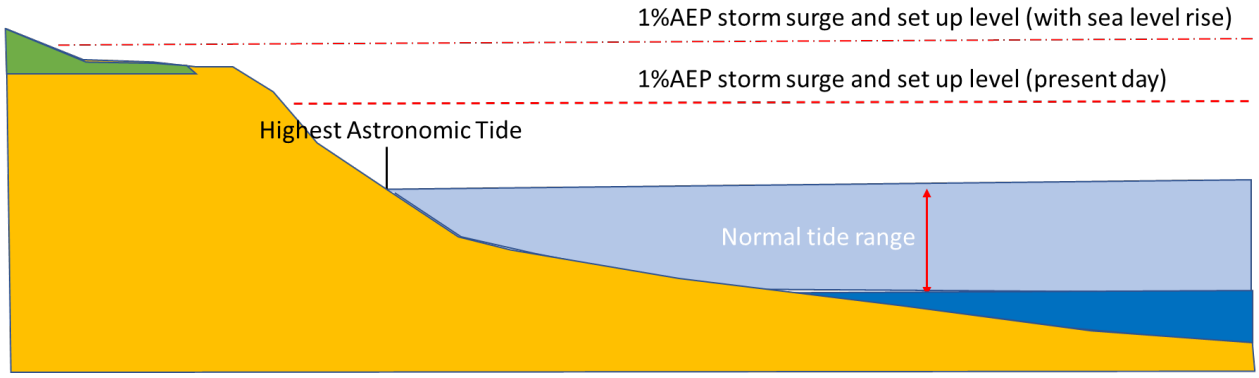


Figure 2-6: Key features for coastal inundation including storm surge, wave set-up and sea-level rise changing the inundation extent

Figure 2-7 shows the resulting coastal inundation hazard extents for the four scenarios (i.e. 1% AEP storm surge and 1% AEP storm surge with 0.5 m, 1.0 m and 2 m sea-level rise). Extensive inundation occurs in the low-lying farmland seaward of Seagrove Road and to the east of Elletts Beach as ground levels are around the present-day high tide level. The Waiuku Inlet has fewer areas of inundation, but often these are situated in areas where there are higher levels residential or commercial development.

2.3.2 Results of assessment

Figure 2-7 identifies the extent of coastal inundation under differing sea level rise scenarios (differing shades of blue in the graphic). Inundation primarily impacts the lower lying areas in Units 6 and 7 to

[6] Carpenter, N., R Roberts and P Klinac (2020). *Auckland's exposure to coastal inundation by storm-tides and waves.* Auckland Council technical report, TR2020/24

the east of Clarks Beach. Coastal inundation also impacts lower lying coastal settlements at Te Toro, Sandspit and Glenbrook Beach, with the landward extent of inundation increasing over time.

Figure 2-7: Coastal inundation for 1% AEP storm surge for present day and with 0.5 m, 1 m and 2 m sea-level rise.

2.3.3 Erosion susceptibility

The T+T (2021) study provides a regional-scale assessment of *Areas Susceptible to Coastal Instability and/or Erosion (ASCIE) for the Auckland Shoreline*. It is a 'first-pass' assessment, in line with the New Zealand Coastal Policy Statement (NZCPS, 2010) and '*Coastal Hazards and Climate Change Guidance' (*Mfe, 2017), that provides high-level information on possible ASCIE on a regional scale.

2.3.3.1 Climate change scenarios

The 2021 report considers recent sea-level rise and climate change guidance (e.g. MfE, 2017). Resulting ASCIE areas have been mapped for the following scenarios as shown in Figure 2-8:

- 2050 RCP4.5M
- 2080 RCP8.5M
- 2130 RCP8.5M
- 2130 RCP8.5H+.

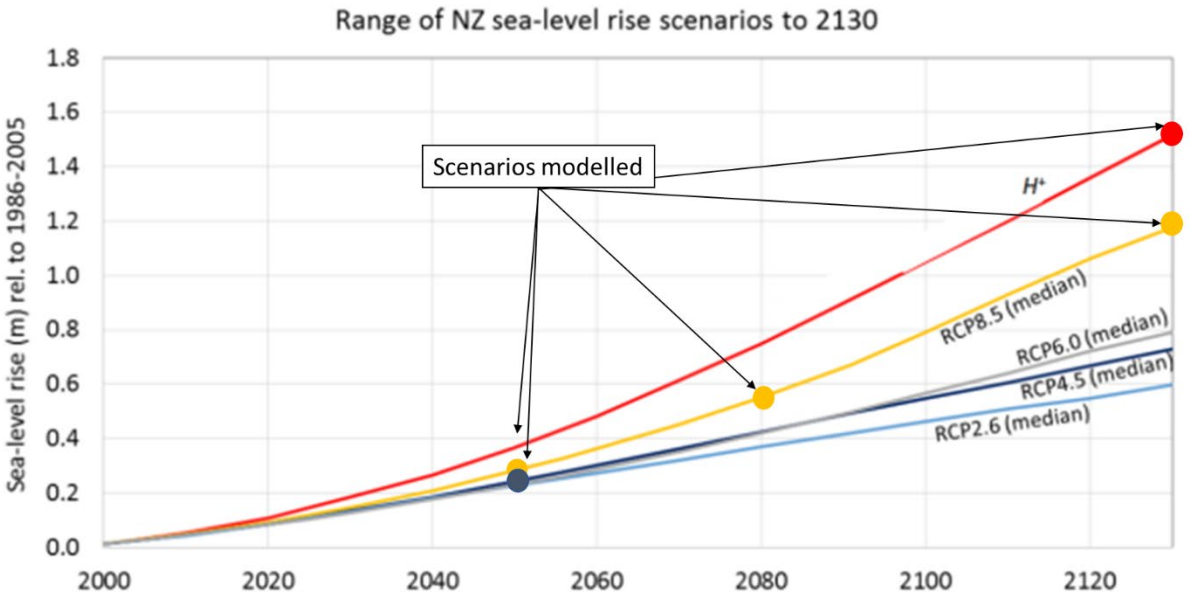


Figure 2-8: Four scenarios of New Zealand-wide regional sea-level rise projections showing the values used for the ASCIE assessment (Source: Me, 2017)

These scenarios represent a range of time periods and sea-level rises that are predicted to occur with a high emission representative concentration pathway (RCP). Water level predictions based on the median trajectory and the 83rd percentile were assessed for 2130, described as RCP8.5H+. Mfe (2017) recommends the use of this value for regional hazard screening to broadly identify areas potentially exposed to coastal hazards.

2.3.3.2 Results of assessment

Figure 2-9 shows the resulting extents for these four scenarios. The 2130 extent was derived from the RCP8.5H+ scenario. Erosion extents are generally greater along the harbour coast than within the inlets, but impact both beach and cliff coasts.

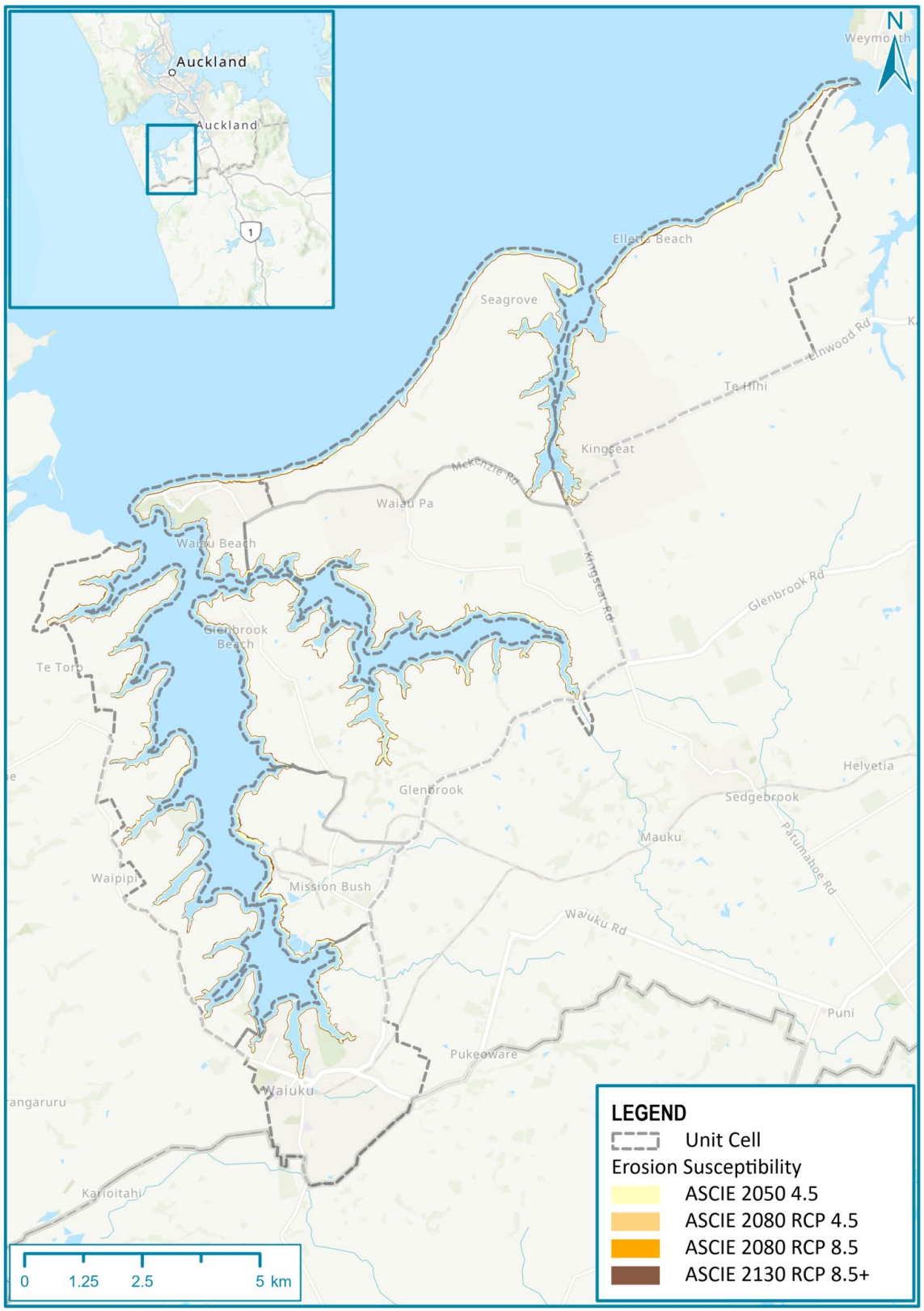


Figure 2-9: Coastal erosion susceptibility for 2050, 2080 and 2130 considering RCP4.5 and RCP8.5 emission scenarios

2.3.4 Rainfall flooding

Rainfall flooding extents have been based on existing published data from Auckland Council. All rainfall flood modelling has been undertaken to comply with Auckland Council's modelling specification[7] concentrating on high flood-risk areas including primary open channels and streams using the 2016 LiDAR.

2.3.4.1 Boundary conditions and parameters used

The Auckland region-wide model for Rural Area Stage 1, created by Auckland Council's Healthy Waters Department, was utilised to assess rainfall-induced flooding. Key aspects of the modelling included:

- The model and flood results were produced based on the datasets available at the time of model build. Therefore, the modelling information cannot be used as a substitute for site-specific investigations
- It uses a rain-on-grid modelling approach with 10 m x 10 m output resolution and assumes the pipe network is fully blocked
- The ground elevations are based on LiDAR 2016 bare earth DEM
- The Maximum Probable Development (MPD), 1% AEP event with 2.1^{0}C climate change impact was used
- A constant tailwater level of MHWS10 + 1 m sea rise as a boundary condition.

2.3.4.2 Results of assessment

The modelling outputs are shown in Figure 2-10. The results show that rainfall inundation extents are generally confined to the coastal margins and the base of the incised channels within the Waiuku Estuary and Taihiki River. On the harbour coast, there are greater extents of flooding with the Whātāpaka Creek and low-lying coastal land at Elletts Beach and Seagrove. There are many small areas of ponding due to the variable topography within all the units.

[7] Auckland Council, 2012. Stormwater Rapid Flood Hazard Assessment Modelling Specification

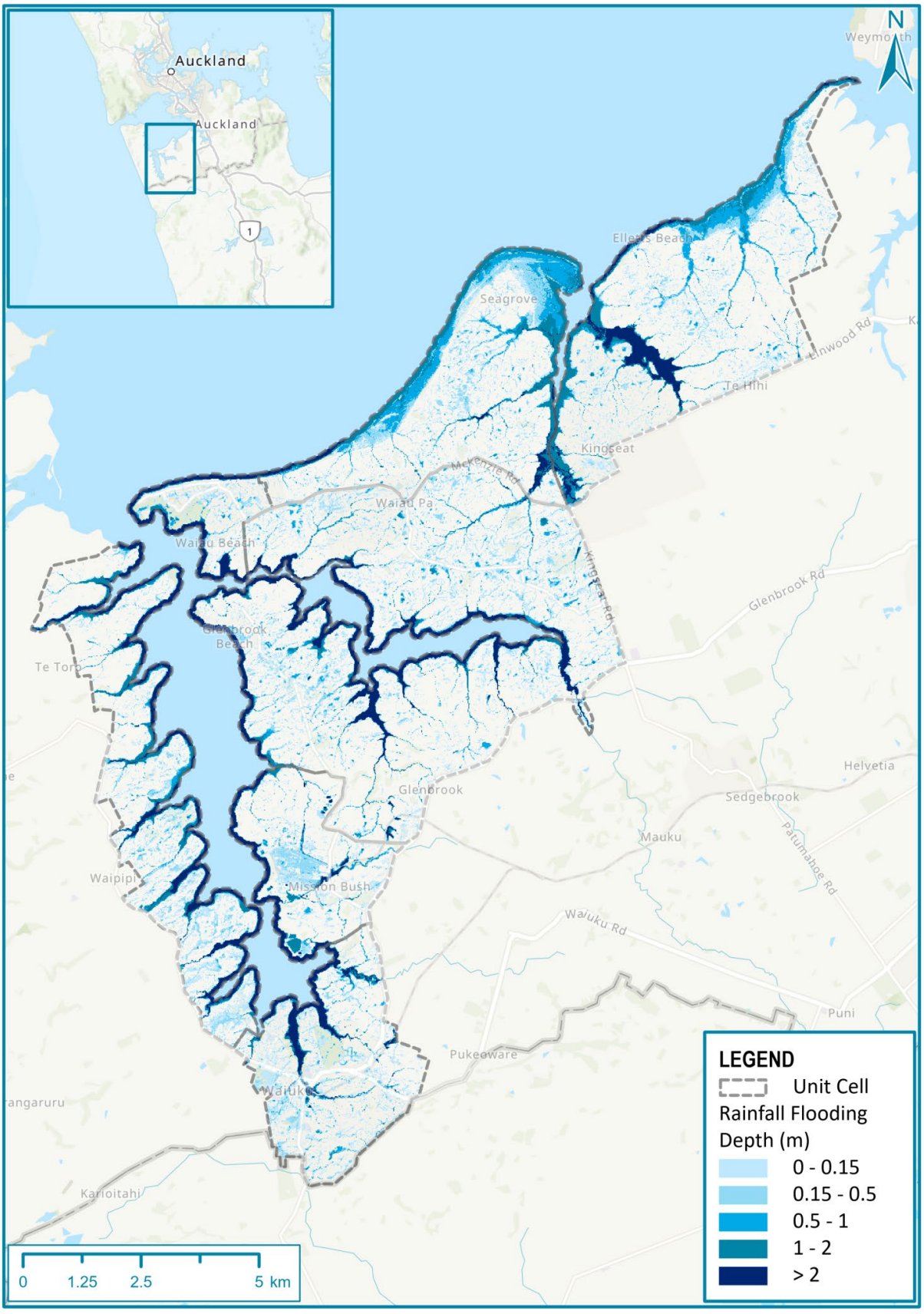


Figure 2-10: Rainfall flood extents and depths for MPD, 1% AEP event with 2.1deg CC

2.3.5 Other hazards impacting coastal areas

Auckland is affected by natural hazards including those that occur frequently such as coastal inundation, rainfall flooding, coastal erosion (including the effects of sea-level rise), freshwater erosion and land instability that can manifest as landslides or slips; and those that occur less frequently such as wildfires, volcanic activity, tsunami, earthquakes, and meteorological hazards such as cyclones, tornadoes and drought. All these hazards can affect people, property and the wider environment.

There are also secondary effects of climate change on groundwater systems that can modify natural hazards such as inundation or liquefaction. Changes to groundwater as a result of climate change can include increased groundwater salinity and raising of groundwater levels as well as changes in surface evaporation and transpiration that may also result in lowering of groundwater levels. The potential effects and interactions between groundwater and seawater are highly localised and complex, and it is uncertain how groundwater in many places will respond as the sea rises.[8]

Some risks from events with low probability but high potential impact (e.g. volcanic activity, tsunami, and earthquakes) cannot be addressed through land-use planning and may be better addressed through measures put in place by emergency management groups such as Civil Defence. These include education, warning systems and emergency preparedness. Meteorological hazards are typically managed through building controls and management approaches.

[8] https://pce.parliament.nz/explore/sea-level-rise/groundwater/#:~:text=If%20sea%20level%20rise%20makes,respond%20as%20the%20sea%20rises.

2.4 Local cultural context

The lands and waters that now comprise Tāmaki Makaurau Auckland have been occupied and accessed for over 1,000 years by mana whenua as the first peoples of Tāmaki Makaurau and form the ecological and cultural fabric of the region. Mana whenua have specific values in relation to their mana of the land and coastal environments. Te Ao Māori calls for the protection and preservation of whole living systems, and for maintenance, sustainability and regeneration of the whakapapa relationships that enable the wellbeing of these systems. Our coastal environment plays an important part of this system.

Each iwi has specific and wider cultural values, interests and associations with the coastal environment and the adjoining whenua captured within this SAP and in individual, iwi-authored 'Cultural Statements' which outline each iwi's guiding principles and cultural values. It is critical to note that each iwi is the kaitiaki (guardian) of their respective mātauranga associated with these areas and thus each 'Cultural Statement Report' is safeguarded and subject to a disclaimer to protect an iwi's intellectual property. The same applies for all cultural kōrero, values and mātauranga embedded within this report.

In recognition of the partnership and co-management approach of the coastal environments and adjoining whenua, following publication of this report, each iwi has communicated that they will direct how their respective mātauranga should be shared through the 'site focused' concept/detailed design and development processes. This will take place through subsequent consenting processes for each coastal stretch, as required.

It is important to note that the coastal units and stretches have been developed to capture Auckland Council asset units and do not reflect the historical cultural boundaries which often extend over multiple units or coastal stretches. Therefore, while all attempts have been made to align with the identified coastal units, the cultural commentary provided throughout this SAP often extends across multiple areas. Where possible, the names of these stretches and units have also been updated to reflect the traditional names.

The cultural history and context of the area, particularly how we embed mātauranga Māori and Te Ao Māori principles, is relevant to the Manukau South SAP development.

2.4.1 Protection of Mātauranga Māori and cultural values

As identified in the opening pages of this document, all cultural information within this document is the intellectual property of iwi who have contributed to the development of the Manukau South SAP.

To ensure the protection of any Mātauranga Māori, cultural information must not be recirculated to other workstreams without direct consultation with and approval by local iwi, to whom this information belongs.

To ensure that cultural values and associations are recognised and provided for in any works programme, it is fundamental that this partnership and co-management approach is applied to each specific coastal stretch when implementing the direction set out in this SAP. Failure to do so has the potential to result in significant adverse cultural impacts.

Early and meaningful engagement with the relevant iwi groups on projects under this SAP is necessary. This will ensure that Auckland Council and Council-owned organisations meet their obligations to Ngā Mana Whenua o Tāmaki Makaurau and Te Tiriti o Waitangi. Iwi must be given the opportunity to act in their role as Kaitiaki for their rohe.

Figure 2-11 below illustrates the cultural significance of the Manukau South SAP area, highlighting the number of sites of significance (i.e. wahi tapu, pā sites and midden) and historic Māori settlements. This information is accessible publicly through Auckland Council's Cultural Heritage Inventory and the NZ Archaeological Association Database. Though the maps below provide an insight into the number of sites of significance across Manukau South, it is essential to note that there are a significant number of cultural heritage sites within the SAP area which are not recorded. These exist both above and below mean high water spring (within the Coastal Marine Area).

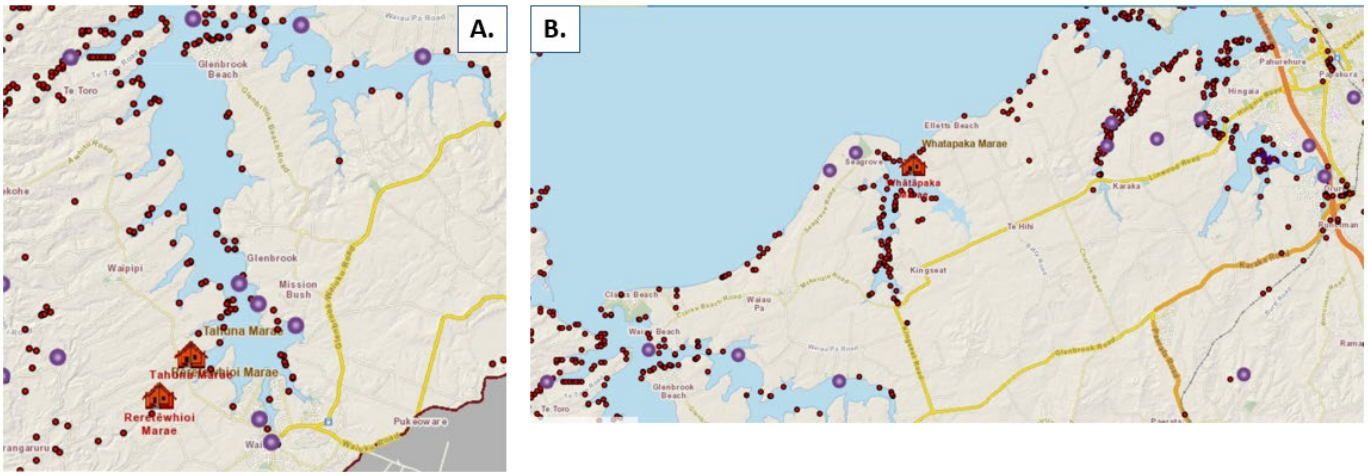


Figure 2-11: Auckland Council Thangata Whenua map layers illustrating the extent of cultural archaeological sites (red dotes), historic Māori occupation (purple dots) and marae (red houses) along the Manukau South Shoreline Adaptation Plan area, identified using the CHI inventory and the NZ Archaeological Association database. Map A covers the area from Clarks Beach to the eastern boundary around Seagrove, whilst Map B covers the area from Glenbrook to the north-western boundary at Te Toro

2.4.2 The Manukau Harbour Claim (Wai 08)

In 1985, the Waitangi Tribunal (the Tribunal) reported on a claim on behalf of the people of the Manukau Harbour. It concerned pollution of seafood resources and loss of surrounding land from confiscations after the New Zealand wars, and for public works.

This claim is integral in understanding the impact on the wellbeing those iwi and hapu who live on and around the Manukau and have done so for centuries.[9]

[9] The Manukau Report (1985). Report of the Waitangi Tribunal on the Manukau claim (Wai 8). 2nd ed. Wellington , N.Z.: The Tribunal

Following are a number of findings by the Tribunal on the Manukau Harbour:

- There is insufficient research to assess the impacts of development on the Manukau Harbour and its environs
- The waters of the Manukau once supported abundant marine resources, and these are now seriously depleted and adversely affected
- Loss of fish stocks is unquantifiable, but overfishing has depleted stocks and the marine habitat has been seriously affected by reclamations, sedimentation, and discharges
- The Māori people have been substantially affected by the loss of their traditional access to the sea, the destruction of traditional fishing grounds, and by failure to define and protect areas of special significance to them.

The Report has a number of recommendations that address the findings of the Tribunal; however, the claim remains unsettled. As such, the Manukau Report identifies the loss to the people of the Manukau. Further korero on the Manukau Claim (Wai 08) is documented in the cultural values assessment provided by Ngāti Te Ata Waiohua [10].

10 Ngāti Te Ata Waiohua Manukau Harbour Report. 2023. *Shoreline Adaptation Plans: Manukau South and Aawhitu. Guiding Principles and Cultural Values*

2.5 Social context

Manukau South SAP area includes a range of coastal communities, which by the nature of their location are exposed to natural hazards, changes in sea level and a changing climate. This exposure and varying vulnerabilities will affect how communities interact with, rely on, and utilise, coastal land and the assets that support them.

Communities along the coastline of Manukau Harbour South include Waiuku, Glenbrook, Clarks Beach, Waiau Pā and Karaka. Manukau Harbour South SAP falls within the Franklin Local Board area.

2.5.1 Regulatory and policy context

Understanding the regulatory and policy context applicable to the Manukau South area helps us understand the previously expressed issues by the communities, as well as their values, objectives and aspirations. An identification of relevant plans has been undertaken.

The following are key plans and documents of relevance to Manukau South SAP development and implementation:

- Waiuku Te Ara Hikoi- Waiuku Trails - an Aspirational Plan (2017): The Waiuku Trails Plan includes proposals for walking and cycling trails linking the foreshore area, open space, esplanade reserves, parks and residential streets with key destinations and the heart of Waiuku Town centre itself.
- The Regional Parks Management Plan and operative Local Parks Management Plans are identified as relevant documents and further consideration of these will be required through implementation. An update to the Franklin Local Parks Management Plan(s) is currently being progressed and close engagement with that plan is occurring to ensure that SAPs and developing local parks management plans are aligned.
- The Franklin Local Board Plan 2020 is a three-year plan due for renewal in 2023. This plan focuses on six outcomes that each contribute towards enhancing and supporting the community across the Franklin Local Board area. These outcomes include:
    - Our strengths generate local opportunity and prosperity
    - Improved transport options and fit-for-purpose roads
    - Fit-for-purpose places and facilities
    - Kaitiakitanga and protection of our natural environment
    - Cultural heritage and Māori identity is expressed in our communities
    - A sense of belonging and strong community participation.

  This Plan refers to the following matters: climate change, coastal erosion, drought, flood, extreme weather events, resilience, environmental conservation, restoration and regeneration projects, assets, future needs, local character.
- Clarks Beach Erosion Management Guidelines - Auckland Regional Council (2004) is a joint initiative between the Auckland Regional Council, Franklin District Council and local residents and ratepayers to provide guidance on the management of the Clarks Beach and Waiau Beach coastline. Guidelines set out in this document are a tool for property owners

who seek some assistance to manage coastal erosion. This document provides direction on appropriate methods for managing coastal erosion, and the resource consent and building permit processes and discusses shoreline change at Clarks Beach and Waiau Beach.

- Coastal Compartment Management Plan for Waiuku Estuary (2007) is a non- statutory document which serves as a guide for Franklin District Council, Auckland Regional Council and the community in their decision-making regarding the management of Waiuku Estuary. The study area of this plan is the Waiuku Estuary, a section of coastline approximately 20 km in length. As such, this plan sets out to achieve the following objectives:
  - To collate relevant existing environmental information on the Waiuku Estuary and identify the values of the Waiuku Estuary and to highlight issues relevant to its future management
  - To identify a shared vision of the community's aspirations for the estuary through a process of community consultation
  - To establish an Action Plan Framework from which future management decisions, including policy development, projects or future investment can be made, and from which the community's aspirations and the long-term sustainable management of the estuary can be achieved.

2.5.2 Key community locations and groups

As an area with a rich historic background and well-established local communities, there are a number of community groups and organisations active along the southern Manukau Harbour that frequently visit the coast and utilise coastal assets for a range of purposes. The table below provides a non-exhaustive list of identified community groups and networks along the Manukau South area.

Table 2-2: Manukau South key community locations/assets and groups

Suburb Area	Community Organization
Clarks Beach	Clarks Beach holiday park
Clarks Beach	Clarks Beach Public Wharf Society
Clarks Beach	Clarks Beach Residents and Ratepayers Association
Clarks Beach	Crest (predator free shorebird protection)
Clarks Beach	Te ara Hikoi/ Franklin Trails- biodiversity corridors along the coastal Taihiki river/ estuary
Clarks Beach	Clarks Beach Yacht Club
Glenbrook	Glenbrook Boating Club
Glenbrook	Glenbrook Vintage Railway Charitable Trust
Glenbrook Beach	Glenbrook Beach Residents and Ratepayers
Karaka	Karaka School
Rural Hall Committees	Contact for Rural Hall Committees
Te Ara	Te Ara Rangatahi (youth/rangatahi focussed) Waiuku based
Te Hihi	Te Hihi School

Suburb Area	Community Organization
Waiuku	Waiuku clinic
Waiau	Waiau Pā Boating Club
Waiau	Waiau Pā School
Waiuku	Mudlarks
Waiuku	Waiuku Family Support
Waiuku	Waiuku Trails Committee
Waiuku	Waiuku Waterfront and Reserves Management Committee
Waiuku	Waiuku Yacht Club
Waiuku and Pukekohe Library	Contact for Waiuku and Pukekohe Library

2.5.3 Growth, development, and future generations

The most recent census data for Manukau South was collected during the 2018 New Zealand census of population and dwellings.

According to the 2018 census, the population within the Manukau South SAP area sits around 8,064. Out of this, the largest demographic percentage is pakeha/ NZ European, 12.3% are Māori, 3.8% Pacific and 6.8% of Asian descent. The median age across Manukau South appears to sit around 40-45 years old. When compared with earlier census results, the statistics suggest a trend towards a growing population across Manukau South, with land zoning changes providing for further development near to the coast. Recent developments include special housing areas at Kahawai Point (Glenbrook) and Clarks Beach, and future growth areas in Kingseat, Te Hihi and Karaka.

The demographic data and information provide a general overview of the existing situation and trends of the Manukau South SAP area. This informs an understanding of local context and needs.

2.6 Ecological context and values

The Auckland region is home to a wide range of ecosystem types and species (see Figure 2-12). This is evident in the range of ecosystems in microcosms found along the shores of Manukau Harbour which covers around 365 km^2 and over 450 km of shoreline, containing terrestrial and aquatic habitats and associated species. Three major inlets (Waiuku, Pahurehure and Mangere) make up Manukau Harbour, with Waiuku being in the Manukau South SAP area extent.[11]

2.6.1 Identified ecological areas and values

Manukau South contains a number of indigenous coastal saline, wetland, cliff, forest and regenerating ecosystems supporting native fauna and flora, such as birds, geckos, and bats endemic to New Zealand.

There are a number of roosts in Manukau South that are excellent feeding grounds for thousands of migratory and New Zealand endemic wading birds. These roosts and closely adjacent intertidal banks in Waipipi and Karaka are 'Areas of Significant Conservation Value' [18]. Supporting these ecosystems is a key focus for biodiversity aspirations, when aiming to maintain the viability of the tūturiwhatu/New Zealand dotterel and oystercatcher population in the next 50 years; the former of which had a total of 2075 birds counted in the 2011 breeding-season census[12].

The Manukau South SAP area has numerous 'Biodiversity Focus Areas' and 'Significant Ecological Areas' (SEAs) as indicated in Figure 2-12 below:

- Biodiversity Focus Areas represent the minimum sites requiring targeted management to ensure protection of Auckland's indigenous ecosystem and threatened species. Within the Manukau South area, they include:
    - Seagrove – Elletts Beach
    - Rangiriri (Near to Te Toro)
    - Manukau Harbour Saline (around Waiau Pā and Seagrove).
- Significant Ecological Areas are located throughout the Manukau South SAP area extent, composed of:
    - Seagrove: Intertidal banks and shellbanks form a complex, dynamic habitat for a variety of flora and fauna species, with fine grain sand flats supporting the greatest diversity and abundance of intertidal sand flat organisms in Manukau Harbour (SEA- M2)
    - Karaka roosts – shellbanks : Seagrove coastline and Whātāpaka Creek. Roosts found along this section of Manukau Harbour are now numerically the most important, most notably for waders (SEA- M1). Extensive beds of eelgrass once existed between Clarks and Seagrove, reappearing slowly over recent years.

[11] *A Synthesis of State of the Environment Monitoring in the Manukau Harbour* (2021). Auckland Council

[12] Dowding, J.E. 2013 [updated 2022]. New Zealand dotterel | tūturiwhatu. *In* Miskelly, C.M. (ed.) *New Zealand Birds Online*. www.nzbirdsonline.org.nz

- **Taihiki River:** This inlet is made up of a range of sheltered harbour habitats ranging from predominantly sand intertidal flats to mangroves and to pockets of saltmarsh, providing important nursery grounds for a range of terrestrial and marine flora and fauna (SEA- M2)
- **Waipipi:** Saltmarsh and intertidal flats (SEA- M2) and Waipipi roosts (SEA – M1).

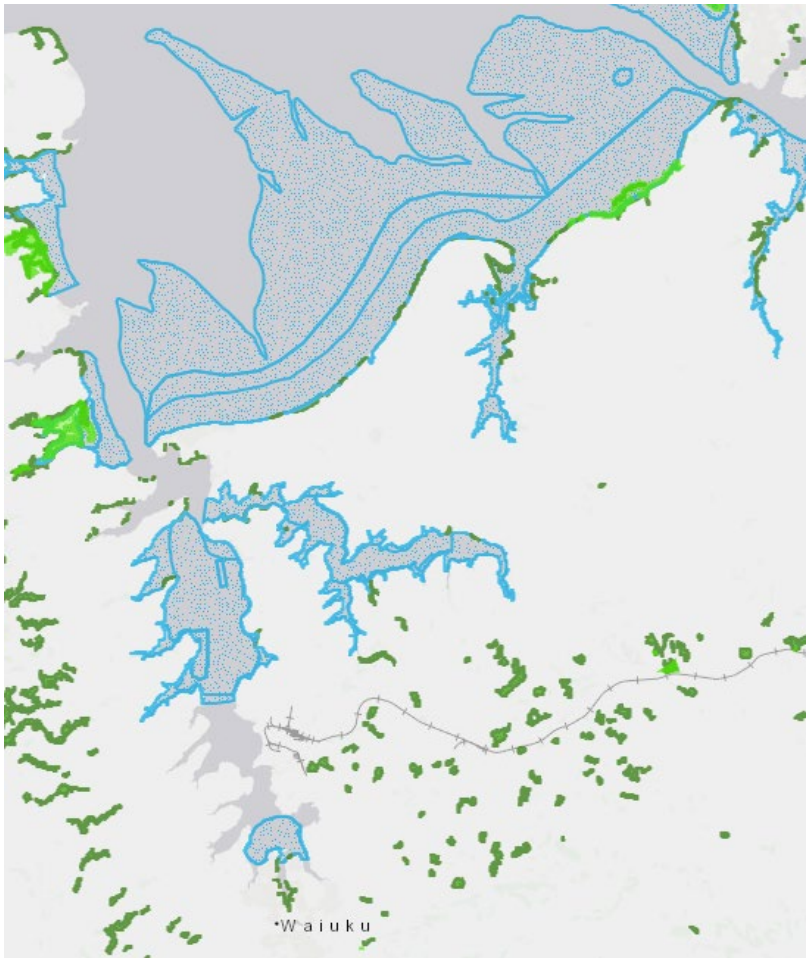


Figure 2-12: Map of Manukau South SAP area extent showing Biodiversity Focus Areas (light green) and Significant Ecological Areas (dark green). Tiaki Tamaki Makaurau Map, Auckland Council.

2.6.2 Threats and opportunities

Manukau Harbour, upon which Manukau South sits, is largely intertidal, with highly productive sand and mudflats. There are ecosystems along Āwhitu Peninsula and within Manukau Harbour facing transformation as a result of anthropogenic modification and environmental change over the last couple of decades. Such change poses threats to the biodiversity of these areas and can be exacerbated by the interventions and management choices we make in our coastal environments.

Conversely, understanding possible ecosystem extents can provide a view to opportunities for enhancement and restoration and the role that choices around shoreline management may contribute to ecological outcomes within the peninsula. Mapped ecosystem extents represent those ecosystems that would have been present prior to human settlement versus the current extent (refer

to Figure 2-13). This information helps us understand level of change of each ecosystem type over time and assists with proactive management of an area and ecosystem[13].

2.6.2.1 Threats

The International Union for the Conservation of Nature (IUCN) classification for describing the risk status of an ecosystem has been used to describe the vulnerability ranking of ecosystems. This assists in identifying which ecosystems require prioritisation of protection, management, and restoration[13]. The IUCN vulnerability ranking of ecosystems within the Manukau South SAP area, varies from least concern to threatened or endangered as follows:

Table 2-3: International Union for the Conservation of Nature (IUCN) classification for ecosystems identified as present in the Manukau South SAP area

Ecosystem	Threat level
Pōhutukawa treeland/flaxland/rockland (coastal cliff ecosystems)	Vulnerable
Mānuka, kānuka scrub (regenerating ecosystems)	Least concern
Machaerina sedgeland	Critically endangered
Mangrove forest and scrub	Least concern
Pōhutukawa, pūriri, broadleaved forest (coastal broadleaved forest)	Endangered
Pōhutukawa scrub/forest	Endangered
Oioi, restiad rushland/ reedland	Endangered
Kauri, podocarp, broadleaved forest	Endangered

2.6.2.2 Opportunities

Map A illustrates how prior to human colonisation and modification, the former vegetation of Auckland was dominated by distinct, location-specific forest types. Coastal forests differed from inland kauri, podocarp, broadleaved forests and they differed from kahikatea forests on flood-prone alluvial river terraces. The region also had a variety of non-forest vegetation on sand dunes and in wetlands, which were particularly diverse. This contrasts with Map B, showing the current ecosystem extent of Auckland following human settlement. The following potential ecosystem extents are evident within the Manukau South SAP area:

- WF7 – 1 Puriri Forest
- Open water ecosystem (along the taihiki inlet)
- Fen / swamp mosaic
- Mangrove forest and scrub (SA1).

[13] Singers et al, 2017

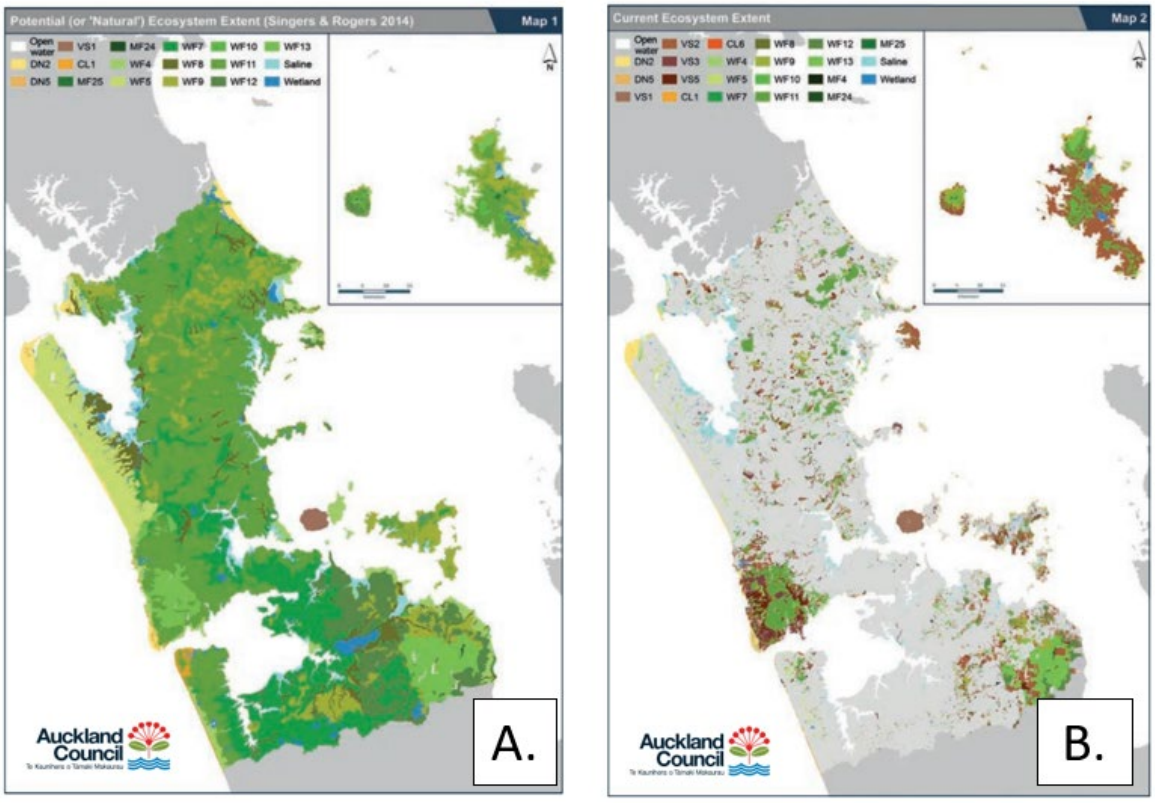


Figure 2-13: Map A represents the potential extent of indigenous terrestrial and wetland ecosystems, Map B represents the current extent of indigenous terrestrial and wetland ecosystems in Auckland (Singers and Rogers, 2014).

2.6.3 Adaptative capacity and sensitivity

The term 'sensitivity' when used in relation to a changing climate refers to the degree to which a species or environment is influenced or affected by a change in its environment and how well it may be able to cope with such a change[14]. A consideration of the ecosystems present within the Āwhitu SAP area has been undertaken and is appended as Attachment A.

[14] Foley and Carbines, 2019

3.0 Manukau South area outcomes and analysis

3.1 Local iwi engagement

To date, the mana whenua engagement process within the Shoreline Adaptation Plan Programme has been facilitated via:

- Regional discussions with the I&ES Mana Whenua Forum
- Local iwi engagement on each area-based plan
- Governance discussions with Te Pou Taiao and the IMSB (Independent Māori Statutory Board).

Within each SAP area, local iwi groups are identified through recognition of statutory acknowledgments and rohe overlays (identified using Auckland Council GeoMaps) and formally approached via a letter to engage. Additionally, prior to the launch of a SAP area plan, updates on the programme are provided through the I&ES Mana Whenua Forum, with an overview on the upcoming SAP areas and a reminder to get in touch if anyone else would like to be involved in the development of upcoming SAP area plans. Local iwi groups which have an affiliation (statutory acknowledgement) to Manukau South have been identified as:

- Ngāti Te Ata Waiohua
- Ngai Tai ki Tamaki
- Ngāti Whanaunga
- Ngāti Maru
- Waikato – Tainui
- Ngāti Tamaoho
- Te Akitai Waiohua.

From the list above, those who expressed an interest in the Manukau South SAP Kaupapa include:

- Ngāti Te Ata Waiohua
- Waikato – Tainui
- Ngāti Tamaoho
- Te Akitai Waiohua.

The development of this SAP and selection of coastal management strategies has been guided by Ngāti Te Ata Waiohua and Ngāti Tamaoho. Throughout the development of this document, mana whenua engagement has taken place with Ngāti Te Ata Waiohua , Ngāti Tamaoho, Te Ākitai Waiohua and Waikato Tainui via a series of online and in-person hui, workshops and on-site hikoi. Each of these iwi groups has been involved in the development of this SAP in some shape or form as they expressed interest in the Manukau South area extent.

Te Ākitai Waiohua has undertaken a role of ‘observer’ in this process to assist in the development of future SAPs which relate to the rohe of Te Ākitai Waiohua.

Waikato Tainui has been involved throughout the development of both the Manukau South and Āwhitu SAPs.

Engagement began in May 2022 and remains ongoing (in support of the development of further area plans, and their implementation under the SAP programme). Engagement included hui both online and in-person. Site visits by the project team have been undertaken with local iwi within the Manukau South SAP area and reviews of SAP plan documents as they are developed and completed for endorsement have been undertaken by iwi partners.

The photos below were taken on a hikoi around the Āwhitu Peninsula and Manukau South areas with local iwi.

Auckland Council and the Project Team (including consultants) acknowledge the importance of the autonomy of each of iwi and respect their individual and collective involvement in the development of this SAP.

Figure 3-1: Local iwi and Auckland Council project team (02/12/2022) location (Orua Bay) Photo Credit: Sage Vernall

3.2 Cultural aspirations and outcomes

The cultural objectives and outcomes sought by the respective iwi that are underpinned by the partnership and co-management approach taken in developing these high-level strategic SAP documents need to be recognised and used as a basis for all facets of the implementation of the SAPs.

It is of vital importance that this partnership and co-management approach is applied when implementing the direction set out in this SAP to each identified, specific, coastal stretch. Failure to do so has the potential to result in significant cultural impacts if iwi are not recognised as kaitiaki of their rohe and their values and associations are not considered when implementing these plans.

Therefore, the primary cultural objective for any process that flows from this SAP, and any SAP or associated document in the future, is the need for a formalised process to establish and formally recognise and provide for the role of iwi as partners as part of a co-management approach. The formalisation of this process will provide for mahitahi participation / working together / individual and shared priorities; all of which are key cultural outcomes. The need for the partnership/co-management approach applies to the rohe of each iwi and also their lands identified through their Treaty settlements.

For the Manukau South SAP area, iwi have provided the following aspirations and outcomes to guide the development and implementation of the Manukau South SAP.

Aspirations and outcomes sought by Ngāti Te Ata Waiohua as outlined in the Ngāti Te Ata Waiohua Manukau Harbour Report, 2023 [10]:

- Embrace and empower kaitiakitanga and rehabilitate and heal the natural systems that support us all. Ngāti Te Ata Waiohua has never relinquished its rangatiratanga or its kaitiakitanga over natural and physical resources including its coastal environment and coastal resources.
- Restore Ngāti Te Ata Waiohua capacity to manage our natural and physical resources according to our own preferences The natural environment is a taonga. It is the source of our nourishment, our kai and our spiritual and physical welfare. We whakapapa to it and we are not separate from it. Inability to exercise our rightful kaitiakitanga affects our welfare and despoils our environment.
- Implement programmes such as riparian planting, protecting sensitive receiving environments and protecting and enhancing water quality. Ngāti Te Ata Waiohua emphasise the importance of healthy uncontaminated water throughout the rohe. Waiora is the water of life, the purest form of freshwater that gives and sustains life and can rejuvenate damaged mauri. Mauri is the life force that regenerates and binds the physical and spiritual elements of resources together.
- Give special attention to the Manukau Harbour to rehabilitate it and secure its future.
- That no further species extinctions occur including the Maui dolphin and that biodiversity is managed to sustain our communities consistent with our kaitiakitanga practices. Biodiversity is integral to Ngāti Te Ata Waiohua. We are not separated from it; rather it is part of us and our conception of health and wellbeing. Biodiversity continues to be under threat despite successive plans to ‘turn the tide’. Its value cannot be over-estimated, and

it is interwoven with many of our traditional values and practices. As Kaitiaki, we take an ecosystem view, and we have a responsibility to manage and protect healthy ecosystems and the biodiversity that they support.

- No ashes of the deceased are to enter into sacred waterways as this is a cultural insult and in conflict with the traditional harvest of kai moana[15].
- That Ngāti Te Ata Waiohua be supported to conduct its own monitoring of the effectiveness of environmental regulations in the protection of its cultural resources, biodiversity wāhi tapu and other taonga within its rohe.

Additionally, Ngāti Te Ata Waiohua has further articulated the need to suitably manage any effects in the hierarchy of avoid, remedy, minimise, mitigate, or balance. This is a hierarchy where the first and preferred option to manage an effect is to avoid it; should this not be possible, the next option is to remedy the effect; and so on through to suitably balancing the effect, which might include offset mitigation. Importantly, only mana whenua can determine the effects and the degree of those effects on themselves and their cultural values. [10]

3.2.1 Mātauranga ā iwi from Ngāti Te Ata Waiohua

The table below sets out a series of guiding principles provided and advocated for by Ngāti Te Ata Waiohua[10] and Ngāti Tamaoho. Future coastal management strategies across the Manukau South SAP area (set out in Section 5) aim to acknowledge and support these principles through implementation, recognising the principles below as the starting point for more meaningful consultation with local iwi groups.

Mana Whakahaere	• Recognising whanau. hapu, and iwi rights to exercise their own tikanga concerning the CMA, foreshore and seabed.
Iwi Rangatiratanga	• Recognising iwi rights to self-determination including their right of self-governance and self-regulation of their CMA, foreshore and seabed.
Maru Taha Tika	• Actively protecting whanau, hapu and iwi rights, as well as interests concerning the CMA, foreshore and seabed.
Manaakitanga	• Recognising the role that Government and Council must play in supporting whanau, hapu and iwi rights, needs and aspirations concerning CMA, foreshore and seabed.
Kaitiakitanga	• Our guardianship is inextricably linked to tino rangatiratanga and is a diverse set of tikanga or practices which result in sustainable management of a resource. Kaitiakitanga involves a broad set of practices based on a world and environmental view and is about healing and restoring the land and water. The root word is tiaki, to guard or protect, which includes a holistic environmental management approach which provides for the following: ○ Restore mana of the Iwi (e.g. protect sensitive cultural and natural features of the environment) ○ Restoration of damaged ecological systems ○ Restoration of ecological harmony

[15] Note: this matter is beyond the scope of the SAPs.

	○ Ensuring that resources and their usefulness increases, i.e. plan for the provision for, and the restoration of traditional resource areas for future generations (e.g. kaimoana, fish, tuna) ○ Reducing risk to present and future generations (i.e. plan long-term management and use of taonga) ○ Providing for the needs of present and future generations. ○ Advocating for seawalls, coastal structures and reclamations that impede kaitiakitanga and access.
Hono Marino	• Acknowledging that Ngāti Te Ata Waiohua would not unreasonably or without good cause, deny others the use and sharing of certain CMA, foreshore and seabed resources consistent with the tikanga of the iwi.
Turukitanga	• Ngāti Te Waiohua consider the principles of access, certainty and protection can be met through recognition of the above principles as the starting point for more meaningful consultation.
Paneketanga	• Recognising the whanu hapu and iwi rights to development over its foreshore and seabed within their own cultural preferences.

3.2.2 Ngāti Tamaoho

Ngāti Tamaoho has identified a particular interest in the Manukau South coastal area. As such, Ngāti Tamaoho has been involved throughout the development of the Manukau South SAP, providing guidance on the selection of coastal adaptation strategies and inputting cultural content into the body of the Manukau South Report (see Section 4.7).

3.2.3 Waikato Tainui

Waikato Tainui directed the Auckland Council SAP team to the Waikato Tainui Environmental Plan to inform the understanding of the values, principles and objectives Tainui has in relation to coastal areas of their rohe[16]:

- Chapter 10 of the Environmental Plan sets out the Tribal Strategic Plan - Whakatupuranga Waikato -Tainui 2050
- Chapter 14 identifies customary activities - Ngaa Mahi Tuku Iho a Waikato -Tainui.

Both of these chapters have been identified by Waikato Tainui as being of relevance to the development of the SAP Plan for Manukau South area.

The Environmental Plan identifies the mana whakahaere of Waikato-Tainui has for associated requirements to responsibly use, protect, and enhance customary resources, and to ensure their on-going health and wellbeing. Waikato-Tainui customary activities and resource use include but are not limited to the activities below.

[16] https://www.waikatoregion.govt.nz/assets/WRC/Council/Policy-and-Plans/HR/S32/Part-A/Waikato-Tainui-environmental-plan-Tai-Tumu-Tai-Pari-Tai-Ao.-Hamilton-New-Zealand-Waikato-Tainui-Te-Kauhanganui.pdf

Waikato -Tainui's customary activities (outlined in Chapter 14) include:

- Koroneihana: The annual celebration of the coronation day of the Head of the Whare Kaahui Ariki
- Waka or kohikohia
- Tangihanga and hari tuupaapaku: The transportation of human remains and the accompanying funeral ceremonies
- Tangohia ngaa momo takawai: The collection of resources, such as river stones, shingle, and sand from the Waikato- Tainui rohe for the purposes of customary practices including:
  - The building of a tuahu (altars)
  - Carvings
  - The preparation of haangii.
- Raahui: The imposition of restrictions, from time to time, on all or part of an activity, or the use of a resource, or rohe
- Hauanga kai: The customary and contemporary gathering and use of naturally occurring and cultivated foods.

Core objectives in this chapter speak to enabling Waikato -Tainui to access and undertake, protect, and enhance customary activities.

Whakatupuranga Waikato-Tainui 2050 (outlined in Chapter 10) is the blueprint for cultural, social and economic advancement for the Waikato-Tainui people. It is a long-term development approach to building the capacity of Waikato-Tainui marae, hapuu, and iwi. Whakatupuranga 2050 will be Waikato-Tainui's legacy for future generations. Within Whakatupuranga Waikato-Tainui 2050 there are three critical elements fundamental to equipping future generations with the capacity to shape their own future:

- A pride and commitment to uphold their tribal identity and integrity
- A diligence to succeed in education and beyond
- A self-determination for socio-economic independence.

Waikato -Tainui's strategic direction charts a course of significant developments to protect tribal identity and integrity. The development of a core strategy designed to provide maximum support for Waikato -Tainui's kaumaatua, the caretakers of maatauranga, and experts of Waikato -Tainui's reo and tikanga, is a key priority. Waikato -Tainui's whenua, rivers, lakes, and other waterways are living embodiments of Waikato -Tainui's tribal identity. The necessity to forge a partnership with the Crown is vital to the preservation and protection of 'te taiao', our environment:

- To preserve our tribal heritage, reo and tikanga
- To grow our tribal estate and manage our natural resources.

With the above in mind, Waikato -Tainui are primarily interested in ensuring that the affiliate marae are engaged and aware of the SAP programme and the opportunities to start korero about innovation, co-benefits and use of mātauranga (by iwi for iwi) in responding to environmental/climate change challenges, acknowledging these things are often interconnected and closely related to social/cultural and economic interest and outcomes too. Engagement with affiliate marae may be

facilitated through local iwi connections; in particular, Ngāti Te Ata Waiohua, Ngāti Tamaoho, Te Ākitai Waiohua, Ngai Tai Ki Tamaki, and the marae at Whaataapaka, Umupuia, Tahunakaitoto, Puukaki, Kakaurau and Te Puea.

Waikato Tainui has identified the following ongoing outcomes of the SAP programme and its implementation:

- Remaining engaged with the development of SAP area plans which include areas where affiliate marae are located
- Ensuring data and knowledge is shared appropriately with agreements and protection of mātauranga clearly specified/documented
- Supporting opportunities for innovation, utilise mātauranga, and being directly engaged in discussion around implementation of the SAP programme.

3.2.4 Te Ākitai Waiohua

As identified in Section 2.4, Te Ākitai Waiohua has undertaken a role of ‘observer’ in this process to assist in the development of future SAPs which relate to the rohe of Te Ākitai Waiohua. Documents have been shared with Te Ākitai Waiohua through the development of this plan. No specific mātauranga have been identified through this process to include in the development of this report.

3.3 Manukau South risk assessment

To identify the potential impact of coastal hazards on Council-owned land and assets and to understand the escalating risk due to climate change, a high-level risk assessment[17] was undertaken. The risk assessment identified which elements of interest were located within hazard zones and may subsequently be adversely affected by hazard events, now and in the future.

For Manukau South, elements of interest included Council-owned parks and reserve land and assets, infrastructure, ecological and environmental areas, cultural and historic heritage sites around the coast. Their exposure and risk were assessed using the wellbeing focus of cultural, social, environmental, and economic indicators, as detailed in the Risk Assessment Technical Report. To understand the varying impacts across Manukau South, the area was broken into 7 separate units as shown in Figure 3-2.

3.3.1 Results of risk assessment

Risk classification provides an understanding of the quantity or extent of a particular asset or value revealing which unit has more, or less, risk compared to other units.

Table 3-1 to Table 3-3 and Figure 3-4 show how the risk for each unit changes across the short, medium and long terms in relation to coastal hazards. The results are split by the following four wellbeings:

- Social (park and reserve assets)
- Economic (public infrastructure including roads and Three Waters' pipes)
- Environmental (ecological areas)
- Cultural (cultural and historic heritage sites).

The results of the risk assessment show that generally, this SAP area has greater risk from coastal erosion than coastal inundation and rainfall flooding for all wellbeings. However, due to relatively low levels of infrastructure assets within the reserve corridor and the road corridor generally being away from the coastal edge, the economic wellbeing risk (network infrastructure) is low. The risk assessment does not consider infrastructure which is planned but not yet constructed. Of relevance for the Manukau South SAP area are the proposed upgrades and development of wastewater facilities in the Glenbrook and Clarks Beach units.

[17] Tonkin and Taylor (2023). *Shoreline Adaptation Plan – Manukau South Risk Assessment*.

Figure 3-2: Map of Manukau South SAP area units

3.3.1.1 Coastal erosion

Short term	• Existing risks are moderate to high to social wellbeing (park and reserves) across the entire area. This is due to the high proportion of relatively narrow esplanade reserves fringing the coast. • There are only modest extents of network infrastructure in the erosion hazard area in the short term, with risks to economic wellbeing varying from none to low. • With the exception of the Glenbrook Steel Mill Unit, ecological wellbeing (ecological land) has a high-risk classification in the short term for the Unit 7, Elletts Beach and Unit 4, Glenbrook and very high-risk classifications at Unit 6, Seagrove. • Excluding Unit 3, Glenbrook Steel Mill, cultural wellbeing risk classifications range from moderate to very high in the short term, with very high classification in Unit 1, Waipipi and Te Toro due to the Tāhuna Marae and land holdings. Units 5, 6, and 7, Clarks Beach, Seagrove and Elletts Beach have high cultural wellbeing risk classifications.
Medium term	• Risks do not substantially change classification over the medium term. • The exception being an increase from high to very high at Unit 7 Elletts Beach in the medium-term for ecological wellbeing.
Long term	• There is an increase from moderate to high in the long term at Unit 2, Waiuku for social wellbeing (park and reserves). • For economic wellbeing (network infrastructure), Unit 2, Waiuku and Unit 5, Clarks Beach increase from low to moderate in the long term. • For cultural wellbeing risk, there is an increase from high to very high at Unit 7, Elletts Beach due to Whātāpaka Marae's location close to the coast (noting this is not located on Council-owned land). • There are no other changes to risk classifications in the long term.

3.3.1.2 Coastal inundation

Short term	• Existing risk classification is low to moderate for social wellbeing (park and reserves) across the majority of the area, except for Unit 6, Seagrove, which has a risk classification of high. • Risk to economic wellbeing is low in the short term. • Risk to ecological wellbeing is high at Unit 7, Elletts Beach and very high at Unit 6, Seagrove, with the remaining units having moderate to no risks. • Risk classifications for cultural sites in the present day are very high in the Waipipi and Te Toro and Elletts Beach Units and high at Clarks Beach and Seagrove, with the remaining units having moderate to low-risk classification.
Medium term	• For social wellbeing (parks and reserves), risk classification increases to moderate at Unit, 1 Waipipi and Te Toro in the medium-term. • For ecological wellbeing, risk increases from high to vary high at Unit 7, Elletts Beach. Unit 3, Glenbrook Steel Mill increases from low to moderate in the medium term for cultural wellbeing risk.

Long term	• In the long term, the risk classification increases to high at Unit 4, Glenbrook for social wellbeing risk. Risk to economic wellbeing in Unit 2, Waiuku and Unit 4, Glenbrook increases to moderate. • For ecological wellbeing, risk increases from low to moderate at Unit 2, Waiuku in the long term.

3.3.1.3 Rainfall flooding

Short term	• Apart from the high-risk classification at Unit 2, Waiuku, rainfall flooding has low to moderate impact on social wellbeing (park and reserves) across the area. • Risk classification is low to moderate for economic wellbeing (network infrastructure), with the exception of Unit 2, Waiuku with a very high risk. • Short-term risk to ecological wellbeing is predominately low to moderate, except for Units 6 and 7, (Seagrove and Elletts Beach), which have a high-risk classification. • Risk classifications for cultural wellbeing in the short term are very high in Unit 1, Waipipi and Te Toro and Unit 7, Elletts Beach. They are also high at Unit 5, Clarks Beach and Unit 6, Seagrove, with the remaining units having moderate risk classification.
Medium term	• Risk classification does not change across the medium-term.
Long term	• In the long term, the risk to ecological wellbeing increases from low to moderate at Unit 2, Waiuku, moderate to high at Unit 4 Glenbrook and high to very high at Unit 7, Elletts Beach. • Unit 5, Clarks Beach increases from high to very high risk in the long term to cultural wellbeing.

Table 3-1: Aggregated risk classifications for coastal erosion susceptibility

Unit	Social - parks and reserves			Economic - network infrastructure			Environmental - ecological			Cultural		
	Short term	Medium term	Long term	Short term	Medium term	Long term	Short term	Medium term	Long term	Short term	Medium term	Long term
Unit 1: Waipipi and Te Toro	Moderate	Moderate	Moderate	Low	Low	Low	Moderate	Moderate	Moderate	Very high	Very high	Very high
Unit 2: Waiuku	Moderate	Moderate	High	Low	Low	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Unit 3: Ohurua | Glenbrook Steel Mill	Moderate	Moderate	Moderate	Low	Low	Low	None	None	None	Low	Low	Low
Unit 4: Kahawai | Glenbrook	High	High	High	Low	Low	Low	High	High	High	Moderate	Moderate	Moderate
Unit 5: Waiau | Clarks Beach	Moderate	Moderate	Moderate	Low	Low	Moderate	Moderate	Moderate	Moderate	High	High	High
Unit 6: Seagrove	Moderate	Moderate	Moderate	Low	Low	Low	Very high	Very high	Very high	High	High	High
Unit 7: Elletts Beach	Moderate	Moderate	Moderate	None	None	Low	High	Very high	Very high	High	High	Very high

Table 3-2: Aggregated risk classifications for coastal inundation

Unit	Social - parks and reserves			Economic - network infrastructure			Environmental - ecological			Cultural		
	Short term	Medium term	Long term	Short term	Medium term	Long term	Short term	Medium term	Long term	Short term	Medium term	Long term
Unit 1: Waipipi and Te Toro	Low	Moderate	Moderate	Low	Low	Low	Moderate	Moderate	Moderate	Very high	Very high	Very high
Unit 2: Waiuku	Moderate	Moderate	Moderate	Low	Low	Moderate	Low	Low	Moderate	Moderate	Moderate	Moderate
Unit 3: Ohurua | Glenbrook Steel Mill	Low	Low	Low	Low	Low	Low	None	None	None	Low	Moderate	Moderate
Unit 4: Kahawai | Glenbrook	Moderate	Moderate	High	Low	Low	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Unit 5: Waiau | Clarks Beach	Moderate	Moderate	Moderate	Low	Low	Low	Low	Low	Low	High	High	High
Unit 6: Seagrove	High	High	High	Low	Low	Low	Very high	Very high	Very high	High	High	High
Unit 7: Elletts Beach	Moderate	Moderate	Moderate	Low	Low	Low	High	Very high	Very high	Very high	Very high	Very high

Table 3-3: Aggregated risk classifications for rainfall induced flooding

Unit	Social - parks and reserves			Economic - network infrastructure			Environmental - ecological			Cultural		
	Short term	Medium term	Long term	Short term	Medium term	Long term	Short term	Medium term	Long term	Short term	Medium term	Long term
Unit 1: Waipipi and Te Toro	Low	Low	Low	Low	Low	Low	Moderate	Moderate	Moderate	Very high	Very high	Very high
Unit 2: Waiuku	High	High	High	Very high	Very high	Very high	Low	Low	Moderate	Moderate	Moderate	Moderate
Unit 3: Ohurua | Glenbrook Steel Mill	Low	Low	Low	Low	Low	Low	Low	Low	Low	Moderate	Moderate	Moderate
Unit 4: Kahawai | Glenbrook	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	High	Moderate	Moderate	Moderate
Unit 5: Waiau | Clarks Beach	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Low	Low	Low	High	High	Very high
Unit 6: Seagrove	Moderate	Moderate	Moderate	Low	Low	Low	High	High	High	High	High	High
Unit 7: Elletts Beach	Moderate	Moderate	Moderate	Low	Low	Low	High	High	Very high	Very high	Very high	Very high

3.4 Community engagement

3.4.1 Engagement purpose

The purpose of community engagement throughout the SAP area plan development process is to:

- Identify how the community uses and values their coastal areas including contemporary interests, issues and aspirations of the community regarding their interaction, and use of coastal areas.
- Identify risk perceptions and experiences held by communities in relation to coastal change and coastal hazards and provide an opportunity to share information on hazards, risk and climate change and the potential impacts these may have over time.
- Facilitate community discourse on adaptive planning, the role of different values and the consideration of options to manage risk such as *holding the line* and *managed retreat* from areas of coastal risk.
- Support the development of community objectives which can be used to inform the selection of adaptations strategies.
- Provide unit or area-specific feedback on the use of coastal assets and land to inform adaption strategy selection.

It is important to note that the SAP programme does not include consultation with the community on the selection of adaptive strategies.

3.4.2 Community engagement for Manukau South

Community engagement for the Manukau South SAP included a series of in-person, public out-reach events. Public consultation was open from mid-July to mid-October 2022. This ran in parallel to consultation for the Āwhitu SAP.

To capture a diversity of demographics, a range of events and engagement opportunities were utilised, including:

- In-person events were spread across the peninsula, taking place at Clarks Beach Yacht Club, Glenbrook Beach Hall and Waiuku Community Hall
- Digital engagement was undertaken using Social Pinpoint and Engagement HQ:
    - Social Pinpoint operates as an on-line engagement platform which allows users to drop pins, write comments, add images, and complete surveys on an interactive map
    - Engagement HQ provided a second digital engagement platform where the community could complete surveys and ask questions.
- In addition to the in-person and online platforms, feedback was also provided through email submissions.

Following the close of community consultation, analysis of the results was undertaken, and community objectives were developed (see Section 3.4) based on the themes identified across the feedback received.

This enabled the final step in community consultation, the *close the loop* phase of community engagement. This was undertaken online and through email communications in early 2023. The purpose of this phase was to ensure that the community was informed of the results of their consultation.

3.4.3 Engagement results

Across both the Manukau South and Āwhitu SAP engagement platforms ~270 users participated in digital engagement via Social Pinpoint and a total of 26 surveys for Manukau South were submitted via Engagement HQ.

The information collated via these digital platforms helped identify key community values across the coastline and highlighted ‘areas of interest’ as summarised Figure 3-3 and Figure 3-4. A more detailed overview of community engagement and development of the community objectives for the Manukau South SAP can be found in the supporting Consultation Summary for Manukau South.

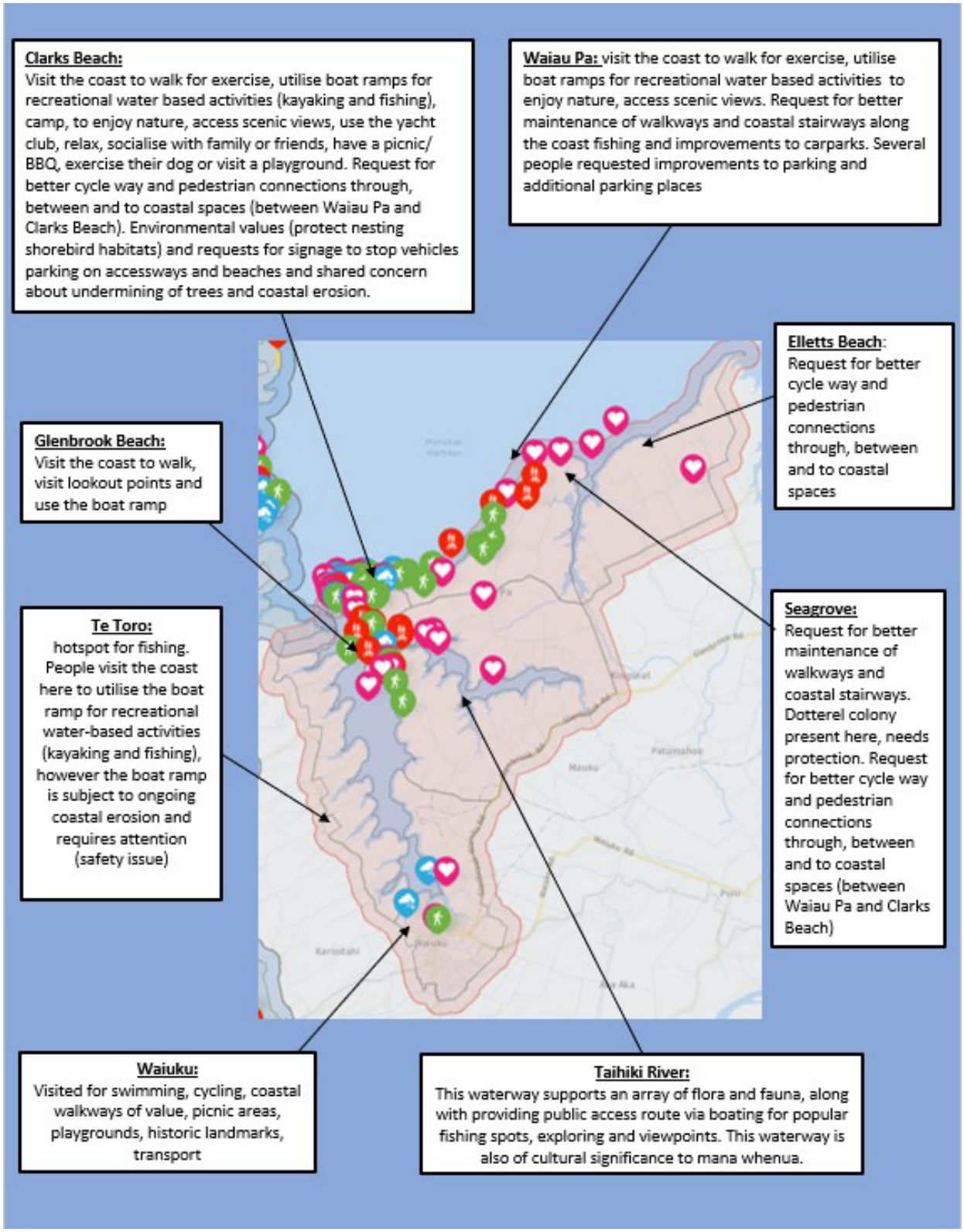


Figure 3-3: Summary of feedback received via Social Pinpoint – Manukau South

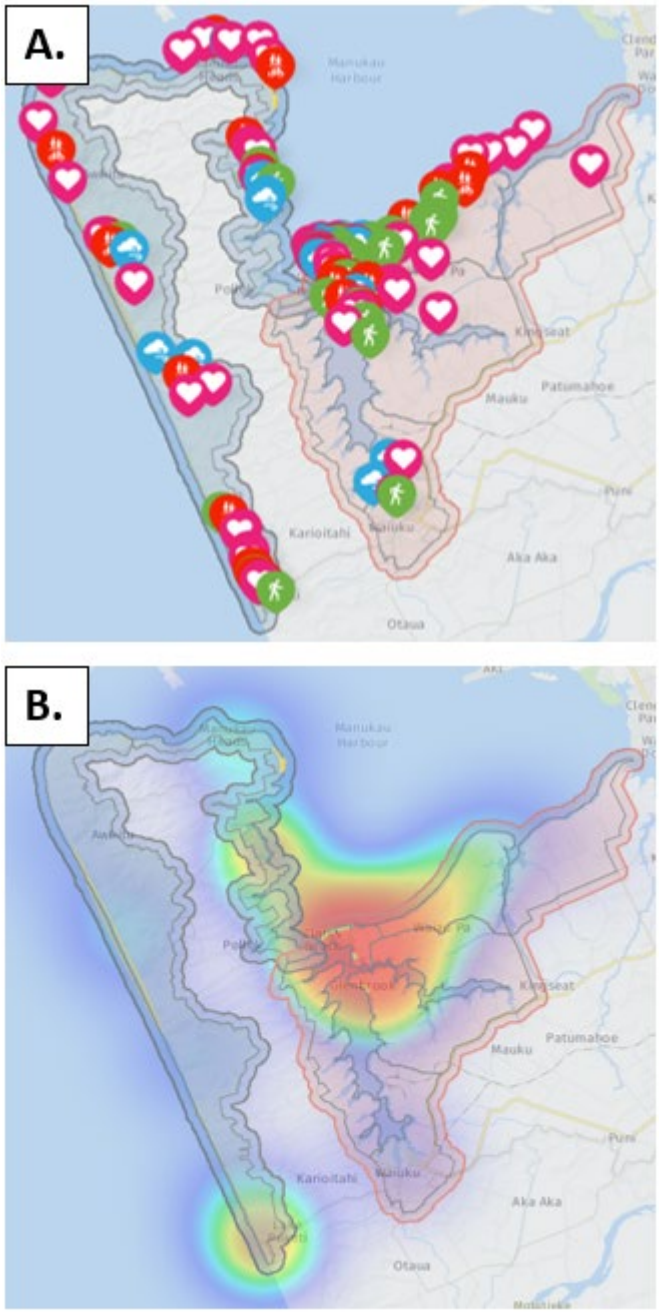


Figure 3-4: Social Pinpoint maps generated from the digital engagement. Map A displays the location of specific comments, with green circles representing the "I go here because" pins, blue circles representing "I remember this storm event…", red circles representing "I access the coast here" and pink circles representing "I value this because" pins. Map B is a heatmap highlighting the areas most commented on during the digital engagement, which for Manukau South is Clarks Beach, Glenbrook Beach, Te Toro, and Waiau Pa, meaning that these are areas of high interest to the local community.

In addition to the in-person and online platforms, a handful of community members across Manukau South and Āwhitu provided feedback via detailed email submissions.

Community comments, email submissions and survey submissions collected as part of the digital engagement process were sorted and grouped into eight major categories (see Table 3-4 below):

Table 3-4: Key categories developed from community feedback

Active recreation	• How people utilise the coastal areas and provided amenities.
Passive recreation	• How people connect to and enjoy the coast and reserve areas.
Environmental	• Concerns related to the care and protection of the natural environment.
Transport	• Concerns related to roading networks across the Manukau South and Awhitu coastlines.
Heritage, history and community	• Comments related to the cultural and historic significance of the coast, along with those detailing the importance of the coast the community.
Community memory	• Coastal hazards and/or storm events that the local community remember, along with changes to the coastline over time.
Coastal engineering and assets	• Values and concerns related to coastal engineering and assets (wharfs, seawalls etc.).
Management and maintenance issues	• Management and maintenance concerns the community has for the coastline and its assets and facilities.

Comments related to topics outside the scope of SAPs, including maintenance and management issues, were forwarded to the relevant departments within Council and across CCOs.

3.4.4 Community objectives for Manukau South

The information collected via all community engagement channels was collated, sorted and grouped into eight major categories (see supporting report, Community Consultation – Manukau South).

Prominent feedback topics from community feedback included:

- Protection of vulnerable and ecologically significant environments which support an array of native flora and fauna
- Mitigate the spread of mangroves around popular coastal access spots and bays
- Improve water quality from inlets and runoff
- Maintain access to the foreshore and coastal marine area for a range of recreational activities (walking, boating, picnicking etc.)
- Improve and maintain current facilities within parks and reserves and parking spaces and transport connections around the coast
- General asset management issues (i.e. maintenance, safety) and improving wayfinding (signage).

Community members who participated in public consultation indicated a strong concern for the impacts of coastal erosion, population growth and the ongoing maintenance of safe access to the coastal environment (foreshore and CMA).

The information collected via Social Pinpoint, Engagement HQ and online and in-person community engagement events was collated and reviewed, in collaboration with the Parks and Community Facilitates Department at Auckland Council, to develop the following high-level objectives:

Table 3-5: Community objectives for Manukau South

Preservation of natural environment	• Adaptation strategies preserve and enhance the natural environment and ecosystems that support biodiversity, whilst protecting vulnerable flora/ fauna from adverse activities that damage these delicate systems.
Connectivity and access	• Adaptation strategies maintain safe access to the beach, coast and harbour (via boat launching facilities) with parking to support a range of recreational and water-based activities at a range of tide levels (e.g. swimming, walking, picnicking, sailing/boating, kiteboarding and surfing). • All-tide access to the beaches, coast and harbour is maintained to enable a range of recreational and water-based activities (e.g. swimming, walking, picnicking, sailing/boating, kiteboarding and surfing).
Asset resilience	• Resilience of community facilities and assets in hazard zones is a priority. • Community facilities in the Manukau South area support community resilience and recovery.
Management and maintenance of coastal spaces	• Pedestrian safety and use of public coastal walkways and lookouts are supported by improvements to signage and maintenance of coastal spaces.
Transport considerations	• Access to, and parking near popular coastal recreation areas is improved, resilient and covers a range of transport modes (improve/ support connectivity between coastal spaces).

4.0 Adaptation strategies for Manukau South

This section provides a commentary on the development of adaptive strategies for the Manukau South SAP area (Sections 4.1 and 4.2) and includes general guidance for the implementation of strategies identified in the Manukau South SAP Report (Section 4.3).

4.1 Adaptation strategy examples

Four major adaptation strategies are considered which are outlined in Section 1.3.5 of this report. To support the understanding of how adaptation strategies may be considered or applied in practice, some examples of local relevance are provided below.

No Active Intervention (NAI)	• This is the 'do nothing' strategy of allowing nature to run its course, including responding to climate change effects. • With this strategy it is expected that shorelines will continue to erode and low-lying areas will become increasingly exposed to more frequent and extreme flood events. • Can include advocacy and guidance for aspects such as vegetation restoration or planting techniques undertaken by local community groups or private property owners
Limited Intervention (LI)	• Limited Intervention may include protection of existing dune habitat, dune restoration or riparian and slope planting programmes to create a more resilient, natural buffer along the coast to mitigate coastal hazard and climate change impacts as well as providing ecological benefits such as habitat corridors. • It can also include management of pedestrian and vehicle uses through provision of and control of access.
Hold the Line (HTL)	• Can include either hard protection structures or more nature-based solutions designed to maintain the coastline or maintain a particular use at a given location. • This may be utilised to protect assets over time or may be an intermediary measure until retreat or change in uses is triggered. • Hold the Line may apply to one or multiple hazards. All engineered structures have a limited design life and specification.
Managed Retreat (MR)	• Managed retreat involves moving physical amenities (car parks, toilets and walkways) from areas when the risk to these assets becomes intolerable as a way to reduce the risk. • Where possible, they will be located landward on existing reserve areas, but there may be areas where this is not possible.

4.2 Development of the strategies for Manukau South

The development of adaptation strategies for the Manukau South area considered technical inputs (such as hazard risks, asset attributes and coastal hazard and climate change projections) alongside iwi and community values and feedback from partners and stakeholders. Ecological and policy framing (as set out in Section 2.0) are also relevant to the feasibility and implementation of adaptive strategies. Table 4-1 below identifies the input and provides descriptions.

Table 4-1: Inputs considered during development of adaptive strategies for Manukau South

Input/consideration	Description
Cultural values regional and local	• Section 1.4 identifies guiding principles provided by Mana Whenua at a regional level for the SAP programme. These values are utilised at a high level and are generally built upon through local iwi engagement. • Local iwi have chosen to share some high-level mātauranga ā iwi values that are fundamental to ensuring that coastal management is respectful of the cultural associations and supports and reflects the cultural values that they have with their rohe. This is included in Section 3.0 of this report. • These values and aspirations are considered as criteria when considering the choice of adaptive strategies.
Cultural values/location specific feedback and guidance	• More detailed information has been shared through hui and on hikoi around the Manukau South Peninsula and through communications with the project team. This has informed the te reo names of coastal stretches and units and supported an understanding of cultural values located within the units. • In some cases, specific details and locations of sites or the stories/korero which relates to them have not been identified by iwi or publicly in this document. • As identified in Section 1.3, further engagement through implementation of this SAP area plan will be required to ensure cultural values are appropriately identified and responded to. • It is important to note that there are a significant number of cultural heritage sites within the SAP area which are not recorded. These exist both above and below mean high water spring tides (within the Coastal Marine Area).
Community objectives	• The objectives at Section 3.4 are considered in the selection of strategies.
Community, location - specific input	• Section 3.4 sets out the approach to and outcomes from the community engagement undertaken over the course of the development of this SAP. Site or location-specific feedback was received through a variety of platforms and utilised to develop overarching community objectives. • This feedback is also directly considered at a unit and stretch level for the selection of adaptions strategies.
Technical inputs, risk assessment results	• The exposure of infrastructure and assets and associated physical risk over the time periods is considered to understand the opportunity for risk management through different adaptive strategies.

Input/consideration	Description
Technical inputs - hazard and climate change information	• A consideration of coastal hazard and climate change impacts supported by regional and local hazard mapping and identification. • Local and expert understanding is also sought from the project team to inform the understanding of coastal processes and hazard scape.
Asset owners/ managers consultation	• A series of workshops are held with asset and infrastructure owners to elicit feedback and test the feasibility and implications of different adaptive strategies.

4.3 Applying the strategies

The recommended adaptive strategies are intended to remain high-level and strategic, with the opportunity to apply a range of differing responses at a site-specific level under each strategy. Note that SAP plans respond to multiple hazards. The interaction between hazards and their coincidental (e.g. a storm surge and rainfall flood event at the same time) or cascading impacts (e.g. rainfall events exacerbating coastal cliff erosion) should be considered when assessing options for implementation under the SAP plans.

Section 4.3.1 below contains some general guidance specifically directed at asset owners/managers. Section 4.3.2 identifies the specific requirement to ensure that local iwi are engaged in the implementation of the Manukau South SAP plan.

4.3.1 Guidance for Auckland Council asset owners

The adaptation strategies developed in the SAP are designed to be integrated across relevant Auckland Council plans. The guidance below is specifically tailored towards asset management operational decision-making and planning:

- Best practice guidance should be identified and applied. It should include, but not be limited to, relevant technical regional publications and guidance documents and national guidance. Of particular importance for areas with a high number of identified and unidentified cultural and historic heritage sites, are the accidental discovery protocols in the Heritage New Zealand Pouhere Taonga Act 2014 and as set out in the Auckland Unitary Plan.
- The location of new assets in the areas susceptible to coastal erosion and instability (over all timeframes) is not recommended.
- Where an asset has a functional need to be within the hazard zone (such as a boat ramp or beach access), the dynamic nature of the coastal environment must be considered, and resilient design prioritised.
- The location of new assets in areas at risk of present-day coastal inundation or rainfall flooding at 1% AEP is not recommended. Avoidance of risk is a priority where practical. Where an asset has a functional requirement to be located within the hazard zone, both increasing and residual risk must be considered.
- Where renewal of existing assets within hazard areas is contemplated, both increasing and residual risk should be considered, and options should be considered which identify appropriate location and resilient design.
- To support natural drainage and not increase the risk of rainfall flooding, all projects in the shoreline area must consider the location of overland flow paths and ensure that future works do not block these paths.

4.3.2 Māori outcomes

Future coastal projects in the Manukau South SAP area need to consider the Kia Ora Tāmaki Makaurau Māori Outcomes Performance Framework, the Te Ora Tāmaki Makaurau Wellbeing Framework, and the values highlighted in Section 3.2. Specific cultural values and outcomes for each coastal stretch are anticipated to be further shared and developed through ongoing involvement of iwi in respective work programmes.

5.0 Adaptation strategies for Manukau South

Manukau South has been broken down into 37 'coastal stretches' (Figure 3-2), based on coastal processes, Council-owned land and asset location, public land boundaries, and infrastructure considerations. Coastal stretches have been grouped into broader coastal unit areas as discussed in the risk assessment section above (Section 3.3).

As stated previously, with respect to the coastal units and stretches, these are aligned to capture Council asset units and do not reflect the historical cultural boundaries which often extend over multiple units or coastal stretches.

The following section provides detail on the high-level strategies developed for each coastal stretch over the short (0-20 years), medium (20-60 years), and long (60+ years) term, 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).

5.1 Navigating Section 5.0 by unit and stretch

Section 5.0 includes the adaptation strategies for Manukau South. This section is structured by unit with stretches included under each unit. Units are numbered 1- 7 and stretches 1-37, starting in the west moving east. Table 5-1 below provides a quick reference index to identify the location of stretches within the units.

Naming of units and stretches is provided in both **Te reo | English**. The te reo names are reflective of the Māori cultural landscape; they are named as per the mana of the chief who held the land at the time. In some cases, this means that both a unit and stretch have a multiple or dual naming, or where the name is replicated at both a unit and stretch level.

Unit specific information is included for each unit as follows:

- **The environmental context**: Identifying the coastal setting, hazard scape and key ecological features within the unit
- **The social, policy and cultural context**: Identifying any specific cultural values, features or sites (to a level of detail chosen to be shared by iwi), social and community values including those identified through Sections 2 and 3
- **Identification of Council-owned land and assets** within the unit and corresponding risk ratings for those assets/land as identified in the risk assessment and summary of Council-owned land and assets. Risk is identified in the tables within each of these sections using traffic-light colours - green to red, indicating risks changing from very low (green) to very high (red).

Stretch specific information is provided as follows:

- Description of the stretch
- Tabulated identification of the hazard scape, Council-owned land and assets and current management approaches
- Adaptation strategy
- Guidance for implementation.

Table 5-1: Summary of the units and stretches for Manukau South

	Unit	Stretches
Unit 1	Waipipi and Te Toro	1: Ohiku Creek 2: Te Toro 3: Western Waiuku River
Unit 2	Waiuku	4: Tahuna Kaitoto | Rangiwhea Creek 5: Tahuna Kaitoto | Sandspit 6: Tahuna Kaitoto | Western shoreline of Waiuku Creek 7: Tamakae | Tamakae Wharf 8: Eastern shoreline of Waiuku Creek 9: Racecourse Road 10: Golf Club 11: Hyland Place to Waitangi Falls
Unit 3	Ohurua | Glenbrook Steel Mill	12: Waitangi | Waiuku Wastewater Treatment Plant 13: Ohurua | Glenbrook Steel Mill
Unit 4	Kahawai | Glenbrook	14: Ohurua | Glenbrook South 15: Kahawai | Glenbrook Beach 16: Kahawai | Cliff Road Esplanade Reserve 17: Kahawai | Kahawai Point 18: Taihiki | Taihiki River
Unit 5	Waiau | Clarks Beach	19: Taihiki | Taihiki River North 20: Waiau/Waitete | Waiau Beach/Pā 21: Karaka/Waiau | Waiau Beach & Golf Course 22: Waiau | Torkar Bay 23: Karaka Point / Torkar Road Reserve 24: Torkar Road West (private land) 25: Wilsons Access West 26: Wilsons Beach East (private land & Irwin's access) 27: Halls Beach Access 28: Torkar Road Central (private land - Halls access to Knights Access) 29: Knights Beach Access

Unit		Stretches
		30: Torkar Road East (private land Knights access to Hoskings Access) 31: Hoskings Access 32: Crisp Road West (private land 2-18) 33: Bradleys Access 34: Clarks Beach east new SHA
Unit 6	Seagrove	35: Seagrove 36: Whātāpaka Creek Inlet
Unit 7	Elletts Beach	37: Elletts Beach

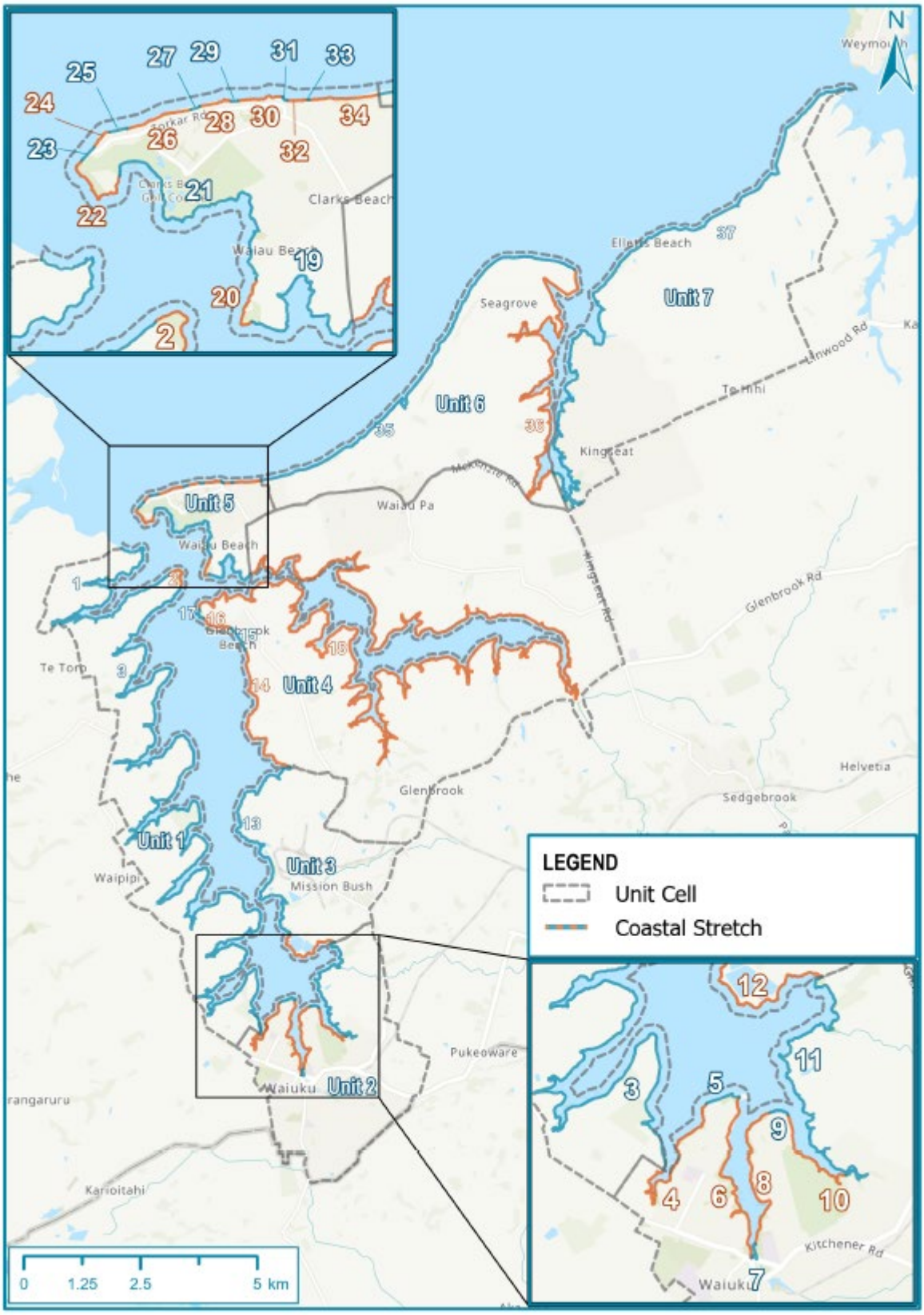
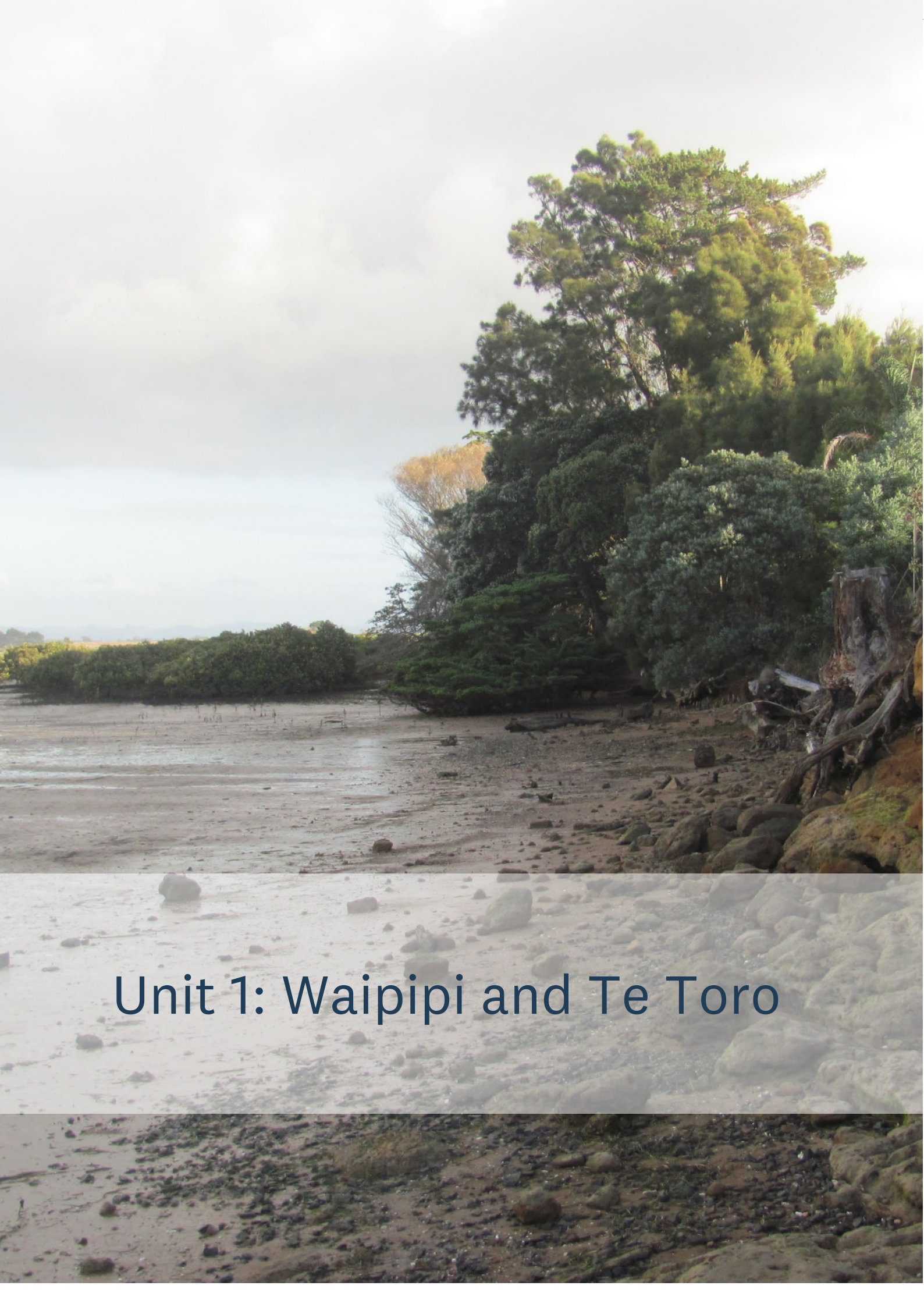


Figure 5-1: Coastal stretches and units within the Manukau South SAP area



Unit 1: Waipipi and Te Toro

Unit 1: Waipipi and Te Toro

This unit area contains three coastal stretches, beginning at Rauau Point and extending to King Street Esplanade Reserve (Waiuku).

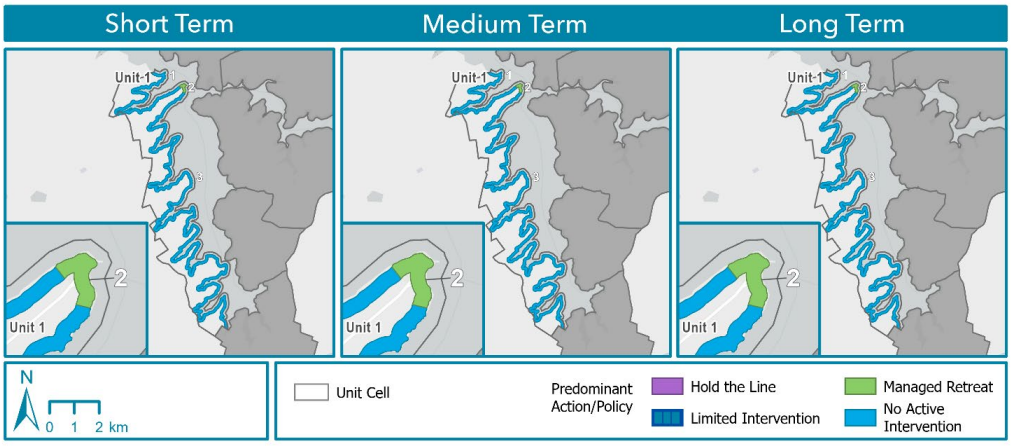


Figure 5-2: Adaptation strategies for coastal stretches within the Waipipi and Te Toro unit

Adaptation summary stretches 1 to 3

Stretch	Short term	Medium term	Long term
1. Ohiku Creek	NAI	NAI	NAI
2. Te Toro	MR	MR	MR
3. Western Waiuku River	NAI	NAI	NAI

Council-owned infrastructure, land, and assets

The landward extent of this unit comprises pastoral farming (private land), and Council-owned reserves in coastal edge areas. Road access to the coast is located at Te Toro, a popular boat launching location. Limited piped assets are located in this unit due to the land use.

Table 5-2: Unit 1 Council-owned land & assets metrics and associated risk scores (short, medium, long terms)

Social - parks and reserves			Economic - network infrastructure			Environmental - ecological			Cultural – culture and heritage		
Park & reserve land: structures, carparks, accessways, buildings (0.1 ha)			AT roads (-) Water pipes (16.6 km) Water assets (-)			Ecological area (6.6 ha) Notable biodiversity overlays (CL1, SA1.2, SA1.3, SEA- M2, and SEA- M1)			Cultural heritage assets (109)		
Short	Medium	Long	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long
Coastal erosion susceptibility											
Coastal inundation											
Rainfall induced flooding											

None | Low | Moderate | High | Very high

Environmental context: Coastal setting, hazard scape and ecological setting

Much of the landward extent of this unit is pastoral farmland, while coastal areas include reserves. This unit can generally be characterised as low, sparsely vegetated cliff shoreline grading to saltmarsh and mangrove vegetation.

The unit is characterised by long swathes of coastal saline mangrove forest and scrub ecosystems (SA1: 2 and SA1:3) and its variants, with short areas of broadleaved species scrub/forest (CL1) lining the creek where Parakau Creek drains into the coast. Mangrove forest and scrub mainly occur in areas of frequent tidal inundation and abundant silt deposition. A naturally rare variant, the shell barrier beaches developed from build-up of wave accumulation of dead mollusc shells and sand and can be found on Chenier plains off the shores of Gordon Road Esplanade Reserve and Waipipi Wharf Reserve. The headland at Te Toro is identified as an 'Outstanding Natural Feature' because of the geological significance of the Te Toro Quaternary Sands exposed on the cliffs. [18,13.]

Sections of this unit (around Waipipi) sit within a 'Significant Ecological Area' overlay (SEA-M2 and SEA- M1) as waders congregate on the saltmarsh and intertidal flats before moving on to the Waipipi roosts and the shell and sand banks at the entrance to Waipipi creek. The Waipipi roosts are isolated from the shore at high tide and are used by a variety of coastal birds, from international migratory wading birds to New Zealand endemic wading birds, including a number of threatened species. This is one of the smaller of the major high-tide wader roosts on the Manukau Harbour, and the adjacent intertidal banks are considered as 'Areas of Significant Conservation Value'.[18]

Cultural context

This unit includes Tahuna Marae located on Tāhuna Pā Road, near Awaruaiti Creek in the Waiuku River. Reretēwhioi Marae is also located in Waiuku on Taurangatira Road (off Āwhitu Road). Both marae have a number of iwi and hapu who affiliate with them. Numerous Māori midden, pits and terraces are situated within this coastal unit, with substantive settlement recorded including some burials (potential urupa). The risk to cultural heritage for this unit is high, as identified in the risk assessment results. Ngāti Te Ata and Ngāti Tamaoho have expressed values and preferences in working to preserve important wahi tapu while maintaining the natural coastline and supporting biodiversity. Concepts such as rangatiratanga or its kaitiakitanga will be supported through ongoing engagement with local iwi through the implementation of adaptation strategies.

Social and policy context

Te Toro is the main all-tide boat launching facility on the southern Āwhitu Peninsula providing access to Manukau Harbour and the Tasman Sea and is the base for Counties Sport Fishing Club (community lease) which is set back from top of the low coastal cliffs. Floating pontoons and a concrete piled breakwater can also be found at Te Toro point. Historically, there was a wharf at Te Toro Recreation Reserve serviced by a ferry that connected farming communities along the Awhitu Peninsula, where there was a wharf in most bays, with Waiuku and Onehunga. This area of the coast has been identified as an important fishing spot and access point to the harbour for a range of recreational activities, with the boat ramp flagged as requiring ongoing maintenance.

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18 https://unitaryplan.aucklandcouncil.govt.nz/Images/Auckland%20Unitary%20Plan%20Operative/Chapter%20L%20Schedules/Schedule%204%20Significant%20Ecological%20Areas%20-%20Marine%20Schedule.pdf

Stretch 1: Ohiku Creek

Stretch description

This stretch covers Ohiku Creek, a small mangrove fringed tidal inlet between Rauau Point in the west and Te Toro Point to the east.

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal erosion and inundation.	• Te Toro Domain/reserve (community lease to fishing club).	• No active management currently in place.

Adaptation strategies

Stretch	Short term	Medium term	Long term
1: Ohiku Creek	NAI	NAI	NAI

Guidance notes for Implementation

- *No active intervention:* This reflects the current management regime for this stretch.
- Cultural and historic heritage: There are numerous cultural and historic sites located within the erosive coastal landscape which will be subject to coastal hazard risks over time. The need for intervention has been identified for consideration by local iwi.
- Advocacy and guidance: Weed management and revegetation of the coastal margin with appropriate native saltmarsh species could be undertaken to assist with management of ongoing weathering of exposed soils and to enhance biodiversity values (led by local iwi to support rangatiratanga and kaitiakitanga over the natural environment).

Stretch 2: Te Toro

Stretch description

This stretch includes Te Toro Point and the shoreline extending south around the eastern side of Te Toro headland.

Figure 5-3: Te Toro Beach

Hazards and climate change	Council-owned infrastructure, land, & assets	Current management approach / risks
• Coastal inundation and erosion. • Overland flow to the coast.	• Te Toro Recreational Reserve (public amenities and park facilities accessways, toilet block, and playground. • Backstop seawall. • An all-tide boat launching ramp with floating pontoons. • Concrete pile breakwater.	• The headland is protected by a timber retaining wall to provide safe access to the boat launching ramp. • Management of the northern end of the beach area/ low cliff has been undertaken through battering and planting of the slope, the diversion of stormwater flows and the installation of a planted bund set back from the cliff edge. • The beach is managed through diversion of surface water, vegetation maintenance and planting and sand transfer in front of the low concrete backstop wall to enhance beach amenity.

Adaptation strategies

Stretch	Short term	Medium term	Long term
2: Te Toro	MR	MR	MR

Guidance notes for implementation

- *Managed retreat* provides for reconfiguration of assets and provides for the ongoing maintenance of the all-tide boat launching ramp. Access to the coast has been identified as highly valued while landward infrastructure (vehicle turning and trailer parking) may require relocation over time. This strategy also provides for maintenance of existing retaining walls. Tree management including several large macrocarpa trees and revegetation will be appropriate to maintain safe access to, and use of the boat launching facility (reflective of community interests and values).
- Cultural values and guidance: Local iwi have indicated a preference for the progressive removal of exotic pine trees and revegetation of native coastal species along the coastal edge of this stretch. Location of any future assets including pou needs to ensure an appropriate set-back from low cliffs.

Stretch 3: Western Waiuku River

Stretch description

This coastal stretch includes the small tidal inlets on the western shoreline of Waiuku River between Te Toro and Rangiwhea Creek in the Waiuku Estuary, including the Needles and Awaruaiti Creek.

Figure 5-4: End of Marae o Rehia Road, showing intertidal section of Waiuku Estuary (SEA overlays)

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal inundation	• Road reserve	• Future opportunity for a shell barrier ecosystem restoration at Pollok Spit and Waipipi (identified by Auckland Council).

Adaptation strategies

Stretch	Short term	Medium term	Long term
3: Western Waiuku River	NAI	NAI	NAI

Guidance notes for implementation

- *No active intervention* is chosen for this stretch as the area includes limited areas of Council-owned land. This strategy is not considered to influence or preclude ecological restoration currently undertaken within this stretch.
- Cultural values and guidance: This area is rich in cultural sites associated with inland Māori settlements, with Tahuna Marae located off Tahuna Pā Road. Ongoing engagement with local iwi regarding the management of coastal middens and other wāhi tupuna may be required.

Unit 2: Waiuku

Unit 2: Waiuku

This unit area contains eight coastal stretches which begin at Waiuku township and extend east to Glenbrook Steel Mill.

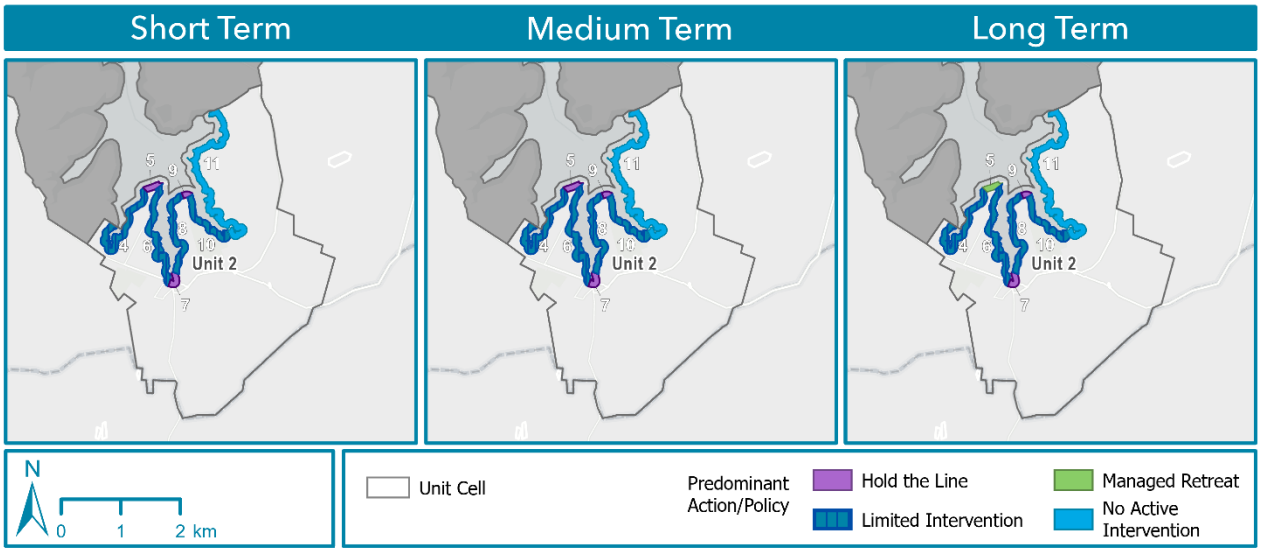


Figure 5-5: Adaptation strategies for coastal stretches within the Waiuku unit area

Adaptation summary stretches 4 to 11

Stretch	Short term	Medium term	Long term
4: Tahuna Kaitoto | Rangiwhea Creek	LI	LI	LI
5: Tahuna Kaitoto | Sandspit	HTL	HTL	MR
6: Tahuna Kaitoto | Western shoreline of Waiuku Creek	LI	LI	LI
7: Tamakae | Tamakae Wharf	HTL	HTL	HTL
8: East shoreline Waiuku Creek	LI	LI	LI
9: Racecourse Road	HTL	HTL	HTL
10: Golf club	LI	LI	LI
11: Hyland Place to Waitangi Falls	NAI	NAI	NAI

Council-owned infrastructure, land, and assets

Council-owned land within this unit includes areas of esplanade reserves along the coastal edge, with larger landholdings within the Waiuku township; Tamakae and sandspit reserves. The settlement of Waiuku and associated roading and network infrastructure has resulted in a larger exposure of network infrastructure within this unit. A closed landfill is located within the Waiuku Golf Club Stretch 10.

Table 5-3: Unit 2 Council-owned land & assets metrics and associated risk scores (short, medium, long terms)

Social – parks and reserves			Economic – network infrastructure			Environmental – ecological			Cultural – culture and heritage		
Park & reserve land: structures, carparks, accessways, buildings (8.1 ha)			AT roads (47.7 km) Water pipes (207.5 km) Water assets (5916)			Ecological area (6.3 ha) Notable biodiversity overlays Notable SA1, SA1.2, SA1.3			Cultural heritage assets (61)		
Short	Medium	Long	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long
Coastal erosion susceptibility											
Coastal inundation											
Rainfall induced flooding											

None	Low	Moderate	High	Very high

Environmental context and hazard scape

This unit is divided into eight (8) stretches reflective of the varied coastal processes, Council-owned land and asset location.

The Waiuku Estuary is a shallow tidal basin characterised by extensive intertidal flats fringed by low-lying cliffed shorelines. Six smaller inlets protrude further inland from the Needles at the entrance to the estuary basin. Five of these inlets are classified as tidal creeks, which are generally sheltered from wave events and are conduits for most of the freshwater inputs to the estuary. The sixth inlet is a small tidal embayment on the eastern shoreline that contains Waitangi Falls and is more exposed to wave events. Waiuku is one of three major inlets for the wider Manukau Harbour.

The Waiuku Estuary Inlet is a low-wave, energy fetch and depth-limited environment. Within Stretch 4, large-scale consented mangrove clearance has been undertaken. The area of dense mangrove forest in the upper Rangiwhea Creek and an area located within the Golf Club Creek (Stretch 10) are identified as protected habitat. Waitangi Falls (Stretch 11) are identified as an 'Outstanding Natural Feature' as the low falls at the head of the small tidal estuary are one of the two most significant waterfalls over a basalt lava flow in the South Auckland volcanic field.

Other notable biodiversity overlays within this unit include mangrove forest and scrub (SA1. 2), broadleaved scrub/ forest (VS5) and sea rush occurring in the upper estuarine zone where saltwater dilutions are the most prevalent (SA1.3). These ecosystems support a range of flora and fauna, including shags, herons, spoonbill, waterfowl, banded rail, marsh crake, pūkeko, migratory and New Zealand-resident shorebirds. The major threats to these ecosystems are primarily abiotic and include eutrophication and increased sedimentation rates as a result of changing land use in surrounding catchments [13].

Cultural context

This unit contains an important cultural portage for local iwi, known as Te Pai 0 Kaiwaka. The Waiuku, or Te Pai 0 Kaiwaka portage was an important path across the narrow stretch of land between Waiuku River and Awaroa Stream which is a tributary of the Waikato River. People reaching the Manukau Harbour and heading south entered the Waiuku River, hauled their vessels over the portage to Purapura on the Awaroa Stream, and from there, gained access to the Waikato River and its tributaries. Where possible, a strategy of *no active intervention* and *limited intervention* has been selected to support local iwi values and principles set out in Section 1.4 above.

Social, and policy context

Community hotspots, such as Sandspit and Tamakae Reserve are situated within this coastal unit, with community consultation indicating the value of walking and cycling trails, coastal walkways, picnic areas, historical structures/ landmarks, playground facilities and opportunities for transport networks and use of community facilities such as the Waiuku Yacht Club. Tamakae Reserve is a focal point of Waiuku Town centre and is valued by the local community.

Prior to European settlement, Waiuku was important as the northern end of Awaroa portage, approximately 2.5 km overland between the headwaters of Waiuku Estuary and the Awaroa Creek tributary of the Waikato River. This unit also contains several recognised historic landmarks, including Tamakae Wharf in Waiuku, an important shipping route between Waiuku and Onehunga. The area around the wharf has been significantly modified, with reclamation and sedimentation restricting navigation to the historic wharf area. The Waiuku museum complex is located on raised ground on the western Tamakae Reserve also sits within this coastal unit and includes several historic buildings that have been relocated to the site. Importantly, the majority of buildings are above the inundation flooding level, however the sites of the old Waiuku Jailhouse (CHI 1795), Pollok Cottage (CHI17166), and Hartmann House (CHI1837) will be at risk from inundation in the long term.

The Waiuku Trails are an example of a popular coastal walkway, comprising a gravel path and timber bridge over the side arm of the inlet at Owens Road. This walkway connects the majority of the shoreline in this unit to Waiuku Town basin with the exception of the steep vegetated section north of Riverside Drive Reserve and the private properties situated along there. Note that future stages of the Waiuku Trails coastal walkway aim to provide continuous public access and connection along this section of coast, stretching along the eastern shoreline of Waiuku Creek.

The community objectivities below have been used to reflect community values associated with this section of coast:

- Adaptation strategies maintain safe access to the beach, coast and harbour (via boat launching facilities) with parking to support a range of recreational and water-based activities at a range of tide levels (e.g. swimming, walking, picnicking, sailing/boating, kiteboarding and surfing)
- Resilience of community facilities and assets in hazard zones is a priority. Community facilities in the Manukau South area support community resilience and recovery
- Pedestrian safety and use of public coastal walkways and lookouts are supported by improvements to signage and maintenance of coastal spaces

- Access to, and parking near popular coastal recreation areas is improved, resilient and considers a range of transport modes (improve/ support connectivity between coastal spaces).

Guidance notes for implementation

- *Hold the line* and *limited intervention* in areas of high amenity value and interest to the community to further reflect acknowledgment of community values and objectives/ aspirations for this unit.

Stretch 4: Tahuna Kaitoto | Rangiwhea Creek

Stretch description

This coastal stretch extends along the sheltered eastern shoreline of Rangiwhea Creek from King Street Esplanade Reserve towards Sandspit Beach in the north, with the adjacent area comprising residential development.

Figure 5-6: Rangiwhea Creek, grass reserve and public accessway

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal inundation and erosion. • Overland flow paths discharge to the coast. • Catchment flooding.	• King Street Esplanade Reserve. • Lina Place Reserve. • Bayview Esplanade Reserve. • Elsie Drive Esplanade Reserve. • Waiuku Trails coastal walkway gravel path. • Stormwater outfalls (including buried Gabion reno mattress toe support stormwater treatment pond and outfalls). • Two wastewater pump stations and wastewater infrastructure. • Earth ramps providing access to the foreshore.	• Staged revegetation of the coastal margin with native, salt-tolerant species. • Boardwalk section of Waiuku Trail, with adjacent saltmarsh planting.

Adaptation strategies

Stretch	Short term	Medium term	Long term
4: Tahuna Kaitoto | Rangiwhea Creek	LI	LI	LI

Guidance notes for implementation

- *Limited intervention* supports the current management practices located within this stretch.
- *Localised retreat* may be required in the longer term for Council/Watercare-owned wastewater assets.
- The Waiuku Trails coastal walkway is elevated along the majority of the esplanade reserve, however there are several low points that may be occasionally inundated and *limited intervention* may require small sections of raised boardwalk.
- Nature-based coastal management solutions, such as continued revegetation of the coastal margin will also contribute to managing erosion of exposed soils.

Stretch 5: Tahuna Kaitoto – Sandspit

Stretch description

This stretch contains Rangiwhea Road, Sandspit Reserve, and Sandspit Beach. The original sandspit has been largely reclaimed to form the low-lying grass reserve, and a small sandspit remains at the eastern end of the beach.

Figure 5-7: Sandspit Beach showing mature stand of pōhutukawa trees along the coastal margin and the timber boardwalk

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal inundation and erosion.	• Rangiwhea Road Reserve, Sandspit Reserve, Nga Waka Reserve boat ramp and stormwater outfalls. • Waiuku Trails coastal walkway gravel path and boardwalk. • Public amenities (playground, toilet, shower). • Seawalls, beach renourishment and associated control structures (groyne, ramp, jetty). • Rangiwhea Road, wastewater pumping station. • Pōhutukawa and large macrocarpa.	• Seawalls in combination with beach renourishment and associated control structures (groyne, ramp and jetty) currently manage erosion, retain sandy beach buffer, improve public amenity and support accessibility of foreshore.

Adaptation strategies

Stretch	Short term	Medium term	Long term
5: Tahuna Kaitoto – Sandspit	HTL	HTL	MR

Guidance notes for Implementation

- *Hold the line* strategy recognises the open space recreational reserve area valued by the wider community, and the established pōhutukawa. Nature-based options are supported including sand renourishment and ongoing sand transfer to provide a dry, high-tide beach area to buffer the armoured reserve.
- *Managed retreat* will be required in the long term due to increased coastal inundation driven by climate change. Landward relocation of services on the reserve in the long term due to coastal flooding which will over time, due to sea level rise, impact the low-lying reclaimed reserve area to the east of the existing yacht club.

Stretch 6: Tahuna Kaitoto - Western Waiuku Creek

Stretch description

This coastal stretch extends along the western shoreline of Waiuku Creek from Sandspit Reserve south, towards Tamakae Reserve in the Waiuku town basin.

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal erosion and inundation • Sections of the walkway at risk of inundation and scour from overland flow.	• Sandspit Road Esplanade. • Riverside Drive Recreational Reserve. • Tamakae Reserve. • Waiuku Trails coastal walkway gravel path. • Wastewater and water assets. • Stormwater outfalls. • Pedestrian bridge. • Council-owned wastewater pipeline located underground along the northern reserve crosses beneath Waiuku Creek River.	• Coastal revegetation along estuarine margin.

Adaptation strategies

Stretch	Short term	Medium term	Long term
6: Tahuna Kaitoto - West Shoreline Waiuku Creek	LI	LI	LI

Guidance notes for Implementation

- *Limited intervention* along this stretch reflects coastal revegetation planting and localised stabilisation where overland flow has saturated low cliffs resulting in isolated slips.
- *Managed relocation* of the gravel coastal walkway may be required, and low-lying sections could be raised with boardwalk sections.

Stretch 7: Tamakae | Tamakae Wharf

Stretch description

This coastal stretch contains the reclaimed reserves around the town basin in the upper reaches of Waiuku Creek and includes the historic Tamakae Wharf site.

Figure 5-8: Tamakae Wharf in Waiuku Town centre

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Large flood plains are present in Waiuku. • Tamakae Reserve and the Waiuku township landward are exposed to coastal inundation.	• Tamakae Reserve. • King Street and River Lane • Waiuku Trails coastal walkway gravel path. • Parks facilities including carpark, boat ramp, wall, signage and lighting and a band rotunda. • Boardwalk and associated fencing and barriers.	• Retaining walls around the central historic wharf area and eastern wharf area. • Eastern wharf current renewal project including piles to enable the deck to be raised in future. • Two large stormwater culverts which pipe the Waiuku Stream and the Tiware Stream discharging to the town basin.

Adaptation strategies

Stretch	Short term	Medium term	Long term
7: Tamakae | Tamakae Wharf	HTL	HTL	HTL

Guidance notes for Implementation

- *Hold the line* is identified over all timeframes to manage risks from coastal erosion. This supports the retention and continued maintenance of the retaining walls supporting the reclamations at Tamakae Wharf.
- Inundation from coastal flooding and catchment flooding will also be an increasing risk over time. In response to this, consideration of localised relocation, avoidance of future risk and mitigations will be required:
    - The landward relocation of assets, located within the low-lying reserve may need to be raised to mitigate risks from inundation
    - New buildings and infrastructure should not be developed within areas of the reserve which are identified as being at risk
    - The wharf deck height may need to be raised
    - The design and location of the wastewater pumping station on the eastern reserve may require consideration over time.

Stretch 8: Eastern shoreline of Waiuku Creek

Stretch description

This coastal stretch extends along the eastern shoreline of Waiuku Creek and contains the area from Lady Jane Franklin Botanical Reserve to the end of Racecourse Road.

Figure 5-9: Eastern shoreline of Waiuku Creek showing isolated pockets of saltmarsh vegetation

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal erosion.	• Lady Jane Franklin Botanical Reserve, Racecourse Road Esplanade Reserve. • Waiuku Trails coastal walkway gravel path, pedestrian bridges, wastewater and water assets, earth dam.	• No active management currently in place.

Adaptation strategies

Stretch	Short term	Medium term	Long term
8: Eastern shoreline of Waiuku Creek	LI	LI	LI

Guidance notes for implementation

- *Limited intervention* is identified to provide for coastal revegetation and managed removal of larger trees. As future stages of the Waiuku Trails coastal walkway are developed, the landward alignment of the formed gravel pathway must be set back from the coastal edge with appropriate drainage provisions to limit the need for future intervention and relocation.
- *Limited intervention* also provides for the ongoing consideration of safe public access along the Waiuku Trails route which may require nature-based or engineering solutions, based on site-specific assessment.

Stretch 9: Racecourse Road

Stretch description

This coastal stretch contains the area from the end of Racecourse Road around the eastern side of the headland at the entrance to the narrow tidal inlet that extends south to Waiuku Golf Course.

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal erosion. • Overland flow paths (Racecourse Road).	• Massbloc concrete seawall. • Wastewater pumping station (Kowhai Place) connects the Waiuku community and the wastewater treatment plant in Glenbrook. • Wastewater pipeline in the intertidal area around the toe of the cliff.	• Massbloc concrete seawall present along the esplanade reserve adjacent to Kowhai Place (associated coastal revegetation planting). • Landslides along coastal margin (Jan 2023).

Adaptation strategies

Stretch	Short term	Medium term	Long term
9: Racecourse Road	HTL	HTL	HTL

Guidance notes for Implementation

- *Hold the line* is identified to reflect the strategy in response to coastal erosion. The establishment of the Massbloc seawall constructed (by Council) in 1999, was undertaken to infill cavities in the cliff and provide toe protection to the narrow reserve. The localised relocation of wastewater and water assets that are subject to erosion and inundation is likely to be required over time.
- Coastal planting and localised drainage work to manage land stability is also likely to be required within this coastal stretch.

Stretch 10: Golf Club

Stretch description

This coastal stretch contains the southern end of Racecourse Road Esplanade Reserve along the eastern shoreline of the inlet towards Rata Street and includes the open space area.

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Flood plains and overland flow path drain to the coast. • Coastal erosion.	• Hamilton Estate recreation reserve. • Open space reserve land (currently leased to Waiuku Golf and Squash Club). • Closed landfill (former Waiuku Borough Council landfill) located in the upper inlet. • Wastewater and water assets including pipe bridge.	• Weed management, pine tree removal and coastal revegetation planting has been (undertaken by the Golf Club). • Several coastal landslides (January 2023 extreme rainfall event).

Adaptation strategies

Stretch	Short term	Medium term	Long term
10: Golf Club	LI	LI	LI

Guidance notes for Implementation

- *Limited intervention* is applicable for selected locations within this stretch, noting that large sections of this shoreline are appropriately managed with *no active intervention*.
- *Limited intervention* in the form of increased width of coastal revegetation planting will be appropriate to manage safe public access and provide a buffer to the closed landfill.
- Long-term management of the closed landfill will be required, as will consideration of the location of the wastewater pipeline including the pipe bridge. These may need to be relocated landward in the longer term.

Stretch 11: Hyland Place to Waitangi Falls

Stretch description

This coastal stretch extends along the eastern shoreline of Waiuku Estuary from the upper inlet adjacent to Hyland Place to the Waiuku wastewater treatment plant on the northern side of Waitangi Falls embayment.

Figure 5-10: Coastal margin along the Hyland to Waitangi falls coastal stretch, showing thin fringe of coastal vegetation along low cliffs

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Overland flow path and flood plains running through Waitangi Falls Reserve. • Hyland Place Esplanade Reserve exposed to coastal inundation.	• Waitangi Falls reserve. • Carpark area at the end of Waitangi Falls Road.	• No active management currently in place.

Adaptation strategies

Stretch	Short term	Medium term	Long term
11: Hyland Place to Waitangi Falls	NAI	NAI	NAI

Guidance notes for Implementation

- The chosen strategy for this stretch is *no active intervention* across all time periods. This is specifically relevant to the management of the shoreline, reflective of the natural features and current approach of *no active intervention*. The relocation of services within the reserve by Waitangi Falls such as the carpark and manoeuvring areas may need to be relocated landward in the future to manage risk to these assets.
- Cultural values: This stretch is of high cultural significance. Tapu Tiketike Pā is located at Waitangi Falls and numerous midden are recorded along the shoreline between Hyland Place Esplanade Reserve to the end of Cameron Road. Shorebird (manu) feeding grounds have also been identified as a key consideration by local iwi. Advocacy and engagement with local iwi regarding future management practices, which work to protect coastal middens, ecological values and other wāhi tupuna, should be supported.

Unit 3: Ohurua | Glenbrook Steel Mill

Unit 3: Ohurua | Glenbrook Steel Mill

This unit includes the eastern shoreline of Waiuku River between Waitangi Falls embayment and Glenbrook Beach. The two stretches within this unit reflect the location of infrastructure and land use.

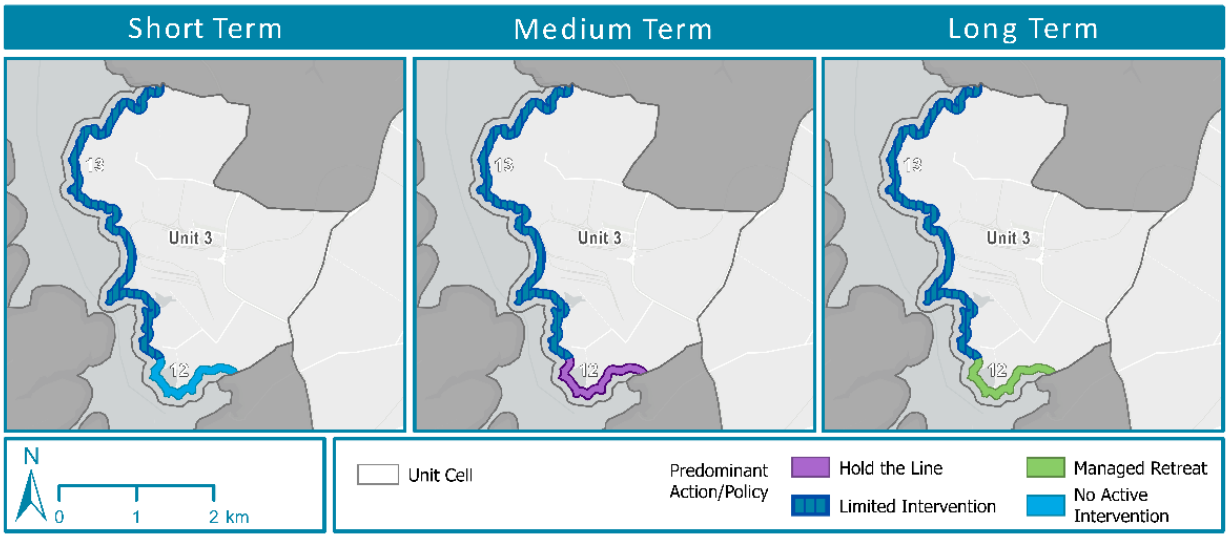


Figure 5-11: Adaptation strategies for coastal stretches within the Glenbrook Steel Mill unit area

Adaptation summary stretches 12 to 13

Stretch	Short term	Medium term	Long term
12: Waiuku Wastewater Treatment Plant	NAI	HTL	MR
13: Glenbrook Steel Mill	LI	LI	LI

Council-owned infrastructure, land, and assets

This unit has a predominantly rural landscape and includes limited Council-owned land, primarily comprised of the Glenbrook Foreshore Esplanade Reserve. Stretch 12 includes the Waiuku wastewater treatment plant. Stretch 13 includes landward of the esplanade reserve, the major industrial site at Glenbrook Steel Mill (not Council-owned). The landward extent of this unit includes several roads and network infrastructure associated with the wastewater plant.

Table 5-4: Unit 3 Council-owned land & assets metrics and associated risk scores (short, medium, long terms)

Social - parks and reserves			Economic - network infrastructure			Environmental - ecological			Cultural – culture and heritage		
Park & reserve land: structures, carparks, accessways, buildings (-)			AT roads (6.6 km) Water pipes (4.2 km) Water assets (40)			Ecological area (11.3 ha) Notable biodiversity overlays CL1, SA1.2, VS5			Cultural heritage assets (15)		
Short	Medium	Long	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long
Coastal erosion susceptibility											
Coastal inundation											
Rainfall induced flooding											

None	Low	Moderate	High	Very high

Environmental context and hazard scape

This unit includes predominantly unmaintained esplanade reserve areas exposed to erosion and inundation over time. While there are limited interventions currently in place, the values identified within this unit and the location of important and major infrastructure within both stretches is reflected in the adaptive strategy selection.

Notable biodiversity overlays that make up this coastal unit include pōhutukawa treeland/ flaxland/rockland (CL1), pōhutukawa scrub/forest (VS5) and mangrove forest and scrub occurring in areas of tidal inundation with abundant silt deposition (SA1.2).

Cultural content

Midden and storage pits have been recorded within this coastal unit; however the condition of these sites are unknown, being potentially damaged/destroyed by prior development. Providing for Te Tiriti outcomes and supporting local iwi to carry out objectives and aspirations in Section 3.2, is a primary consideration in the selection of adaptation strategies, with special interest in midden, named pā and evidence of extensive occupation within this coastal unit.

Social, and policy context

Community values along this coastal unit obtained during consultation relate to supporting and maintaining ecosystem values and biodiversity. The community objective regarding preserving and enhancing the natural environment and ecosystems is of particular importance to this unit.

Stretch 12: Waitangi | Waiuku Wastewater treatment plant

Stretch description

This coastal stretch contains the Waiuku wastewater treatment plant located on the northern side of Waitangi Falls embayment. A wastewater pipeline connection from Waiuku crosses beneath the embayment to the wastewater pump station adjacent to Kowhai Street in Racecourse Road (Stretch 9).

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Wastewater treatment plant exposed to coastal inundation and located near to large flood plains.	• Wastewater treatment plant. • Wastewater assets and pipelines (wastewater pipeline connection from Waiuku beneath the embayment to the wastewater pump station at Stretch 9). • Esplanade reserve.	• No active management currently identified.

Adaptation strategies

Stretch	Short term	Medium term	Long term
12: Waitangi | Waiuku wastewater treatment plant	NAI	HTL	MR

Guidance notes for Implementation

- *No active intervention* in the short term reflects the current management and absence of protection structures within this stretch. The Waiuku wastewater treatment plant is subject to erosion and flooding.
- The need to maintain this infrastructure in the event of increased risk from hazards is reflected in the identification of *hold the line* in the midterm. Ultimately, aspects of this treatment plant are likely to be relocated with some assets left on site. Remaining assets can be managed within the site to avoid and/or mitigate effects of flooding and erosion.
- Cultural values: Local iwi have indicated the need to protect manu feeding grounds, pā and other wāhi tupuna within this wider unit area.

Stretch 13: Ohurua | Glenbrook Steel Mill

Stretch description

This coastal stretch extends along the eastern shoreline of the Needles in Waiuku River and contains the industrial site of Glenbrook Steel Mill.

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Flood plains and overland flow paths. • Coastal erosion and coastal inundation.	• Esplanade reserve.	• No active management currently in place.

Adaptation strategies

Stretch	Short term	Medium term	Long term
13: Ohurua – Glenbrook Steel Mill	LI	LI	LI

Guidance notes for Implementation

- *Limited intervention* reflects the need for future consideration of management of heritage sites which may be required within this stretch. This includes the Ohurua Pā and evidence of previous extensive occupation. There is a need to work with local iwi to consider coastal hazard risks and coastal management.
- There is a *no active intervention* approach otherwise applied for this stretch that is reflective of the unmaintained nature of this esplanade reserve.

Unit 4: Kahawai | Glenbrook

Unit 4: Glenbrook | Kahawai

This unit covers the southwest-facing Glenbrook coastline on the eastern shoreline of Waiuku River and includes the Taihiki River inlet (five coastal stretches).

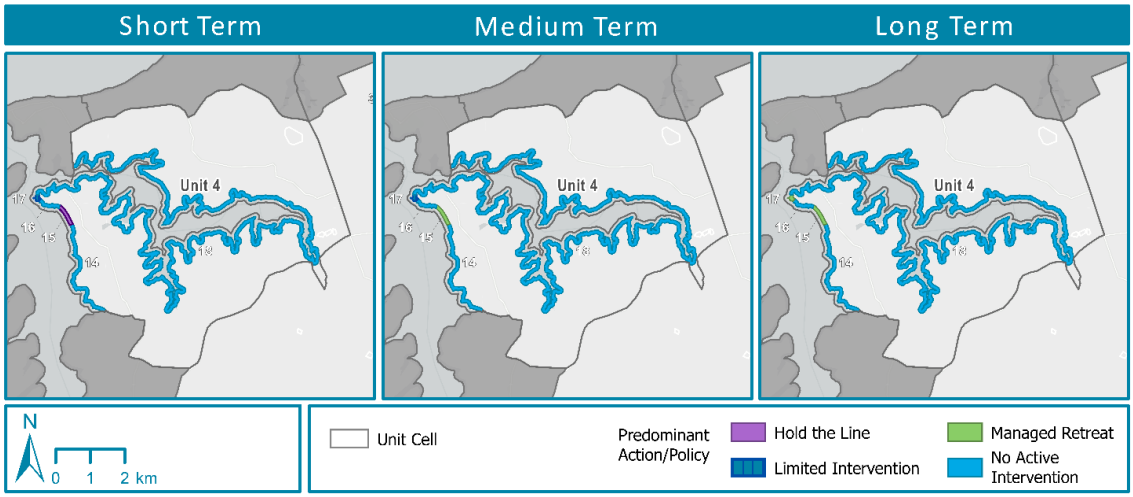


Figure 5-12: Adaptation strategies for coastal stretches within the Glenbrook unit area

Adaptation summary stretches 14 to 18

Stretch	Short term	Medium term	Long term
14: Glenbrook South	NAI	NAI	NAI
15: Glenbrook Beach	HTL	MR	MR
16: Cliff Road Esplanade	NAI	NAI	NAI
17: Kahawai Point	LI	LI	MR
18: Taihiki River	NAI	NAI	NAI

Council-owned infrastructure, land, and assets

Watercare has several assets within this unit, including submarine pipelines connecting Glenbrook Beach to Waiau Beach for water and wastewater services (Stretch 18). The connecting points at each side are subject to erosion. Localised relocation is possible and may be undertaken in the short term. Watercare is currently in process of confirming the location for the new southwest wastewater treatment plant adjacent to Taihiki River.

Watercare also has a significant number of assets located within Stretch 15, both water and wastewater, subject to coastal erosion and inundation, which may be managed through localised relocation. Wastewater assets may be relocated as part of the south-west wastewater treatment plant programme within the short term. Other assets are unlikely to be relocated within these timeframes.

This unit includes limited park land with roading assets captured within the landward extent of the unit area. The park areas at Glenbrook Beach (and associated road) are exposed to erosion and inundation, being low lying in close proximity to the coastal edge.

Table 5-5: Unit 4 Council-owned land & assets metrics and associated risk scores (short, medium, long terms)

Social - parks and reserves			Economic - network infrastructure			Environmental - ecological			Cultural – culture and heritage		
Park & reserve land: structures, carparks, accessways, buildings (0.9 ha)			AT roads (43 km) Water pipes (38.2 km) Water assets (1,191)			Ecological area (11.7 ha) notable biodiversity overlays CL1, SA1.2, SA1.3, SEA-M2w			Cultural heritage assets (37)		
Short	Medium	Long	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long
Coastal erosion susceptibility											
Coastal inundation											
Rainfall induced flooding											

None | Low | Moderate | High | Very high

Environmental context and hazard scape

This unit is characterised by low coastal cliffs that bookend the narrow beach to the south of Kahawai Point. The beach fronts a large wetland area, and wide intertidal mudflats extend 400 m from Glenbrook Beach to Waiuku Channel. This coastal unit includes pōhutukawa treeland/ flaxland/rockland (CL1), mangrove forest and scrub (SA1.2) occurring in areas of frequent tidal inundation with abundant silt deposition, and sea rush (SA1.3) occurring in the upper estuarine zone where saltwater dilution is greatest.[13] Taihiki River is considered to be an important nursery area for young flounder and grey mullet. It provides habitat for banded rail and is a wading bird roosting area. This remains one of the least impacted of harbour habitats in the Manukau because of the lack of major inputs of sediment from the catchment and vegetated shoreline. Taihiki River is considered to be a 'Significant Ecological Area' under the AUP (SEA-M2w). [18]

Cultural context

Recent survey work led by the heritage team at Auckland Council recorded midden, settlement, pits and terraces and a previously unrecorded pā site along this section of the coast[19]. The cultural heritage inventory identifies that there were four pā sites in the Waiau Pā area, with a potential connection to Te Toro Pā. Waitete Pā has been noted as largest out of these four.

Social, and policy context

This section of the coast is highly valued by the community for the boat ramp and its access to the Manukau Harbour and Taihiki inlet (highly valued river | awa by both iwi and the local community), as well as its walkways and lookout points.

[19] AUP ID 1550 - CHI 1807, R12/1080

Stretch 14: Ohurua | Glenbrook South

Stretch description

This coastal stretch contains the shoreline south of Glenbrook Beach to the Glenbrook Steel Mill. It is largely privately-owned farmland with some lengths of unmaintained reserve that is not contiguous.

Figure 5-13: Section of shoreline south of Glenbrook beach to the Steel Mill

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Weakly consolidated erosion prone coastal cliffs. • Large flood plains present.	• Limited unconnected esplanade reserve.	• No active management currently in place.

Adaptation strategies

Stretch	Short term	Medium term	Long term
14: Glenbrook South	NAI	NAI	NAI

Guidance notes for Implementation

- *No active intervention* is chosen for this stretch as the area is unmaintained and has inaccessible areas of esplanade reserve.
- Cultural values*:* Local iwi feedback focused on protecting manu feeding grounds, pā and other wāhi tupuna.

Stretch 15: Kahawai |Glenbrook Beach

Stretch description

Glenbrook Beach is a narrow, highly-modified beach to the south of Kahawai Point.

Figure 5-14: Glenbrook beach seawall and beach front

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal erosion. • Coastal inundation. • catchment flooding.	• Beach Road. • Concrete seawall. • Glenbrook Beach Esplanade Reserve. • Wastewater pumping station in the central area at Fleet Street. • Parks facilities/amenities (toilet block, playground, seating, bbq). • Narrow remnant of inaccessible esplanade reserve south of Beach Road. • Stormwater outfall and associated pipeline.	• Current (2023) renewal project for Glenbrook Beach (in design) includes beach nourishment with control structures at the northern end, and stepped timber seawall along the central beach esplanade reserve and Southern Beach Road Reserve. • A large stormwater outfall pipe extends through mid-beach and discharges into the intertidal area.

Adaptation strategies

Stretch	Short term	Medium term	Long term
15: Kahawai/Glenbrook Beach	HTL	MR	MR

Guidance notes for Implementation

- *Hold the line* recognises the high recreational amenity value of Glenbrook Beach, further supported by the community objective of recognising the importance of connectivity to the beach and along the coastal edge reserve. This strategy supports the planned protection from coastal erosion over the short term of Council land and assets, including Beach Road.
- A strategy of *hold the line* can include both nature-based and hard engineering structures.
- *Managed retreat* over the medium and long terms, reflects the increasing risk from coastal inundation and catchment flooding. Planned relocation of assets and uses will required to respond to the changing hazard scape.

Stretch 16: Kahawai | Cliff Lane Esplanade Reserve

Stretch description

This coastal stretch contains the entirety of Cliff Lane Esplanade Reserve, stretching from Ronald Avenue at the northern end of Glenbrook Beach to Glenbrook Beach boat ramp reserve at Kahawai Point.

Figure 5-15: Informal coastal track providing coastal access along Cliff Lane Esplanade Reserve, fringed with pōhutukawa

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Low rates of ongoing coastal erosion is the main hazard affecting this area.	• An informal coastal track provides pedestrian connection along this coastline. • Areas of unconnected esplanade reserve.	• No active management currently in place.

Adaptation strategies

Stretch	Short term	Medium term	Long term
16: Cliff Lane Esplanade Reserve	NAI	NAI	NAI

Guidance notes for Implementation

- *No active intervention* reflects the limited nature of Council-owned land in this stretch. It is noted that this strategy does not preclude advocacy for the development of future walkways, appropriately set back from the coastal edge. Two sites of significance have been recorded in the foreshore bank of Kahawai Point. Advocacy and engagement with local iwi may also be required to manage risk to cultural heritage where sites are located within Council-owned land.

Stretch 17: Kahawai | Kahawai Point

Stretch description

This coastal stretch covers Kahawai Point /Glenbrook Beach Boat Ramp Reserve, at the confluence of the Waiuku and Taihiki Rivers.

Figure 5-16: Kahawai Point boat ramp

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Reserve exposed to coastal inundation and instability/ erosion in the short term.	• Glenbrook boat ramp reserve. • Glenbrook boat launching ramp (southern ramp). • Beach access ramp (northern ramp). • Car park, toilet block. • Supporting park amenities. • Accessway.	• Maintaining boat access ramp and amenities in reserve area.

Adaptation strategies

Stretch	Short term	Medium term	Long term
17: Kahawai Point	LI	LI	MR

Guidance notes for Implementation

- *Limited Intervention* across all time periods recognises the importance of the boat launching facility, and that localised works may be required to maintain safe public access to this section of the coast and for on-going use of the boat ramp.
- *Managed retreat* of assets and uses within this site will be required in the long term. This is required to provide for planned management of uses including the low-lying car and boat trailer parking area and road access.

Stretch 18: Taihiki | Taihiki River

Stretch description

This stretch covers the Taihiki River coastline extending east from Kahawai Point, with the northern arm of Taihiki River extending east to Mauku Bridge and the site of the closed landfill (former Mauku tip).

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal erosion.	• Road reserve along coastal margin of Kahawai Point. • Coastal walkway (Hoggin pathway). • Unmaintained esplanade reserve along Taihiki River. • Closed landfill (former Mauku tip).	• No active management currently in place.

Adaptation strategies

Stretch	Short term	Medium term	Long term
18: Taihiki River	NAI	NAI	NAI

Guidance notes for Implementation

- *No **active intervention*** is chosen for this stretch as the area includes areas of unmaintained and unconnected esplanade reserve. Within the south/western areas of the stretch, coastal planting and management of mature trees may be undertaken in response to increased use of this area associated with residential development. Along with the ongoing management of the Mauku closed landfill, there may be a need to review this strategy over time and consider limited interventions to respond to risks.
- Advocacy: Future development at Kahawai Point should consider coastal hazard risks in relation to setbacks from the coastal edge which enable the strategy of ***no active intervention*** to be maintained.
- Cultural values: This section of the coast has been highlighted as being of high importance from a cultural and heritage perspective, with recorded midden, pits and terraces and a previously unrecorded pā site noted (CHI inventory CHI 6907, R12/347 and CHI 865). This presents an opportunity to advocate in support of local iwi groups to monitor risks to cultural heritage.

Unit 5: Waiau | Clarks Beach

Unit 5: Waiau | Clarks Beach

This coastal unit contains 16 coastal stretches, which span the area from the north of the Taihiki River in the south, including the area referred to as Waiau Beach or Waiau Pā and Ngahere or Torkar Bay and the northern facing shoreline of Waiau | Clarks Beach. The unit culminates at the end of the developed residential area (at the end of Crispe Road) and at this point, it adjoins the unit of Seagrove to the east.

Clarks Beach is divided into multiple stretches to reflect the location of Council-owned reserves and assets a within this unit.

- Stretches 19- 21 Include Waiau Pā historic reserve and boat launching area, the residential settlement of Waiau Beach/Pā, Clarks Beach golf course and the existing wastewater treatment plant.
- Stretches 22-24 include Torkar / Ngahere Bay and associated reserve areas. This includes key community facilities such as the holiday park and yacht club. Stretch 24 culminates east of Karaka Point.
- Stretches 25, 27, 29, 31, 33; are short stretches which include the key public access points to the beach, referred to as: Wilsons, Halls, Knights, Hoskings and Bradleys. Irwins Access is included within Stretch 26. These reserves contain varying Council-owned assets and have varying coastal management approaches reflective of historic management and the local setting within the wider Clarks Beach Unit.
- Stretches 26, 28, 30, 32 and 34 include stretches of coast adjacent to private land between the access reserves. Access along the coast within this esplanade reserve is not contiguous and, in some places, has been lost entirely to the sea, meaning access along the beach is not feasible at high tide.

These stretches are set out below in Figure 5-19 and listed in the table along with their adaptive strategies.

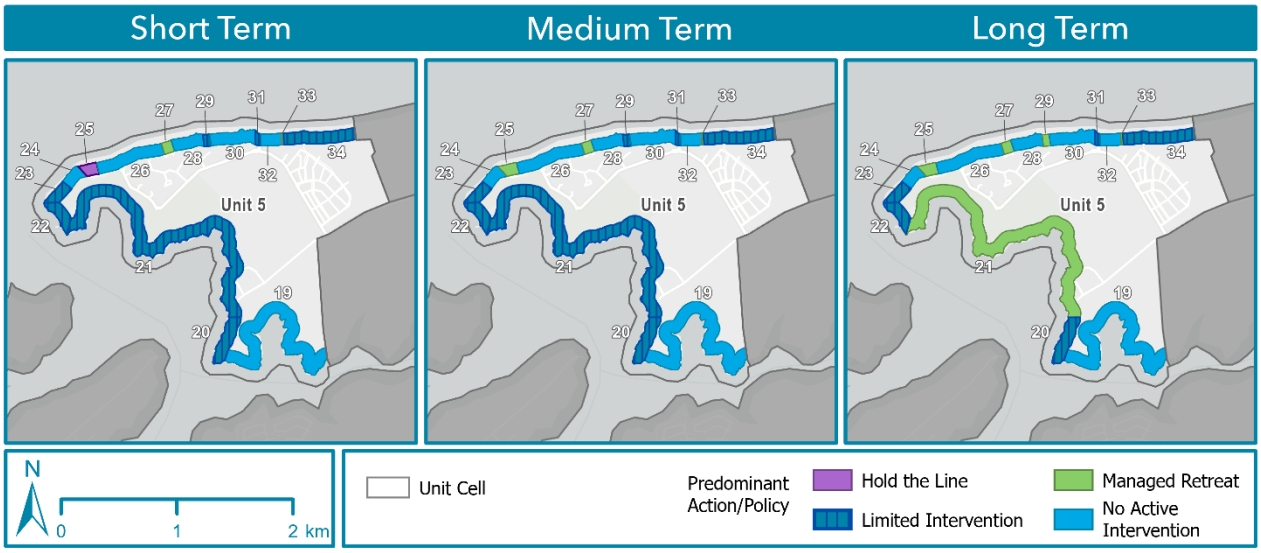


Figure 5-17: Adaptation strategies for coastal stretches within the Clarks Beach unit area

Adaptation summary stretches 19 to 34

Stretch	Short term	Medium term	Long term
19: Taihiki | Taihiki River North	NAI	NAI	NAI
20: Waiau/Waitete | Waiau Beach/Pā	LI	LI	LI
21: Karaka/Waiau | Clarks Beach Golf Course	LI	LI	MR
22: Waiau | Torkar Bay	LI	LI	LI
23: Karaka Point / Torkar Road Reserve	LI	LI	LI
24: Torkar Road West (private land)	NAI	NAI	NAI
25: Wilsons Access West	HTL	MR	MR
26: Wilsons Beach East (private land & Irwin's Access)	NAI	NAI	NAI
27: Halls Beach Access	MR	MR	MR
28: Torkar Road Central	NAI	NAI	NAI
29: Knights Beach Access	LI	LI	MR
30: Torkar Road East	NAI	NAI	NAI
31: Hoskings Access	LI	LI	LI
32: Crisp Road West	NAI	NAI	NAI
33: Bradleys Access	LI	LI	LI
34: Clarks Beach East	LI	LI	LI

Council-owned infrastructure, land, and assets

The Waiau | Clarks Beach unit includes extensive esplanade reserves and road reserves, engineered beaches, a golf course and several recreational reserve areas. Assets and facilities/amenities within this area include walkways and access ways (at least 7 along the frontage of Clarks Beach alone), public boat ramps/boat launching area, parking areas and toilet facilities, within the larger reserve areas. Council-owned land also provides for privately-owned facilities, such as the Waiau Pā Boating Club and Clarks Beach Yacht Club.

Erosional risk to these narrow, exposed esplanade areas is a key consideration for the management of risks within this unit. Continuous public access along the landward edge of this unit is not possible because of cliffed topography and location of private property boundaries. Areas of lower-lying reserve are also exposed to inundation from both the sea and rainfall flooding.

The wider Waiau Pā and Clarks Beach settlements are serviced with three waters' infrastructure, and as such, pipes and associated water assets (collectively nearly 50 km of pipe) are located within the units and exposed to coastal hazards and rainfall flooding. The Watercare wastewater treatment facility for the wider Clarks Beach area is located within Council-owned land in the wider golf course area (Stretch 21). Watercare has planned for a new subtidal wastewater outfall associated with the

wastewater treatment facilities within the Manukau South SAP area. This outfall is proposed to be located between Ngahere Bay and Waiau Beach (Stretch 21). This is planned infrastructure and is not yet constructed or specifically included in the risk assessment in Table 5-6. In several areas within this unit, three waters pipes are located in proximity to the coast. These assets are identified in the tables for each stretch.

Nearly 10 km of public roads (identified within the unit extent) provide access to the settlements of Waiau Pā and Clarks Beach. Torkar and Crispe Roads run parallel to the coastline at Clarks Beach. Wharf Road provides access to Waiau Pā and the Waipa Historic Reserve (Stretch 20).

Table 5-6: Unit 5 Council-owned land & assets metrics and associated risk scores (short, medium, long terms)

Social – parks and reserves			**Economic – network infrastructure**			**Environmental – ecological**			**Cultural – culture and heritage**		
Park & reserve land: structures, carparks, accessways, buildings (2.8 ha)			AT roads (9.8 km) Water pipes (46.7 km) Water assets (1,227)			Ecological area (1.8 ha) Notable biodiversity overlays CL1[20], VS5[21], SA1, & SA2[22], WF4[23], VS3[24]			Cultural heritage assets (21)		
Short	Medium	Long	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long
Coastal erosion susceptibility											
Coastal inundation											
Rainfall induced flooding											

None | Low | Moderate | High | Very high

Environmental context: Coastal setting, hazard scape and ecological setting

Waiau Beach/ Waiau Pā settlement (Stretch 20) is located on the eastern shoreline of the Waiuku River tidal inlet, in an embayment between Clarks Beach and Taihiki River. There are several small, narrow, high-tide beaches along this section of coast, fronted by wide mud flats with tidal drainage channels. The northern and central part of the embayment is fringed by coastal vegetation with adjoining land used as a golf course and farmland (Stretch 21). The coastline to the south of the stream has been developed with residential housing with future urban growth anticipated.

Waiau | Clarks Beach (Stretches 22-34) is located on the south-western shore of Manukau Harbour between the Waiuku River and Whātāpaka Creek (located within the neighbouring unit). The

20 Cliff ecosystems, regenerating ecosystem include pōhutukawa treeland/flaxland/rockland

21 Regenerating ecosystem

22 Coastal saline ecosystems

23 Coastal broadleaved forest ecosystem

24 Broadleaved species scrub/forest

settlement of Clarks Beach is located along the western 2.5 km section of north-facing coastline, exposed to the largest fetch (approximately 22 km) for wind-generated waves in northerly wind-wave conditions. The beach system consists of a wide inter-tidal flat (extending up to 3-4 km) with a narrow sandy perched high-tide beach, that is backed by a low, steep bank ranging in height from 0.1 - 2.0 m. Along some parts of the coastline there is little or no high-tide beach, and the intertidal flats extend directly to the coastal cliffs up to 8-10 m high.

Access along and to the coast within the Clarks Beach unit (Stretches 24-34) are detailed below to assist navigation of the stretches within this unit:

- Continuous public access along the landward edge is not possible because of cliffed topography and the location of private properties' boundaries.
- Seven (7) reserves provide pedestrian connections from Torkar Road and Crispe Road to the coastal marine area. Access is provided via a combination of stepped and sloping concrete paths, usually including steps to the beach.
- The access ways at Wilsons and Halls Beach (Stretch 25 and 27) include vehicle access with sealed car parking areas, and toilet facilities and associated three waters' infrastructure located landward of the beach.
- Irwins Access is located within Stretch 26 and retains a natural coastal edge, with no associated protection structures. Knights Access also currently includes no formal protection structures.
- Hoskings and Bradleys Access (Stretch 31 and 33) have existing erosion protection structures with associated access stairs and stormwater outfalls.
- A reserve area within the Clarks Beach precinct, at the eastern end of Clarks Beach (Stretch 34), includes a reserve and newly formed coastal access connections.

The risk assessment results (see Table 5-6) identifies that the unit has a moderate to high risk profile for all hazards and across all wellbeings (including cultural and ecological elements at risk). Risk from coastal erosion and inundation to network infrastructure (roads and three waters) is generally high across all timeframes.

Ecosystems located within this unit include cliff ecosystems characterised by coastal pōhutukawa, regenerating ecosystems, located within more rural aspects within the southern portions of the unit, localised areas of broadleaved species scrub/forest and coastal broadleaved forest ecosystem, mangrove forest and scrub and coastal saline ecosystems. All of these are vulnerable to weathering by the sea, exacerbated through an inability to migrate landward, vegetation disturbance, invasive species and land-use changes. Significant ecological areas are located within coastal areas of the golf course (Stretch 21). Significant marine ecological areas are identified within the Coastal Marine Area to the north of Clarks Beach; this area is identified as providing habitat for wading birds. Within the Taihiki River inlet (stetch 19) further significant marine ecological areas are also identified.

Cultural context

This unit is of high cultural significance to local iwi. Waiau Pā / Waitete Pā is located within this unit and is one of the largest pā in the area. Multiple middens are recorded along the shoreline, situated within esplanade reserves, accessways and foreshore banks.

Specific cultural values and outcomes for each coastal stretch will be shared and developed through iwi involvement in future work programmes. Providing for Te Tiriti outcomes and supporting local iwi to achieve objectives and aspirations identified in Section 3.2 is a primary consideration in the selection of adaptation strategies, with special interest in midden and pā, along with further sites of value and significance.

Social, and policy context

Community consultation results support a strong affiliation to coastal access within this unit. Results and discussions held identify that both visitors and the local community are frequent users of pedestrian accessways and boat ramps. Uses and values included exercise, harbour access (for a variety of uses), a connection to the coast, recreation (including enjoying the views gained of the harbour), and the use of community and park facilities such as the Clarks Beach Yacht Club, bbq areas and playgrounds. Consultation also elicited a familiarity with coastal hazards, particularly coastal erosion. Frequently raised matters included:

- The need for better walkway and pedestrian connections through, between, and to coastal spaces. There was a desire for a coastal connection between Waiau Pā and Clarks Beach
- The need to maintain and support biodiversity hotspots and ecosystems, with some members of the community expressing concern related to the expansion of mangroves
- Requests for better signage, for safety and access
- Improvements to carpark facilities (scale and repair)
- The undermining of trees due to coastal processes.

Policy

Areas within the southern portion of this unit are zoned as rural coastal, while the northern areas are a mix of residential zones. Reserve areas have associated Open Space Zoning including a large area comprising the golf course. One precinct is identified to the eastern area of Clarks Beach (Stretch 34); the policy direction provided identifies connections to the coast being of particular importance and provides a larger coastal setback and a focus on stormwater management.

In 2004, Clarks Beach Erosion Management Guidelines were produced by Auckland Regional Council and Franklin District Council in conjunction with the Residents and Ratepayers of the time. The purpose of this guidance was to assist landowners address the significant number of unlawful coastal protection structures. These structures were in many cases, poorly constructed, not suitably designed for the coastal processes (erosion) and did not achieve relevant policy direction in relation to natural character and amenity values of the area.

Stretch 19: Taihiki | Taihiki River North

Stretch description

This stretch includes the embayment on the northern side of Taihiki River entrance (from Boyd Road west) and culminates at the eastern side of Waitete Point.

Figure 5-18: Aerial imagery of Taihiki river inlet leading outwards Manukau Harbour

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Erosion.	• Unmanaged reserve and road reserve.	• Privately owned farmland, with some unconnected sections of unmaintained esplanade reserve and road reserve.

Adaptation strategies

Stretch	Short term	Medium term	Long term
19: Taihiki River continued	NAI	NAI	NAI

Guidance notes for implementation

- *No active intervention* is chosen for this stretch.
- Cultural values: Local iwi have identified a need to protect wāhi tapu and sites of significance within this stretch.

Stretch 20: Waiau / Waitete | Waiau Beach / Pā

Stretch description

This stretch commences at Waitete Point and includes the section of Wharf Road up to the first residential property on the western side of the road.

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal erosion and instability.	• Waiau Beach boat ramp reserve. • Wharf Road toilets. • Public boat ramp with armoured vehicle accessway, gravel trailer parking area. • Wastewater pipelines, potable water pipelines. • Limited stormwater assets. • Wharf Road reserve (Waipa Historic Reserve).	• Current renewal project for relocation of the toilet block to landward side of Wharf Road to avoid coastal instability and existing slips.

Adaptation strategies

Stretch	Short term	Medium term	Long term
20: Waiau / Waitete | Waiau Beach/Pā	LI	LI	LI

Guidance notes for Implementation

- *Limited intervention* provides for the physical works required to support retention of a boat launching facility within this stretch. Over time, the 'ramp approach' park amenities (such as the toilet block) and supporting uses (such as the cliff-top, boat-trailer parking area) will need to be moved away from the cliff edge to manage risks from coastal instability.
- *Limited intervention* also supports the ability to undertake planned planting to increase the coastal vegetation buffer along the coastal margin.
- Cultural values: This stretch is of high cultural significance to local iwi. Partnership with local iwi and the Department of Conservation will be required to respond to risks to cultural assets over time.

Stretch 21: Waiau/ Waitete | Waiau Beach & Golf Course

Stretch description

This stretch includes the two embayments on the northern shoreline of Waiuku River, between Waitete Point and Torkar Bay to the north. The stretch commences at Wharf Road in the south (adjacent to the private landholdings on Wharf and Channel View Roads) and culminates at the point prior to the Clarks Beach Boat Ramp to the north (located within Stretch 22).

Figure 5-19: Aerial imagery of Waiau facing west. Clarks Beach, Waiau Beach and Clarks beach golf club are evident in this image

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal erosion and instability. • Coastal inundation for lower lying areas within the embayment's and the settlement of Waiau Beach. • Areas of floodplain located in depressions and lower lying areas of the catchment within the stretch.	• Goble/Channel Road Reserve. • Goble Road, Channel View Road, Keven Road. • Keven Road boat ramp. • Wastewater pipelines, Keven/Goble Road pumping station. • Potable water pipeline. • Clarks Beach Recreation Reserve, community lease to Clarks Beach Golf Club. • Watercare wastewater treatment plant (ponds and associated infrastructure). • Clarks Beach Boat Ramp Reserve (lease to Clarks Beach Yacht Club & Clarks Beach Holiday Park).	• Numerous private seawalls and other coastal access structures are located within the esplanade reserve within the Waiau Beach area (Goble and Channel View Reserve). • Seawall and groyne/ breakwater provides shelter to the Clarks Beach boat ramp.

Adaptation strategies

Stretch	Short term	Medium term	Long term
21: Waiau / Waitete | Waiau Beach & Golf course	LI	LI	MR

Guidance notes for Implementation

- *Limited intervention*: This strategy provides for the management of existing interventions to manage coastal hazard risks and provides for localised relocation of assets landward where subject to upgrade and renewal.
- *Managed retreat:* This reflects the need for a coordinated management approach (including multiple asset owners) for the realignment of assets to manage hazard risks. This includes the need to consider realignment of network infrastructure, the management of reserve land and the retreat of road /coast access, particularly where these roads run perpendicular to the coast.
- *Limited intervention* with *managed retreat* in the long term also signals the need to consider the location of third-party assets subject to leases, located within reserve areas.
- Cultural values: This stretch is of high cultural significance to local iwi. Partnership with local iwi and the Department of Conservation will be required to respond to risks to cultural assets over time.
- Advocacy for an adequate width of esplanade reserve, considering the hazard scape and current shoreline adaptation intentions, to be vested as part of the development of future growth areas.

Stretch 22: Waiau | Torkar Bay

Stretch description

Torkar Bay is an embayment located on the northern entrance to Waiuku River, between Karaka Point and Ngahere Bay. This stretch includes the area from the point adjacent to the Clarks Beach Yacht Club building to the paved boat ramp on the north-western side of the bay.

Figure 5-20: Torkar Bay and Clarks Beach Yacht Club (Stretch 21 and 22)

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Current coastal erosion and inundation. • Undermining of trees along yacht club.	• Clarks Beach boat ramp reserve (Clarks Beach Yacht Club building and Clarks Beach Holiday Park [community lease]). • Breakwater, trailer boat launching. • Park amenities (toilets, bbq, picnic facilities). • Playground, carpark, concrete boat ramp. • Yacht Club wastewater pump station. • Torkar Road.	• A wide beach area has accreted on the northern side of the rock groyne breakwater that extends approximately 40 m across the intertidal area towards Waiuku Channel.

Adaptation strategies

Stretch	Short term	Medium term	Long term
22: Waiau | Torkar Bay	LI	LI	LI

Guidance notes for Implementation

- *Limited intervention:* Ongoing mechanical sand transfer from the northern to southern side of the breakwater to manage sand levels on the beach will be enabled through this strategy, allowing for maintenance of the beach and the grass reserve area.
- *Advocacy and consultation:* Where community leases are considered, and the renewal and replacement of parks amenities and facilities is required, these uses and buildings should be located landward of coastal instability and erosion areas to avoid (and reduce) risks where possible.
- *Cultural values:* Management of risk through additional coastal protection and interventions should respond to identified priorities regarding coastal access, amenity and reflect the values of local iwi.

Stretch 23: Karaka Point / Torkar Road Reserve

Stretch description

This stretch includes the cliffed section of road reserve managed by Auckland Transport on the landward side of Torkar Road.

Figure 5-21: Cliffed section of road reserve showing a rock revetment installed in response to a coastal landslide

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Exposed to erosion and inundation in the short term.	• Torkar Road and road reserve. • Mature pōhutukawa. • Coastal footpath and planting. • Steps. • Rock revetment.	• A rock revetment has been installed in response to a coastal landslide. • Coastal planting has been undertaken • Seats have been relocated landward on the grassed area adjacent to 163 Torkar Road.

Adaptation strategies

Stretch	Short term	Medium term	Long term
23: Torkar Road Reserve	LI	LI	LI

Guidance notes for Implementation

- *Limited intervention* is required to maintain the installed protection works (rock rip rap) and to facilitate ongoing planting to develop a safe buffer from the coastal edge. The localised relocation of assets within the reserve may continue to be undertaken.
- Cultural values: Midden have been recorded within this esplanade reserve. Aspirations, objectives and guiding practices and principles set out in Sections 1.4 and 3.2 above, work to guide early and ongoing engagement with local iwi in managing coastal hazard risks and coastal management (i.e. local iwi are supported to conduct their own monitoring of the effectiveness of environmental regulations in the protection of cultural resources, biodiversity wāhi tapu and other taonga within their rohe).

Stretch 24: Torkar Road West

Stretch description

This stretch includes the area of private land located between the end of the Karaka Point / Torkar Road Reserve and Stretch 25 which includes the Wilsons Beach area.

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal erosion and instability. • Inundation and erosion/general coastal processes - relevant for the wastewater pipeline located within the intertidal area.	• There appears limited/no remaining esplanade reserve seaward of private properties along this stretch[25]. • Underground wastewater pipeline through intertidal area (within the coastal marine area).	• Private landowners have constructed various forms of coastal armouring.

Adaptation strategies

Stretch	Short term	Medium term	Long term
24: Torkar Road west	NAI	NAI	NAI

Guidance notes for Implementation

- *No active intervention*: This strategy is reflective of the unmaintained and impassable nature of any remaining Council land and the location of Watercare assets within the coastal marine area.
- *Managed relocation* of services: Watercare has wastewater assets in this area that are exposed to erosion and inundation. Localised relocation may be possible, but continued maintenance of this asset within the coastal marine area will require the design to respond to the regulatory and policy context and physical environment/coastal processes.

[25] The location of the parcel boundaries appear below mean high water spring. Source: Auckland Council geomaps/aerial imagery.

Stretch 25: Wilsons Access West

Stretch description

This stretch includes the beach area from the western end of Wilsons Beach culminating to the east of the toilet facilities and road access.

Figure 5-22: Sections of the reserve, seawall and access steps at Wilsons Access

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal inundation currently impacting the stretch. • Overland flow path within the road/access.	• Wilsons Beach reserve. • Carparking area. • Seawall and access steps. • Toilet. • Wastewater pumping station.	• Timber seawall reconstructed in 2018 post-storm damage, provides erosion protection to sealed carpark over short term (20 year) design life.

Adaptation strategies

Stretch	Short term	Medium term	Long term
25: Wilsons Access	HTL	MR	MR

Guidance notes for Implementation

- *Hold the line:* This reflects the recent establishment of a timber seawall which provides erosion protection to the carpark area and associated assets. The design life of this structure is limited and will require replacement in the midterm. The structure is intended to provide protection for erosion only.
- Inundation over time will require *managed retreat* to coordinate the relocation or realignment of park amenities, parking, access and water infrastructure, and consideration of cultural heritage. Maintaining the protection structure in the short term enables realignment of this area to be planned.

Stretch 26: Wilsons Beach East (private land & Irwin's Access)

Stretch description

This stretch extends east of Wilsons Access, towards and including Irwin's Access Reserve.

Figure 5-23: Irwins Beach accessway. The sandy beach is backed by a narrow low-lying area of grass reserve established over the stable backshore along the base of the vegetated bank that slopes up to private properties.

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal erosion. • Coastal inundation, with the landward extent increasing over time.	• Wilsons Beach access reserve, grass picnic area, parks amenities. • Irwin's Beach access.	• Management currently limited to management of grass reserve.

Adaptation strategies

Stretch	Short term	Medium term	Long term
26: Wilsons Beach East (including Irwin's Access)	NAI	NAI	NAI

Guidance notes for Implementation

- *No active intervention:* This strategy will allow the beach to adjust in response to natural beach processes, retaining a dry, high-tide beach area with landward movement of the beach profile. This strategy does not preclude advocacy for planting along the landward backshore slope.
- Cultural values: Midden have been recorded within the esplanade reserve, with an archaeological assessment and ongoing early engagement with local iwi is required for any adaptation work planned.

Stretch 27: Halls Beach Access

Stretch description

The Halls Beach stretch includes the area adjacent to the beach reserve and parking area, culminating to the east of the park's facilities.

Figure 5-24: Halls Beach

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal inundation and erosion in the short term.	• Halls Beach Access Reserve. • Sealed carpark/access, toilet block, park amenities. • Wastewater pumping station, stormwater outfall.	• The reserve in front of the carpark and toilet is armoured with tipped rock spalls. • A concrete stormwater outfall pipe discharging to the coast is exposed on the beach.

Adaptation strategies

Stretch	Short term	Medium term	Long term
27: Halls Beach Access	MR	MR	MR

Guidance notes for Implementation

- *Managed retreat:* This is required to address ongoing erosion and coastal inundation flooding and enable the coordinated realignment/location of assets (waters, access and parks). Planned processes will be required to achieve identified community objectives of connectivity, access, and amenity and address ecological and cultural considerations.

Stretch 28: Torkar Road Central (private land - Halls Access to Knights Access)

Stretch description

This stretch extends east of Halls Beach Access and reserve and continues east to the eastern side of the Knights Beach Access.

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal inundation and erosion.	• Wastewater pipeline. • There is minimal esplanade reserve land remaining along this stretch between private properties and the beach, and no public access connection along the coastal edge.	• No active management currently undertaken by Council. • Note: privately owned/constructed coastal protection structures.

Adaptation strategies

Stretch	Short term	Medium term	Long term
28: Torkar Road Central (private land - Halls Access to Knights Access)	NAI	NAI	NAI

Guidance notes for Implementation

- *No active intervention:* There is minimal/no remaining esplanade reserve (above MHWS). A driven timber piled seawall, owned and constructed by private property owners is located from 57 to 71 Torkar Road.

Stretch 29: Knights Beach Access

Stretch description

This stretch is limited and includes the Knights Reserve and access to the coast.

Figure 5-25: Knights accessway showing timber steps down to beach

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Overland flow path. • Small flood plain.	• Knights Accessway Reserve. • Concrete path and timber steps to beach • Grass reserve (large pōhutukawa tree on coastal edge). • Wastewater pump station, storm water outfall.	• Tipped rock and concrete structures are present on the coastal edge.

Adaptation strategies

Stretch	Short term	Medium term	Long term
29: Knights Beach Access	LI	LI	MR

Guidance notes for Implementation

- *Limited intervention* for this stretch provides for the maintenance of access to the coast. Limited works to maintain access and the stormwater outfall will be required over the short and medium terms. Consideration of options which respond to the need to maintain access, manage water infrastructure, and respond to the local attributes of the reserve (pōhutukawa tree and hard protection installed by adjacent property owners) will be required.
- *Managed retreat* may be required in the long term, to determine how uses, values, and services (stormwater and wastewater) are managed within the reserve area and how both erosional and inundation hazards are responded to.

Stretch 30: Torkar Road East (private land between Knights & Hosking's Access)

Stretch description

This stretch extends east from Knights Access Reserve to Hoskings Access.

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal erosion- cliffed section of shoreline.	• Limited remaining esplanade reserve. • Limited stormwater outfalls.	• No active management currently in place. • Note: Private landowners have constructed cliff retaining, coastal armouring and access structures within this stretch.

Adaptation strategies

Stretch	Short term	Medium term	Long term
30: Torkar Road East (between Knights & Hoskings)	NAI	NAI	NAI

Guidance notes for implementation

- *No **active intervention*** is chosen for this stretch as remaining esplanade reserve land is unmaintained by Council, and continuous access along the esplanade reserve is not possible. This strategy does not preclude maintenance of stormwater outfalls within this stretch.

Stretch 31: Hoskings Access

Stretch description

This coastal stretch includes the reserve at Hoskings Access.

Figure 5-26: Existing timber stairway proving public access to the beach at Hoskings access

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal erosion and inundation. • Minor overland low path.	• Hoskings Reserve, Clarks Beach Road Reserve. • Timber steps, rock armour. • Wastewater pumping station, stormwater outfall.	• Low clay embankment with tipped rock armour that incorporates a stormwater outfall discharge pipe. • Timber steps constructed over tipped rock provide connection to the foreshore.

Adaptation strategies

Stretch	Short term	Medium term	Long term
31: Hoskings Access	LI	LI	LI

Guidance notes for implementation

- *Limited Intervention:* Coastal erosion management and access are currently in place and include an existing stormwater outfall. Consideration of options for managing erosional risk to the grass reserve over time will be required to maintain access.
- *Limited intervention* reflects the consideration of realignment of protection over time in response to hazard risk and the management of values associated with this location.
- Cultural values: Midden (CHI site 14551) have been recorded within this coastal stretch.
- Note: Private properties to the east are armoured with consented seawalls, and large concrete pipes (former Franklin County) are stacked along toe of cliff beneath pōhutukawa to the west.

Stretch 32: Crispe Road West

Stretch description

This coastal stretch includes the area between Hoskings Access and Bradleys Access, adjacent to numbers 2 – 18 Crispe Road.

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Erosion.	• Esplanade reserve no longer remains. • No identified infrastructure, land, and assets in proximity to the coast. • Crispe Road and water assets located landward of private landholdings.	• No active management currently in place.

Adaptation strategies

Stretch	Short term	Medium term	Long term
32: Crispe Road West	NAI	NAI	NAI

Guidance notes for Implementation

- *No active intervention* for this stretch reflects there being no assets or land located within this stretch in proximity to the coastal edge and no active management undertaken.
- Cultural values: Midden have been recorded within the esplanade reserve in this coastal stretch. Management of risk to sites and values may require further engagement with iwi and private landowners.

Stretch 33: Bradleys Access

Stretch description

This coastal stretch includes Bradleys Reserve and beach access.

Figure 5-27: Bradleys Access showing timber seawall and access point to the beach

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Erosion and inundation.	• Bradleys Reserve (mature vegetation and grass). • Timber seawall. • Sloped concrete pathway and steps. • Stormwater outfall pipe.	• Timber seawall in alignment with adjoining structures for the purpose of erosion protection.

Adaptation strategies

Stretch	Short term	Medium term	Long term
33: Bradleys Access	LI	LI	LI

Guidance notes for Implementation

- *Limited intervention* provides for the continued maintenance of the access to the beach and reflects the current management approach for erosion on the coastal edge. Landward realignment of assets and protection structures within the reserve may be required. This is anticipated under this strategy.

Stretch 34: Clarks Beach east

Stretch description

This coastal stretch includes the area east of Bradleys Access, including the Clarks Beach growth area, culminating at the eastern end of the new precinct area to the west of Camp Morley.

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Coastal erosion and inundation.	• Small sections of Clarks Beach/ Bradleys Beach Access Reserve. • Stormwater management area and outfall. • Reserve access pathways and planting.	• A stormwater reserve and associated infrastructure are situated within the eastern extent of this coastal stretch.

Adaptation strategies

Stretch	Short term	Medium term	Long term
34: Clarks Beach east	LI	LI	LI

Guidance notes for Implementation

- *Limited intervention* is reflective of the limited remaining esplanade reserve land adjacent to the private sites on Crispe Road (western section of the stretch). The eastern reserve has recently been developed and includes a stormwater management area (with outfall structures and planting). Ongoing management of these structures is likely to be required. No further coastal erosional protection structures are anticipated within this stretch.

Unit 6: Seagrove

Unit 6: Seagrove

This unit includes the area east of Clarks Beach settlement, up to and including the eastern extent of the McKenzie Road Esplanade Reserve at Kingseat.

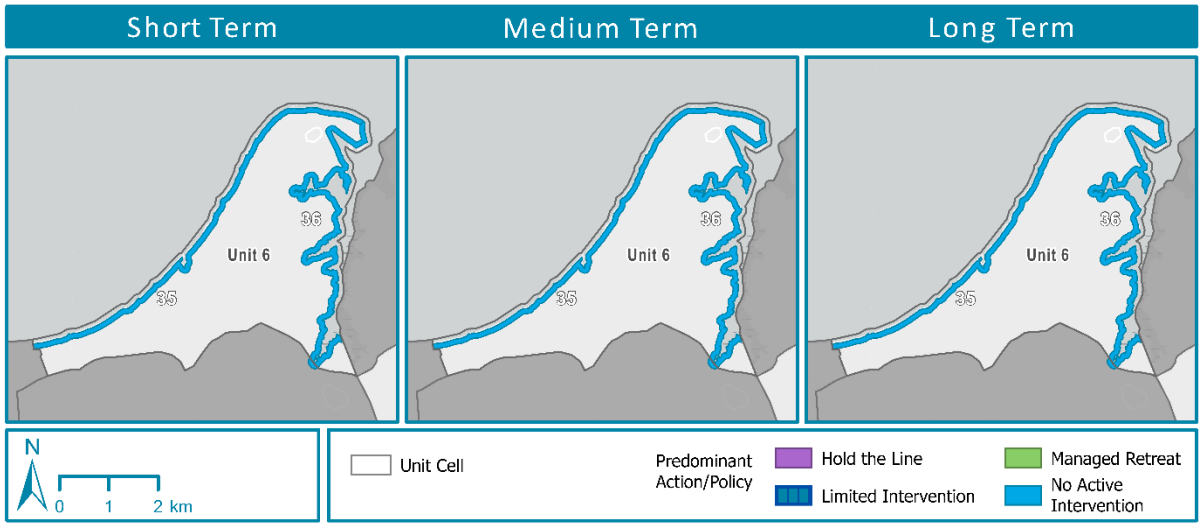


Figure 5-28: Adaptation strategies for coastal stretches within the Seagrove unit area

Adaptation summary stretches 35 and 36

Stretch	Short term	Medium term	Long term
35. Seagrove	NAI	NAI	NAI
36. Whātāpaka Creek	NAI	NAI	NAI

Council-owned infrastructure, land, and assets

Table 5-7: Unit 6 Council-owned land & assets metrics and associated risk scores (short, medium, long terms)

Social - parks and reserves			Economic - network infrastructure			Environmental - ecological			Cultural – culture and heritage		
Park & reserve land: structures, carparks, accessways, buildings (0.2 ha)			AT roads (13.5 km) Water pipes (4.6 km) Water assets (126)			Ecological area (19.8 ha) Biodiversity overlays EF, EG, ES, SA1, SA1.2, SA1.3, SA1:5, TL, WL10			Cultural heritage assets (58)		
Short	Medium	Long	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long
Coastal erosion susceptibility											
Coastal inundation											
Rainfall induced flooding											

None | Low | Moderate | High | Very high

Environmental context: Coastal setting, hazard scape and ecological setting

This unit consists of an area of intertidal banks and shell banks forming a complex habitat for a variety of animal and plant communities (SA1:5) and rural, low-lying land, with early farming practices modifying the landscape by draining saltmarsh and modifications including stopbanks and floodgates to enable local pasture growth. The low-lying cliff shoreline along this unit is sparsely vegetated, with grazing extending to the coastal edge and dense mangrove vegetation fringing the narrow tidal channel of Whātāpaka Creek, with several areas of unmaintained esplanade reserve along the coastal margin. The extensive, gently graded, predominantly fine sand flats in this unit support the greatest diversity and abundance of intertidal sand flat organisms and shorebirds in the Manukau Harbour (as detailed in Section 2.6). A handful of SEAs sit within this coastal unit, made of up shell-barrier beaches (Chenier plains). The shell-bank roosts which have developed at Karaka, Seagrove and Whātāpaka Creek are now numerically the most important roosting site on the Manukau Harbour. The roosts and closely adjacent intertidal banks are considered to be 'Areas of Significant Conservation Value' by the Department of Conservation. Given the mosaic of ecosystems listed above, including the vulnerable and globally rare shell barrier beaches (Chenier plains), this section of coast is listed as a biodiversity focus area.

Cultural context

Coastal middens have been recorded in the esplanade reserves situated this coastal unit. Whilst the extent of Council-owned land and assets in this coastal unit is limited (reflected in the choice of adaptation strategies), ensuring locals have the ability to exercise their right as kaitaiki along this section of the coast is essential. While specific cultural values and outcomes for each coastal stretch will be shared and developed through ongoing involvement of iwi in respective work programmes, guiding objectives and outcomes set out in Section 3.2 above are advocated for at all times.

Social and policy context

This unit contains a former WWII site occupied by USA troops and the Royal New Zealand Airforce used it as an airfield on part of the area DoC land. In addition, several midden and pā have been recorded within the coastal stretch and historic landing and wharf. Other archaeological sites, early historic settlements and botanical sites have been recorded within this unit.

During community consultation, the local community indicated an interest in enhancing and supporting the natural environment and significant ecological areas (protecting nesting shorebird colonies), with specific reference to the intertidal banks and shell banks around Seagrove. A request for better maintenance of walkways and coastal stairways along with improvements to cycleways and pedestrian connections along the coast was also advocated for via community consultation.

This feedback was captured in the community objectives, in particular the following:

- Adaptation strategies preserve and enhance the natural environment and ecosystems that support biodiversity, whilst protecting vulnerable flora/ fauna from adverse activities that damage these delicate systems
- Access to, and parking near popular coastal recreation areas is improved, resilient and considers a range of transport modes (improve/ support connectivity between coastal spaces).

Stretch 35: Seagrove

Stretch description

This coastal stretch contains the area from the end of Clarks Beach settlement (east of Crisp Road) to north of Wright Road Esplanade Reserve.

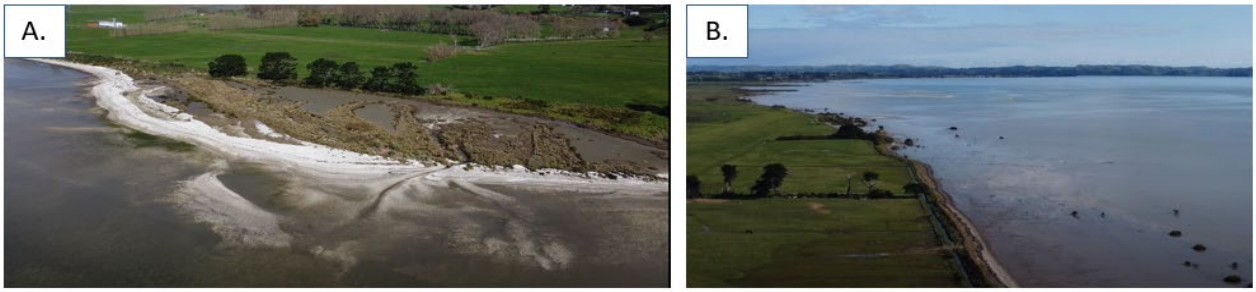


Figure 5-29: A handful of SEAs sit within this coastal unit, made of up shell- barrier beaches (Chenier plains) as evident in A and B. The shell-bank roosts which have developed along this stretch of coast are now numerically the most important roost on the Manukau Harbour.

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Large overland flow paths present within this stretch, highly exposed to coastal inundation in the short term.	• No identified Council assets or land.	• Auckland Council biodiversity team has a consent to remove mangroves for shell barrier ecosystem restoration at Seagrove and Elletts Beach.

Adaptation strategies

Stretch	Short term	Medium term	Long term
35: Seagrove	NAI	NAI	NAI

Guidance notes for Implementation

- This stretch is predominately private land and there are no Council-owned land parcels or assets. This area is of high cultural significance to local iwi, with private ownership identified as limiting iwi ability protect heritage sites and exercise the appropriate tikanga.
- The selected strategy of *no active intervention* applies only to Council-owned land and assets and does not pertain to coastal management of private land. In turn, engagement with local iwi when managing the land within this stretch is advocated for and supported by Council to ensure the ongoing protection of wāhi tapu/kōiwi sites. Advocacy for the preservation of ecological values present within this stretch is also identified.

Stretch 36: Whātāpaka Creek Inlet West

Stretch description

This coastal stretch contains the Whātāpaka Creek shoreline and extends to Puhitahi Creek in the upper reaches of the narrow tidal inlet.

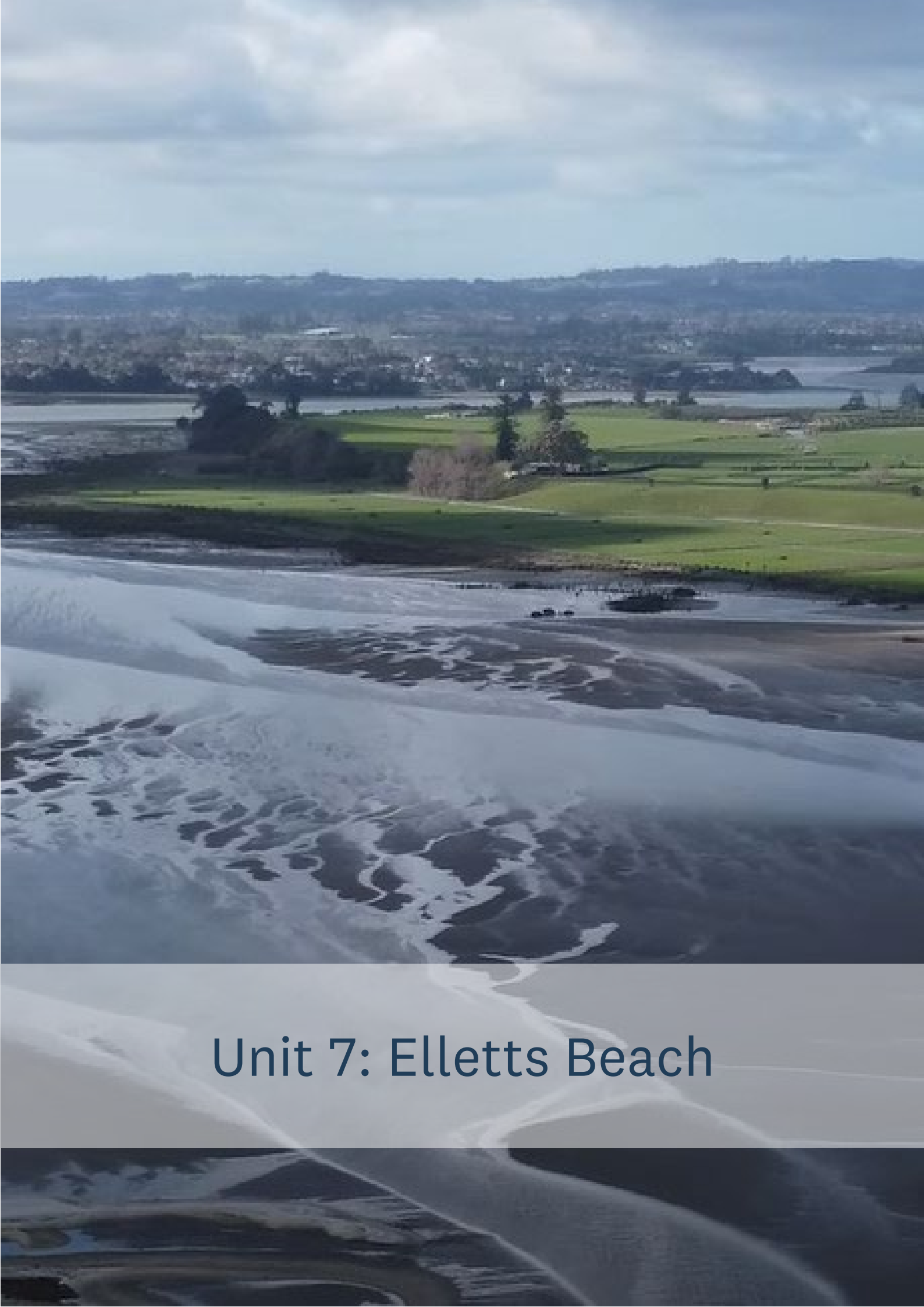
Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Large overland flow paths running through road reserves.	• Unmaintained reserves, Wright Road Esplanade Reserve. • McKenzie Road Esplanade Reserve.	• No active management currently in place.

Adaptation strategies

Stretch	Short term	Medium term	Long term
36: Whātāpaka Creek	NAI	NAI	NAI

Guidance notes for implementation

- Cultural values and advocacy: While the selected strategy here is *no active intervention*, numerous coastal middens have been recorded in this stretch. Coastal monitoring by mana whenua should be supported. Aspirations, objectives and guiding practices and principles set out in Sections 1.4 and 3.2 above, work to guide ongoing engagement with local iwi in managing coastal hazard risks and coastal management (i.e. local iwi conduct their own monitoring of the effectiveness of environmental regulations in the protection of cultural resources, biodiversity wāhi tapu and other taonga within their rohe).



Unit 7: Elletts Beach

Unit 7: Elletts Beach

This unit includes only one stretch and contains the eastern shoreline of Whātāpaka Creek inlet from Puhutahi Creek, including Kingseat and the Elletts Beach shoreline to Karaka Point at the entrance to Pahurehure Inlet.

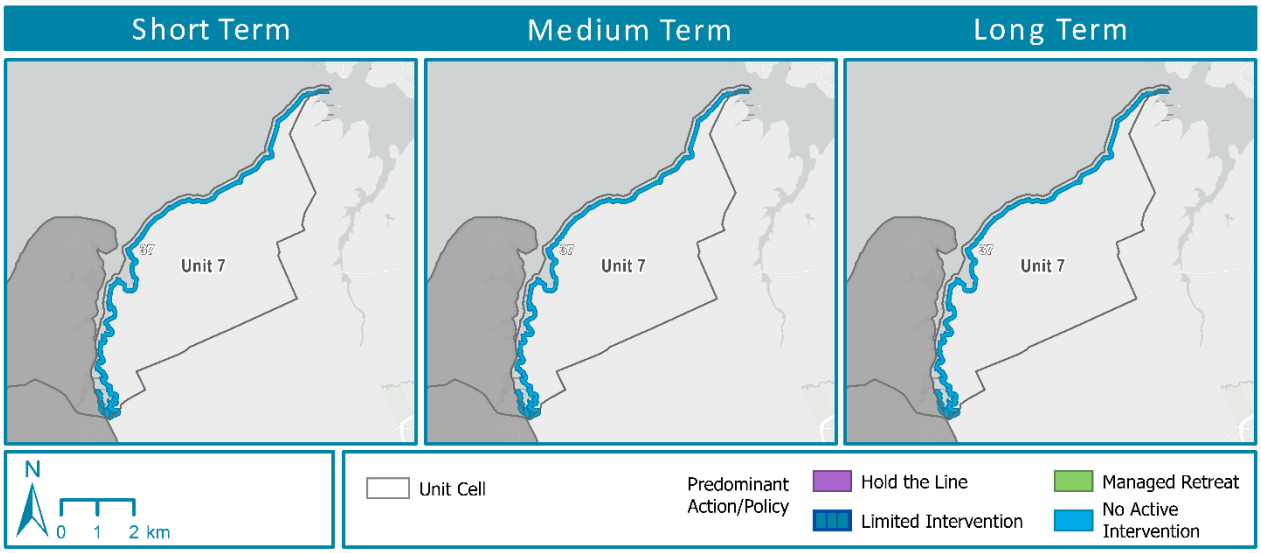


Figure 5-30: Adaptation strategies for coastal stretches within the Elletts Beach unit area

Adaptation summary stretch 37

Stretch	Short term	Medium term	Long term
37: Elletts Beach	NAI	NAI	NAI

Council-owned infrastructure, land, and assets

Council-owned land and assets are limited within Unit 7. Within the southern extent this includes the currently undeveloped McRobbie Road Esplanade Reserve and the Capriole Reserve adjacent to the planned expansion of the Kingseat area.

In the more northern areas, there are some additional areas of unconnected esplanade reserve, identified as the Clark Road Esplanade Reserve. Elletts Road and Urquhart Road are identified as terminating at the coast, however these sections of road are currently unformed.

Table 5-8: Unit 7 Council-owned land & assets metrics and associated risk scores (short, medium, long terms)

Social - parks and reserves			Economic - network infrastructure			Environmental - ecological			Cultural – culture and heritage		
Park & reserve land: structures, carparks, accessways, buildings (0.1 ha)			AT roads (14.4 km) Water pipes (1.5 km) Water assets (45)			Ecological area (21.9 ha) Biodiversity overlays (EF, EG, ES, SA1, SA1.2, SA1.3, SA1. 5, TL, WL10, SEA			Cultural heritage assets (73)		
Short	Medium	Long	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long
Coastal erosion susceptibility											
Coastal inundation											
Rainfall induced flooding											

None | Low | Moderate | High | Very high

Environmental context: Coastal setting, hazard scape and ecological setting

Biodiversity overlays within this unit include exotic forest, exotic grass, mangrove forest and scrub (coastal saline ecosystems (SA1 and SA1: 2 and SA1: 3) and oioi, restiad rushland/reedland(wetland ecosystems (WL10) and shell barrier beaches (SA1:5). These ecosystems provide habitat for a range of flora and fauna, including banded rail, spotless crake, marsh crake, pūkeko and harrier, tui, shags, herons, waterfowl and other resident shorebirds. The major threats to these ecosystems include invasive species land eutrophication and increased sedimentation rates as a result of changing land use in surrounding catchments. This unit includes numerous 'Significant Ecological Areas' both terrestrial and marine which equates to over 21 ha of 'Significant Ecological Area' within the unit bounds. Given the mosaic of ecosystems listed above, including the vulnerable and globally rare shell barrier beaches (Chenier plains), this section of coast is listed as a biodiversity focus area.

Cultural context

Karaka Point has been identified as a site of interest due to its history as a Māori village (occupied post-European contact). This includes an urupa site, located within private ownership but adjacent to the esplanade reserve.

This unit also includes Whātāpaka marae, located at the entrance to Whātāpaka Creek, accessed via a private road at the end of Whātāpaka Road, Te Hihi. Whātāpaka Marae is located on privately-owned land and has occupied this area for close to 1,000 years. The principal iwi associated with Whātāpaka is Ngāti Koheriki, Ngai Tai and Ngāti Tamaoho. The marae complex hosts the wharenui Tamaoho, the wharekai Te Kupenga and the wharemoe Te Ohaki o nga Tupuna.

Whilst the extent of Council-owned land and assets in this coastal unit is limited (reflected in the choice of adaptation strategies), ensuring locals have the ability to exercise their right as kaitaiki along this section of the coast is essential. While specific cultural values and outcomes for each coastal stretch will be shared and developed through ongoing involvement of iwi in respective work programmes, guiding objectives and outcomes set out in Section 3.2 above are advocated for at all times.

Social and policy context

The unit currently comprises a mix of future development land in the southern portions adjacent to the existing Kingseat area, and privately-owned land in rural use, which comprises much of the northern area of this unit. Areas of esplanade reserve are zoned as open space, while landward areas of Kingseat are residential-single house zone and northern rural areas are identified as rural coastal zone.

There are several historic features are evident within this unit, including:

- Wharf CHI 18815 - wharf dismantled, posts remain but will degrade further over time
- McKenzie Road Esplanade Reserve former landing - heritage potential.

Additionally, the Kingseat Hospital historic campus is located within the southern areas of this unit. No specific community uses were identified through consultation for this area. Key themes advocated for during community feedback included improvements to cycleways and pedestrian connections between and to coastal spaces. This is reflected in the community objective below:

- Access to, and parking near popular coastal recreation areas is improved, resilient and considers a range of transport modes (improve/ support connectivity between coastal spaces).

This feedback and community interest in improving cycleways and pedestrian connections between and to coastal spaces within this coastal unit has been shared with Auckland Transport.

Stretch 37: Elletts Beach

Stretch description

This coastal stretch contains the eastern shoreline of Whātāpaka Inlet (east of Puhitahi Creek) to the end of Elletts Beach (Karaka Point) and includes Kingseat.

Figure 5-31: Section of coastline within this coastal stretch

Hazards and climate change	Council-owned infrastructure, land, and assets	Current management approach / risks
• Highly exposed to coastal inundation and erosion in the short term.	• Clarks Road Esplanade Reserve. • McRobbie Road Esplanade Reserve. • Capriole Reserve, Kingseat.	• N/A

Adaptation strategies

Stretch	Short term	Medium term	Long term
37: Elletts Beach	NAI	NAI	NAI

Guidance notes for Implementation

- Cultural values: Whātāpaka Marae and numerous identified and unidentified cultural significant sites are located within this coastal stretch. The exposure of these sites and associated values presents a significant risk to cultural values. Future consideration will be required to manage risks to these cultural significant sites and landscape. This is beyond the scope of this report.

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Attachments

Attachment A: Sensitivity Analysis

Attachment B: Summary of Adaptation Strategies

Attachment A: Sensitivity analysis

Table A-1 below summarises the key changes of concern to each ecosystem type and illustrates the sensitivity of these ecosystems to climate change and coastal hazards. The table supports the consideration of ecological values where these are located within Council-owned land and may be influenced by shoreline management options. In the absence of a comprehensive understanding around how multiple stressors cumulatively affect ecosystems, precautionary and adaptive approaches should be considered[26] [11].

Table A-1: Key changes of concern to each ecosystem type

Ecosystem type	Key impacts of concern	Associated impacts & discussion
Marine ecosystems-present within Manukau Harbour	• This ecosystem is susceptible to increasing temperatures, sedimentation, eutrophication, decreasing ocean pH and, alterations to current and wind patterns, and sea-level rise.	• Intertidal habitats, kelp forests, and subtidal rocky reefs are among those the most sensitive to changing conditions within marine ecosystems. • Coastal management strategies which work to safeguard intertidal habitats should be supported where appropriate.
Freshwater ecosystems	• Changes in temperature, eutrophication, drought, invasive species, storm events and decreasing river flows contribute to the gradual decline of these ecosystems.	• Freshwater fish and macroinvertebrates are amongst those particularly sensitive to changing conditions (shifts in water temperatures in Manukau Harbour, especially species that are already living close to their maximum thermal threshold).
Coastal cliffs ecosystem	• Exposed to the elements and salt spray, coastal cliffs experience weathering from storms and erosion, which damage vegetation and cover plants in salt spray. • They are especially vulnerable to increased sea-level rise and erosion exacerbated by climate change.	• Ongoing impacts of the weather and the sea can over time lead to vegetation disturbance and erosion for the Āwhitu coastal cliff ecosystems. • This allows a wide range of invasive plant species to take hold. Adaptive weed and pest management is critical to maintain cliff ecosystems, especially where vulnerable plant populations are limited in distribution and extent (a likely scenario for Manukau South's coastal cliff ecosystems with population growth and coastal squeeze).

[26] Foley and Carbines, 2019

Ecosystem type	Key impacts of concern	Associated impacts & discussion
Forest ecosystems	• Fragmentation, edge effects, habitat destruction driving land use change and invasive species threaten the long-term viability of forest ecosystems. These effects could be exacerbated by anthropogenic climate change (e.g. warmer climate, invasion of weed species, increased pest presence. increased erosion and inundation etc.).	• Manukau South contains both forest ecosystems and regenerating ecosystems which thrive in warm, humid conditions. In some situations, the vegetation provides a physical buffer from erosion and habitat diversity for bush birds. Though land use changes coupled with climate change impacts are driving habitat fragmentation to take place. Coastal management strategies should ensure they are supporting rather than hindering the expansion of ecological corridors across Manukau South.
Regenerating ecosystems	• Key known threats to these ecosystems include invasive species, habitat fragmentation and land clearance for farming, urban development etc. Niche species are especially vulnerable to any change in their environment.	• Pōhutukawa scrub/forest and mānuka, kānuka scrub regenerating ecosystems are found within the Manukau South SAP area extent. Ongoing active advocacy of the values of these often undervalued ecosystems is vital for their protection, along with the protection of neighbouring ecosystems.
Wetland ecosystems (Oioi, restiad rushland/ reedland))	• Wetlands are characterised by factors of the water itself and its interaction with surrounding geology, soil, climate, ground-water levels, water fertility and chemistry, and plants and animals present. While this makes them unique, it also makes them sensitive to environmental pressures and land use changes.	• Machaerina sedgeland and Oioi, restiad rushland/ reedland wetlands are both identified within the Manukau South SAP area extent. Each are susceptible to invasive species, warmer climates and changing weather patterns capable of transforming areas into communities dominated by introduced species and altering the ability to manage water quality and flooding events. Ensuring coastal management practices support, rather than adversely impact these sensitive, sparse wetland types is essential, with wetlands such as these working as a natural buffer for the impact of sea-level rise and provide amelioration during droughts.

Ecosystem type	Key impacts of concern	Associated impacts & discussion
Coastal saline ecosystems	• The major threats to this ecosystem are primarily abiotic and include eutrophication and increased sedimentation rates as a result of changing land use in surrounding catchments, however sea-level rise (SLR) is most likely to have the greatest impact on coastal habitats that sit at the land-sea margin, having little room to migrate up the shore due to coastal development or steep coastlines (coastal squeeze).[27]	• Ensuring that coastal management strategies support the coastal saline ecosystems (such as those found along the Waiuku Inlet and Taihiki river is essential for maintaining nursery ground and ecological corridors. Shell barrier beach ('Chenier plains') situated along the Seagrove coastline and Clarks Beach are another important consideration, being globally rare and providing important roosts for a variety of coastal shorebird, both migratory and non- migratory. • Increased sedimentation, whether it is from land use or sea-level rise driven erosion, can reduce the diversity of the ecosystem variants by expanding mangrove forests to the detriment of other forms of vegetation. This may lead to a loss in biodiversity, despite an overall increase in the extent of the ecosystem type.

[27] Bishop, C. D. and T. J. Landers (2019). Climate change risk assessment for terrestrial species and ecosystems in the Auckland region. Auckland Council technical report, TR2019/014

Attachment B: Summary of Adaptation Strategies

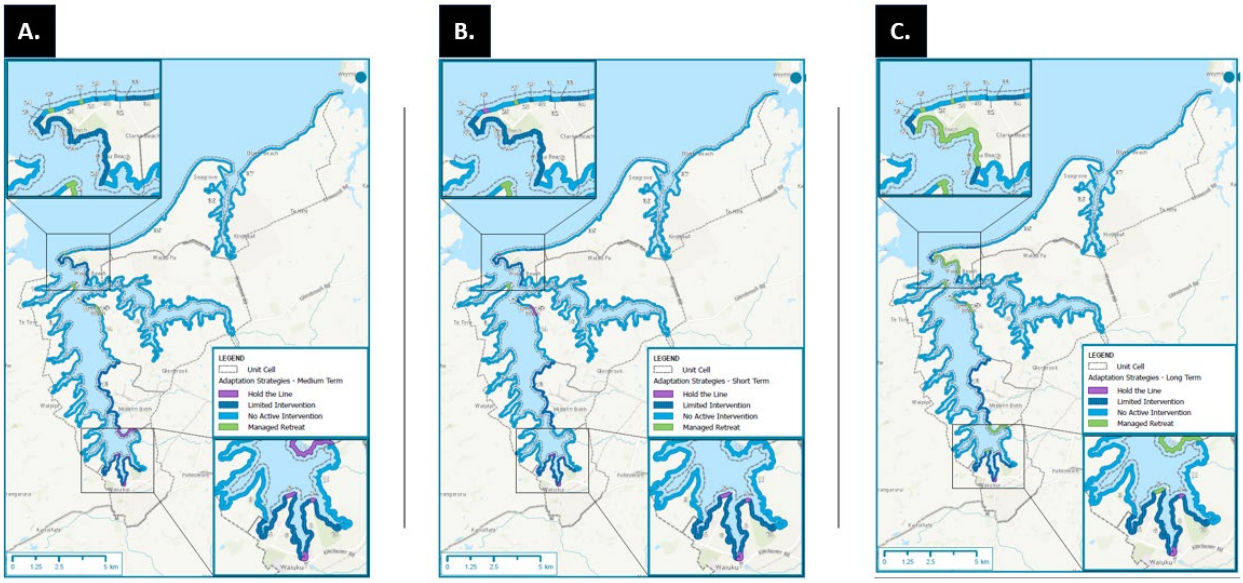

Figure 6-1: Adaptation strategies across all 37 coastal stretches. Map A shows the short-term adaptation strategies, Map B shows the medium-term adaptation strategies and Map C shows the long-term adaptation strategies for Manukau South.

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