# Mini Shoreline Adaptation Plan: Wai Manawa

## Little Shoal Bay

2022

NGAATI WHANAUNGA

Ngāti Pāoa Trust Board

NGĀTI WHĀTUA ŌRĀKEI

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Front cover

Picture of Wai Manawa/Little Shoal Bay 2014 (Source: Auckland Council)

# Shoreline Adaptation Plan: Wai Manawa/ Little Shoal Bay

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Auckland Council

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## Purpose

The Wai Manawa/Little Shoal Bay project has been completed as part of Auckland Council's Shoreline Adaptation Plan (SAP) work programme as a site specific, or mini, SAP.

SAPs are non-statutory documents that are being developed over the next few years to provide a long-term, sustainable management approach to Auckland Council-owned land and assets in response to coastal hazards and climate change impacts. These plans generally cover large extents of the coast and are key to implementation of the Coastal Management Framework for the Auckland Region (2017) and Te Tāuke-a-Tāwhiri: Auckland's Climate Plan (2020).

The 'mini' SAP concentrates on a localised scale of the plan focussed on a specific reserve and its surrounding environs. There is a greater level of detail in the background information and recommended actions, but the mini-SAP still follows the best practice principles of the wider SAP programme, including the guiding principles from mana whenua and the framework for mana whenua and community engagement. The high-level strategies recommended by the Wai Manawa/Little Shoal Bay 'mini' SAP will be embedded into the wider Shoreline Adaptation Plan for the Waitematā Harbour when it is developed within the wider work programme.

The guiding principles from mana whenua to be considered and to inform strategies and actions for all SAPs are:

- Responsive to iwi management plan
- 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.

## Physical setting

Wai Manawa/Little Shoal Bay is located on the southern coast of the North Shore facing south into the Waitemata Harbour (Section 4.0). Significant reclamation and modification of the natural bay occurred from 1840 to 1980, changing the original marine environment. It now includes around 3.5 ha of well used recreational reserve and 6.5 ha of high value wetland areas of Le Roys Bush and Lutner Reserve from a wider 136.5 ha catchment of predominantly residential land. The wetland part of the reserve is one of the few remaining freshwater wetlands on the North Shore.

The recreational reserve is divided by a park road between Maritime Terrace and Council Terrace. The seaward side of the road is used for passive recreation and water-edge activity, including swimming, boating and boat maintenance and storage in the boat yard. The grassed area to the north of the park road, known as Dudding Park, is used for informal active recreation.

### Regulatory controls

The National Policy Statement for Freshwater Management 2020 (NPS FM) and Auckland Unitary Plan Rules are the two main regulatory controls for activities in this area (Section 6.0). The requirement of the NPS FM is:

> "*the loss of extent of natural wetlands is avoided, their values are protected, and their restoration is promoted*".

Both the freshwater wetland and the intertidal coastal edge could be considered natural wetlands. However, the NPS FM does not require Auckland Council to protect the wetland against climate change and sea level rise. Consents are required for a wide range of activities including vegetation clearance, earthworks and land disturbance and use, diversion, damming or discharge of water.

### Hazard exposure

Development of the SAP considers the impact of coastal hazards over time (Section 7.0). These were coastal inundation, rainfall flooding and erosion susceptibility, all accounting for the effects of climate change. The exposure of Auckland Council-owned land and assets to these hazards was assessed over three timescales: short term: 2025 to 2045 (around 20 years), medium term: 2045 to 2085 (20-60 years) and long term: 2085 to 2125+ (60 – 100+ years). The reserve area was divided into nine units and exposure to coastal hazards was assessed for each unit.

Results of the exposure assessment concluded that most of the area is exposed to coastal inundation. Most of the cricket pitch and the boat yard areas are already highly susceptible to coastal inundation (Table 6). Le Roys Bush has high exposure, while the Road Reserve is moderately exposed. The beach front reserve, tennis/basketball and parking areas as well as the Maritime Terrace abutments have low exposure in the short term. In the medium term, the beach front reserve and road reserve increase to being highly exposed. In the long term, all the units are high to very highly exposed to coastal inundation, except for the Maritime Terrace abutment.

Areas that experience coastal inundation were also generally the areas affected by rainfall flooding, although rainfall flooding had less impact on vegetation. The overall area was less affected by coastal erosion, apart from the beach front and road reserves, boat yard area and the seaward Maritime Terrace abutment.

### Engagement

Community engagement for the development of this mini SAP involved a range of public events including an online survey through the *AK Have Your Say* page to understand key community values, a webinar to explain the process, hazards and exposure and two community workshop sessions, undertaken several times to enable maximum attendance (Section 8.0). The first workshop was facilitated to understand local knowledge and agree key community values, objectives and outcomes. The second workshop was facilitated to confirm community preferences for the proposed strategies.

More than 60% of the 395 people who completed the online survey commented on the importance of active and passive recreation and 48% on the importance of the environment. The boat yard was an area of considerable interest in the digital engagement with 182 participants commenting on it (around 46% of the respondents). For active recreation, the highest rated comments were associated with the sports field (45% of respondents) followed by walking, and the playground (23% and 21%

respectively). Strong support for the wetland, biodiversity, the stream and water quality were raised in the environment category. The remaining categories generally received fewer responses.

A number of hui with four iwi representatives were also held throughout the project period, including two combined hui with the Kaipātiki Local Board. Feedback from the hui held during the SAP process identified that it was important that the iwi group lead the guidance of restoration and storytelling of cultural and natural heritage supported by community groups and others.

### Objectives and outcomes

Primary and secondary objectives as well as key outcomes were developed for each unit (Section 9.0). The primary objective for Le Roys Bush and environs was protecting the environment. Maintaining access was the primary objective for the Road Reserve, while for the remainder of the area, the primary objectives were active and passive recreation. However, secondary objectives for each unit indicates the importance of the environment, community heritage and cultural values.

Key outcomes were focussed on enhancing the natural wetland functioning in the Le Roys Bush and Lutner Reserve and improving and enhancing the environment in the coastal area. For the remainder of the reserve space, outcomes were focussed on enhancing and improving recreational experiences, improving access and connections to walkways and boardwalks and improving and enhancing the environment.

### Strategy outcomes

Based on a combination of consideration of community feedback, understanding the bounds imposed by regional and national policy settings (particularly associated with wetlands), and a consideration of the mana whenua guiding principles, the preferred adaptation strategies were developed (Section 10.0). For Le Roys Bush and environs and the coastal marine area within Shoal Bay, the preferred strategy is 'limited intervention' across all time frames. While the preferred strategy for the land-based reserve areas is 'hold the line' for all time periods. The 'hold the line' strategy relates to preserving the function and use of the reserve area or asset. So it can mean holding the coastal edge in its current position or raising land levels to allow the same functionality as currently exists in flood-prone areas of the recreational land area. In all cases, any actions or plans developed under these strategies would also need to go through an approval and consenting process to be implemented.

### Current actions

It was recognised that implementation of the SAP strategies could take a number of years as the SAP process is being applied around the entire Auckland region. A range of actions that can be progressed to assist in strategy development and to meet current issues within current budgets have been identified (refer Section 10.5)

# 1.0 Te Ao Māori

Te tiro ā Māori ki tōna ake ao, a Māori worldview, 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 inter-relationship and interconnectedness are in part captured within the fundamental concept of *'mai i te rangi ki te whenua, mai i te whenua ki te rangi' ('from the sky to the earth, from the earth to the sky')*, and which underpins the holistic world view for many iwi / hapū of Tāmaki Makaurau, and how the traditional concept of kaitiakitanga is approached.

The wellbeing of tāngata whenua (indigenous people) and the ecosystems that support them is interlinked with the concept of *'mai i te rangi ki te whenua, mai i te whenua ki te rangi'* as it provides for the spiritual / intrinsic connection to te taiao.

Understanding inter-relationships and interconnectedness is a fundamental part of addressing climate change and sea-level rise, their impacts and the response.

As an adaptation workstream within Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan, Shoreline Adaptation Plans (SAPs) respect te ao Māori by giving effect to the Kia Ora Tāmaki Makaurau and Te Ora ō Tāmaki Makaurau frameworks and recognising and providing for te ao Māori concepts.

## 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 Kia Ora Tāmaki Makaurau and supports Te Tātai. 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. Within Te Ora, there are three dimensions of wellbeing that form a holistic approach: Taiao (environment), Whenua (land, earth), Tangata (people).

When considered together, these dimensions 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
- Whangauangatanga
- Rangatiratanga

- Mātauranga
- Oritetanga
- Tōnuitanga

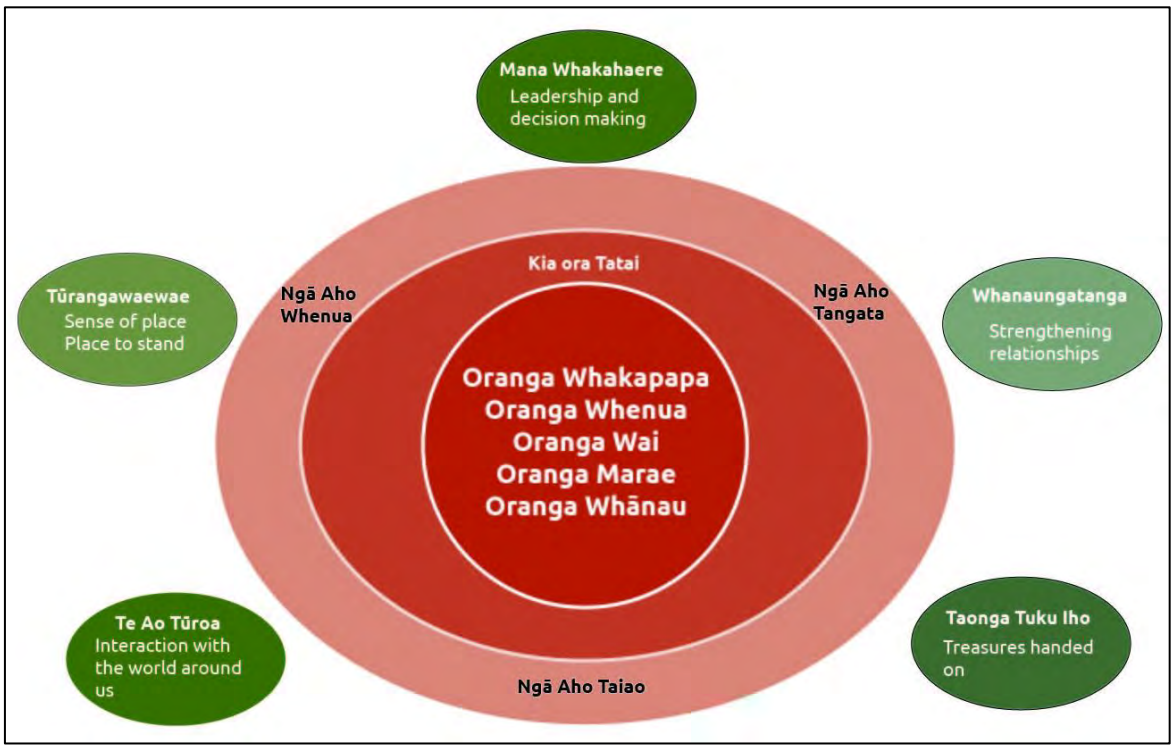



*Figure 1: Graphic of Te Ora ō Tāmaki Makaura*

## 1.2 Treaty relationships and governance

The hapū and iwi of Tāmaki Makaurau, hold important values as kaitiaki (guardians or 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 o Waitangi outcomes. Treaty principles provide guidance for decision-making, partnership, and collaboration between mana whenua and government. This can include co-governance and co-management approaches, including for natural resources where holistic, integrated and sustainable outcomes are sought.

To date, the Crown has provided Treaty settlement redress to several mana whenua groups that relate to Wai Manawa and its adjacent coastal marine area. The Hauraki Gulf Forum, a statutory body under the Hauraki Gulf Marine Park Act 2000, promotes and facilitates integrated management and the protection and enhancement of the Hauraki Gulf, and has adopted a co-governance leadership model.

## 1.3 Operational 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 the Te Ora framework and help guide the SAP's work programme and its implementation.

# 2.0 Purpose

The Wai Manawa/Little Shoal Bay project has been completed as part of Auckland Council's SAP work programme as a site specific, or mini, SAP. As an adaptation workstream within Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan, SAPs respect te ao Māori by giving effect to the Kia Ora Tāmaki Makaurau and Te Ora ō Tāmaki Makaurau frameworks.

SAPs are non-statutory documents that are being developed over the next few years to provide a long-term, sustainable management approach to Auckland Council-owned land and assets in response to coastal hazards and climate change impacts. These plans generally cover large extents of the coast and are key to implementation of both the Coastal Management Framework for the Auckland region (2017) and Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan (2020).

The 'mini' SAP framing highlights a more localised scale of the plan that is focussed on the reserve and its environs. There is a greater level of detail in both the background information and recommended actions, but the mini-SAP still follows the best practice principles of the wider SAP programme, including the guiding principles from mana whenua and the framework for mana whenua and community engagement.

The high-level strategies recommended by the Wai Manawa/Little Shoal Bay 'mini' SAP will be embedded into the wider Shoreline Adaptation Plan for the Waitemata Harbour when it is developed (Figure 2: ).

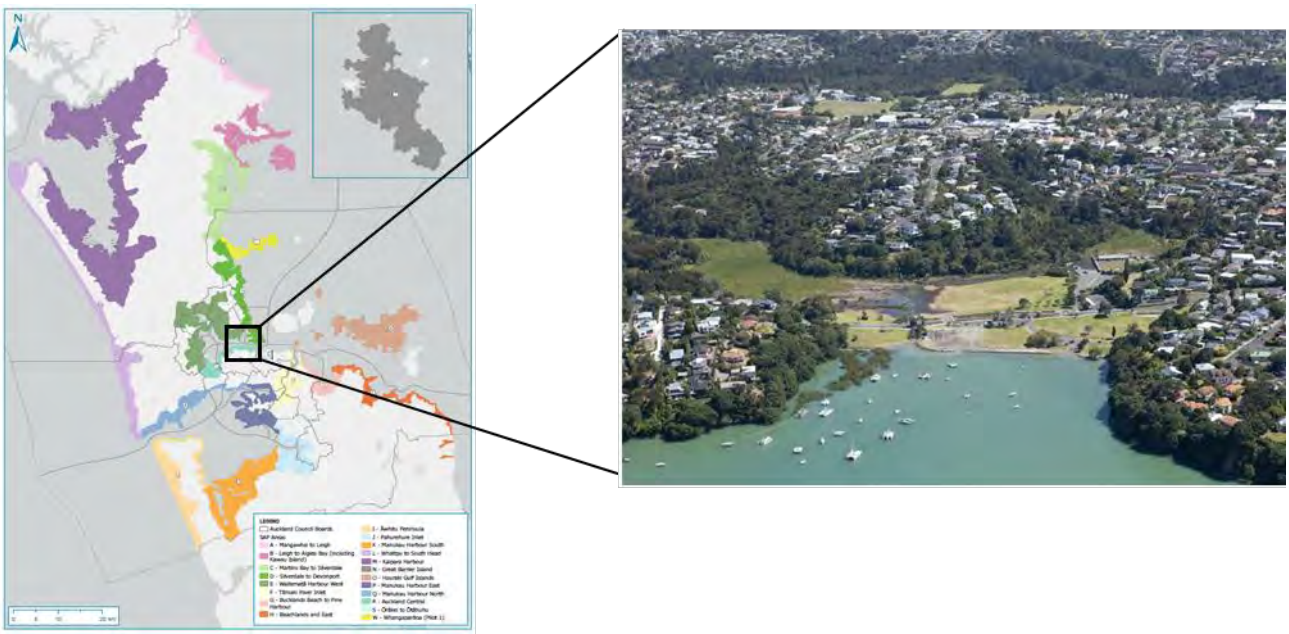


*Figure 2: Overview of SAP areas across the Auckland region highlighting the location of the Little Shoal Bay mini SAP within the wider Waitemata SAP area (dark green)*

# 3.0 Regional context

The Auckland region is bounded to the east and west by the South Pacific Ocean and the Tasman Sea. It has roughly 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 are concentrated in coastal areas and are exposed to coastal processes such as erosion and inundation. These natural processes are considered hazards when they impact on assets, activities 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. To support a resilient future for Auckland's coast, Auckland Council needs to build integrated coastal management and climate adaptation into its long-term strategic planning processes, and the SAPs are intended to support this.

## 3.1 What are Shoreline Adaptation Plans?

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 impacts (including sea level rise) and seek to provide an adaptive planning approach that is focused on the needs and values of local iwi and communities. Acknowledging the environmental and landscape value of the shoreline, SAPs also promote the preservation, enhancement, and ecological restoration of the coastal environment for future generations. As there are a high number of non-Council assets in shoreline areas, these plans are developed with input from stakeholder partners such as Auckland Transport, Watercare, Waka Kotahi, and other infrastructure and utility providers.

The need for SAPs was set out in the Coastal Management Framework[1] ('the Framework') adopted by Auckland Council in 2017[2]. The Framework established Council's hierarchy for best practice coastal management, with SAPs directed by the overarching regional philosophy for coastal management. To support the holistic development of these plans, the Auckland region was divided into a series of coastal cells of varying size. Each coastal cell identified within the Framework will have its own SAP informed by local iwi, infrastructure providers, and local community engagement. They will be implemented through integration of all recommended adaptive strategies into relevant Auckland Council Asset Management Plans. Once every SAP has been completed, they will also inform the regional prioritisation and funding of future asset management.

The SAPs give effect to the New Zealand Coastal Policy Statement, which directs councils to identify areas that may be affected by coastal hazards over a timeframe of at least 100 years. Their approach aligns with guidance from the Ministry for the Environment[3], through the establishment of mana whenua and community values and objectives and the development of a coastal hazards'

1 Carpenter, N., Sinclair, S., Klinac, P., Walker, J (2017) Coastal management framework for the Auckland region.

2 Within the Coastal Management Framework, Shoreline Adaptation Plans were previously referred to as Coastal Compartment Management Plans

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

vulnerability and risk assessment. It uses this information to provide high-level strategies for the short, medium and long term.

At this stage, Auckland's SAPs are focused on Auckland Council-owned coastal land and assets to enable a best practice method for developing the Dynamic Adaptive Policy Pathways (DAPP) approach recommended by the Ministry for the Environment. The current scope also recognises the reforms to the Resource Management Act currently underway. It is anticipated that an iterative approach to the SAPs will be adopted, aligning with international approaches to coastal management such as the UK's Shoreline Management Plans.

# 4.0 Wai Manawa/Little Shoal Bay Reserve

## 4.1 Setting

Wai Manawa/Little Shoal Bay catchment is located on the southern coast of the North Shore facing south into the Waitemata Harbour, approximately 1 km northwest of the Auckland Harbour Bridge as shown in Figure 2:

Wai Manawa/Little Shoal Bay Reserve comprises a total area of around 10 ha with the flat reclaimed area of the reserve comprising some 3.5 ha and the wetlands occupying around 6.5 ha (Figure 4). The reserve is divided by a park road extending in an east-west direction linking Maritime Terrace and Council Terrace. The area south of the park road is used for passive recreation, including boating activities (Figure 3: ) and includes an area of land leased to Little Shoal Bay Boat Club. The grassed area to the north of the park road, known as Dudding Park, is used for informal active recreation and the western boundary adjoins the areas commonly called Le Roys Bush and Lutner Reserve. It is part of a contiguous area of vegetative cover, which follows a southeast to south facing narrow valley system from the upper northern reaches near Hinemoa Street and Onewa Road. It is accessible from multiple roads (Valley Road, Fairfax Road, Glade Place and Seaview Avenue), through carpark of the Northcote Bowling Club off Council Terrace and through Dudding Park.

Part of Wai Manawa/Little Shoal Bay Reserve comprises steep, bush clad land rising from the old shoreline. The stream comprises two main arms: the main channel which flows northwest to southeast direction (Le Roys Bush) and a tributary that flow north to south (Lutner Reserve) draining a catchment area of approximately 136.5 ha and encompasses predominately residential land use.


*Figure 3: Drone image of the central beach reserve area (Source: Auckland Council)*


*Figure 4: Wai Manawa/Little Shoal Bay Reserve, location and key features*

## 4.2 Cultural context

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

Wai Manawa / Little Shoal Bay sits beside the significant pā, Te Ōnewa (a short weapon made of dark grey stone) on Stoke's Point, now known as Northcote Point. Over the years, Te Ōnewa was occupied by Ngai Tai, Ngāti Paoa and Te Taoū. Wai Manawa (Heart Waters) was used for fishing and access to Te Ōnewa and the land above. It continues to hold significance to Iwi who maintain a strong connection to this place. It is this connection through time that drives some of the concepts for management of Wai Manawa/ Little Shoal Bay.

Each of the four iwi have specific and wider cultural values, interests and associations with the coastal environment and the adjoining whenua captured within this SAP. Each iwi are the kaitiaki (guardians) of their respective mātauranga associated with this areas.

### 4.2.1 Cultural objectives and outcomes

The cultural objectives and outcomes sought by iwi are underpinned by the need for the partnership and co-management approach taken in developing these high-level strategic documents, to be recognised and provided for across all facets of the implementation of these strategic documents.

The cultural objectives and outcomes will be aligned with the principles identified in section 1.3 of this report and will guide the SAP's work programme and implementation, these are as follows:

- 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.

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 project identified when implementing the direction set out in this SAP. This ensures that iwi can have a meaningful and effective role in these projects thus enabling them to exercise their kaitiakitanga and ensuring that the principles of the Te Tiriti o Waitangi are provided for and given effect to.

# 5.0 Historic development

The historic context was based on information included in the previous Reserve Management Plan[4] and a timeline is included in Table 1. Wai Manawa/Little Shoal Bay has been significantly altered from its natural state. Prior to its modification, the bay was a shallow mangrove fringed tidal inlet. The mangroves extended upstream of Valley Road on either side of the once navigable waterway. A shell bank where the road now runs formed a dynamic barrier to the inner bay. The general area accommodated the historic settlement of Awataha and included wahi tapu, kaianga, canoe landing sites and gardens. The tidal inlet was used by Māori as a fishing ground and shellfish gathering area.

Urban development of the surrounding catchment began after 1840 and a gas works was constructed on the eastern side of Wai Manawa/Little Shoal Bay in the late 1800s. In 1907, the Auckland Harbour Board vested 8.9 ha of tidal lands at the head of Wai Manawa/Little Shoal Bay for use as a public domain and recreation ground. To enable access across the bay, a 1.2 to 1.8 m high embankment was constructed across the bay and an automatic tide gate was installed. The general location of this embankment is visible in the 1947 aerial photograph below.

*Figure 5: Historic aerial from June 1947 (Source: Whites Aviation)*

In 1923, the Northcote Association Football Club was granted permission to reclaim a small area of land in the location of the present Dudding Park field. At a similar time, the tennis club was granted rights to use the bay and the northern arm of the reserve was reclaimed for 10 courts, although five were abandoned due to flooding. Reclamation continued during the late 1950s and early 1960s using fill from land development from the surrounding area. The causeway was widened by infilling behind the seawall, including old concrete and clay fill from the demolition of two reservoirs at the top of Pupuke Road. Filling was also carried out along the frontage of the reserve.

In 1964, reclamations were complete and flood gates constructed on the seaward boundary of the reserve. Catchment run-off was retained behind the reclamation and the wetland swamp began to develop within the western and northern arms that had previously been mangrove areas and freshwater wetland flora and fauna became established.

[4] NSCC, 1999

Boat ramps, the haul out area and seawalls were constructed in the mid-1960s and in 1968, the scout den was built. A concrete seawall was constructed in 1979 and a new stormwater outfall with concrete encased pipes and a stone face was constructed in 1988 with overland flow channels formed in 1989 and the road ford replaced by twin box culverts in 1990.

*Table 1: Timeline for key infrastructure works within reserve area*


| Date | Activity |
|---|---|
| 1840 | • Gas works constructed |
| 1907 | • 8.9 ha of land vested for reclamation for use as a public domain and recreation |
| Mid-1920s | • Dudding Park and tennis club reclamations |
| Mid-1960s | • Reclamations completed and boat ramps/haul out and seawalls constructed |
| 1969 | • 1350 mm concrete culvert pipe installed along western boarder to divert water way from land being reclaimed (i.e., temporary works that was not removed)<br>• Anecdotal evidence of a tide flat on seaward side. Based on Morphum (2018) report, the primary inlet level is around 0.6 m AVD (2.34 m CD) |
| 1971 | • Maritime Terrace open (ford provided access prior) |
| 1979 | • Concrete seawall constructed |
| 1988-90 (post Bola) | • High flow bypass (box culvert) under Maritime Terrace for flows above 1.6 m AVD (3.3 m CD)<br>• 3 No. 500 mm diameter culvert pipes in the main channel between Rods Island and the southern part of the reserve to enable further reclamation of Rods Island. Invert levels around 0.1 to 0.4 m AVD (1.8 to 2.1 m CD) |
| 1990-1997 | • Flap gate at the terminus of the high flow channel with a crest level of 3.7 m CD that functioned poorly as a result of sand blockage<br>• Bunding around the carpark and field |
| 1997-1999 | • Flap gate on 1350 mm outlet still in place |
| Jan 2011 | • Significant storm event affecting freshwater wetland |

| Date | Activity |
|---|---|
| 2011 | • Established by Healthy Waters that primary and secondary outlets from main drainage were under capacity to pass 10-year ARI MPD storm, particularly 1350 discharge under capacity |
| 2017-2018 | • Wool bale groyne constructed adjacent to the 1350 mm outlet pipe to reduce sand loss from the adjacent beach. (Aitken, pers. Comm.) |

### 5.1.1 Physical assets

The location of key features of recreational reserves, road and parking assets, shoreline protection and access structures and three water assets are shown in Figure 6: . A more detailed schedule of the number of land areas and physical assets within the project area is included in Appendix B. This schedule includes the asset ID and the number or size/extent of the asset based on information from the GIS layers in the Auckland Council's GIS viewer.

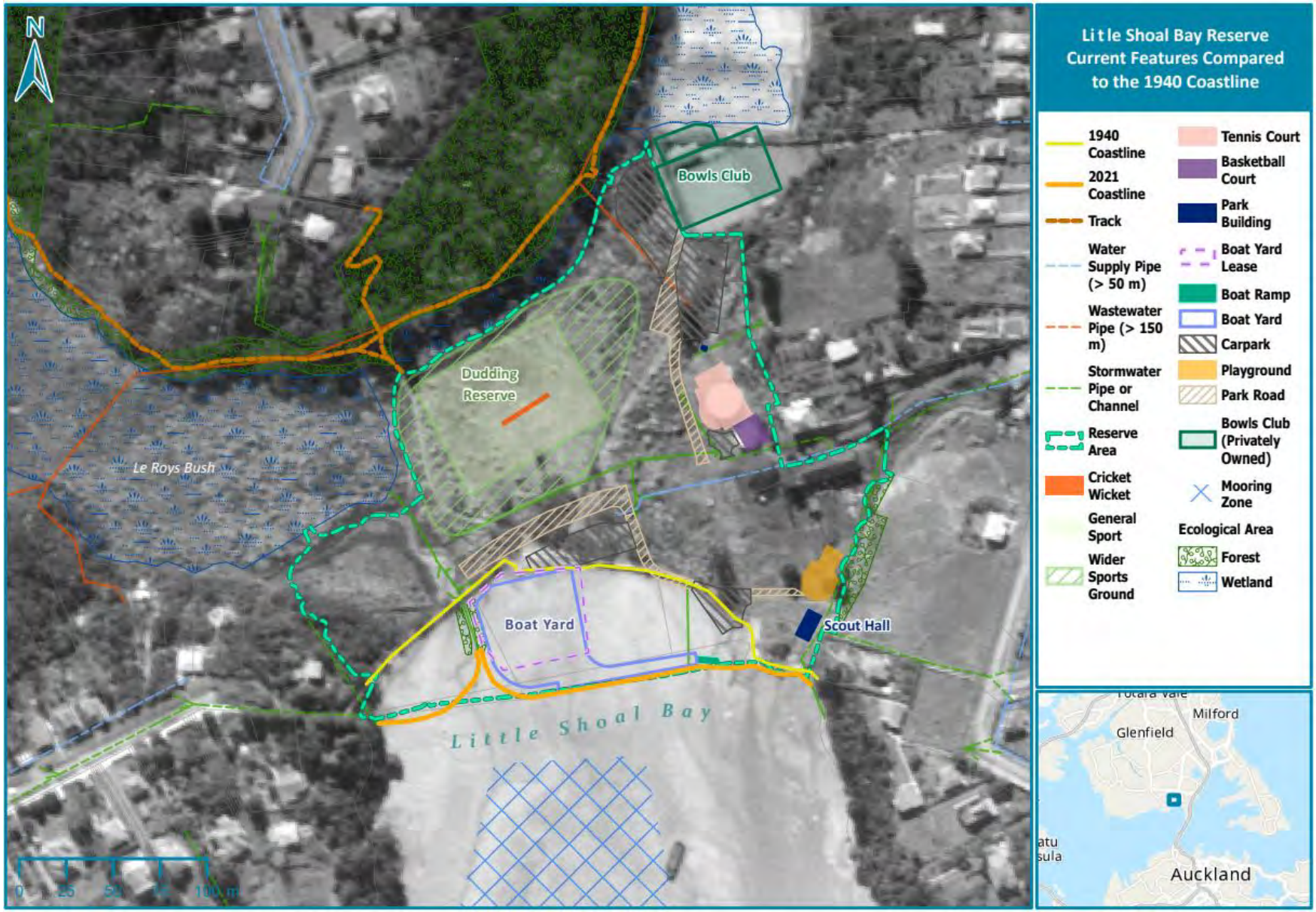



*Figure 6: Key features of the present day reserve area overlain the 1940's aerial photograph (Source: Auckland Council)*

## 5.2 Physical Setting

Information on the physical setting of Wai Manawawa/Little Shoal Bay to support development of the SAP was taken from previous published reports and information sources. No additional physical studies were completed. The sections below provide a summary of the existing information that was used.

### 5.2.1 Topography

The topography of the Wai Manawa/Little Shoal Bay catchment is steep around the ridges and drops off to the main channel of the stream. At the bottom of the catchment the estuary was reclaimed allowing an extensive fresh wetland to form, which is flat. The eastern and western parts of the catchment face onto Wai Manawa/Little Shoal Bay and are characterised with sea cliffs that are 10 m high. Site topography is shown in Figure 7 which is based on 2016 LiDAR data from Auckland Council. The wetland areas are all generally below 1.5 m above Auckland Vertical Datum (AVD)[5] while the boat yard and Duddings Reserve have levels ranging from around 1.5 m AVD to 2.2 m and the bowling club land being around 2 m. The recreational reserve areas to the east steepen to around 5 m AVD.


*Figure 7: Site topography*

[5] AVD is based on the mean sea level measured in 1946 and is the datum for land levels in the Auckland Region

### 5.2.2 Geology

Figure 8 shows the geology of the site and surrounding area. The published geology beneath the site is described by Kermode[6] as being underlain by organic-rich alluvium (muddy peat) in the west and construction fill in the east. When overlain on the geological map, the western site boundary also overlaps the East Coast Bays Formation flysch. No site-specific geological information is held on file by Tonkin and Taylor but based on the historic information, much of the reclaimed area is likely to comprise clay fill from subdivision works in the general area and construction debris.

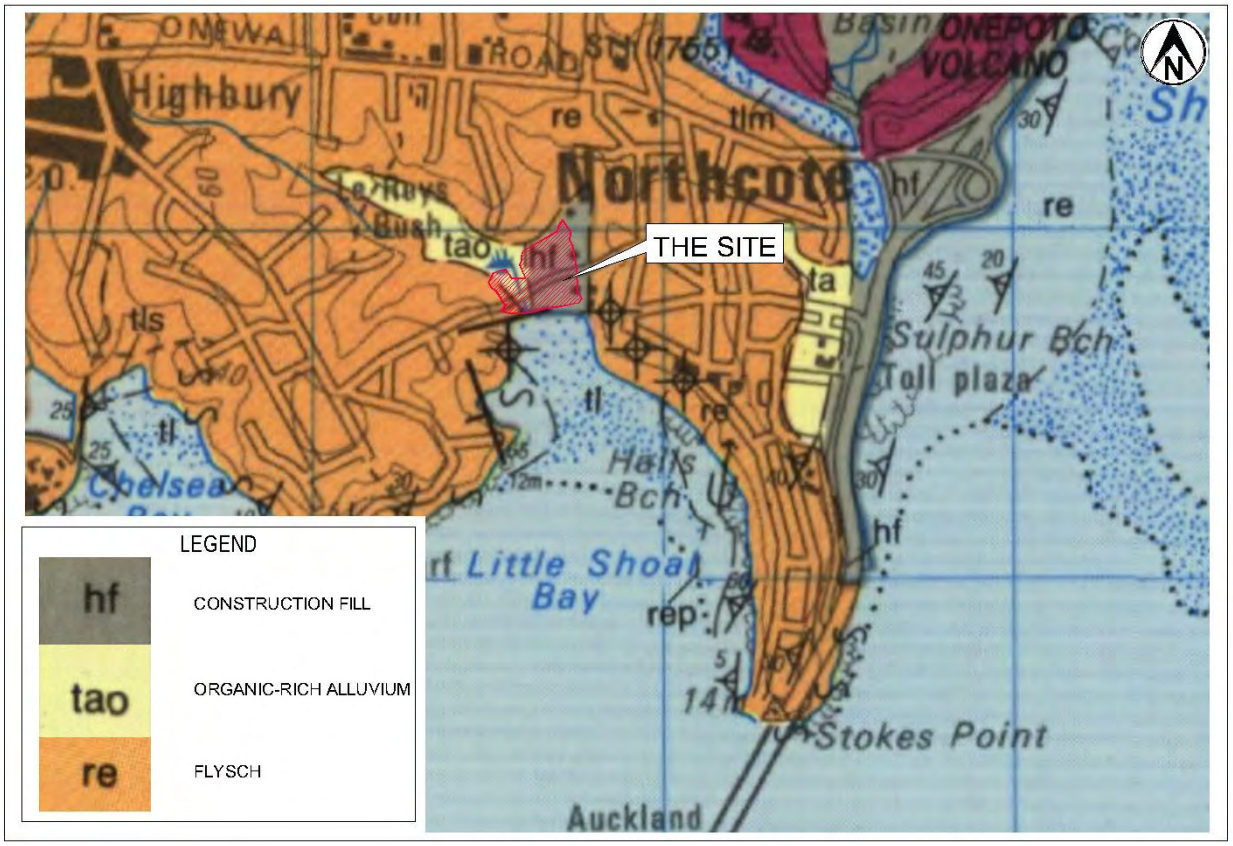



*Figure 8: Published geology of Wai Manawa/Little Shoal Bay (source: Kermode)*

### 5.2.3 Tidal and extreme water levels

Water levels within Wai Manawa/Little Shoal Bay are influenced by the astronomical tide, local storm surge and future sea level rise. The Waitemata Harbour has a diurnal tide with a spring tide range of around 2.9 m and neap tide range of 1.8 m. At the Ports of Auckland, Mean High Water Spring (MHWS) is 1.56 m RL and Lowest Astronomical Tide (LAT) is -1.68 m AVD. Regional weather patterns that influence wind and atmospheric pressure can cause a storm surge phenomenon that raises water level above the astronomical tide. Storm surge levels were assessed by Stephens et al. (2016). Tidal and extreme water levels with an Annual Recurrence Interval of 100 and 10 years are shown in Table 2.

[6] Kermode, L.O. 1992: Geology of the Auckland Urban Area. Scale 1:50,000, Institute of Geological & Nuclear Sciences geological map 2. 1 sheet + 63p. Institute of Geological and Nuclear Sciences Ltd. Lower Hutt, New Zealand.

*Table 2: Tidal and extreme water levels*

| Condition | Level m (CD) | Level m (AVD-46) |
|---|---|---|
| 100 Year ARI storm tide | 4.18 | 2.41 + 0.023 = 2.43 |
| 10-year ARI storm tide | 4.00 | 2.23 + 0.023 = 2.25 |
| Highest astronomic tide (HAT) | 3.71 | 1.97 |
| Mean high water spring (MHWS) | 3.35 | 1.61 |
| Mean high water neap (MHWN) | 2.81 | 1.07 |
| Mean sea level (MSL) | 1.91 | 0.17 |
| Mean low water neap (MLWN) | 1.03 | -0.71 |
| Mean low water spring (MLWS) | 0.48 | -1.26 |
| Lowest astronomical tide (LAT) | 0.06 | -1.68 |
| Tide levels from LINZ Standard port tidal levels / Toitū Te Whenua Land Information New Zealand (linz.govt.nz)<br>Storm surge levels from Stephens et al. (TR2016, 2017) from output point 9, adjusted by 0.023 m being 2.54 mm/yr from 2013 to 2022, with 2013 being the date of the original storm surge report TR2016 was based on. | | |

### 5.2.4 Site contamination

A detailed site investigation of the reserve, excluding the gas work site was carried out in 2021[7] involving shallow soils sample testing from 29 hand auger boreholes. The general area of investigation is shown in Figure 9.

[7] Tonkin and Taylor, 2021a


*Figure 9: Site plan with general areas contamination testing completed identified*

Soil testing from Area 1 found that all chemical concentrations complied with the assessment criteria for human health (recreational use) and the AUP discharge criteria. Some metal concentrations were reported above background values and the Australia/New Zealand sediment quality guidelines (ANZG) in Area 1. However, based on the random distribution and the overall minor nature of the exceedances, a source of contamination is not considered to be present in shallow soil in Area 1.

Soil testing from Area 2 found concentrations of copper and zinc, likely from historic boat maintenance, haul out and storage, above the AUP discharge criteria. Copper, lead, zinc, TBT and PCB concentrations were reported above the ANZG sediment quality guidelines conservatively adopted for screening the risk to ecological receptors in the marine environment. Concentrations did not exceed the criteria for human health under commercial/industrial or recreational uses.

Given the nature of the contamination in Area 2 and the potential for its migration via sediment transport, there is a potential pathway to ecological receptors in Wai Manawa/Little Shoal Bay and the estuary. There are methods to manage and/or remediate risk to the environment associated with these materials such as capping, soil removal and ongoing stormwater management.

Further investigations of the extent of contamination are currently underway within the adjacent Significant Ecological Areas (SEA) and around the gasworks capped area.

### 5.2.5 Marine sediment quality

Marine sediment quality in the Waitemata Harbour at Wai Manawa/Little Shoal Bay has been assessed historically, NSCC, 2007. This research assessed zinc and copper contaminant levels

against Auckland Regional Council's Environmental Response Criteria (ERC), Canada's Probable Effects Level and the ANZECC Interim Sediment Quality Guideline. Zinc concentrations in the Wai Manawa/Little Shoal Bay marine sediments were at Green ERC level and are projected to reach Amber ERC levels by 2034 (Amber level is where contaminants are elevated, and biology is possibly affected). Copper was projected to reach Amber ERC by 2019 and Red ERC by 2044 (Red levels are higher impact sites where degradation has already occurred). No recent studies were identified to confirm if the levels projected are occurring.

## 5.3 Environmental

### 5.3.1 Vegetation

Vegetation covers 35% (48 ha) of the Wai Manawa/Little Shoal Bay Stream catchment. There is significant continuous vegetation alongside most of the stream channel and tributaries and active community involvement in reducing invasive species. Throughout the upper catchment, native species such as rewarewa, pururi, tawa, rata, kauri, kahikatea and supplejack are present. The reserves in Wai Manawa/Little Shoal Bay generally comprise grassed areas for passive and active recreation.

### 5.3.2 Wetlands

Little Shoal Bay has two large wetlands. The freshwater wetland has an area of around 6.5 ha (Figure 10) and sits within the catchment[8]. This wetland developed as a result of reclamation of a former estuarine area at the head of Wai Manawa/Little Shoal Bay, approximately 40 years ago. This caused a build-up of freshwater upstream of the reclaimed land and the subsequent development of a raupo wetland in what was formerly a saline mangrove area. In accordance with the National Policy Statement for Freshwater Management 2020, this induced wetland would be considered a natural wetland. Saline intrusion into the lower parts of the freshwater wetland are converting some areas of the wetland and banks of the streams back to mangrove, saltmarsh and other salt tolerant species.

A number of native plant species occur in and around this wetland. Some of the species observed include: raupo, maire, hangehange, manuka, sedges, kowhai, manuka, kanuka, kiekie, tree ferns and allies (SCMP, AC 2013). Previously, willow trees dominated a large part of the upper wetland. A weed control programme involved poisoning the willows throughout the wetland.

The other large natural wetland is little Shoal Bay itself. There is some debate over the seaward extent of natural wetlands in the Coastal Marine Area (CMA). However, there is no question that the intertidal area could be a natural wetland.

8 SCMP, AC 2013

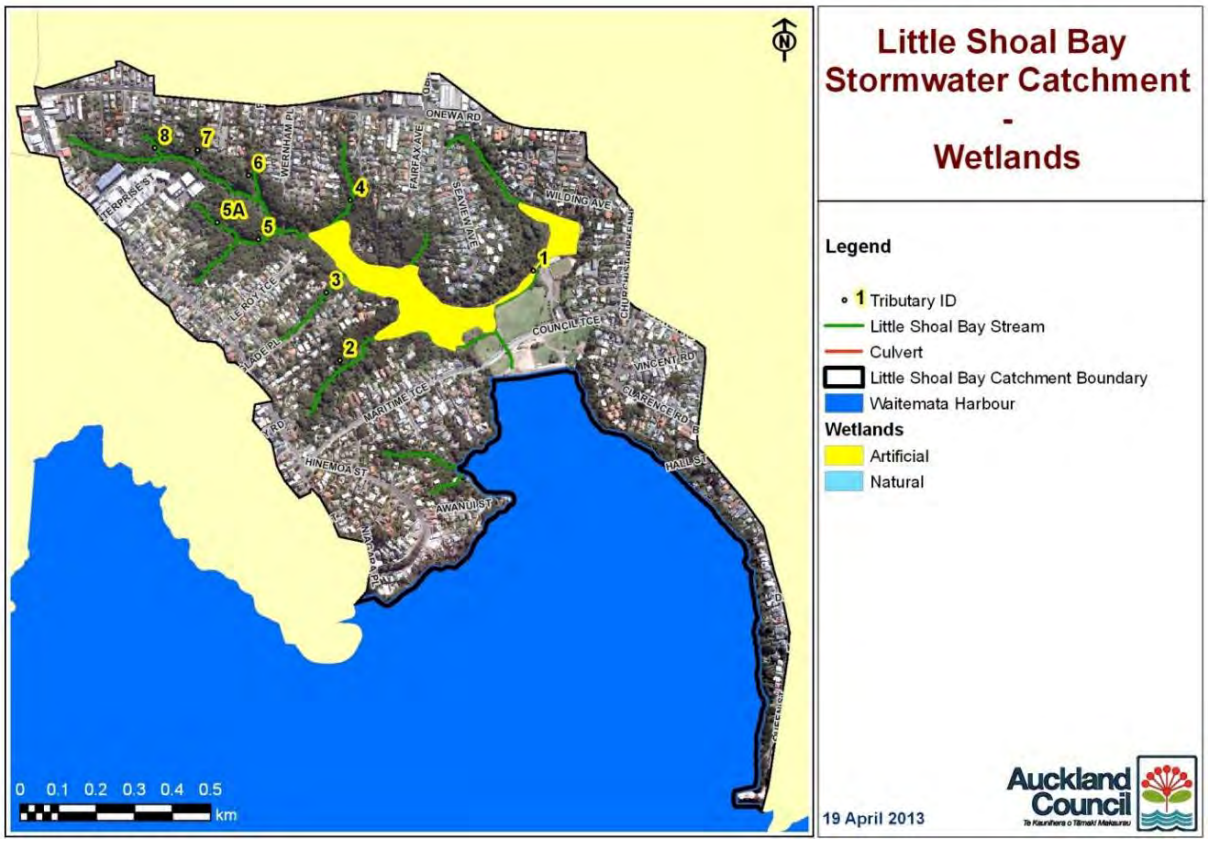



*Figure 10: Wetland areas (Source: SCMP, AC 2013)*

### 5.3.3 Inanga

Inanga have been recorded within the Wai Manawa/Little Shoal Bay Stream (SCMP, AC 2013). The large expanse of suitable spawning vegetation present in the lower margins of the watercourse makes it an ideal spawning area (Figure 11). There is an area of approximately 3.7 ha in which inanga could potentially spawn. This area is approximately 550 m in length. Waterflows are dominated by the daily tidal ebb and flow. Marginal streamside vegetation is inundated during high tide. The upstream extent of the saltwater wedge is likely to be highly variable and influenced by stream baseflows during spawning tides. Therefore, the location of spawning is likely to vary and to occur at different locations annually, depending on conditions. The marginal streamside vegetation in which inanga tend to spawn during the spring tide is predominantly native. Species observed include sedge grasses, saltmarsh ribbonwood, Carex sp., Hebe stricta, mahoe and flax.

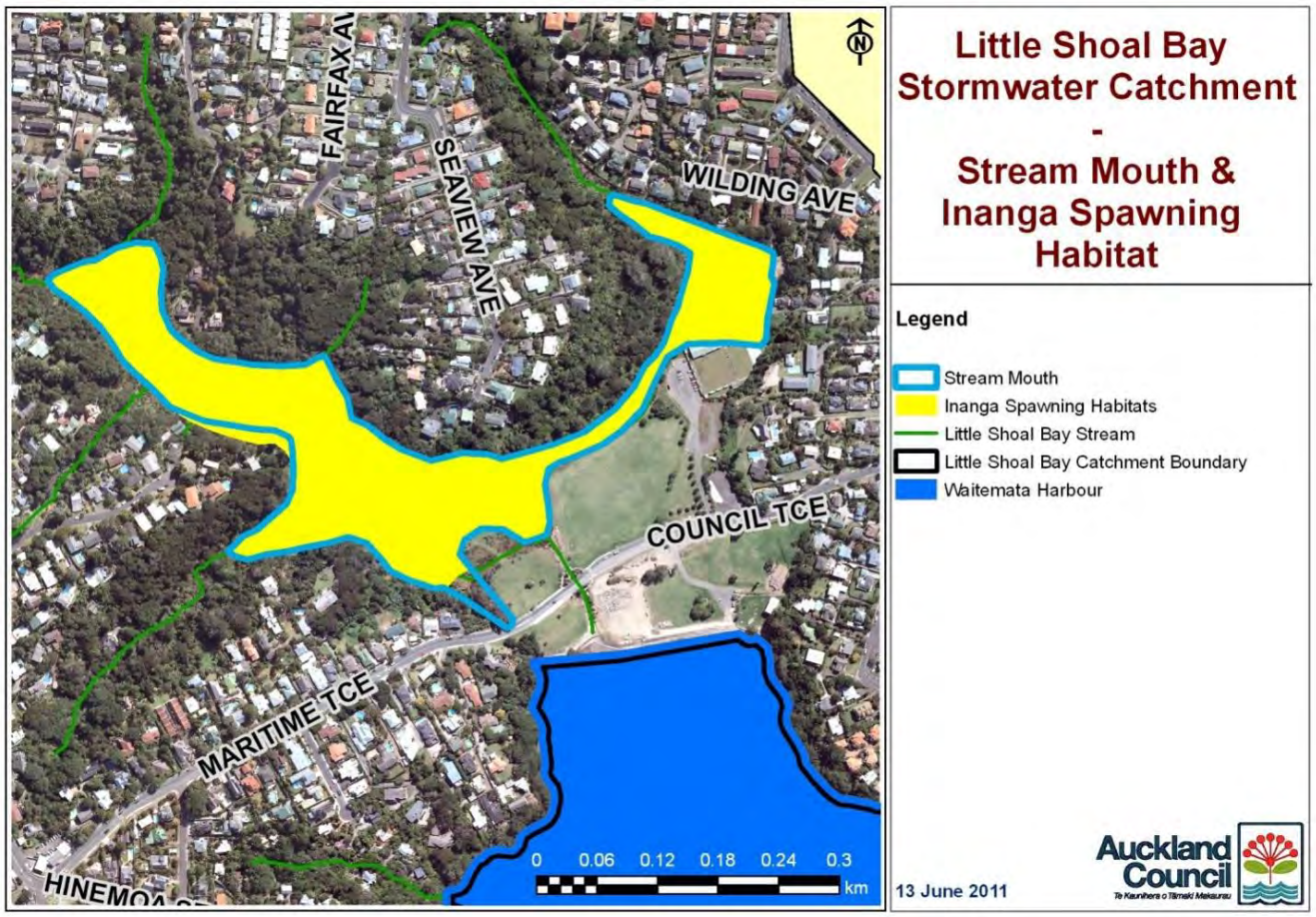



*Figure 11: Stream mouth and inanga spawning habitat (AC, 2013)*

# 6.0 Legislation and previous assessments

## 6.1 Planning impact of National Policy Statement for Freshwater Management

There are a range of existing and established policy documents and plans that will influence the approaches and outcomes for any adaptation response both on the reserve land and the wetland, including the Auckland Unitary Plan, the Resource Management Act and the New Zealand Coastal Policy Statement. A relatively new planning document that will also impact what can be done in and near wetland areas is the National Policy Statement for Freshwater Management. This section introduces the National Policy Statement for Freshwater Management relevant to Wai Manawa/Little Shoal Bay. It is not intended to provide a full statutory assessment of the planning tools that could impact adaptation strategies.

### 6.1.1 National Policy Statement for Freshwater Management

The National Policy Statement for Freshwater Management 2020 (NPS FM), in section 3.22 requires:

> *The loss of extent of natural wetlands is avoided, their values are protected, and their restoration is promoted …*

The definition of natural wetland in the NPS FM includes both freshwater wetlands (inland natural wetlands) and natural wetlands in the Coastal Marine Area. The Freshwater National Environmental Standard (Freshwater NES) sets out requirements for carrying out certain activities that pose risks to freshwater and freshwater ecosystems. These standards are designed to include for the protection of existing inland and coastal wetlands, protection of urban and rural streams from infilling and ensure connectivity of fish habitat and passage.

The direction of the NPS FM to avoid loss of extent and protection of values of natural wetlands relates to activities undertaken by humans that may have adverse effects on natural wetlands. However, climate change and sea level rise are outside the matters that the NPS FM and the Freshwater NES manage. The NPS FM objective to avoid loss of extent and protect values does not require Auckland Council to protect the wetland against climate change and sea level rise impacts.

Any management approach could simply recognise these changes, elect not to interfere, and allow nature to take its course. Increasing saline intrusion into the current freshwater wetland would see a change in species to those that are tolerant of the increasing salinity over time.

Alternatively, Auckland Council could introduce controls to minimise the effects of saline intrusion caused by climate change and sea level rise. Such controls could be short term or long term, could be structural or non-structural. Any implemented control would need to be assessed against the statutory provisions within the Resource Management Act, New Zealand Coastal Policy Statement, NPS FM, Freshwater NES, and the Auckland Unitary Plan. Any required resource consents would need to be gained prior to implementation.

### 6.1.2 Regulatory controls

This section discusses the controls contained in the Freshwater NES and the Auckland Unitary Plan and how these may influence any outcomes from the project.

**Freshwater National Environmental Standards**

Freshwater NES regulates three types of activities that affect natural wetland. These are:

- Vegetation clearance
- Earthworks and land disturbance
- Taking, use, damming, diversion, and discharge of water.

Resource consents under Freshwater NES would be required for any works that sought to:

- Undertake vegetation clearance within or within 10 m of a natural wetland. Vegetation clearance is defined in the Freshwater NES and is very broad. It means the disturbance, damage, destruction, or removal of vegetation by any means (e.g., by cutting, crushing, application of chemicals, or burning).
- Undertake earthworks or land disturbance within or within 10 m of the natural wetland.
- Take, use, divert, dam, or discharge water within or within 100 m of the natural wetland. The definition of water in the Resource Management Act includes water in all its forms. This would include any activities the sought to alter the intrusion of water into the area.

The Freshwater NES applies to all natural wetlands, including inland natural wetlands (freshwater) and natural wetlands within the Coastal Marine Area.

### 6.1.3 Relationship between Freshwater NES and Auckland Unitary Plan

The Auckland Unitary Plan controls activities in wetlands:

- Chapter E3 includes natural wetlands
- Chapter H7 has controls for open space zones
- Chapter F2 includes controls for activities in the coastal marine zone
- Chapter E.36 also includes controls for the use of Hard Protection Structures against coastal hazards.

Auckland Council is yet to amend the AUP to reflect Freshwater NES. If an activity is captured by both the Freshwater NES and the AUP, the more stringent rule applies. That is, the rule with the highest level of control would apply.

It is possible that activities may trigger rules in both the Freshwater NES and the AUP.

### 6.1.4 Existing resource consents continue

Any activity that is authorised by a resource consent issued before the Freshwater NES came into effect (3 September 2020) may continue to be undertaken until such time as the resource consent expires. Any new resource consent would need to be considered against the relevant provisions, including the NES FM, the Freshwater NES, and the AUP.

### 6.1.5 Permitted activities

To be a permitted activity, an activity must be permitted under both the Freshwater NES and the AUP.

The Freshwater NES is a regional provision under Section 30 of the Resource Management Act. Existing use rights for regional activities are limited. Section 20A of the Resource Management Act requires that where an activity that was a permitted activity, and the person undertaking that activity wishes to continue to undertake that activity, they must apply for the necessary resource consents within 6 months of the provision becoming operative.

Consideration should be given to what activities currently occur that may require resource consents. Potential activities that would need to be reviewed would include activities such as mangrove removal, stream mouth clearance, movement and redistribution of beach sands, construction of groynes, reinstallation of flood gates, etc.

### 6.1.6 Future activities

Future activities needing resource consent would need to be considered against the Freshwater NES and the AUP.

Permitted activities may include wetland restoration activities, scientific research, maintenance of wetland utility structures including boardwalks, maintenance of specified infrastructure and natural hazards works. Activities that fall outside the permitted activities require resource consent. Work on reserve areas adjacent to wetlands are also likely to require additional consideration of effects.

The Freshwater NES and the AUP also include controls on fish passage through culverts and similar structures. Any activities that sought to manage saline intrusion would need to provide for fish passage. Existing structures, established before the Freshwater NES came into effect, are not required by the Freshwater NES to retrofit fish passage devices.

## 6.2 Objectives from previous assessments

This section outlines the objectives identified from previous assessments. It illustrates the common themes presented through the various assessments since the North Shore City Council 1999 Reserve Management Plan to the present day.

### 6.2.1 North Shore City Council Reserve Management Plan, 1999

While this 1999 management plan is now significantly dated, it is still seen by some local residents as an important document setting out proposed actions within the reserve. The vision from the Little Shoal Bay and Le Roys Bush Reserves Management Plan (NSCC, 1999) was:

> *"for a high quality natural environment that offers a range of appropriate recreation opportunities to meet the reasonable needs of visitors. An environment that is protected for its unique environmental, landscape, recreational and educational values from potentially degrading effects of both internal and external activities".*

Achievement of this vision was by the following principles:

- To protect and enhance the natural environment
- To provide for appropriate physical development for the purpose of enhancing recreational and environmental quality
- To provide for reasonable use of the reserved while ensuring the degraded effects of use are minimised
- To provide access
- To remediate contaminated sites
- To ensure co-ordinated management
- To encourage community participation.

### 6.2.2 Questionnaire response from Aitken (2006) assessment

As part of his Batchelor in Resource Management, Kyle Aitken carried out a sustainability assessment of the coastal environment of Little Shoal Bay. This included a questionnaire to measure community feelings towards the aesthetic appearance for natural/physical resources within Little Shoal Bay. The questionnaire was hand delivered to 100 residents whose property adjoin the reserve or who live close by. There was a 39% response rate.

A significant number of surveyed residents visit Little Shoal Bay once a week or more (74.3%) and the primary recreational activity was walking, although swimming, boating, playing sports, having picnics, and taking the kids to the playground were also identified activities.

Little Shoal Bay was seen as relatively undeveloped and a natural environment, but the boat haul out, contamination potential from the boat haul out, the disturbance of the foreshore due to boat haul out activities, the condition and state of the seawall and rubbish/debris on the beach are seen as detractions. However, it was also recognised that the boat haul out provides part of the character of the bay and it was suggested that with better management, it could continue.

A question asking respondents' views of allowing the sea to flow back into the freshwater wetland behind Dudding Park received strongly polarised responses, with more supporting than opposing. Positive responses were for naturalising the environment and better flushing. Negative responses were due to the seawater killing freshwater plants and flooding of the sports field. Additional information on how the environment would respond was seen as important.

### 6.2.3 Healthy Waters Stormwater Catchment Management Plan, 2013[9]

The Stormwater Catchment Management Plan identified the following objectives for the Wai Manawa/Little Shoal Bay SAP area:

- Provide mitigation measures to enhance ecological values
- Maintain existing public access within the stream corridor
- Reduce gross pollutants entering the marine environment
- Recognise and protect heritage and cultural values of the stream and environs
- Manage stream erosion
- Establish and/or retain selected sections of riparian corridor alongside perennial streams
- Use Low Impact Design and other on-site mitigation methods for new development or redevelopment to manage stream erosion and protect stream health
- Investigate the provision or enhancement of catchment-wide treatment at the bottom of the catchment using a pond or wetland system
- Manage existing stream bank erosion
- Protect against future stream bank erosion and damaged native riparian vegetation
- Maintain and/or enhance amenity and ecological values by retaining existing native riparian vegetation where practicable, implement new planting and ongoing weed management
- Protect and enhance existing wetland/s and its/their associated natural treatment capability by restoring and maintaining in a more natural condition
- Enhance general stream ecology by other means where appropriate, e.g. by habitat enhancement
- Minimise in-stream works as far as practicable
- Maintain and enhance flow capacity of the stream channel
- Retain existing inanga spawning areas in their present condition, as far as practicable and where it is within Auckland Council's ability to control
- Encourage current and future community involvement in stream management
- Mitigate the effects of erosion at Auckland Council outfalls
- Remove or mitigate man-made barriers to fish associated with Auckland Council infrastructure except where ecological benefits would be limited in relation to the costs involved.

### 6.2.4 Community Facilities Recreational Assessment, 2018

Based on the recreation assessment completed on 3 October 2018, Community Facilities re-confirmed that Little Shoal Bay Reserve is an important resource for active and passive recreational use and had a high recreational value rating.

[9] Auckland Council, 2013

The reserve is easily accessible from multiple entrances from the roads located in the adjacent urbanised area. The reserve offers a range of recreational opportunities such as walking in native bush with recreational trails, sport fields, fitness equipment and open spaces, making it a popular destination with locals and visitors alike. The reserve also provides commuter access via the walkway between Glade Place and Valley Road. There is an active and well organised volunteer group who act as a guardian of the bay, to help ensure that open space and the natural environment is protected and enhanced. Their main activities include beach clean-ups and planting.

The following service outcomes were identified from the assessment:

- Retain and enhance the access to the park from Valley Road, Fairfax Avenue, Glade Place, Dudding Park Sports field and Seaview Avenue
- Retain and enhance access to Little Shoal Bay from Dudding Park sports field
- Retain and enhance the existing recreational opportunities and sporting activities in Dudding Park sports field
- Retain and enhance access to Northcote Bowling Club
- Retain and enhance the connectivity of the track network from Wilding Avenue to Le Roys Bush.

### 6.2.5 Parks Services Survey, 2020

Parks Services from Auckland Council Parks Department conducted several assessment activities through the late Summer 2020 to assess visitor numbers and analyse how they are currently using the reserve. Three studies were undertaken using drones which captured views of the reserve from the same perspective twice a day across six days, a site interceptor to survey what activities users were involved in when they visited the reserve and observations from staff.

The conclusion from these assessments were:

- The foreshore around the playground and BBQs is the most popular area in Little Shoal Bay Reserve
- Little Shoal Bay Reserve is well frequented by all age groups for a broad range of activities
- Walking and dog walking are the most popular activities on all zones surveyed
- Passive enjoyment of the reserve in a vehicle is a significant occurrence
- Carparks are well used. The ‘beach’ and ‘ road’ car parks are substantially busier than other car parks and the bowling club car park is only busy during bowling tournaments
- The grassed area is more popular than the beach for sunbathing and picnicking, but the number of people swimming is low
- The boat hard stand area is seldom used for recreational activity
- The sports field is seldom used for organised sport but predominantly used for pedestrian connectivity through the reserve.

Park services identified the following potential outcomes to inform long-term management options:

- Enhance opportunities for passive recreational experiences around the foreshore, particularly around the popular eastern areas
- Enhance opportunities for active recreational experiences around the eastern side of reserve north of the road
- Improve connectivity through the north-western reserve area to facilitate better pedestrian access to Le Roys Bush Reserve
- Consider options for rationalisation of the boat hard stand, boat ramps and coastal access provision
- Retain an open grass area suitable for informal community sporting activities to the north of the road.

### 6.2.6 Kaipātiki Local Board, 2020

Kaipātiki Local Board held a meeting on 18 November 2020 and adopted the following key park service outcomes for Little Shoal Bay Reserve and surrounds[10], noting these outcomes will be used to inform long-term management options for the reserve:

- Enhance opportunities for passive recreational and aesthetic experiences around the foreshore areas seaward of the road, the sandy beach areas, and the popular eastern areas
- Enhance opportunities for active recreational experiences around the eastern side of the reserve north of the road
- Improve pedestrian connectivity through the north-western reserve area to facilitate better pedestrian access to Le Roys Bush Reserve
- Consider options for rationalisation of the boat hard stand, boat ramps and coastal access provision
- Retain a flat open grass field area suitable for informal community recreational activities, summer sports (including cricket pitch) and events to the north of the road
- Retain a low-speed road connection for public vehicle access through the reserve
- Retain the existing carparking areas on both sides of the road
- Protect and enhance the freshwater ecosystem in the western side of the reserve
- Provide the ability for community volunteers to work with the local board on environmental management.

#### Kaipātiki Local Board Plan, 2020

Local board plans are strategic three-year plans that are developed in consultation with the community. They set out the direction for the local area that reflects community aspirations and priorities. The plans guide the local boards in:

- Decisions on local activities, projects, and facilities
- Input into Council's regional strategies and plans, including the Auckland Plan

[10] Resolution number KT/2020/189

- How local boards will work with other agencies including community groups, central government agencies and Council-controlled organisations that play key roles in the area
- Funding and investment decisions.

The Kaipātiki Local Board Plan was developed in 2020 using feedback received from public engagement. This plan focuses on the following five outcomes, alongside key initiatives, to guide the work of the Board. Within each objective key opportunities and challenges are highlighted. These five outcomes are as listed below:

| Outcome 1: Te whai wāhitanga me te oranga - Belonging and wellbeing | |
|---|---|
| Our people are involved in the community, socially connected to one another, and supported to be active, creative, resilient and healthy. | Objectives include but are not limited to:<br>• Individuals and communities have a high level of wellbeing<br>• Our diversity is a strength that we nurture and celebrate as we come together<br>• Our children and young people are included in decision-making and are empowered to effect change. |
| **Outcome 2: Te taiao – Environment** | |
| Our natural environment is protected and restored for future generations to enjoy. | Objectives include but are not limited to:<br>• Our natural environment, harbours and waterways are protected and enhanced, in partnership with mana whenua and our community<br>• Our people are environmentally aware and work together to live sustainably<br>• Support coastal communities to be prepared for the impacts of a changing climate. |
| **Outcome 3: Ngā wāhi me ngā takiwā - Places and spaces** | |
| Our built environment is high quality, vibrant, well-maintained, reflects the culture and heritage of Kaipātiki, and meets our people's needs. | Objectives include but are not limited to:<br>• Our parks, playgrounds, and public spaces are SunSmart, high quality, accessible, and well maintained<br>• Our aquatic, recreational, art and community facilities are enhanced to meet the needs of our growing and changing population<br>• Quality and sustainable urban development occurs that creates spaces that are safe, healthy, multi-functional and have a low impact on the climate. |
| **Outcome 4: Te Ikiiki me ngā tūhononga - Transport and connections** | |
| Our people have many transport options and can easily and safely move around and find their way. | Objectives include but are not limited to:<br>• People have more travel choices to get to work, school or go about their daily lives<br>• Our public transport network is affordable, convenient, frequent, environmentally conscious and accessible – connecting people to where they need to go<br>• The Kaipātiki Connections Network Plan delivers commuter and recreational walking and cycling links through the local board area. |

| Outcome 5: Te āheinga me te taurikura - Opportunity and prosperity | |
|---|---|
| Our people can buy local, live local and work local. | Objectives include but are not limited to:<br>• The Wairau Valley and our other business areas provide our people with the opportunity to work locally<br>• Our village centres and small local precincts are enhanced<br>• Our business community encourages and supports local sustainable business practices and initiatives. |


*Figure 12: Kaipātiki Local Board area and boundaries*

The Kaipātiki Local Board boundaries are the northern motorway to the east, the inner Waitematā harbour to the south and west, and Glendhu Road and Sunset Road to the north. It includes the suburbs of Bayview, Beach Haven, Birkdale, Birkenhead, Birkenhead Point, Chatswood, Glenfield,

Hillcrest, Marlborough, Northcote, Northcote Point, Sunnybrae, Totara Vale, Wairau Valley and Windy Ridge (Figure 12).

Within these boundaries are several heritage sites of importance to Māori, such as Te Ōnewā Pa. In addition, there are 540 ha of reserves and walkways, with Kaipātiki making up one of the largest areas of continuous urban native vegetation remaining within Auckland's ecological region.

The Plan acknowledges the increased coastal impacts Wai Manawa / Little Shoal Bay has been experiencing in recent years, with specific reference to flooding and coastal inundation as matters of concern.

A Parks Service Assessment and a Coastal Process Issues and Options Assessment was commissioned by the Kaipātiki Local Board in 2020 to know more about how Wai Manawa / Little Shoal Bay was being used, what communities valued about this space and what options there are to mitigate the impacts. The 2020 Plan's focus on managing issues within Wai Manawa / Little Shoal Bay, such as coastal inundation and flooding, are aligned with the SAP process outlined within this report. The entire 2020 Kaipātiki Local Board plan has been attached to this report in Appendix C.

# 7.0 Coastal hazards and exposure assessment

This section sets out the erosion, inundation and flooding values used, and the timescales considered to describe what is happening from the perspective of a coastal hazards' perspective.

## 7.1 Coastal inundation and erosion susceptibility

Natural processes, such as coastal inundation and erosion, become hazards when they have the potential to negatively impact things we 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. Erosion susceptibility and inundation extents have been based on existing published data from Auckland Council, and in particular, the following two sources:

- Stantec (2020) Remapping of coastal inundation data to 2016 Lidar, June 2020
- T+T (2021) Auckland coastal erosion study: regional assessment, February 2021.

Catchment flooding was based on modelling carried out by Auckland Council and included in the GIS viewer.

## 7.2 Timeframes and scenarios

Timeframes and scenarios applied to identify coastal inundation, rainfall flooding and erosion susceptibility are shown in Table 3 for the short, medium, and long term. The selection of events for the various time periods was based on expert judgement considering the available data sets that are described in the section below.

There are differences in the sea-levels used for the three time periods for each hazard. Coastal inundation uses 0 m sea level rise, 0.5 m and 1 m, for short/medium and long term respectively, while coastal erosion susceptibility uses 0.24 m, 0.55 m and 1.52 m. Rainfall flooding is currently only available for one scenario.

*Table 3: Timeframes and scenarios for coastal hazard exposure assessment*

| Hazard drivers | Time frame | | |
|---|---|---|---|
| | Short:<br>2025 – 2045<br>0-20 years | Medium:<br>2045 - 2085<br>20 – 60 years | Long:<br>2085 – 2130+<br>60 – 100+ years |
| Coastal inundation | 1% AEP storm surge | 1% AEP storm surge + 0.5 m sea level rise | 1% AEP storm surge + 1 m sea level rise |
| Rainfall flooding | Existing development, 1% AEP rainfall event, MHWS10 | | |
| Erosion susceptibility | 2050 RCP8.5M<br>(0.24 m sea level rise) | 2080 RCP8.5M<br>(0.55 m sea level rise) | 2130 RCP8.5+<br>(1.52 m sea level rise) |
| Notes: All sea levels from 1986-2005 baseline | | | |

## 7.3 Coastal inundation

Previous studies have been undertaken by NIWA and DHI to derive coastal inundation levels at the shoreline around the Auckland region. 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 including wave setup on the open coast[11]. The 2 m sea level information was included to provide potential longer term understanding of possible coastal inundation.

Stantec (2020) updated the coastal inundation extents from the inundation levels around the coast using the latest LiDAR data for the region, to ensure any changes in landform were represented in the published data. Figure 13 shows the resulting coastal inundation hazard extents for the three scenarios (i.e. 1% AEP storm surge and 1% AEP storm surge with 0.5 and 1.0 m sea level rise).

Appendix A includes maps showing inundation depths for the short, medium and long term. The results show that present day flooding extends over much of the reserve area, with relatively small increases in area with 0.5 m, 1 m and 2 m sea level rise. This indicates that ground levels increase reasonably quickly, limiting the increase in spatial extent of inundation. However, the results also indicate that areas of present-day inundation will experience greater depths of inundation and inundation will occur more frequently with sea level rise.

[11] Stevens et al., 2016 published as Auckland Council Technical Publication TR2016/017

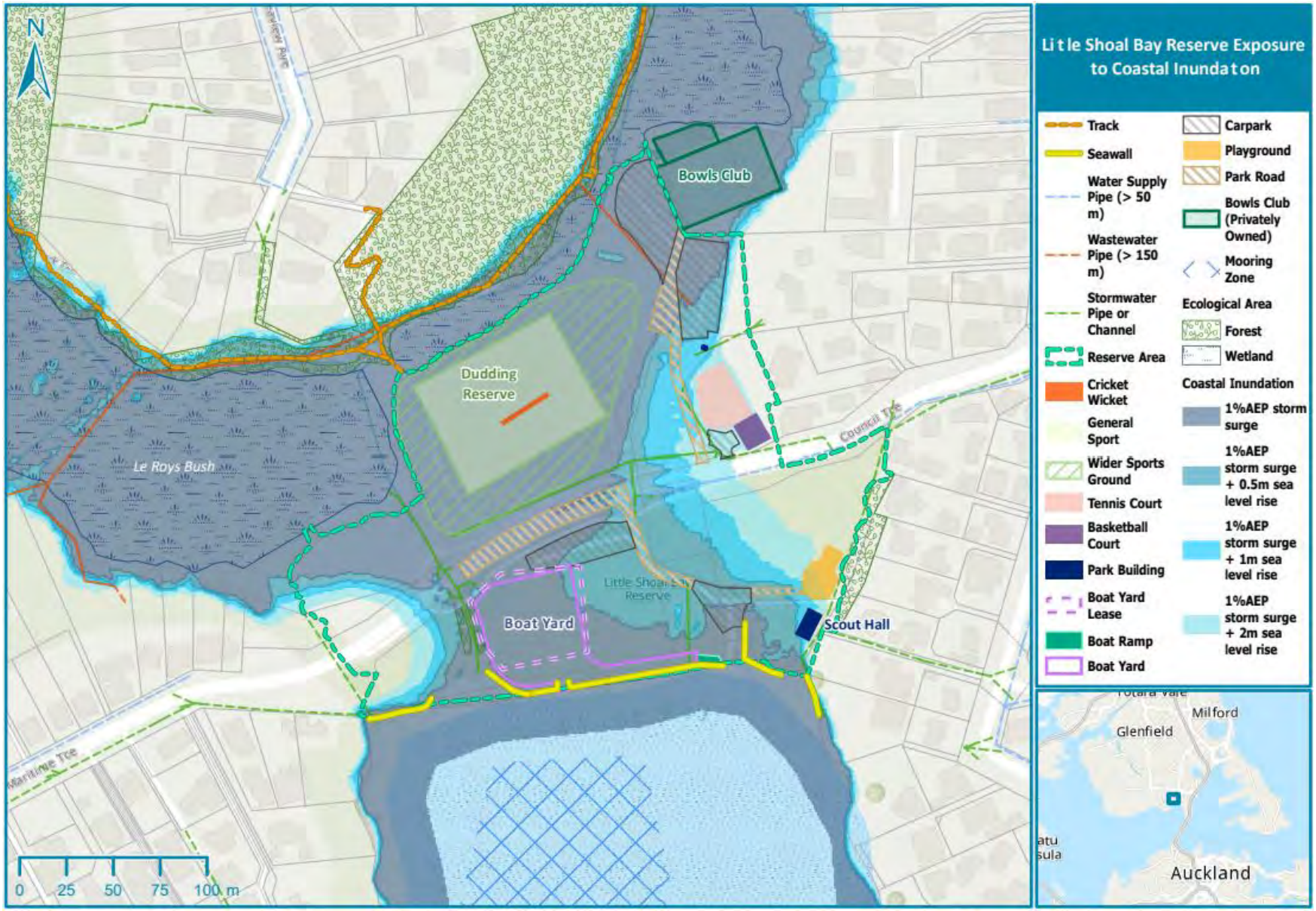



*Figure 13: Coastal inundation hazard extents for the three scenarios (datasets from Stantec 2020)*

## 7.4 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 New Zealand Coastal Policy Statement (NZCPS, 2010) and Ministry for the Environment (MfE, 2017) '*Coastal Hazards and Climate Change Guidance*', that provides high-level information on possible ASCIE on a regional scale.

It uses 2016-2018 LiDAR data (consistent with the coastal inundation mapping) which covers the entire Auckland region and has enabled mapping of the ASCIE. Resulting ASCIE areas have been mapped for the following scenarios:

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

These scenarios represent a range of time periods and sea level rise values that are predicted to occur with a high emission representative concentration pathway (RCP). Water level predictions based on the median trajectory and the 83$^{rd}$ percentile were assessed for 2130, described as RCP8.5H+. MfE (2017) recommend the use of this value for regional hazard screening to broadly identify areas potentially exposed to coastal hazards, so it follows national guidance. Figure 14 shows the resulting extents for the four time periods.

## 7.5 Rainfall flooding

This section sets out the rainfall flooding values used for the same timescales as set out above. Inundation values have been based on existing published data from Auckland Council.

All rainfall flood modelling has been done to comply with Auckland Council's modelling specification[12] concentrating on high flood risk areas including primary open channels and streams using the 2016 LiDAR. Scenarios considered the present day and the maximum development scenario. The maximum development scenario was based on full development within the existing zones shown in current planning maps. Increases in rainfall for future time frames were based on RCP8.5 projections and tailwater levels were also adjusted for medium and long term time periods to consider sea level rise. The modelling outputs as shown in Figure 14, were determined to be appropriate for system performance assessment and floodplain mapping.

[12] Auckland Council 2011

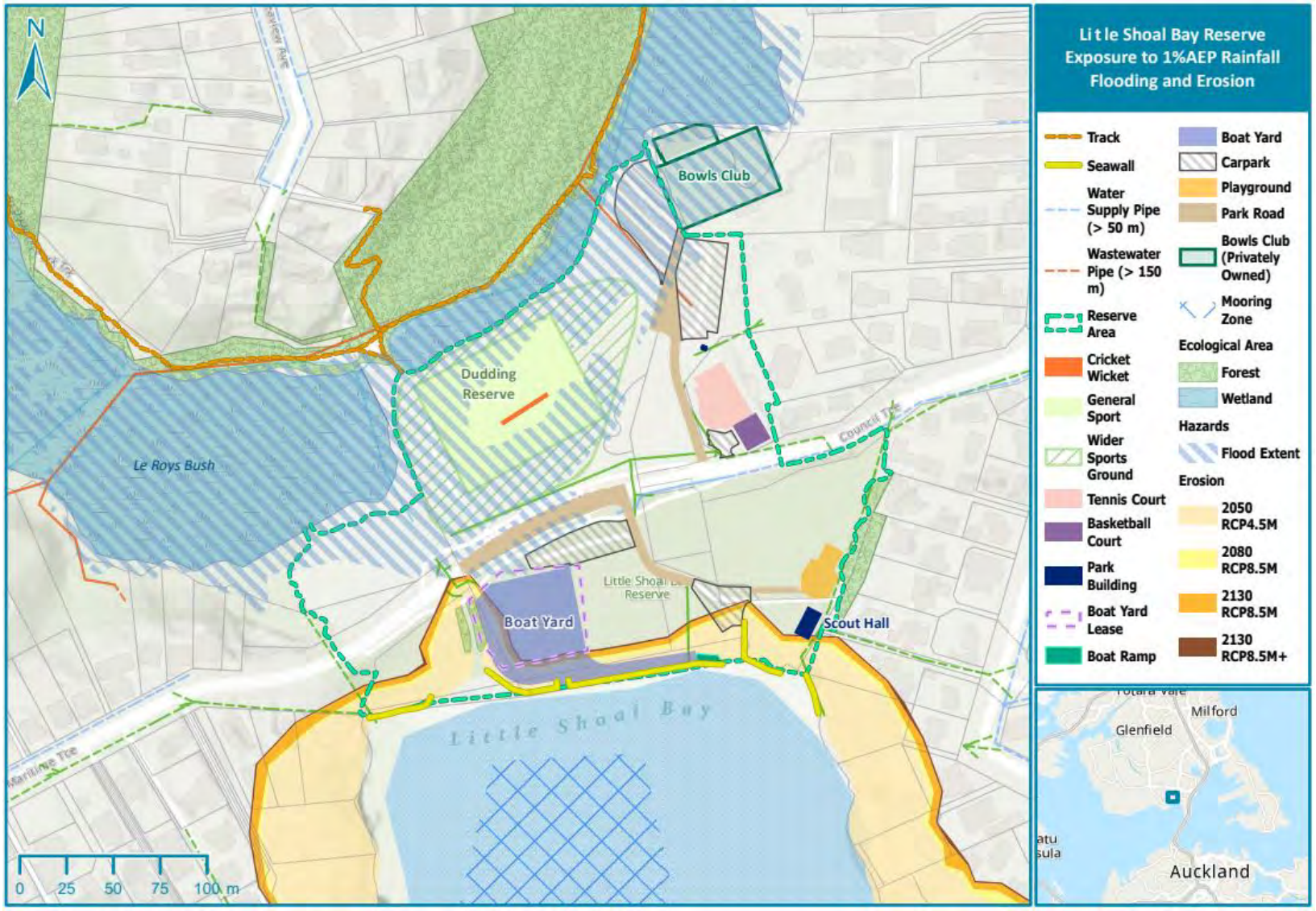



*Figure 14: Erosion susceptibility for a range of future climate change scenarios and present-day pluvial flooding extents*

## 7.6 Vertical land movement

Vertical land movement is reported as the average long-term rate of change over time of the elevation of the land surface. Processes such as tectonic movements and subsidence cause land to move up or down. Change in land surface elevation can impact relative sea level rise at any particular location. At Wai Manawa/Little Shoal Bay, it is possible that both the reclamation and wetland areas could have settled over time resulting in subsidence, and thus more at risk of inundation.

The recently published data on the NZSeaRise website suggests an average VLM of around -2.8 mm/yr (i.e., subsidence) at this location based on InSAR and GPS data between 2003 and 2010. Subsidence does not affect the sea level projections used for this study but could mean that inundation could occur sooner and the depth of inundation greater. However, given the broad time scales (short/medium/long), and the selection of available scenarios, any shift in relative sea-level rise as a result of vertical land movement is still likely to still be captured within the short/medium and long-term timeframes considered in the project.

## 7.7 Elements at risk

Elements considered at risk within the study are the Auckland Council-owned land and assets and supporting infrastructure near the coast. These are elements that the risk assessment has focused on quantifying. These elements are grouped within the four wellbeings of the Local Government Act:

| | |
|---|---|
| Economic | • Assets including the road corridor and three waters infrastructure |
| Environmental | • Based on the Auckland Unitary Plan including land area of areas of natural significance<br>• Environmental exposure is based on land areas and does not include the coastal-coastal transition zone that extends seaward of mean high water springs that also has significant value |
| Social | • Focusing on Auckland Council-owned social assets and infrastructure including recreation areas, parks and reserves as taken from the AUP dataset, and their supporting amenity focused infrastructure<br>• Auckland Council provided data sets |
| Cultural | • Utilising a set of indicators based on cultural heritage sites to gain some understanding of potential sites of significance<br>• However, it is recognised there are likely to be sites not recorded that may have equal or greater value, and other values and connections for mana whenua that cannot be attributed in this method |

To facilitate a better understanding of where exposure occurred, Wai Manawa/Little Shoal Bay was divided into nine units, including the intertidal foreshore area. These units generally reflected different primary uses and locales within the project area (Figure 15), although it is noted that the

Boat Yard lease area comprises a smaller area within the more generally defined Boat Yard unit (refer Figure 4). A schedule of the elements at risk within these units is included in Appendix B.

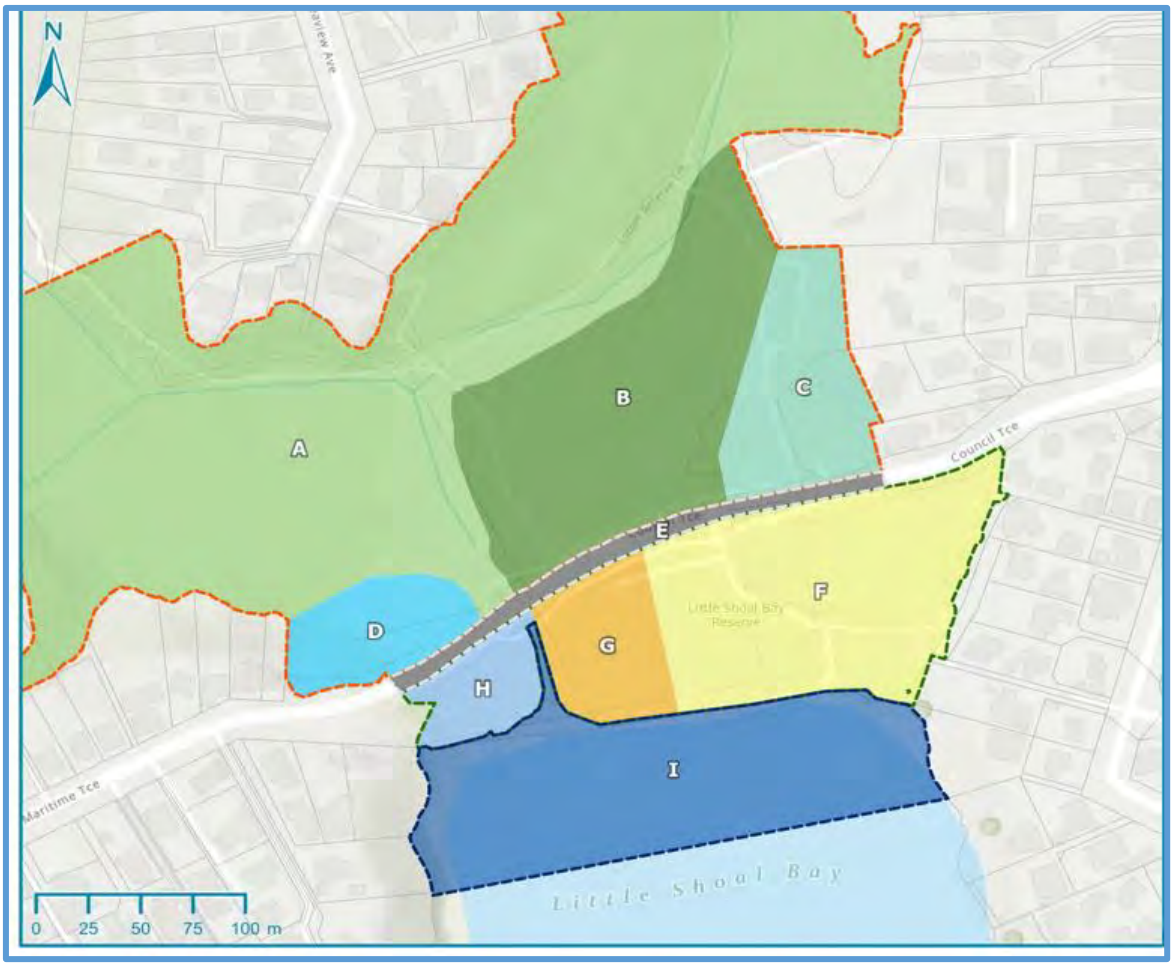



*Figure 15: Eight units representing Wai Manawa/Little Shoal Bay reserve and environs*

### 7.7.1 Social wellbeing

Social wellbeing focussed on Auckland Council-owned social assets and infrastructures. This included an assessment of the community's importance which is placed on recreation areas, parks, and reserves as taken from the AUP dataset (provided by Auckland Council), and park assets and coastal infrastructure. The majority of the land area (Units B, C, D, F, G and H) are dominated by social land and infrastructure. Social infrastructure, such as boardwalks and tracks are also present in Unit A.

### 7.7.2 Economic

The economic aspect focused on assets assigned to the following categories for the analysis:

- Road corridor
- Three-waters infrastructure (including potable water supply, wastewater, and stormwater networks).

Unit E is the road corridor running from east to west through the reserve land. Wastewater infrastructure is located within units A, B, C, E and F with stormwater infrastructure in all units.

### 7.7.3 Environmental

Environmental classifications were based on a range of sources included in the AUP and definitions as set out in Table 4. Environmental exposure is based on land areas and does not include the coastal-coastal transition zone that extends seaward of the line of mean high water springs that also has significant value.

*Table 4: Environmental measure classifications*

| Measure | Source |
|---|---|
| Natural areas of significance | • Natural resources<br>  o Significant ecological areas overlay<br>  o Natural stream management areas<br>  o Wetland management areas overlay<br>• Natural heritage<br>  o Outstanding natural features overlay<br>  o Outstanding natural landscape<br>  o Outstanding natural character overlay<br>  o High natural character overlay |
| Open space – Conservation | AUP base zone classified |
| Closed landfills | Auckland Council closed landfill locations |

### 7.7.4 Cultural

Cultural aspects are not readily able to be assessed using western world view approaches, particularly for mana whenua. This exposure assessment used a set of indicators based on recorded cultural heritage sites to gain some understanding of potential sites of significance but recognises there are likely to be sites and/or values not recorded that may have equal or greater value, particularly for mana whenua.

A range of datasets was used to provide proxies for cultural asset exposure. Additional to the AUP Special Purpose Zones, other datasets available on the AUP GIS viewer are used to supplement the assessment of exposure for cultural sites:

- AUP Historic Heritage Extent of Place Overlay
- AUP Historic Heritage Place Overlay
- AUP Sites and Places of Significance to mana whenua Overlay
- New Zealand Archaeological Association Cultural Sites.

There were only three identified cultural records within this area, and these were plaques, monuments and the historic wharf site but there were no identified mana whenua sites. However, there was significant historic connection and importance of this area to mana whenua, and it is likely that this has been impacted by the more recent reclamations.

## 7.8 Exposure classification

As part of the assessment, the four wellbeings need to be classified into defined ranges from 'very low' to 'very high'. This allows ease of comparison between the various wellbeings (noting some can have a prescribed financial value while for other well beings, a financial quantification is either not appropriate or readily able to be done).

A percentage-based approach has been developed, fitting to a quasi-normal distribution with 10% and 90% representing the very-low and very-high ends of the spectrum. This approach considers the value of each wellbeing in the elements within the combined long-term hazard (i.e., both the coastal inundation and erosion) extent of cell. Table 5 presents the percentage thresholds used within the study.

The exposure classification allows an understanding of the quantity or extent of a particular asset or value and can therefore enable an understanding of which unit has more, or less, exposure compared to other units.

*Table 5: Classifications percentage thresholds*

| Class | Percentage of value per hectare/length for social, economic, and environmental wellbeings |
|---|---|
| Very Low | < 10% |
| Low | 10% - 30% |
| Moderate | 30% - 50% |
| High | 50% - 90% |
| Very High | > 90% |

## 7.9 Exposure assessment results

Detailed exposure results for point assets and areas are included in Appendix B, identifying both the number of point assets and area affected by both coastal erosion and inundation and the percentage of exposure. Scenarios assessed were the 2050, 2080 and 2130+ scenario for coastal erosion, and the 1% AEP storm surge for the present day and with 0.5, 1.0 and 2.0 m sea level rise, although the tables below only present information with up to 1 m sea level rise.

Information on catchment flooding was not included as this is similar to the extent of coastal inundation in the present day. Results are presented with the specific wellbeing identified and

location of the assets and totals are provided that relate to the specific asset layer obtained from Auckland Council's GIS.

Table 6 shows the percentage area of units affected by coastal inundation. The majority of the cricket pitch and the boat yard areas are already highly susceptible to coastal inundation. Increased sea level rise has a relatively small impact on increasing the extent of inundation, but inundation will be more frequent and greater depths of inundation will occur in these areas.

Le Roys Bush (Unit A) is highly exposed to coastal inundation in all periods. While the Road Reserve (Unit E) and Beach Front Reserve (Unit F) transition to high exposure in the medium term. The remaining areas remain moderately exposed in the medium term but increase to highly exposed in the long term with the exception of the landward part of the Maritime Terrace abutment (Unit D).

*Table 6: Percent of area of unit affected by coastal inundation*

| Unit | Main wellbeing in the unit | Short term | Medium term | Long term |
|---|---|---|---|---|
| A - Le Roys Bush and Environs | Environmental | 55% | 62% | 64% |
| B - Cricket Pitch | Social | 98% | 100% | 100% |
| C - Tennis/Basketball and Parking | Social | 13% | 32% | 53% |
| D - Maritime Terrace Abutment | Social | 24% | 36% | 43% |
| E - Road Reserve | Economic | 42% | 59% | 66% |
| F - Beach Front Reserve | Social | 20% | 55% | 65% |
| G - Boat Yard | Social | 94% | 98% | 98% |
| H - Maritime Terrace Abutment | Social | 22% | 41% | 54% |

Units are generally less affected by coastal erosion (Table 7), with erosion susceptibly low in the present term for Units E, F and G and moderate from Maritime Terrace Abutment (Unit H). Exposure increases to high for Unit H in the medium to long term and is high for the Boat Yard (Unit G) in the long term.

*Table 7: Percent of area of unit affected by coastal erosion*

| Unit | Main wellbeing | Short term | Medium term | Long term |
|---|---|---|---|---|
| E - Road Reserve | Economic | 0% | 0% | 2% |
| F - Beach Front Reserve | Social | 12% | 13% | 17% |
| G - Boat Yard | Social | 23% | 25% | 35% |
| H - Maritime Terrace Abutment | Social | 50% | 54% | 68% |

# 8.0 Engagement process

This section summarises the engagement process used to develop the SAP Wai Manawa/Little Shoal Bay.

## 8.1 Engagement with mana whenua

The guiding principles from mana whenua for all SAPs (see Section 1.3) were used to inform the recommended high level strategies set out by each plan and will also be used to evaluate actions and plans that are informed by these strategies.

In the feedback during the eight hui held during the SAP process, iwi also identified that it was important that iwi groups lead the guidance of restoration and storytelling of cultural and natural heritage supported by community groups. This aligns with the Kaipātiki Local Board Plan (2020) commitments as listed below:

- Ensuring that Māori identity, culture and language is consistently incorporated into programmes, services and facility developments
- Supporting community support and networking programmes that respond to the needs of our Māori communities.

## 8.2 Community engagement

Community engagement involved a range of public events, an online survey through the AK Have Your Say page, a webinar and community workshop sessions. The opportunity for the community to provide further insight into key values, issues and concerns for Wai Manawa was offered via submissions to Council as part of the digital engagement process. A total of 19 submissions were provided to Council via email. Mitchell Daysh (2022) prepared a detailed summary of the engagement process for the community and details of the community feedback based on analysis by Auckland Council. This report is included in Appendix C.

Two workshops were facilitated to enable focused discussion of SAP community objectives, strategies and adaptation options for the reserve and wetland areas. The workshops included a range of participants from a variety of backgrounds with most participants being residents of the nearby area. In total, 38 participants attended Workshop 1 and 50 participants attended Workshop 2.

**Acknowledgment of the "Save our Bay" Petition:**

In March 2022, the Save Our Bay campaign ran a Change.org petition inviting the community to have their say about the future of Little Shoal Bay.

Over 850 people from the community signed the petition over a three-week period asking Auckland Council to retain the bay's parks and recreational facilities, with a number providing supporting commentary.

The Kaipātiki Local Board was presented with a presentation of the petition and provided with a summary of the results. Key findings from the commentary included within this petition were:

- People love Wai Manawa/Little Shoal Bay just the way it is
- There is a strong desire to retain and improve the facilities
- People want to balance the environmental needs and protect the freshwater ecology.

## 8.3 Engagement with the Kaipātiki Local Board

Several presentations were made to local board workshops to update them on the engagement process and provide members with the opportunity to provide feedback. Two joint engagement hui were also held with representatives of the local board (chair and deputy chair) and mana whenua to assist with aligning objectives and outcomes.

## 8.4 Engagement with Auckland Council specialists

Specialists from Community Facilities, Parks Sports and Recreation, Healthy Waters and Regulatory Services participated in the project team internal workshops and meetings as well as attending the public and local board workshops. Watercare and Auckland Transport were briefed on progress throughout preparation of the plan and development of the management strategies.

# 9.0 Values and objectives

The values and objectives have been obtained from engagement carried out throughout development of the 'mini' SAP with mana whenua, the local community and the Local Board, and are summarised in Section 8.0. They have been further informed by mana whenua's guiding principles (as set out in Section 1.0), from previous management plans (as set out in Section 6.2), understandings of the policy guidelines (Section 3.5).

It is recognised that the profile raising, information dissemination and engagement instigated by Save Little Shoal Bay organization, an independent group formed by interested community members created significant public interest and that assisted with the engagement and feedback through this process.

## 9.1 Visions and values

Some 395 responses to the survey were received with written comments, photographs and suggested development and mitigation options within the reserve and wetland areas. Table 8 shows a summary of the responses based on five high-level categories and the number of survey results tagged. More than 60% of respondents commented on the importance of active and passive recreation and 48% on the importance of the environment. The boat yard was an area of considerable interest in the digital engagement with 182 participants commenting on it (around 46% of the respondents). Ninety-two (23% of respondents) indicated they supported its removal and 50 participants (13% of respondents) indicated they support it remaining.

Figure 16 shows the areas most commented on within each high-level category. For active recreation, the highest rated comments were associated with the sports field (45% of respondents) followed by walking, and the playground (23% and 21% respectively). Strong support for the wetland, biodiversity, the stream and water quality were raised in the environment category. The remaining categories generally received fewer responses. Most items for passive recreation were seen as important, while for access the walkways, road and carpark received the most responses.

*Table 8: Online survey results (Source: Mitchell Daysh, 2022)*

| High level category | # of survey results tagged | Results of sub-topic tags |
|---|---|---|
| Active recreation | 268 | • The active recreation values of the reserve areas were highly commented on by the local community<br>• Topics of importance included the sports field and other sport-related activities<br>• The community also highly valued the importance of the reserve for walking and the availability of the playground for children |
| Passive recreation | 238 | • The passive recreation value of Wai Manawa/Little Shoal Bay was highly commented on |

| High level category | # of survey results tagged | Results of sub-topic tags |
|---|---|---|
| | | • Topics of importance included the boat yard, the ability to picnic, the amenity reserve as a viewpoint and location for events, and its importance to the local community as a place to connect to nature. |
| Access | 110 | • Subtopics within the access category related to the importance of walkways and boardwalks and ensuring that the road remain a functioning transport connection with adequate parking |
| Community heritage and cultural values | 83 | • Comments within this category focused mostly on enabling community connectivity to the reserve and the importance of Wai Manawa / Little Shoal Bay as a heritage location and site of Manua Whenua significance |
| Environment | 189 | • The environment was also a key focus. Topics of importance included biodiversity, the wetland areas, improving water quality, the stream and concern about contamination |

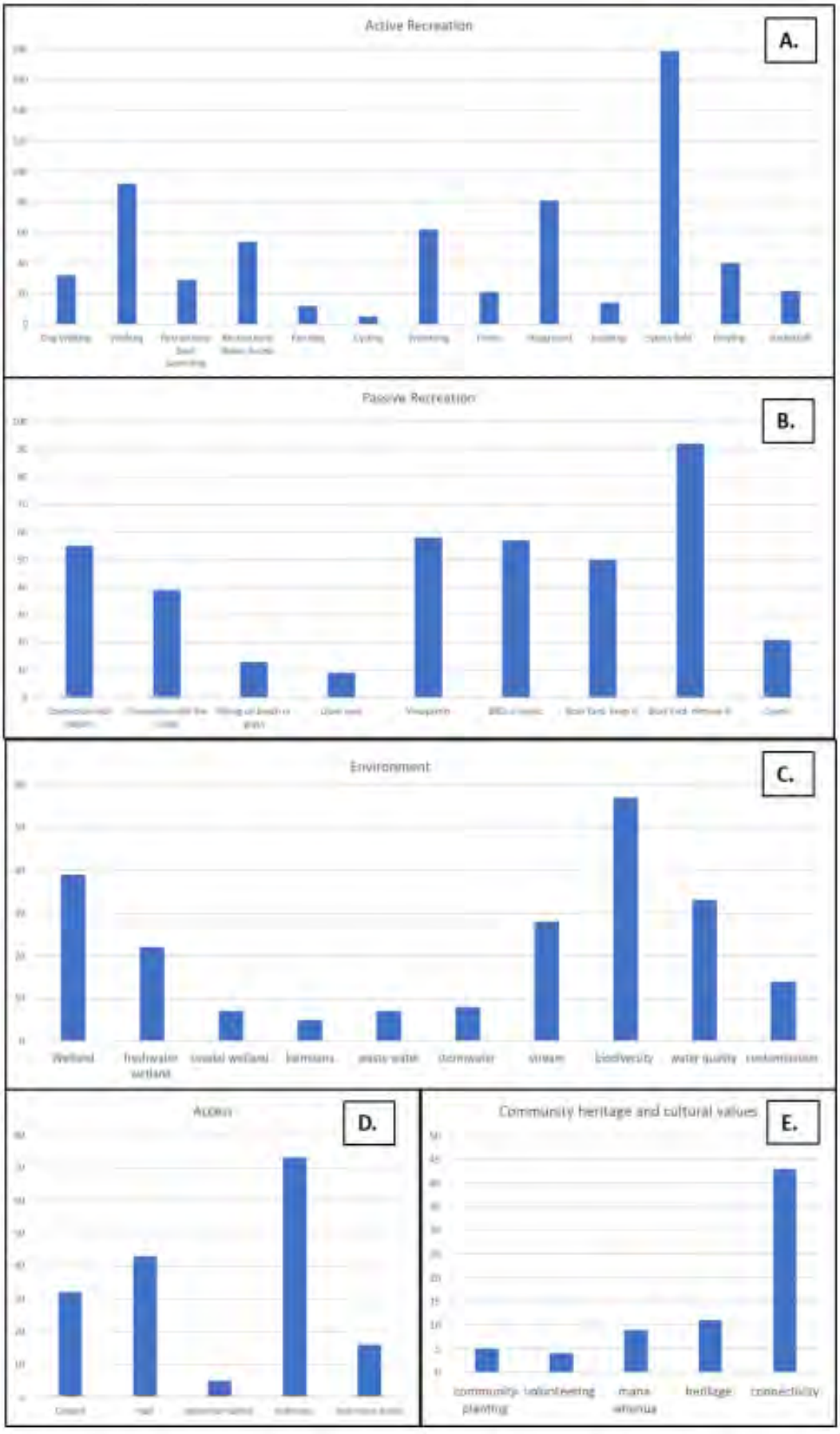



*Figure 16: Responses for specific issues within key category areas*

## 9.2 Objectives

The purpose of Workshop 1 was to understand local knowledge and to have thorough discussions with participants to identify and agree key community values, objectives and outcomes. The primary and secondary objectives were based on the high level categories identified through community engagement. Primary and Secondary objectives along with key outcomes for each unit are shown in Table 9.

*Table 9: Key objectives and outcomes from community Workshop 1*

| Cell | Unit | Primary objective | Secondary objectives | Key outcomes |
|---|---|---|---|---|
| North of road | A<br>Le Roys Bush and environs | Environment | • Passive Recreation<br>• Access<br>• Community, heritage & cultural values | • Enhance natural wetland functioning<br>• Reduce pollutants from catchment entering wetland<br>• Maintain functioning wastewater network<br>• Enhance network of boardwalks<br>• Raise awareness of sense of place for cultural heritage and environment |
| | B<br>Cricket pitch | Active recreation | • Access<br>• Passive Recreation<br>• Environment | • Retain space for active recreation (sport)<br>• Dog walking<br>• informal active recreation<br>• Enhance wetland edges and functioning |
| | C<br>Tennis/ Basketball and parking | Active recreation | • Access<br>• Passive recreation<br>• Environment | • Retain basketball and tennis court<br>• Maintain access and connection to boardwalks, walkways and southern reserve area<br>• Improve access and parking |
| | D<br>Abutment (north) | Passive recreation | • Environment<br>• Community, heritage and cultural values | • Raise awareness of sense of place for cultural heritage and environment<br>• Include in landscaping/planting area |
| Road reserve | E<br>Road reserve | Access | • Recreational Water access<br>• Environment | • Maintain multi-modal route access along road reserve.<br>• Ensure safe access across road to adjacent reserve areas. |

| Cell | Unit | Primary objective | Secondary objectives | Key outcomes |
|---|---|---|---|---|
| South of road | F<br>Beach front reserve | Passive recreation | • Access<br>• Active recreation<br>• Recreational Water access<br>• Community, heritage and cultural values | • Maintain high quality reserve space<br>• Enhance access to the water. |
| | G<br>Boat yard | Passive recreation | • Recreational water access<br>• Environment<br>• Active recreation<br>• Community, heritage and cultural values | • Resolve boat yard status<br>• Enhance opportunities for active and passive recreation around the coast edge including swimming, kayaking, fishing and walking<br>• Improve and enhance environment |
| | H<br>Abutment (south) | Passive recreation | • Environment | • Enhance opportunities for passive recreation experiences including outlooks and picnicking areas<br>• Improve and enhance environment |
| Foreshore (CMA) | I<br>Foreshore | Passive recreation | • Recreational water access<br>• Environment | • Improve and enhance environment<br>• Improve access from reserve to foreshore |

# 10.0 Adaptation strategies

Shoreline adaptation strategies need to be targeted and specific, with the chosen strategy and pathway taking into account the unique character and values of the coastal areas in question. The development of adaptation strategies requires consideration of escalating risk, the values of mana whenua, feedback of infrastructure providers, and the objectives of the local community. Giving effect to mana whenua values in the development and implementation of adaptation strategies is essential.

## 10.1 Adaptation strategy definitions

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

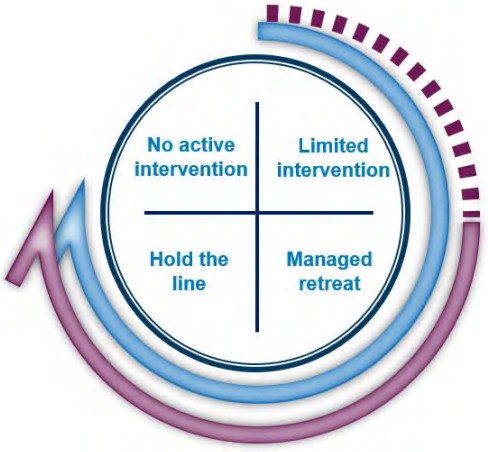
**No Active Intervention (NAI)**

Natural processes are allowed to continue.

- There is 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 retreat 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 (like dune planting) to support the coastline's resilience.




**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.

**Hold the Line (HTL)**

- The function and use of the area in question is preserved.
- This may include the use of nature-based options (like beach nourishment) or hard structures (e.g. sea walls).
- Nature-based options are the preferred method where possible.

Adaptation strategies are recommended across the short (0-20 years), medium (20-60 years), and long (60+ years) timeframes. However, when dealing with climate change impacts, it is important to note that the timing of when a change in strategy is required can be uncertain. While specific signals and triggers are not identified in this plan, we have endeavoured to provide high-level indications of potential impacts that would lead to a change in strategy.

## 10.2 Community preferred adaptation strategies

The purpose of the Workshop 2 sessions was to confirm the community objectives and outcomes previously identified and discuss the range of potential adaptation strategies and their alignment with identified community priorities.

The results of the high-level strategies based on Workshop 2 are shown in Figure 17 as well as the community primary and secondary objectives within each unit. In most areas there were clear preferences of adaptation approaches to apply. In Area I the preferred action was ‘limited intervention’, while for the reserve areas seaward of the road, the strategy was to ‘hold the line’ to maintain the high-quality reserve space for wider public use. ‘Hold the line’ was also the preferred strategy within the majority of Unit B and all of Unit C. Within Le Roys Bush there was a greater range of suggested strategies.

Overall, the themes for the reserve included:

- Improving the water quality of the Coastal Marine Area
- ‘Holding the line’ along the coastal edge with improved water access and enhancement of the beach front reserve
- Maintaining the active recreation areas of the reserve and some ‘limited intervention’ within the freshwater wetland.

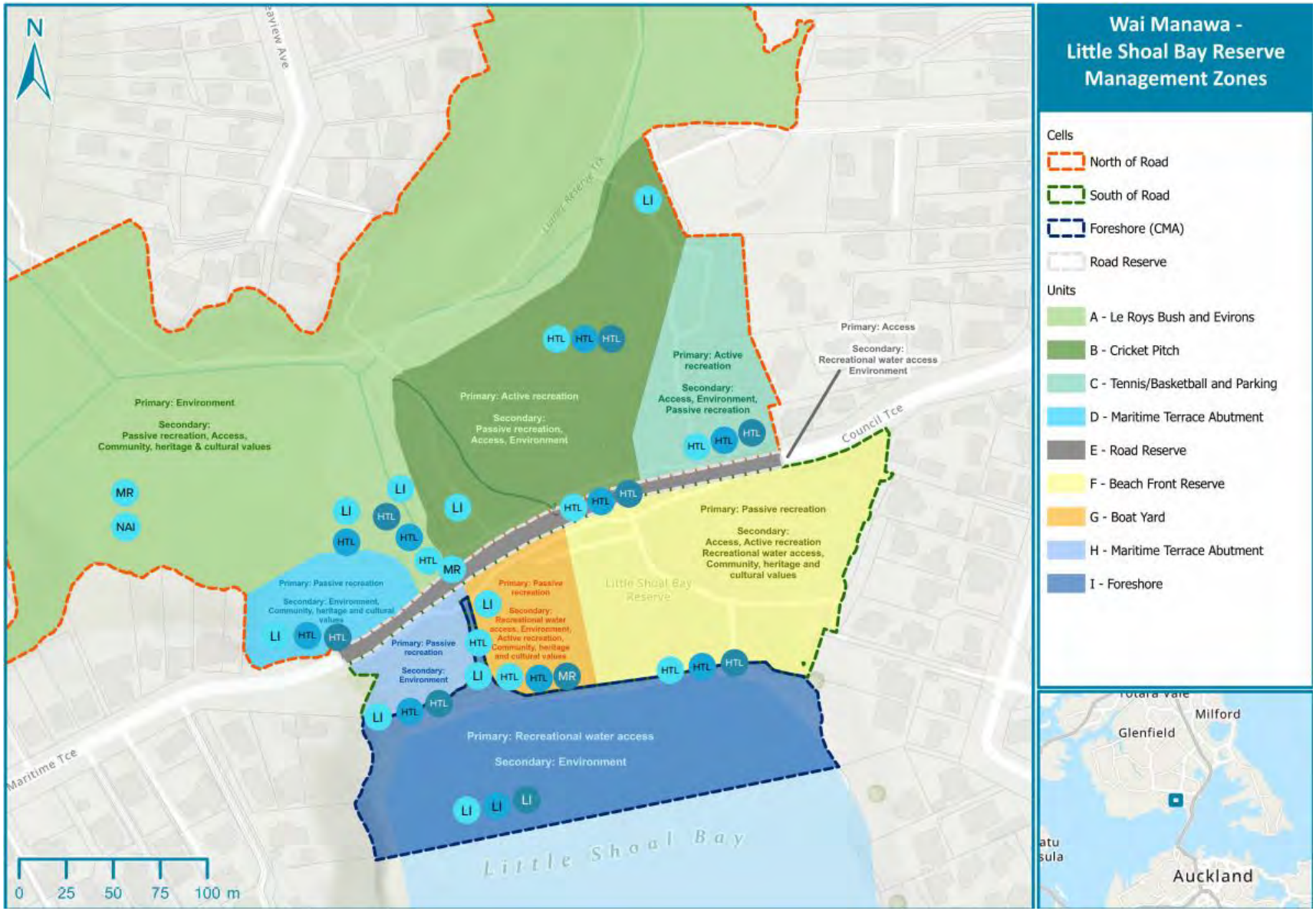



*Figure 17: Consolidated feedback from community Workshops 1 and 2*

## 10.3 Community suggested actions

During the community workshops, actions were also suggested for the various units. Table 10 shows the suggested actions and the range of ideas for the wetland, consistent with the range of proposed adaptation strategies and developed from the key outcomes in Table 9. It also shows a range of possible actions depending on the future of the boat yard.

*Table 10: Suggested actions for unit areas identified during community workshops*

| Unit | Area | Suggested actions from community workshop |
|---|---|---|
| A | Le Roys Bush and Environs | Naturalise wetlands if NAI allows natural succession |
| A | Le Roys Bush and Environs | Help facilitate the zonal transition from saltwater to freshwater by managing vegetation |
| A | Le Roys Bush and Environs | Allow natural succession - improve both freshwater and saltwater areas |
| A | Le Roys Bush and Environs | Reduce flow through culvert if *Managed Retreat* |
| A | Le Roys Bush and Environs | Perhaps allow freshwater, transition and saltwater zones to form in the short term but apply controls to maintain zone edges when established trees are threatened |
| B | Cricket Pitch | Retain Dudding Reserve for cricket and other sports perhaps increase levels but let the west go to wetland |
| A/B | Le Roys Bush and Environs/Cricket Pitch | Close the pipe |
| B | Cricket Pitch | Raise the level of the cricket pitch |
| A | Le Roys Bush and Environs | Reinstalling flood gates in the short term to manage seawater influx |
| A/G | Le Roys Bush and Environs/Boat Yard | Maintain and potentially enhance fish passage |
| A/G | Le Roys Bush and Environs/Boat Yard | Manage contaminants in boat yard and Le Roys bush |
| A | Le Roys Bush and Environs | Natural approaches to slow water flow/ encroachment |
| E | Road Reserve | Improve road safety as a part of access. Plantings and crossings to be looked at |
| F | Beach Front Reserve | Improve water access where seawall currently sits, perhaps with a natural option like Huia. Improve Safety, particularly access for families |
| F | Beach Front Reserve | Improve or maintain seawall |

| Unit | Area | Suggested actions from community workshop |
|---|---|---|
| F | Beach Front Reserve | Improve access, open to a natural option moving away from hard infrastructure like seawalls |
| F | Beach Front Reserve | Retain and enhance seawall. Natural options could be considered as well |
| F | Beach Front Reserve | Be careful to maintain water access for pedestrians. Consider the safety of a sharp seawall on children/paddle boarders' feet |
| G | Boat Yard | If the boat yard is removed, plant and enhance value for passive recreation |
| G | Boat Yard | Keep seawall |
| G | Boat Yard | Close the boat ramp as sea-level rise increases |
| G | Boat Yard | Clean up contaminants |
| G/H | Boat Yard/Maritime Terrace Abutment | Remove wrecks/old boats from area |
| H/G | Boat Yard/Maritime Terrace Abutment | Short term re-install flood gates to help control seawater flow |
| H/G | Boat Yard/Maritime Terrace Abutment | Flood gates as a short-term option to reduce seawater flow |
| G | Boat Yard | Enhance natural value |
| H | Maritime Terrace Abutment | Improve hazard posed by water velocity from pipe out to sea |
| I | Maritime Terrace Abutment | Retain Māori values in these areas and access to Mahinga kai |
| I | Maritime Terrace Abutment | Reduce contaminants from the land areas |
| All | | If *hold the line* happens for southern sites - reduces need for actions in northern sites |
| CMA | Foreshore | Groynes as a potential HTL solution alongside the seawall |
| CMA | Foreshore | Improve water quality and access for water activities |
| CMA | Foreshore | Identify source of contaminants |

## 10.4 Preferred adaptation strategies

Based on community feedback, understanding the guidance imposed by regional and national policy, particularly associated with wetlands, and a consideration of the mana whenua guiding principles, the preferred adaptation strategies were developed and are set out in Table 11. Strategies include 'limited intervention' for Le Roys Bush and environs and the coastal marine area within Shoal Bay for all time frames, and 'hold the line' for the land-based reserve areas for all time periods.

*Table 11: Preferred high level adaptation strategies for the units in Wai Manawa/Little Shoal Bay.*

| Cell | | Unit | Short term 2025 - 2045 | Medium Term 2045 - 2085 | Long Term 2085 – 2130 |
|---|---|---|---|---|---|
| North of road | A | Le Roys Bush and environs | Limited intervention | Limited intervention | Limited intervention |
| | B | Cricket pitch | Hold the line | Hold the line | Hold the line |
| | C | Tennis/ basketball and parking | Hold the line | Hold the line | Hold the line |
| | D | Abutment (north) | Hold the line | Hold the line | Hold the line |
| Road reserve | E | Road reserve | Hold the line | Hold the line | Hold the line |
| South of road | F | Beach front reserve | Hold the line | Hold the line | Hold the line |
| | G | Boat yard | Hold the line | Hold the line | Hold the line |
| | H | Abutment (south) | Hold the line | Hold the line | Hold the line |
| Foreshore (CMA) | I | Foreshore | Limited intervention | Limited intervention | Limited intervention |

## 10.5 Possible current (2022 -2025) actions

As implementation of the SAP strategies could take a number of years as the SAP process is being applied around the entire Auckland region, a range of actions that can be undertaken to meet current issues within current budgets have been identified.

Table 12 presents the current actions that can be undertaken to support development of the strategies and to address current issues.

*Table 12: Possible actions to support development of strategies and address current issues*

| Item | Unit | Short Term Strategy | Action |
|---|---|---|---|
| 1 | Unit A<br>(Le Roys Bush) | Limited intervention | • Additional studies to understand salt water/freshwater effects of possible actions. |
| 2 | Unit B<br>(Car park adjacent to bowling club) | Hold the line | • Local bund raising and stormwater upgrade to reduce nuisance flooding of car park. |
| 3 | Unit B<br>(Duddings Reserve) | Hold the line | • Shift and raise cricket pitch to the west to retain active recreational space and planting of western edge of reserve. |
| 4 | Unit B and E<br>(Duddings and road access) | Hold the line | • Install non-return valves on stormwater pipes to reduce nuisance sea inundation due to high tides (does not address larger flooding). |
| 5 | Unit G/F<br>(Boat yard and beach front reserve area) | Hold the line | • Investigate options to reduce inundation through beach access ramp.<br>• Could include removing access ramp to boat yard by extending seawall, or low bunds on reserve to reduce flood pathway during high tides and storm surge events. |
| 6 | Unit I<br>(CMA adjacent to 1350 outlet at western end of bay) | Limited intervention | • Investigate benefit of existing unauthorised wool bale bag groyne structure and options for more durable replacement if retaining structure is preferred. |

# 11.0 Conclusions

The Wai Manawa/Little Shoal Bay ‘mini’ SAP has set the long-term strategic direction for management of the Bay and its environs. It outlines decisions on how Auckland Council-owned land and assets will be sustainably managed against the impacts of coastal hazards and climate change across the short (0-20 years), medium (20-60 years), and long (60 years and onwards) term.

As a more focussed, ‘mini’ SAP, the Plan also includes a series of six possible current actions that can be undertaken within existing budgets to address current issues and support the development of future adaptation strategies.

## 11.1 Next steps

For consistency with the broader SAP Work Programme, results of the Wai Manawa/Little Shoal Bay ‘mini’ SAP will be embedded into the wider Waitemata Harbour SAP when it is developed. Recognising the extensive engagement already undertaken for Wai Manawa/Little Shoal Bay, this area will not be revisited as part of this process.

# 12.0 References

Auckland Council (2013) Wai Manawa/Little Shoal Bay stormwater catchment management plan, Version 3, August 2013

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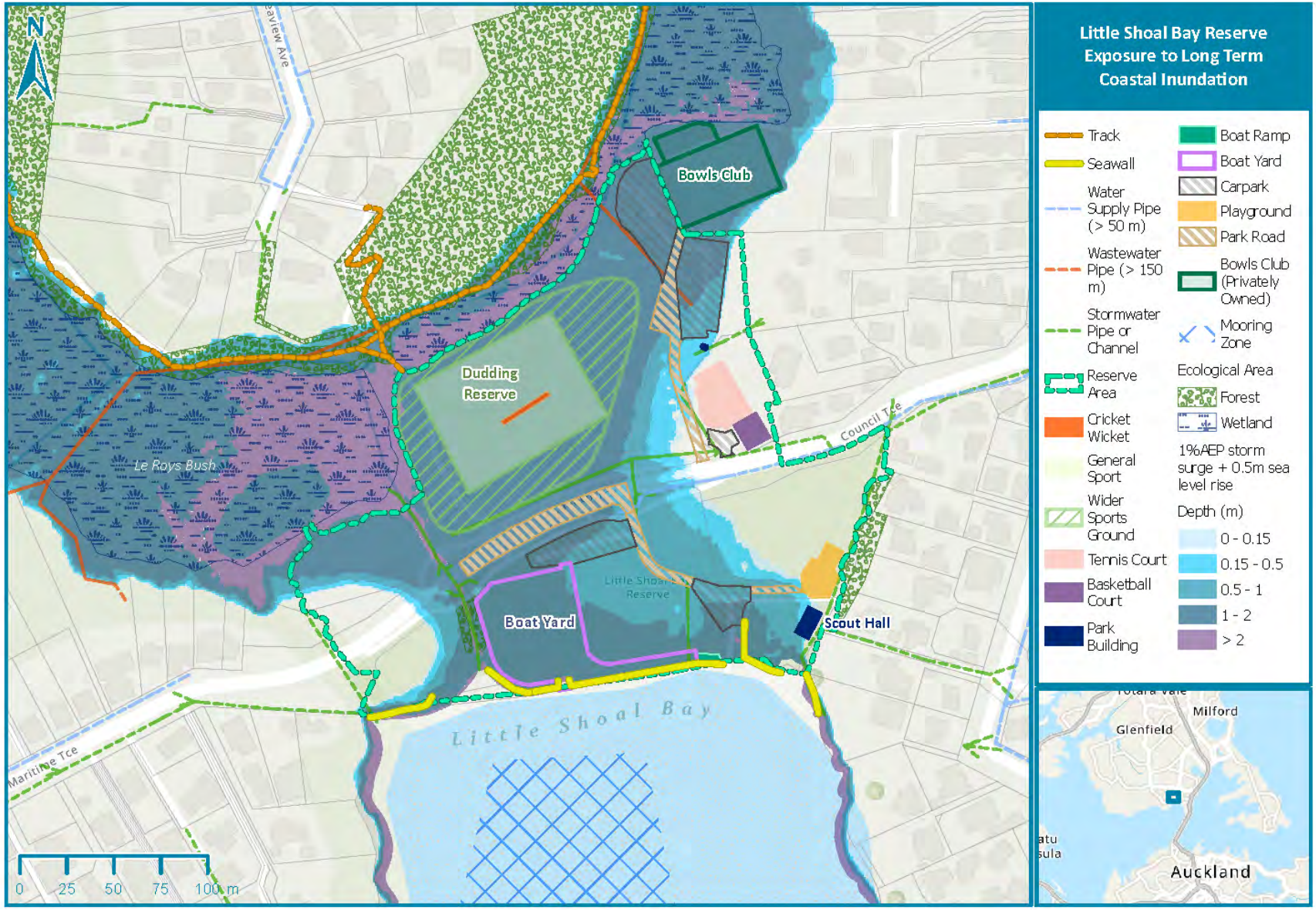
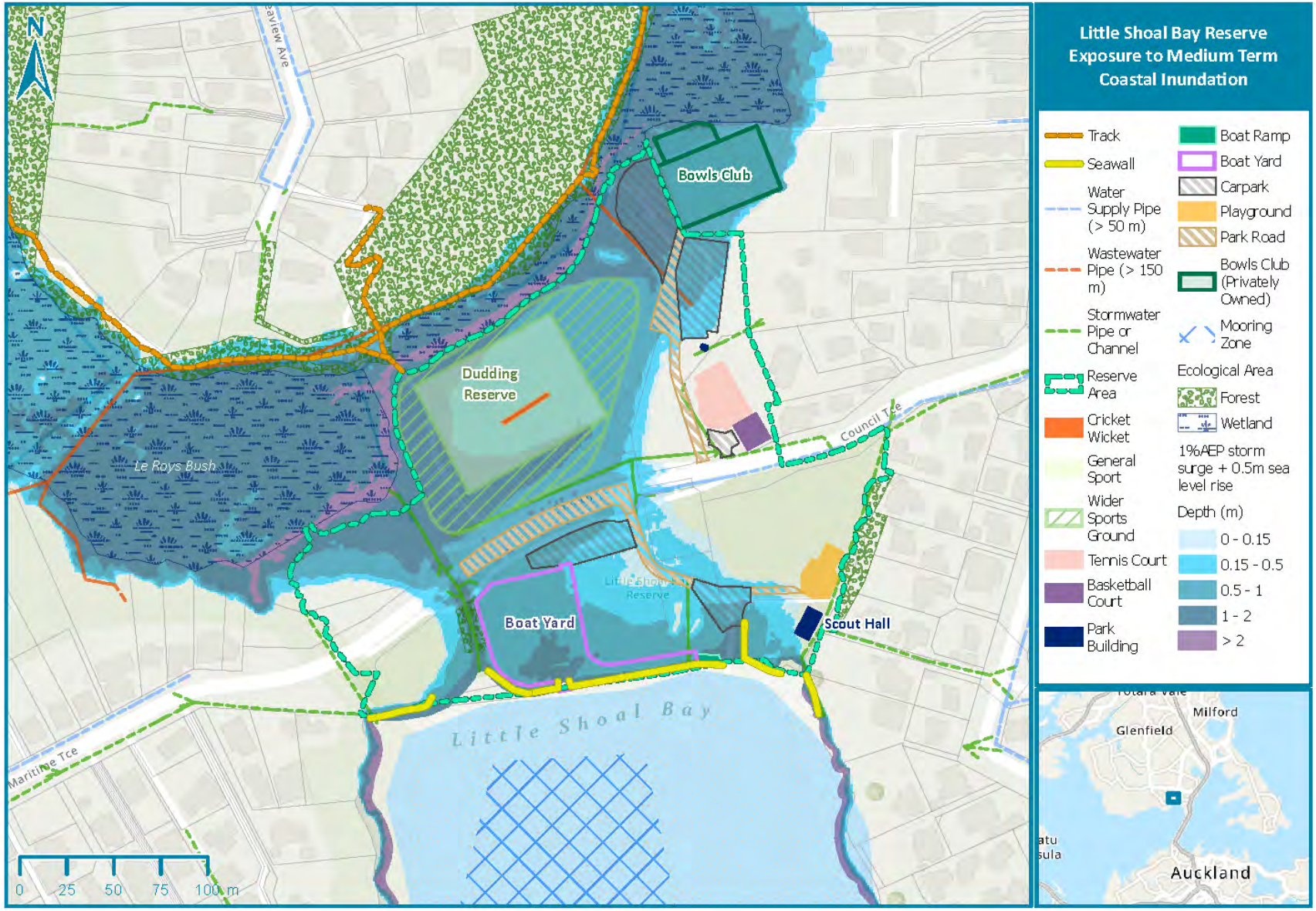
Tonkin + Taylor (2021) Auckland Coastal Erosion Study: Regional Assessment. T+T Ref. 1007104 prepared for Auckland Council, February 2021.

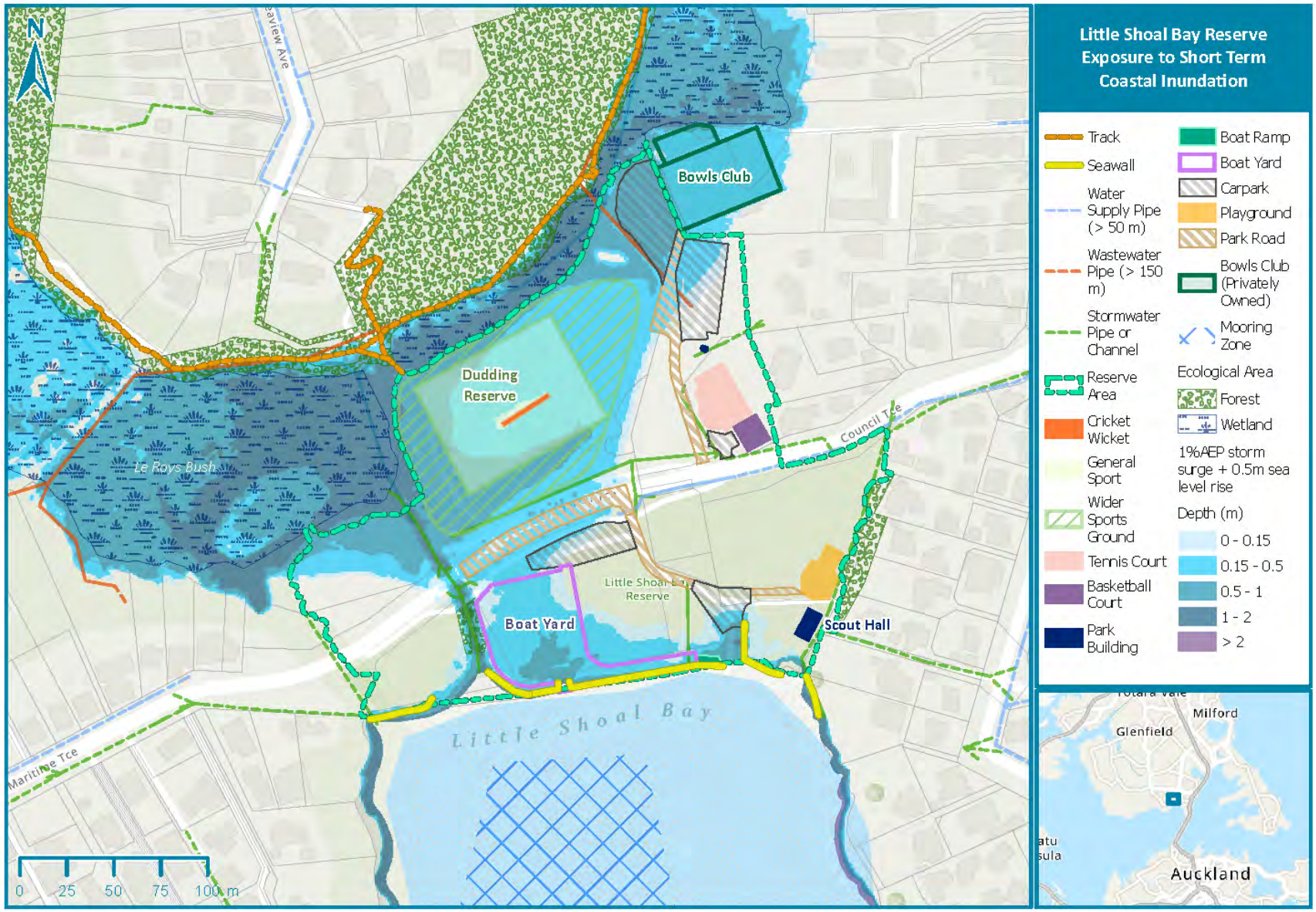
# Appendix A: Hazard extents



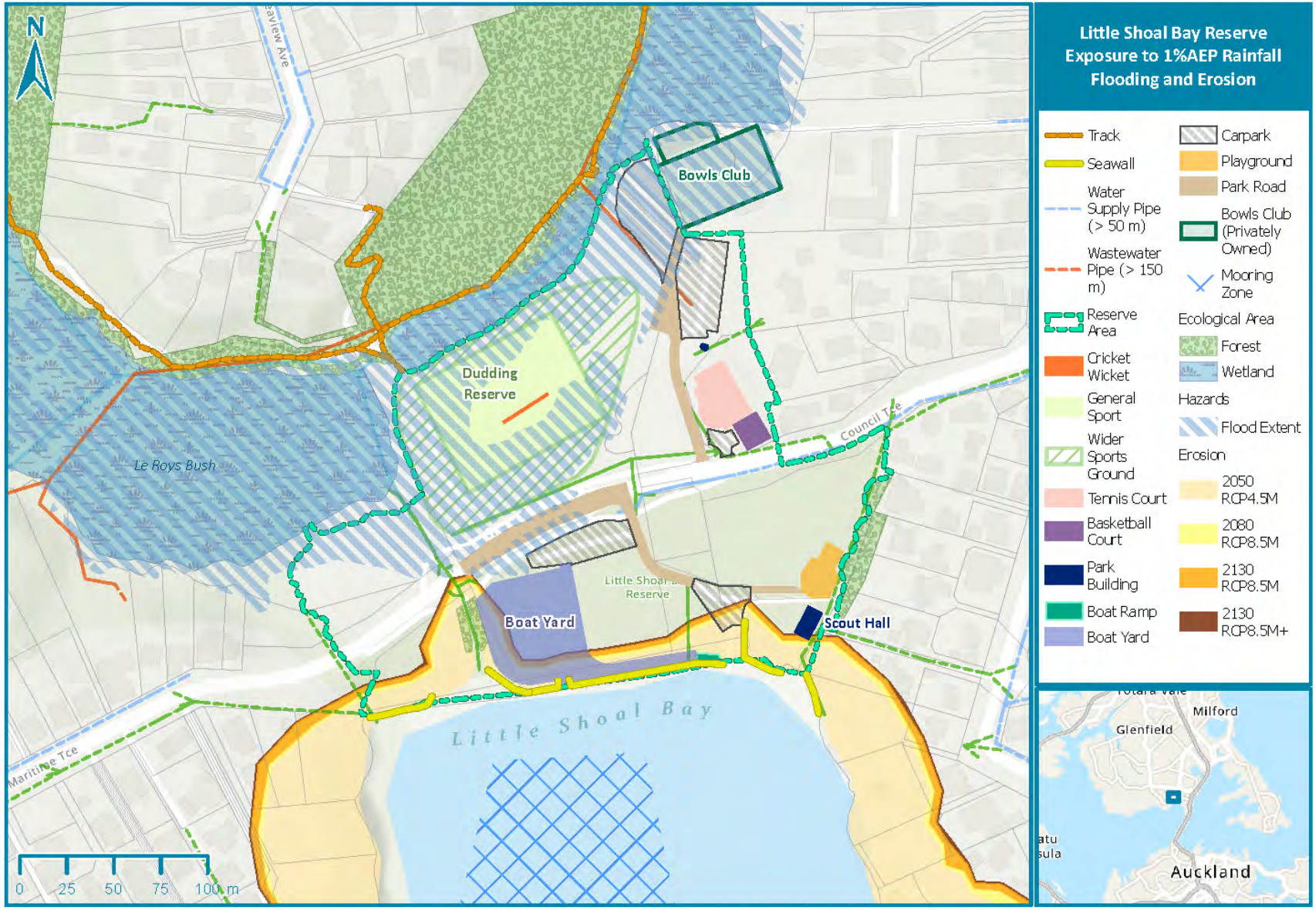

*Appendix A Figure 1: Little Shoal Bay Reserve exposure to long-term coastal inundation*




*Appendix A Figure 2: Little Shoal Bay Reserve exposure to medium-term inundation*




*Appendix A Figure 3: Little Shoal Bay Reserve exposure to short-term coastal inundation*




*Appendix A Figure 4: Little Shoal Bay Reserve exposure to 1% AEP rainfall flooding and erosion*

# Appendix B: Schedule of assets and exposure summary tables

*Table 13: Total number or size of land areas and physical assets within project area*

| Wellbeing | Asset | Unit | Total in Little Shoal Bay and Le Roys Bush |
|---|---|---|---|
| **Total point assets** | | **Count** | **74** |
| Social | BBQ | Count | 2 |
| Social | Gate | Count | 3 |
| Social | Playground Equipment | Count | 2 |
| Social | Pole | Count | 15 |
| Social | Rubbish Bin | Count | 14 |
| Social | Seat | Count | 22 |
| Social | Sports Equipment | Count | 1 |
| Social | Table | Count | 2 |
| Environmental | Kauri Dieback Station | Count | 9 |
| Cultural | Plaque | Count | 2 |
| Cultural | Monument | Count | 1 |
| Cultural | INDUSTRIAL \| WHARF SITE | Count | 1 |
| **MASTER_ParkBuilding_inundated.shp (Total)** | | **Area m²** | **362** |
| Social | Hall Street Beach Public Toilets | Area m² | 27 |
| Social | Toilet (Little Shoal Bay Reserve) | Area m² | 12 |
| Social | Toilet(Little Shoal Bay Reserve Scout Den) | Area m² | 139 |
| **MASTER_ParkGardenTurfExtent_ecological_inundated.shp (Total)** | | **Area m²** | **182,701** |
| Environmental | BUSH-Throughout Reserve | Area m² | 101,527 |
| Environmental | BUSH-Throughout the reserve | Area m² | 53,478 |
| Social | GRAS- | Area m² | 22,991 |
| Environmental | RVEG-Behind tennis crt & W of sportfield | Area m² | 1,617 |
| Environmental | RVEG-Opposite bowling club | Area m² | 161 |
| Environmental | SHRB-Around tennis crts & c/prks | Area m² | 238 |
| Environmental | SHRB-Beside a/w to playground | Area m² | 833 |

| Wellbeing | Asset | Unit | Total in Little Shoal Bay and Le Roys Bush |
|---|---|---|---|
| Environmental | SHRB-Maritime Tc road swale planting | Area $m^2$ | 43 |
| Environmental | WILD-Throughout the reserve | Area m2 | 1,310 |
| **MASTER_ParkSportExtent_inundated.shp (Total)** | | **Area $m^2$** | **11,893** |
| Social | COUH-Bball-beside tennis crt (15x15) | Area $m^2$ | 225 |
| Social | COUH-Tennis-E of playing fields | Area $m^2$ | 578 |
| Social | PETA-Beside tennis court | Area $m^2$ | 136 |
| Social | Summer - Astro - Cricket Wicket 1A | Area $m^2$ | 80 |
| Social | Winter - Soil - 1 - General Sport | Area $m^2$ | 5,205 |
| Social | Winter - Soil - Surrounds - General 1 | Area $m^2$ | 5,669 |
| **MASTER_ParkStructureHardSurface_access_inundation.shp (Total)** | | **Area $m^2$** | **5,118** |
| Social | BOAR-2nd W of cricket field | Area $m^2$ | 6 |
| Social | BOAR-3rd W of cricket field | Area $m^2$ | 6 |
| Social | BOAR-4th E of junction | Area $m^2$ | 6 |
| Social | Boardwalks | Area $m^2$ | 233 |
| Social | Footpath/Tracks | Area $m^2$ | 93 |
| Social | PADS-For BBQ area by beach | Area $m^2$ | 26 |
| Social | PATH-Bridge towards Valley Rd | Area $m^2$ | 74 |
| Social | PATH-Concrete rest area above seawall | Area $m^2$ | 16 |
| Social | PATH-Dudding to Wilding Ave | Area $m^2$ | 134 |
| Social | PATH-Fairfax Av to junction | Area $m^2$ | 82 |
| Social | PATH-From 24 Glade Place | Area $m^2$ | 83 |
| Social | PATH-From C/prk to Clarence St a/w | Area $m^2$ | 71 |
| Social | PATH-from S bridge into Maritime Tce | Area $m^2$ | 64 |
| Social | PATH-Junction to junction | Area $m^2$ | 450 |
| Social | PATH-Maritime Tce N side | Area $m^2$ | 366 |
| Social | PATH-Maritime Tce N side to BOAR | Area $m^2$ | 24 |
| Social | PATH-N side cricket field | Area $m^2$ | 62 |
| Social | PATH-Private | Area $m^2$ | 70 |
| Social | PATH-S side Council Tce | Area $m^2$ | 188 |
| Social | PATH-S side Maritime Tce | Area $m^2$ | 348 |

| Wellbeing | Asset | Unit | Total in Little Shoal Bay and Le Roys Bush |
|---|---|---|---|
| Social | PATH-Seaview to cricket field | Area $m^2$ | 93 |
| Social | PATH-To toilet by tennis crts | Area $m^2$ | 20 |
| Social | PATH-to toilets | Area $m^2$ | 57 |
| Social | PATH-toilets to beach | Area $m^2$ | 11 |
| **MASTER_ParkStructureHardSurface_Bridge_inundation.shp (Total)** | | **Area $m^2$** | **150** |
| Social | BRDP-40m S of 24 Wilding Ave | Area $m^2$ | 35 |
| Social | BRDP-N side cricket field | Area $m^2$ | 11 |
| Social | BRDV-NE side cricket field | Area $m^2$ | 32 |
| Social | Pedestrian Bridge | Area $m^2$ | 22 |
| **MASTER_ParkStructureHardSurface_multiple_inundated.shp (Total)** | | **Area $m^2$** | **9,028** |
| Social | BASEC-Boat yard & slipway | Area $m^2$ | 3,300 |
| Social | BASEV-From c/prk to playground | Area $m^2$ | 91 |
| Social | CSUR-Beside Tennis & Basketball crts | Area $m^2$ | 153 |
| Social | CSUR-Between tennis crt & bowls club | Area $m^2$ | 1,203 |
| Social | CSUR-by bridge to track | Area $m^2$ | 1,241 |
| Social | CSUR-Nearest playground | Area $m^2$ | 511 |
| Social | CSUR-Sth side of Maritime Terrace | Area $m^2$ | 852 |
| Social | SURF-Cushionfall | Area $m^2$ | 425 |
| Social | VSUR-Council Terr to p/grnd c/prk | Area $m^2$ | 278 |
| Social | VSUR-To Bowls club c/prks | Area $m^2$ | 840 |
| **MASTER_ParkStructureHardSurface_ramp_inundation.shp (Total)** | | **Area $m^2$** | **51** |
| Social | BOAT-Dinghy Ramp PRIVATE | Area $m^2$ | 2 |
| Social | BOAT-SE cnr reserve by slipway | Area $m^2$ | 49 |
| **MASTER_ParkStructureHardSurface_steps_inundation.shp (Total)** | | **Area $m^2$** | **437** |
| Social | BOXS-From path down to toilets | Area $m^2$ | 11 |
| Social | BOXS-From path to beach path | Area $m^2$ | 11 |
| Social | STEP-6th down frm Seaview | Area $m^2$ | 2 |
| Social | STEP-Between 2 boardwks | Area $m^2$ | 8 |

| Wellbeing | Asset | Unit | Total in Little Shoal Bay and Le Roys Bush |
|---|---|---|---|
| Social | STEP-Concrete steps beside toilets | Area $m^2$ | 2 |
| Social | STEP-Concrete steps down to beach | Area $m^2$ | 16 |
| Social | STEP-Entry at 24 Wilding Ave | Area $m^2$ | 36 |
| Social | STEP-Private-102A Queen St | Area $m^2$ | 3 |
| Social | STEP-Private-57 Maritime Terrace | Area $m^2$ | 2 |
| **GasworksCappedArea_inundated (Total)** | | **Area $m^2$** | **10,938** |
| **ManagementZones_inundated (Total)** | | **Area $m^2$** | **140,595** |
| Environmental | A - Le Roys Bush and Environs | Area $m^2$ | 71,695 |
| Social | B - Cricket Pitch | Area $m^2$ | 17,287 |
| Social | C - Tennis/Basketball and Parking | Area $m^2$ | 6,790 |
| Social | D - Maritime Terrace Abutment | Area $m^2$ | 3,922 |
| Economic | E - Road Reserve | Area $m^2$ | 2,274 |
| Social | F - Beach Front Reserve | Area $m^2$ | 14,925 |
| Social | G - Boat Yard | Area $m^2$ | 4,246 |
| Social | H - Maritime Terrace Abutment | Area $m^2$ | 2,681 |
| Social | I - Foreshore | Area $m^2$ | 17,139 |
| **Economic** | **Wastewater pipe (Total)** | **Length m** | **1,689** |
| Economic | A - Le Roys Bush and Environs | Length m | 1,239 |
| Economic | B - Cricket Pitch | Length m | 59 |
| Economic | C - Tennis/Basketball and Parking | Length m | 158 |
| Economic | E - Road Reserve | Length m | 10 |
| Economic | F - Beach Front Reserve | Length m | 223 |
| **Economic** | **Stormwater Pipe (Total)** | **Length m** | **594** |
| Economic | A - Le Roys Bush and Environs | Length m | 33 |
| Economic | B - Cricket Pitch | Length m | 20 |
| Economic | C - Tennis/Basketball and Parking | Length m | 154 |
| Economic | E - Road Reserve | Length m | 18 |
| Economic | F - Beach Front Reserve | Length m | 204 |
| Economic | G - Boat Yard | Length m | 7 |
| Economic | H - Maritime Terrace Abutment | Length m | 21 |

| Wellbeing | Asset | Unit | Total in Little Shoal Bay and Le Roys Bush |
|---|---|---|---|
| Economic | I - Foreshore | Length m | 10 |
| Economic | **Stormwater Channel (Total)** | Length m | **91** |
| Economic | A - Le Roys Bush and Environs | Length m | 45 |
| Economic | H - Maritime Terrace Abutment | Length m | 6 |
| Economic | I - Foreshore | Length m | 40 |
| Economic | **Water Pipe (Total)** | Length m | **122** |
| Economic | F - Beach Front Reserve | Length m | 122 |

*Table 14: Asset exposure to coastal inundation*

| Wellbeing | Asset | Unit | 1% AEP | 1% AEP + 0.5m SLR | 1% AEP + 1m SLR | 1% AEP + 2m SLR |
|---|---|---|---|---|---|---|
| **Total point assets** | | **Count** | **28** | **45** | **47** | **58** |
| Social | BBQ | Count | | 2 | 2 | 2 |
| Social | Gate | Count | 2 | 3 | 3 | 3 |
| Social | Playground Equipment | Count | | | | 1 |
| Social | Pole | Count | 9 | 12 | 14 | 14 |
| Social | Rubbish Bin | Count | 6 | 10 | 10 | 13 |
| Social | Seat | Count | 8 | 12 | 12 | 17 |
| Social | Sports Equipment | Count | | | | 1 |
| Social | Table | Count | | 2 | 2 | 2 |
| Environmental | Kauri Dieback Station | Count | 1 | 1 | 1 | 1 |
| Cultural | Plaque | Count | 1 | 2 | 2 | 2 |
| Cultural | Monument | Count | | | | 1 |
| Cultural | INDUSTRIAL \| WHARF SITE | Count | 1 | 1 | 1 | 1 |
| **MASTER_ParkBuilding_inundated.shp (Total)** | | **Area m²** | | **1** | **53** | **162** |
| Social | Hall Street Beach Public Toilets | Area m² | | | 0 | 22 |
| Social | Toilet (Little Shoal Bay Reserve) | Area m² | | | 12 | 12 |
| Social | Toilet(Little Shoal Bay Reserve Scout Den) | Area m² | | 1 | 41 | 128 |
| **MASTER_ParkGarden TurfExtent_ecological_inundated.shp (Total)** | | **Area m²** | **12,493** | **21,995** | **28,605** | **35,594** |
| Environmental | BUSH-Throughout Reserve | Area m² | | | 124 | 837 |
| Environmental | BUSH-Throughout the reserve | Area m² | 2,944 | 6,510 | 10,037 | 13,506 |
| Social | GRAS- | Area m² | 7,869 | 13,349 | 16,070 | 18,386 |
| Environmental | RVEG-Behind tennis crt & W of sportfield | Area m² | 548 | 548 | 555 | 610 |
| Environmental | RVEG-Opposite bowling club | Area m² | 183 | 238 | 238 | 238 |
| Environmental | SHRB-Around tennis crts & c/prks | Area m² | 61 | 94 | 230 | 617 |
| Environmental | SHRB-Beside a/w to playground | Area m² | 6 | 38 | 43 | 43 |
| Environmental | SHRB-Maritime Tc road swale planting | Area m² | 873 | 1,198 | 1,276 | 1,310 |
| Environmental | WILD-Throughout the reserve | Area m² | 10 | 19 | 31 | 46 |

| Wellbeing | Asset | Unit | 1% AEP | 1% AEP + 0.5m SLR | 1% AEP + 1m SLR | 1% AEP + 2m SLR |
|---|---|---|---|---|---|---|
| **MASTER_ParkSportExtent_inundated.shp (Total)** | | **Area m²** | **10,918** | **10,953** | **10,949** | **11,874** |
| Social | COUH-Bball-beside tennis crt (15x15) | Area m² | | | | 206 |
| Social | COUH-Tennis-E of playing fields | Area m² | | | | 578 |
| Social | PETA-Beside tennis court | Area m² | | | | 136 |
| Social | Summer -Astro - Cricket Wicket 1A | Area m² | 79 | 80 | 80 | 80 |
| Social | Winter -Soil 1 -General Sport | Area m² | 5,171 | 5,205 | 5,205 | 5,205 |
| Social | Winter - Soil - Surrounds - General 1 | Area m² | 5,669 | 5,669 | 5,664 | 5,669 |
| **MASTER_ParkStructureHardSurface_access_ inundation.shp (Total)** | | **Area m²** | **978** | **1,452** | **1,734** | **2,142** |
| Social | BOAR-2nd W of cricket field | Area m² | | | | 6 |
| Social | BOAR-3rd W of cricket field | Area m² | 3 | 5 | 6 | 6 |
| Social | BOAR-4th E of junction | Area m² | 34 | 6 | 6 | 6 |
| Social | Boardwalks | Area m² | 18 | 138 | 193 | 222 |
| Social | Footpath/Tracks | Area m² | | | | 87 |
| Social | PADS-For BBQ area by beach | Area m² | 16 | 26 | 26 | 26 |
| Social | PATH-Bridge towards Valley Rd | Area m² | 107 | 16 | 16 | 15 |
| Social | PATH-Concrete rest area above seawall | Area m² | | | | 16 |
| Social | PATH-Dudding to Wilding Ave | Area m² | 0 | 134 | 134 | 134 |
| Social | PATH-Fairfax Av to junction | Area m² | | | | 3 |
| Social | PATH-From 24 Glade Place | Area m² | | | | 16 |
| Social | PATH-From C/prk to Clarence St a/w | Area m² | | 35 | 49 | 60 |
| Social | PATH-from S bridge into Maritime Tce | Area m² | | 50 | 64 | 64 |
| Social | PATH-Junctn to junction | Area m² | 141 | 187 | 252 | 403 |
| Social | PATH-Maritime Tce N side | Area m² | 259 | 318 | 357 | 366 |
| Social | PATH-Maritime Tce N side to BOAR | Area m² | 24 | 24 | 24 | 24 |
| Social | PATH-N side cricket field | Area m² | 56 | 62 | 62 | 62 |
| Social | PATH-Private | Area m² | 2 | 3 | 4 | 17 |
| Social | PATH-S side Council Tce | Area m² | | 60 | 132 | 188 |

| Wellbeing | Asset | Unit | 1% AEP | 1% AEP + 0.5m SLR | 1% AEP + 1m SLR | 1% AEP + 2m SLR |
|---|---|---|---|---|---|---|
| Social | PATH-S side Maritime Tce | Area m² | 293 | 348 | 348 | 348 |
| Social | PATH-Seaview to cricket field | Area m² | 19 | 28 | 31 | 33 |
| Social | PATH-To toilet by tennis crts | Area m² | | 3 | 20 | 20 |
| Social | PATH-to toilets | Area m² | | 0 | 1 | 9 |
| Social | PATH-toilets to beach | Area m² | 6 | 8 | 10 | 11 |
| **MASTER_ParkStructureHardSurface_Bridge_ inundation.shp** | | **Area m²** | **65** | **99** | **99** | **99** |
| Social | BRDP-40m S of 24 Wilding Ave | Area m² | 4 | 35 | 35 | 35 |
| Social | BRDP-N side cricket field | Area m² | 11 | 11 | 11 | 11 |
| Social | BRDV-NE side cricket field | Area m² | 32 | 32 | 32 | 32 |
| Social | Pedestrian Bridge | Area m² | 19 | 22 | 22 | 22 |
| **MASTER_ParkStructureHardSurface_multiple_ inundated.shp (Total)** | | **Area m²** | **6,017** | **8,018** | **8,245** | **8,616** |
| Social | BASEC-Boat yard & slipway | Area m² | 3,159 | 3,300 | 3,300 | 3,300 |
| Social | BASEV-From c/prk to playground | Area m² | | 78 | 91 | 91 |
| Social | CSUR-Beside Tennis & Basketball crts | Area m² | | | | 152 |
| Social | CSUR-Between tennis crt & bowls club | Area m² | 631 | 1,184 | 1,202 | 1,203 |
| Social | CSUR-by bridge to track | Area m² | 1,241 | 1,241 | 1,241 | 1,241 |
| Social | CSUR-Nearest playground | Area m² | 210 | 511 | 511 | 511 |
| Social | CSUR-Sth side of Maritime Terrace | Area m² | 341 | 852 | 852 | 852 |
| Social | SURF-Cushionfall | Area m² | | | 6 | 150 |
| Social | VSUR-Council Terr to p/grnd c/prk | Area m² | | 278 | 278 | 278 |
| Social | VSUR-To Bowls club c/prks | Area m² | 436 | 575 | 765 | 840 |
| **MASTER_ParkStructureHardSurface_ramp_ inundation.shp (Total)** | | **Area m²** | **50** | **50** | **50** | **50** |
| Social | BOAT-Dinghy Ramp PRIVATE | Area m² | 1 | 1 | 1 | 1 |
| Social | BOAT-SE cnr reserve by slipway | Area m² | 49 | 49 | 49 | 49 |
| **MASTER_ParkStructureHardSurface_steps_ inundation.shp (Total)** | | **Area m²** | **3** | **7** | **11** | **22** |
| Social | BOXS-From path down to toilets | Area m² | | | | 1 |

| Wellbeing | Asset | Unit | 1% AEP | 1% AEP + 0.5m SLR | 1% AEP + 1m SLR | 1% AEP + 2m SLR |
|---|---|---|---|---|---|---|
| Social | BOXS-From path to beach path | Area $m^2$ | 1 | 3 | 4 | 5 |
| Social | STEP-6th down frm Seaview | Area $m^2$ | | | 0 | 2 |
| Social | STEP-Between 2 boardwks | Area $m^2$ | | | | 0 |
| Social | STEP-Concrete steps beside toilets | Area $m^2$ | | | 1 | 2 |
| Social | STEP-Concrete steps down to beach | Area $m^2$ | | 1 | 1 | 2 |
| Social | STEP-Entry at 24 Wilding Ave | Area $m^2$ | | 0 | 3 | 6 |
| Social | STEP-Private-102A Queen St | Area $m^2$ | 2 | 3 | 3 | 3 |
| Social | STEP-Private-57 Maritime Terrace | Area $m^2$ | | | 0 | 1 |
| **GasworksCappedArea_inundated (Total)** | | **Area $m^2$** | **1** | **1,538** | **6,240** | **10,938** |
| **ManagementZones_inundated (Total)** | | **Area $m^2$** | **66,829** | **80,527** | **92,684** | **123,743** |
| Environmental | A - Le Roys Bush and Environs | Area $m^2$ | 39,582 | 44,654 | 46,073 | 48,364 |
| Social | B - Cricket Pitch | Area $m^2$ | 16,876 | 17,287 | 17,274 | 17,287 |
| Social | C - Tennis/Basketball and Parking | Area $m^2$ | 867 | 2,158 | 3,576 | 5,477 |
| Social | D - Maritime Terrace Abutment | Area $m^2$ | 931 | 1,405 | 1,696 | 2,193 |
| Economic | E - Road Reserve | Area $m^2$ | 960 | 1,341 | 1,507 | 1,734 |
| Social | F - Beach Front Reserve | Area $m^2$ | 2,936 | 8,269 | 9,659 | 11,368 |
| Social | G - Boat Yard | Area $m^2$ | 3,980 | 4,180 | 4,179 | 4,180 |
| Social | H - Maritime Terrace Abutment | Area $m^2$ | 594 | 1,112 | 1,460 | 1,936 |
| Social | I - Foreshore | Area $m^2$ | 103 | 119 | 133 | 145 |
| **Economic** | **Wastewater pipe (Total)** | **Length m** | **598** | **951** | **1106** | **1253** |
| Economic | A - Le Roys Bush and Environs | Length m | 525 | 761 | 837 | 907 |
| Economic | B - Cricket Pitch | Length m | 59 | 59 | 59 | 59 |
| Economic | C - Tennis/Basketball and Parking | Length m | 15 | 51 | 105 | 137 |
| Economic | E - Road Reserve | Length m | | | | 10 |
| Economic | F - Beach Front Reserve | Length m | | 80 | 105 | 140 |
| **Economic** | **Stormwater Pipe (Total)** | **Length m** | **172** | **263** | **314** | **384** |
| Economic | A - Le Roys Bush and Environs | Length m | 16 | 17 | 17 | 17 |
| Economic | B - Cricket Pitch | Length m | 99 | 120 | 120 | 120 |
| Economic | C - Tennis/Basketball and Parking | Length m | | 6 | 52 | 112 |
| Economic | E - Road Reserve | Length m | 10 | 18 | 18 | 18 |

| Wellbeing | Asset | Unit | 1% AEP | 1% AEP + 0.5m SLR | 1% AEP + 1m SLR | 1% AEP + 2m SLR |
|---|---|---|---|---|---|---|
| Economic | F - Beach Front Reserve | Length m | 21 | 73 | 75 | 78 |
| Economic | G - Boat Yard | Length m | 7 | 7 | 7 | 7 |
| Economic | H - Maritime Terrace Abutment | Length m | 14 | 17 | 19 | 21 |
| Economic | I - Foreshore | Length m | 4 | 5 | 7 | 10 |
| **Economic** | **Stormwater Channel (Total)** | **Length m** | **91** | **91** | **91** | **91** |
| Economic | A - Le Roys Bush and Environs | Length m | 45 | 45 | 45 | 45 |
| Economic | B - Cricket Pitch | Length m | | | | |
| Economic | C - Tennis/Basketball and Parking | Length m | | | | |
| Economic | E - Road Reserve | Length m | | | | |
| Economic | F - Beach Front Reserve | Length m | | | | |
| Economic | G - Boat Yard | Length m | | | | |
| Economic | H - Maritime Terrace Abutment | Length m | 6 | 6 | 6 | 6 |
| Economic | I - Foreshore | Length m | 40 | 40 | 40 | 40 |

*Table 15: Coastal inundation exposure as a percentage of the asset class*

| Asset | Wellbeing | Unit | 100yr ARI | 100yr ARI + 0.5m SLR | 100yr ARI + 1m SLR | 100yr ARI + 2m SLR |
|---|---|---|---|---|---|---|
| **Total point assets** | | **Count** | **38%** | **61%** | **64%** | **78%** |
| BBQ | Social | Count | 0% | 100% | 100% | 100% |
| Gate | Social | Count | 67% | 100% | 100% | 100% |
| Playground Equipment | Social | Count | 0% | 0% | 0% | 50% |
| Pole | Social | Count | 60% | 80% | 93% | 93% |
| Rubbish Bin | Social | Count | 43% | 71% | 71% | 93% |
| Seat | Social | Count | 36% | 55% | 55% | 77% |
| Sports Equipment | Social | Count | 0% | 0% | 0% | 100% |
| Table | Social | Count | 0% | 100% | 100% | 100% |
| Kauri Dieback Station | Environmental | Count | 11% | 11% | 11% | 11% |
| Plaque | Cultural | Count | 50% | 100% | 100% | 100% |
| Monument | Cultural | Count | 0% | 0% | 0% | 100% |
| INDUSTRIAL \| WHARF SITE | Cultural | Count | 100% | 100% | 100% | 100% |
| **MASTER_ParkBuilding_inundated.shp (Total)** | | **Area m2** | **0%** | **0%** | **15%** | **45%** |
| Hall Street Beach Public Toilets | Social | Area m2 | 0% | 0% | 0% | 80% |
| Toilet (Little Shoal Bay Reserve) | Social | Area m2 | 0% | 0% | 100% | 100% |
| Toilet(Little Shoal Bay Resve Scout Den) | Social | Area m2 | 0% | 1% | 30% | 92% |
| **MASTER_ParkGardenTurfExtent_ecological_inundated.shp (Tota** | | **Area m2** | **7%** | **12%** | **16%** | **19%** |
| BUSH-Throughout Reserve | Environmental | Area m2 | 0% | 0% | 0% | 1% |
| BUSH-Throughout the reserve | Environmental | Area m2 | 6% | 12% | 19% | 25% |
| GRAS- | Social | Area m2 | 34% | 58% | 70% | 80% |
| RVEG-Behind tennis crt & W of sportfield | Environmental | Area m2 | 34% | 34% | 34% | 38% |
| RVEG-Opposite bowling club | Environmental | Area m2 | 77% | 100% | 100% | 100% |
| SHRB-Around tennis crts & c/prks | Environmental | Area m2 | 7% | 11% | 28% | 74% |
| SHRB-Beside a/w to playground | Environmental | Area m2 | 13% | 87% | 100% | 100% |
| SHRB-Maritime Tc road swale planting | Environmental | Area m2 | 67% | 91% | 97% | 100% |
| WILD-Throughout the reserve | Environmental | Area m2 | 6% | 11% | 17% | 26% |
| **MASTER_ParkSportExtent_inundated.shp (Total)** | | **Area m2** | **92%** | **92%** | **92%** | **100%** |
| COUH-Bball-beside tennis crt (15x15) | Social | Area m2 | 0% | 0% | 0% | 92% |
| COUH-Tennis-E of playing fields | Social | Area m2 | 0% | 0% | 0% | 100% |
| PETA-Beside tennis court | Social | Area m2 | 0% | 0% | 0% | 100% |
| Summer - Astro - Cricket Wicket 1A | Social | Area m2 | 99% | 100% | 100% | 100% |
| Winter - Soil - 1 - General Sport | Social | Area m2 | 99% | 100% | 100% | 100% |
| Winter - Soil - Surrounds - General 1 | Social | Area m2 | 100% | 100% | 100% | 100% |

| | | | | | | |
|---|---|---|---|---|---|---|
| **MASTER_ParkStructureHardSurface_access_inundation.shp (Tot** | | **Area m2** | **19%** | **28%** | **34%** | **42%** |
| BOAR-2nd W of cricket field | Social | Area m2 | 0% | 0% | 0% | 100% |
| BOAR-3rd W of cricket field | Social | Area m2 | 45% | 97% | 100% | 100% |
| BOAR-4th E of junction | Social | Area m2 | 109% | 100% | 100% | 100% |
| Boardwalks | Social | Area m2 | 8% | 59% | 83% | 95% |
| Footpath/Tracks | Social | Area m2 | 0% | 0% | 0% | 94% |
| PADS-For BBQ area by beach | Social | Area m2 | 62% | 100% | 100% | 100% |
| PATH-Bridge towards Valley Rd | Social | Area m2 | 0% | 0% | 0% | 100% |
| PATH-Concrete rest area above seawall | Social | Area m2 | 0% | 0% | 0% | 100% |
| PATH-Dudding to Wilding Ave | Social | Area m2 | 0% | 100% | 100% | 100% |
| PATH-Fairfax Av to junction | Social | Area m2 | 0% | 0% | 0% | 4% |
| PATH-From 24 Glade Place | Social | Area m2 | 0% | 0% | 0% | 19% |
| PATH-From C/prk to Clarence St a/w | Social | Area m2 | 0% | 50% | 69% | 84% |
| PATH-from S bridge into Maritime Tce | Social | Area m2 | 0% | 79% | 100% | 100% |
| PATH-Junctn to junction | Social | Area m2 | 31% | 42% | 56% | 89% |
| PATH-Maritime Tce N side | Social | Area m2 | 71% | 87% | 98% | 100% |
| PATH-Maritime Tce N side to BOAR | Social | Area m2 | 100% | 100% | 100% | 100% |
| PATH-N side cricket field | Social | Area m2 | 91% | 100% | 100% | 100% |
| PATH-Private | Social | Area m2 | 2% | 4% | 5% | 24% |
| PATH-S side Council Tce | Social | Area m2 | 0% | 32% | 70% | 100% |
| PATH-S side Maritime Tce | Social | Area m2 | 84% | 100% | 100% | 100% |
| PATH-Seaview to cricket field | Social | Area m2 | 21% | 30% | 33% | 36% |
| PATH-To toilet by tennis crts | Social | Area m2 | 0% | 15% | 100% | 100% |
| PATH-to toilets | Social | Area m2 | 0% | 1% | 2% | 15% |
| PATH-toilets to beach | Social | Area m2 | 52% | 71% | 92% | 100% |
| **MASTER_ParkStructureHardSurface_Bridge_inundation.shp (Tot** | | **Area m2** | **43%** | **66%** | **66%** | **66%** |
| BRDP-40m S of 24 Wilding Ave | Social | Area m2 | 11% | 100% | 100% | 100% |
| BRDP-N side cricket field | Social | Area m2 | 100% | 100% | 100% | 100% |
| BRDV-NE side cricket field | Social | Area m2 | 100% | 100% | 100% | 100% |
| Pedestrian Bridge | Social | Area m2 | 86% | 100% | 100% | 100% |
| **MASTER_ParkStructureHardSurface_multiple_inundated.shp (To** | | **Area m2** | **67%** | **89%** | **91%** | **95%** |
| BASEC-Boat yard & slipway | Social | Area m2 | 96% | 100% | 100% | 100% |
| BASEV-From c/prk to playground | Social | Area m2 | 0% | 86% | 100% | 100% |
| CSUR-Beside Tennis & Basketball crts | Social | Area m2 | 0% | 0% | 0% | 100% |
| CSUR-Between tennis crt & bowls club | Social | Area m2 | 52% | 98% | 100% | 100% |
| CSUR-by bridge to track | Social | Area m2 | 100% | 100% | 100% | 100% |
| CSUR-Nearest playground | Social | Area m2 | 41% | 100% | 100% | 100% |
| CSUR-Sth side of Maritime Terrace | Social | Area m2 | 40% | 100% | 100% | 100% |
| SURF-Cushionfall | Social | Area m2 | 0% | 0% | 1% | 35% |
| VSUR-Council Terr to p/grnd c/prk | Social | Area m2 | 0% | 100% | 100% | 100% |
| VSUR-To Bowls club c/prks | Social | Area m2 | 52% | 68% | 91% | 100% |
| **MASTER_ParkStructureHardSurface_ramp_inundation.shp (Tota** | | **Area m2** | **98%** | **98%** | **98%** | **98%** |
| BOAT-Dinghy Ramp PRIVATE | Social | Area m2 | 52% | 52% | 52% | 52% |
| BOAT-SE cnr reserve by slipway | Social | Area m2 | 100% | 100% | 100% | 100% |

| MASTER_ParkStructureHardSurface_steps_inundation.shp (Tota | | Area m2 | 1% | 2% | 3% | 5% |
|---|---|---|---|---|---|---|
| BOXS-From path down to toilets | Social | Area m2 | 0% | 0% | 0% | 7% |
| BOXS-From path to beach path | Social | Area m2 | 7% | 28% | 31% | 45% |
| STEP-6th down frm Seaview | Social | Area m2 | 0% | 0% | 20% | 100% |
| STEP-Between 2 boardwks | Social | Area m2 | 0% | 0% | 0% | 3% |
| STEP-Concrete steps beside toilets | Social | Area m2 | 0% | 0% | 54% | 100% |
| STEP-Concrete steps down to beach | Social | Area m2 | 0% | 4% | 6% | 15% |
| STEP-Entry at 24 Wilding Ave | Social | Area m2 | 0% | 1% | 7% | 15% |
| STEP-Private-102A Queen St | Social | Area m2 | 84% | 93% | 93% | 100% |
| STEP-Private-57 Maritime Terrace | Social | Area m2 | 0% | 0% | 0% | 35% |
| **GasworksCappedArea_inundated (Total)** | | **Area m2** | **0%** | **14%** | **57%** | **100%** |
| **ManagementZones_inundated (Total)** | | **Area m2** | **48%** | **57%** | **66%** | **88%** |
| A - Le Roys Bush and Evirons | Environmental | Area m2 | 55% | 62% | 64% | 67% |
| B - Cricket Pitch | Social | Area m2 | 98% | 100% | 100% | 100% |
| C - Tennis/Basketball and Parking | Social | Area m2 | 13% | 32% | 53% | 81% |
| D - Maritime Terrace Abutment | Social | Area m2 | 24% | 36% | 43% | 56% |
| E - Road Reserve | Economic | Area m2 | 42% | 59% | 66% | 76% |
| F - Beach Front Reserve | Social | Area m2 | 20% | 55% | 65% | 76% |
| G - Boat Yard | Social | Area m2 | 94% | 98% | 98% | 98% |
| H - Maritime Terrace Abutment | Social | Area m2 | 22% | 41% | 54% | 72% |
| I - Foreshore | Social | Area m2 | 1% | 1% | 1% | 1% |
| **Wastewater pipe (Total)** | **Economic** | **Length m** | **35%** | **56%** | **65%** | **74%** |
| A - Le Roys Bush and Evirons | Economic | Length m | 42% | 61% | 68% | 73% |
| B - Cricket Pitch | Economic | Length m | 100% | 100% | 100% | 100% |
| C - Tennis/Basketball and Parking | Economic | Length m | 9% | 32% | 66% | 87% |
| E - Road Reserve | Economic | Length m | 0% | 0% | 0% | 100% |
| F - Beach Front Reserve | Economic | Length m | 0% | 36% | 47% | 63% |
| **Stormwater Pipe (Total)** | **Economic** | **Length m** | **29%** | **44%** | **53%** | **65%** |
| A - Le Roys Bush and Evirons | Economic | Length m | 48% | 50% | 50% | 50% |
| B - Cricket Pitch | Economic | Length m | 82% | 100% | 100% | 100% |
| C - Tennis/Basketball and Parking | Economic | Length m | 0% | 4% | 34% | 73% |
| E - Road Reserve | Economic | Length m | 57% | 100% | 100% | 100% |
| F - Beach Front Reserve | Economic | Length m | 10% | 36% | 37% | 38% |
| G - Boat Yard | Economic | Length m | 100% | 100% | 100% | 100% |
| H - Maritime Terrace Abutment | Economic | Length m | 67% | 79% | 89% | 100% |
| I - Foreshore | Economic | Length m | 43% | 46% | 65% | 100% |
| **Stormwater Channel (Total)** | Economic | Length m | 100% | 100% | 100% | 100% |
| A - Le Roys Bush and Evirons | Economic | Length m | 100% | 100% | 100% | 100% |
| H - Maritime Terrace Abutment | Economic | Length m | 100% | 100% | 100% | 100% |
| I - Foreshore | Economic | Length m | 100% | 100% | 100% | 100% |
| **Water Pipe (Total)** | Economic | Length m | 0% | 32% | 43% | 60% |
| F - Beach Front Reserve | Economic | Length m | 0% | 32% | 43% | 60% |

*Table 16: Asset exposure to coastal erosion*

| Asset | Wellbeing | Unit | 2050 | 2080 | 2130 |
|---|---|---|---|---|---|
| **Point asset (Total)** | | **Count** | 28% | 31% | 38% |
| BBQ | Social | Count | 100% | 100% | 100% |
| Gate | Social | Count | 33% | 33% | 33% |
| Pole | Social | Count | 20% | 20% | 20% |
| Rubbish Bin | Social | Count | 14% | 14% | 14% |
| Seat | Social | Count | 23% | 32% | 36% |
| Table | Social | Count | 0% | 0% | 50% |
| Boatshed/Boat Shed/Dinghy Locker | Social | Count | 100% | 100% | 100% |
| Garden \| Tree | Environmental | Count | 100% | 100% | 100% |
| INDUSTRIAL \| WHARF SITE | Cultural | Count | 100% | 100% | 100% |
| PA (HEADLAND) \| BURIAL | Cultural | Count | 100% | 100% | 100% |
| PITS | Cultural | Count | 100% | 100% | 100% |
| **MASTER_ParkStructureHardSurface_access_erosion (Total)** | | **Area m2** | 5% | 6% | 7% |
| PADS-For BBQ area by beach | Social | Area m2 | 100% | 100% | 100% |
| PATH-Awanui St to beach steps | Social | Area m2 | 100% | 100% | 100% |
| PATH-Concrete rest area above seawall | Social | Area m2 | 100% | 100% | 100% |
| PATH-from S bridge into Maritime Tce | Social | Area m2 | 21% | 28% | 57% |
| PATH-lookout to Awanui St | Social | Area m2 | 99% | 99% | 99% |
| PATH-Private | Social | Area m2 | 100% | 100% | 100% |
| PATH-S side Maritime Tce | Social | Area m2 | 2% | 3% | 7% |
| PATH-to toilets | Social | Area m2 | 21% | 29% | 74% |
| PATH-toilets to beach | Social | Area m2 | 100% | 100% | 100% |
| **MASTER_ParkStructureHardSurface_Bridge_erosion (Total)** | | **Area m2** | 15% | 15% | 15% |
| Pedestrian Bridge | Social | Area m2 | 99% | 99% | 99% |
| **MASTER_ParkStructureHardSurface_multiple_erosion (Total)** | | **Area m2** | 22% | 23% | 33% |
| BASEC-Boat yard & slipway | Economic | Area m2 | 31% | 33% | 45% |
| CSUR-Nearest playground | Social | Area m2 | 16% | 19% | 36% |
| **MASTER_ParkStructureHardSurface_ramp_erosion (Total)** | | **Area m2** | 100% | 100% | 100% |
| BOAT-Dinghy Ramp PRIVATE | Social | Area m2 | 100% | 100% | 100% |
| BOAT-SE cnr reserve by slipway | Social | Area m2 | 100% | 100% | 100% |
| **MASTER_ParkStructureHardSurface_steps_erosion (Total)** | | **Area m2** | 10% | 11% | 12% |
| BOXS-From path down to toilets | Social | Area m2 | 36% | 47% | 100% |
| BOXS-From path to beach path | Social | Area m2 | 78% | 100% | 100% |
| STAI-Next to steps leading to lookout | Social | Area m2 | 100% | 100% | 100% |
| STEP-Above stairs leading to lookout | Social | Area m2 | 100% | 100% | 100% |
| STEP-Concrete steps beside toilets | Social | Area m2 | 100% | 100% | 100% |
| STEP-Concrete steps down to beach | Social | Area m2 | 100% | 100% | 100% |
| STEP-Private-102A Queen St | Social | Area m2 | 100% | 100% | 100% |
| STEP-Private-57 Maritime Terrace | Social | Area m2 | 100% | 100% | 100% |

| | | | | | |
|---|---|---|---|---|---|
| **ManagementZones_erosion (Total)** | | **Area m2** | 3% | 3% | 4% |
| E - Road Reserve | Economic | Area m2 | 0% | 0% | 2% |
| F - Beach Front Reserve | Social | Area m2 | 12% | 13% | 17% |
| G - Boat Yard | Social | Area m2 | 23% | 25% | 35% |
| H - Maritime Terrace Abutment | Social | Area m2 | 50% | 54% | 68% |
| I - Foreshore | Social | Area m2 | 1% | 1% | 1% |
| **Wastewater pipe** | | **Length m** | 0% | 0% | 0% |
| A - Le Roys Bush and Evirons | Economic | Length m | 0% | 0% | 0% |
| B - Cricket Pitch | Economic | Length m | 0% | 0% | 0% |
| C - Tennis/Basketball and Parking | Economic | Length m | 0% | 0% | 0% |
| E - Road Reserve | Economic | Length m | 0% | 0% | 0% |
| F - Beach Front Reserve | Economic | Length m | 0% | 0% | 0% |
| Stormwater Pipe | | **Length m** | 9% | 10% | 15% |
| A - Le Roys Bush and Evirons | Economic | Length m | 0% | 0% | 0% |
| B - Cricket Pitch | Economic | Length m | 0% | 0% | 0% |
| C - Tennis/Basketball and Parking | Economic | Length m | 0% | 0% | 0% |
| E - Road Reserve | Economic | Length m | 0% | 1% | 28% |
| F - Beach Front Reserve | Economic | Length m | 16% | 17% | 22% |
| G - Boat Yard | Economic | Length m | 0% | 20% | 94% |
| H - Maritime Terrace Abutment | Economic | Length m | 61% | 87% | 98% |
| I - Foreshore | Economic | Length m | 71% | 71% | 71% |
| Stormwater Channel | | **Length m** | 0% | 7% | 7% |
| H - Maritime Terrace Abutment | Economic | Length m | 0% | 100% | 100% |

*Table 17: Erosion exposure as a percentage of total asset class*

| Asset | Wellbeing | Unit | 2050 | 2080 | 2130 |
|---|---|---|---|---|---|
| **Point asset (Total)** | | **Count** | **28%** | **31%** | **38%** |
| BBQ | Social | Count | 100% | 100% | 100% |
| Gate | Social | Count | 33% | 33% | 33% |
| Pole | Social | Count | 20% | 20% | 20% |
| Rubbish Bin | Social | Count | 14% | 14% | 14% |
| Seat | Social | Count | 23% | 32% | 36% |
| Table | Social | Count | 0% | 0% | 50% |
| Boatshed/Boat Shed/Dinghy Locker | Social | Count | 100% | 100% | 100% |
| Garden \| Tree | Environmental | Count | 100% | 100% | 100% |
| INDUSTRIAL \| WHARF SITE | Cultural | Count | 100% | 100% | 100% |
| PA (HEADLAND) \| BURIAL | Cultural | Count | 100% | 100% | 100% |
| PITS | Cultural | Count | 100% | 100% | 100% |
| **MASTER_ParkStructureHardSurface_ access_erosion (Total)** | | **Area m2** | **5%** | **6%** | **7%** |
| PADS-For BBQ area by beach | Social | Area m2 | 100% | 100% | 100% |
| PATH-Awanui St to beach steps | Social | Area m2 | 101% | 101% | 101% |
| PATH-Concrete rest area above seawall | Social | Area m2 | 102% | 102% | 102% |
| PATH-from S bridge into Maritime Tce | Social | Area m2 | 21% | 28% | 57% |
| PATH-lookout to Awanui St | Social | Area m2 | 99% | 99% | 99% |
| PATH-Private | Social | Area m2 | 100% | 100% | 100% |
| PATH-S side Maritime Tce | Social | Area m2 | 2% | 3% | 7% |
| PATH-to toilets | Social | Area m2 | 21% | 29% | 74% |
| PATH-toilets to beach | Social | Area m2 | 102% | 102% | 102% |
| **MASTER_ParkStructureHardSurface_ Bridge_erosion (Total)** | | **Area m2** | **15%** | **15%** | **15%** |
| Pedestrian Bridge | Social | Area m2 | 99% | 99% | 99% |
| **MASTER_ParkStructureHardSurface_ multiple_erosion (Total)** | | **Area m2** | **22%** | **23%** | **33%** |
| BASEC-Boat yard & slipway | Economic | Area m2 | 31% | 33% | 45% |
| CSUR-Nearest playground | Social | Area m2 | 16% | 19% | 36% |

| Asset | Wellbeing | Unit | 2050 | 2080 | 2130 |
|---|---|---|---|---|---|
| **MASTER_ParkStructureHardSurface_ ramp_erosion (Total)** | | **Area m2** | **100%** | **100%** | **100%** |
| BOAT-Dinghy Ramp PRIVATE | Social | Area m2 | 100% | 100% | 100% |
| BOAT-SE cnr reserve by slipway | Social | Area m2 | 100% | 100% | 100% |
| **MASTER_ParkStructureHardSurface_ steps_erosion (Total)** | | **Area m2** | **10%** | **11%** | **12%** |
| BOXS-From path down to toilets | Social | Area m2 | 36% | 47% | 100% |
| BOXS-From path to beach path | Social | Area m2 | 78% | 100% | 100% |
| STAI-Next to steps leading to lookout | Social | Area m2 | 100% | 100% | 100% |
| STEP-Above stairs leading to lookout | Social | Area m2 | 100% | 100% | 100% |
| STEP-Concrete steps beside toilets | Social | Area m2 | 100% | 100% | 100% |
| STEP-Concrete steps down to beach | Social | Area m2 | 100% | 100% | 100% |
| STEP-Private-102A Queen St | Social | Area m2 | 100% | 100% | 100% |
| STEP-Private-57 Maritime Terrace | Social | Area m2 | 100% | 100% | 100% |
| **ManagementZones_erosion (Total)** | | **Area m2** | **3%** | **3%** | **4%** |
| E - Road Reserve | Economic | Area m2 | 0% | 0% | 2% |
| F - Beach Front Reserve | Social | Area m2 | 12% | 13% | 17% |
| G - Boat Yard | Social | Area m2 | 23% | 25% | 35% |
| H - Maritime Terrace Abutment | Social | Area m2 | 50% | 54% | 68% |
| **Stormwater Pipe (Total)** | | **Length m** | **9%** | **10%** | **15%** |
| A - Le Roys Bush and Environs | Economic | Length m | 0% | 0% | 0% |
| B - Cricket Pitch | Economic | Length m | 0% | 0% | 0% |
| C - Tennis/Basketball and Parking | Economic | Length m | 0% | 0% | 0% |
| E - Road Reserve | Economic | Length m | 0% | 1% | 28% |
| F - Beach Front Reserve | Economic | Length m | 16% | 17% | 22% |
| G - Boat Yard | Economic | Length m | 0% | 20% | 94% |
| H - Maritime Terrace Abutment | Economic | Length m | 61% | 87% | 98% |
| I – Foreshore | Economic | Length m | 71% | 71% | 71% |
| **Stormwater Channel (Total)** | | **Length m** | **0%** | **7%** | **7%** |
| H - Maritime Terrace Abutment | Economic | Length m | 0% | 100% | 100% |

# Appendix C: Community engagement outcomes

AUCKLAND COUNCIL

**COMMUNITY ENGAGEMENT OUTCOMES**

Wai Manawa | Little Shoal Bay Mini Shore Line Adaptation Plan


To find out more email:
shorelineadaptationplans@aucklandcouncil.govt.nz

Auckland Council
Te Kaunihera o Tāmaki Makaurau