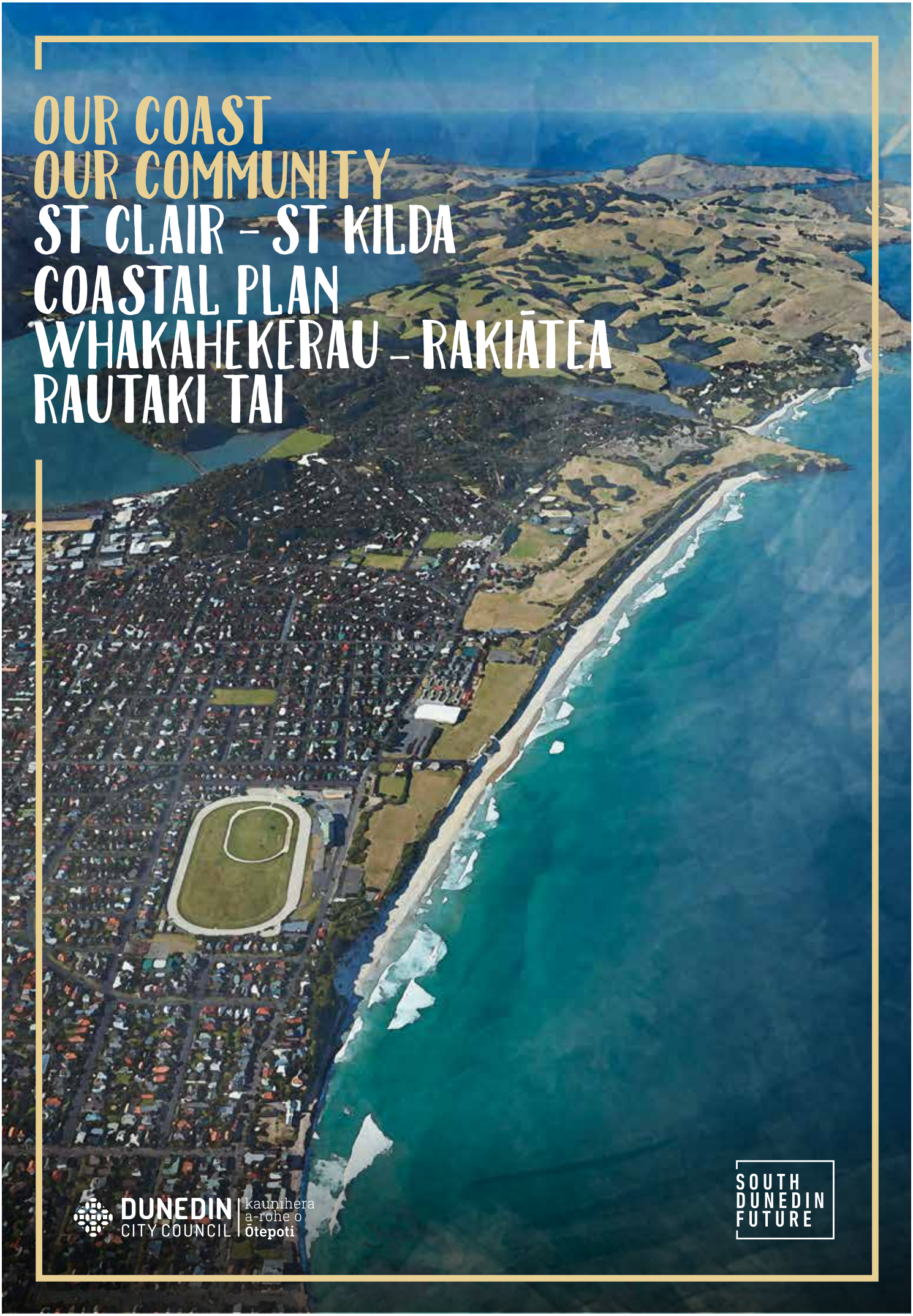
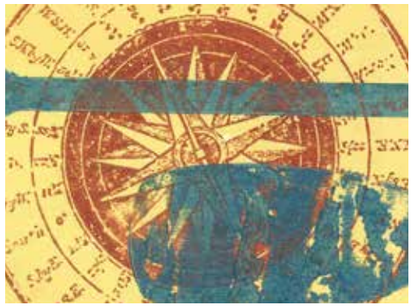
OUR COAST
OUR COMMUNITY
ST CLAIR – ST KILDA COASTAL PLAN
WHAKAHEKERAU – RAKIĀTEA RAUTAKI TAI

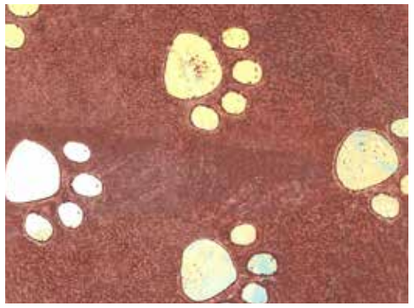


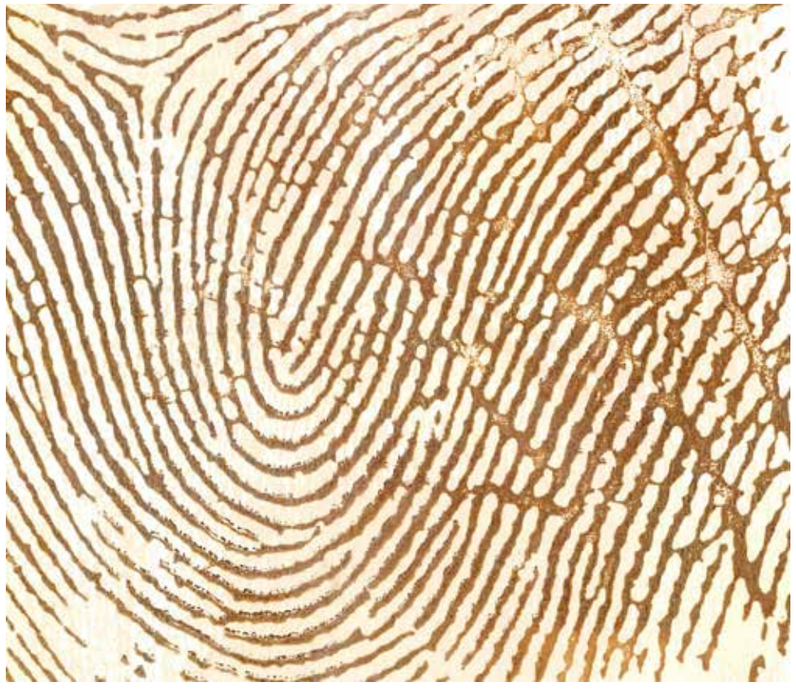
DUNEDIN CITY COUNCIL | kaunihera a-rohe o Ōtepoti

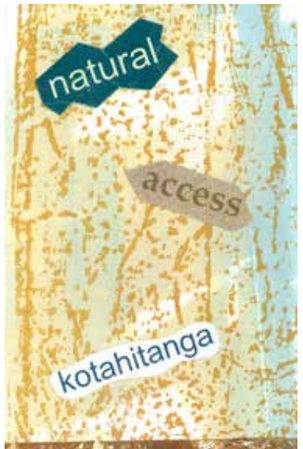
SOUTH DUNEDIN FUTURE

PHOTO: DAVID WALL









CONTENTS

This artwork, along with much more, has been produced by the community through the consultation process for this plan. The artwork helps to convey what the community values and loves about the coast. This community artwork is shown throughout the plan.

TAKUTAI MOANA

Whakahekerau – Rakiātea is a valued place for Te Rūnanga o Ōtākou (Mana Whenua). This part of the plan provides the cultural context of the area. We are grateful to be working with Ōtākou and we will continue to work together as this plan moves forward.

WHAKAHEKERAU (ST CLAIR) TO RAKIĀTEA (ST KILDA)

The coastal area that surrounds Whakahekerau (St Clair) and Rakiātea (St Kilda) is an area of great significance to mana whenua. Kai (food) and medicinal resources were gathered all along that stretch of coast, and it was an important route for whānau travelling to and from further north. An old moa hunting track runs parallel to Whakahekerau (St. Clair) and Rakiātea (St Kilda), and archaeologists have found remains of moa hunting sites all along the coastline. The hunting track started near Green Island, passed through Blackhead up to where Cargill's Castle now stands, past Whakahekerau and Rakiātea, down the peninsula and ending where the road meets Allan's Beach. In more recent times, the hunting track was used by whānau returning to Ōtākou from the Tītī islands or the Waihora and Waipouri wetlands.

As part of Te Tai o Arai Te Uru (the Coastal Marine Area), the coast from Whakahekerau (St Clair) to Rakiātea (St Kilda) is also within a Statutory Acknowledgement Area under the Ngāi Tahu Claims Settlement Act, signifying its importance to mana whenua. The naming of various features along the coastline reflects the succession of mana whenua tūpuna (ancestors) who traversed the coastline at different times.

WHAKAHEKERAU – ST CLAIR

Whakahekerau is the traditional name given to the area of the St Clair suburb by mana whenua tūpuna (ancestors).

Little is known of the origin of the name. However, Whakahekerau referred to a series of lagoons that served as a highway to the harbour entrance and further inland along Te Mata-au (Clutha River). Whānau at the time would use mōkihi (rafts) to traverse the area gathering kai such as kanakana (lamprey) and weka. The wife of prominent Kāti Māmoe Chief Tūwiriroa was also named Whakahekerau. Tūwiriroa had his pā at Motupara near the entrance of Taieri Mouth.

Whānau would often travel along the beach at Whakahekerau (St Clair), over the hill and back down to the beaches leading to Taieri mouth and up to the wetlands. Historically, this route was very well used when travelling to the nearby estuary and wetlands.

RAKIĀTEA – ST KILDA

The name Rakiātea is rooted in an old kōrero from Māori and Polynesian legends referring to a place of spiritual significance located somewhere in the Pacific Islands. Its association with St Kilda is most likely an ode to the place in this legend and its location in the South Pacific.

Rakiātea (St Kilda) itself, is a mapped wāhi tūpuna in the 2GP with significance as a traditional ara tawhito (ancestral trail), nohoaka (settlement) and a wāhi mahika kai (food gathering place). There are also traditional places which overlook Rakiātea, a significant one being the resting place of Rakiihia, a Kāti Mamoe chief who died at Ōtākou and was buried atop the ridge above St Clair.

ST CLAIR - ST KILDA COASTAL PLAN

PLAN OVERVIEW

COMMUNITY VISION FOR OUR COAST

Our vision for the St Clair to St Kilda coast is to enhance the natural environment, for it to be resilient to coastal hazards and future sea level rise and for future generations to be provided with access, and recreational opportunities.

COMMUNITY-DERIVED MANAGEMENT OBJECTIVES

OBJECTIVE 1

Ensure that the coast and inland area are resilient to the effects of coastal hazards and climate change and that resilience is achieved through sustainable practises.

OBJECTIVE 2

Work with nature to create a long term solution that benefits natural landscapes and wildlife - fostering a culture of care.

OBJECTIVE 3

Work with the community to plan for the future and support the community in staying connected to the plan.

OBJECTIVE 4

Create connected, accessible public spaces and encourage recreational-use in safe and appropriate ways.

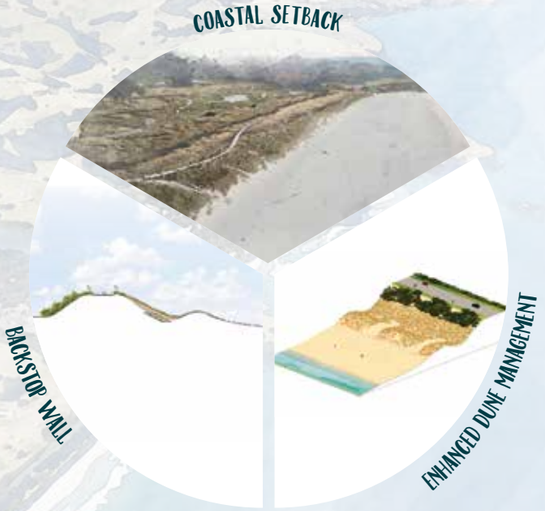
OBJECTIVE 5

Implement the plan through:
(a) embedding and aligning the plan within relevant policy and plans, and
(b) utilising emerging and innovative best practice.

MANAGEMENT OPTIONS

ST KILDA

CURRENT APPROACH



MIDDLE BEACH

CURRENT APPROACH

ST CLAIR

CURRENT APPROACH

ST CLAIR - ST KILDA COASTAL PLAN

AN OVERVIEW OF THE STORY

WHAT PEOPLE VALUE

What we've heard from our community

COMMUNITY VISION FOR OUR COAST

Our interpretation of the aspiration for the future of our coast

COMMUNITY AND MANA WHENUA MANAGEMENT OBJECTIVES

The things we will aim for and that will guide our decisions

ENGAGING WITH OUR COMMUNITY

Tells the story of the engagement undertaken so far

ADAPTIVE MANAGEMENT APPROACH

Oveview of how the coast could be managed

PATHWAYS

Different routes we might take toward our vision

NEXT STEPS

What we plan to do next to make our vision a reality

PREFACE

The St Clair-St Kilda Coastal Plan has been developed over two years including contributions from a range of organisations and individuals. More than 2,300 people have provided input to this plan, which provides the basis for the sustainable management of this coast.

The short-term actions, including planned physical works and investigations are shared in the "Site-Specific Plans" section. The shortlisted management options for the coast are also shared on these pages.

The development of this plan has generally followed the process set out in the Ministry for the Environment's Coastal Hazards and Climate Change: Guidance for Local Government document. This document is being used by councils across New Zealand to guide climate change adaptation planning at the coast. For the St Clair – St Kilda area, this guidance document is being used to help develop the city's first plan that focuses on coastal adaptation.

Historically, the Ocean Beach Reserve Management Plan has served as the most relevant coastal management plan for this area. This plan focused on public spaces including recreation reserve (sports fields) and the sand dune areas. Historically management of coastal hazards (such as erosion) has been undertaken through reactive intervention (following storms). The St Clair – St Kilda Coastal Plan fills this gap and will support the city in planning for and adapting to the effects of coastal hazards and climate change.

A range of legacy issues will need to be addressed in time, to support adaptation at the coast. In particular, the historic landfill beneath Kettle Park will need to be managed within the context of this plan. More generally, land-use change along this coastal frontage will need to be considered in time, to support the resilience of the beach and level of protection afforded to the inland area.

The coastal plan is not an implementation plan, but serves as a platform for subsequent stages of work to inform key decisions relating to coastal management. Upcoming work will involve further evaluating hazards / risks, assessing the shortlisted options and designing/ consenting prior to implementation. The coastal plan provides the context and direction required to begin this work and sets out short-term activities to get things started.

CONTEXT

Purpose – why do we need a plan?

This plan is a critical step towards creating a safe and sustainable future for the stretch of coast between St Clair headland and Lawyers Head. This section of coast protects the low-lying inland area, while also being the city's most well-used beach.

The historic approach to managing this coast has been reactive and has done little to address the long-term risks such as erosion and sea level rise. Reactive decisions have resulted in the gradual seaward advance of infrastructure and development, the loss of beach amenity and the exposure of hazardous materials along the coast from the dunes at Middle Beach.

Over time, a range of activities and decisions have contributed to the seaward advance and engineered modification of the coast. This has forced the beach to be squeezed between the ocean and inland development. The beach is now located substantially further seaward than it was historically and, as a result, it is more frequently eroded.

This erosion degrades beach access, amenity and the environmental value of the area.

With sea levels rising and coastal storms becoming more frequent as a result of a changing climate, this coast will become increasingly impacted by coastal processes. If nothing is done, it is expected this will lead to a lower, more eroded beach; poorer access to and along the beach and a more degraded natural environment. There is an opportunity to mitigate these effects and enhance this coast in the coming years and decades.

This plan seeks to establish a basis for change and a transition towards more appropriate and sustainable coastal management practices that align with the community's aspirations for the area and support the city in adapting to the effects of coastal hazards and climate change.

South Dunedin Future – the big picture and how this plan fits

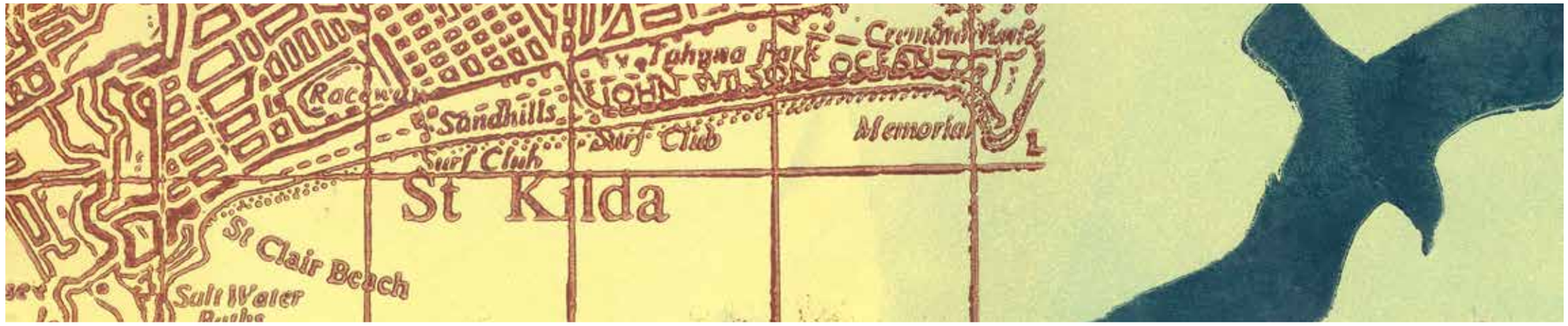
The St Clair – St Kilda Coastal Plan sits within a wider programme of work called South Dunedin Future, which is a joint Dunedin City Council-Otago Regional Council programme aiming to respond effectively to the climate-driven challenges facing the greater South Dunedin area.

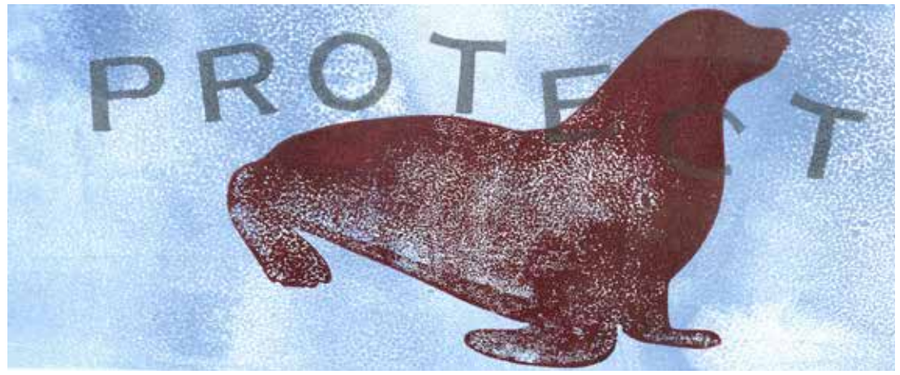
Vibrant and diverse, the area is home to 10,000 people. It is central, flat and conveniently located, and is home to many businesses, schools and a large amount of critical infrastructure that the wider city relies on.

South Dunedin is built on land reclaimed from a coastal wetland and sits just above sea level – most of the land is within 1.5m of high tide. The area's high groundwater and the predicted effects of climate change, especially sea level rise (and thus rising groundwater) and increased rainfall and storm intensity, combine to increase the risk of severe flooding and drainage problems.

Together, the councils are working with the community, central government, research agencies and others to understand what is happening, build resilience, identify opportunities and options, and decide how to best adapt the area to give it a strong long-term future. The St Clair – St Kilda Coastal Plan is a key component of this broader work programme, focusing on the coastal frontage that protects the low-lying area from coastal hazards and serves as a valued public space to the city.

EROSION PHOTOS: ASSOCIATE PROFESSOR MIKE HILTON, UNIVERSITY OF OTAGO





ENGAGING WITH OUR COMMUNITY

Prior to drafting the St Clair – St Kilda Coastal Plan, there was 18 months of public and stakeholder engagement to help understand the community's aspiration and ambition for this coast.

THE ENGAGEMENT PROCESS

In developing the St Clair – St Kilda Coastal Plan, there have been many opportunities for community input to support the establishment of a community-oriented vision for the coast.

People throughout Dunedin and farther afield care deeply about the St Clair – St Kilda coast. The aim from the outset of engagement was to hear from mana whenua, the community and stakeholders.

Three phases of engagement were used to engage with stakeholders and the community.

Phase 1 aimed to help people understand what is happening at the coast (the coastal processes and risks) and involved gathering feedback on what people value and love about the coast.

Phase 2 aimed to understand what people's views were about what could be done to manage the coast. This involved sharing different management possibilities and evaluating people's preferences and prioritises.

Phase 3 used all of the feedback from the phases above. Visuals were developed to share possible futures for the coast, with the aim of building awareness for different possibilities.

A diverse range of engagement methods were used to reach the community and encourage participation. Using a diverse set of methods has helped to produce a plan that better reflects the community's collective ambition for the area. The photographs on the right side of this page provide a sense of the methods used in engagement.

WHAT WE HAVE HEARD

At various points during engagement, we checked in, to share with the community what we have heard regarding the community's values and aspirations for the area.

Feedback has been received from more than 2,300 people, with several common values being shared throughout. These values are important to guide planning of the coast well into the future and are used in this plan to form a vision and contribute to the management objectives of this plan.

Throughout engagement, people were eager to share solutions about what should be done along the coast. These ideas included fixing the seawall, getting rid of the landfill, dune management and planting, managed retreat, breakwaters and groynes either as a wooden structure or a more significant rock structure. While the focus of the engagement has been to understand what the community values, we have also listened to people's thinking and perspectives on options. The long-list of options considered for this plan included all possibilities shared by the community.

We have sought to understand what the community values, as without this understanding we risk actions that will fail to achieve, or at least adequately consider, the community's desired outcomes.

THEMES OF FEEDBACK – COMMUNITY VALUES

Through engagement people provided many insights into what matters most to them at the coast. This has helped to generate a set of shared community values that will outlast any management option and will provide guidance for decision making at the coast well into the future.

From all of the feedback, the following overarching community values emerged:

Recreation
Being able to enjoy recreation. A place for swimming, walking, surfing, playgrounds and sports.

Environment
The wild natural open space at the coast, a sandy beach, a clean safe place for people and wildlife to thrive.

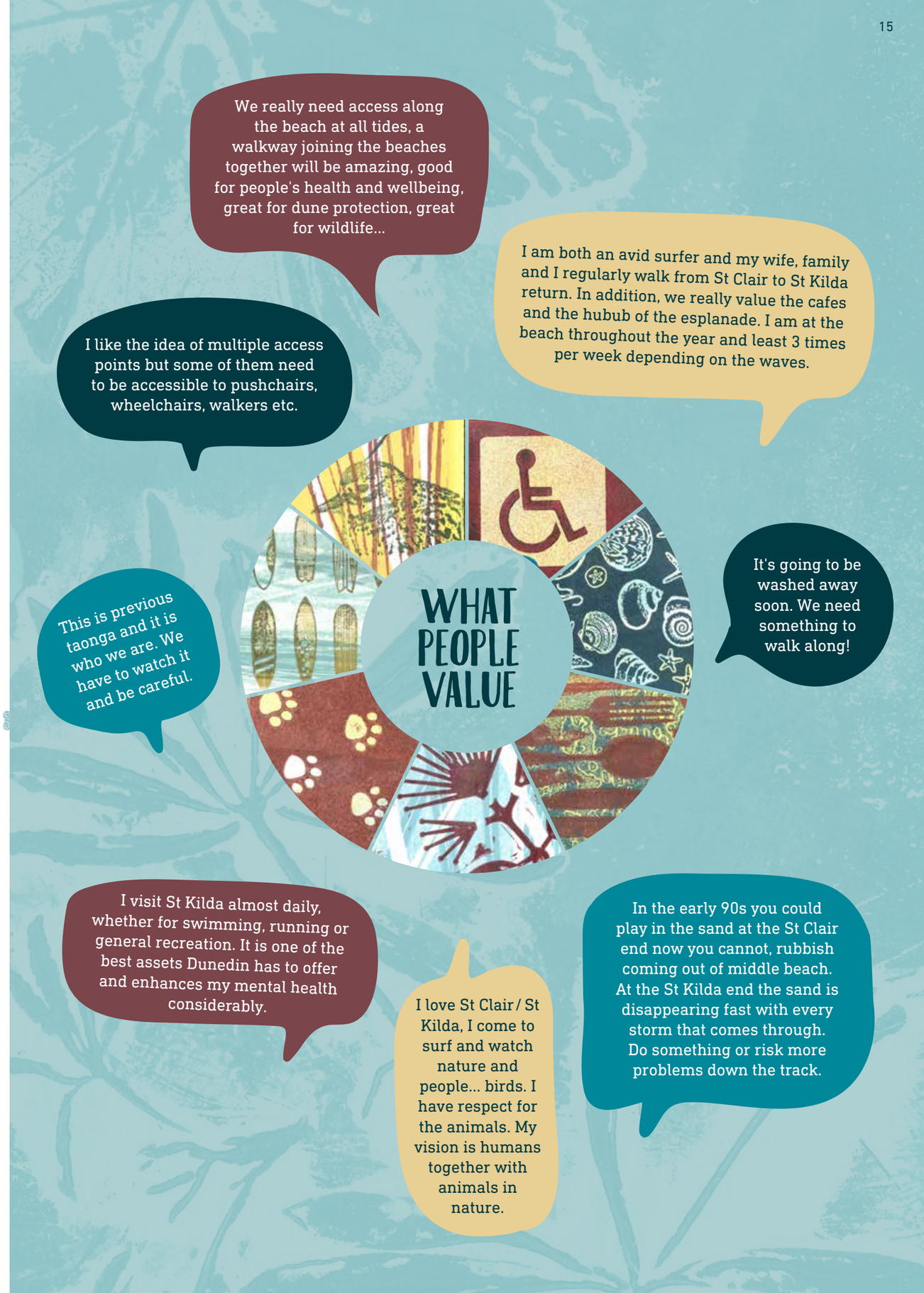
Access and connectivity
Safe and easy access to the beach and along the coast.

Lifestyle and wellbeing
People feel that it is a place where they can spend quality time with friends and whānau. The value of businesses, particularly those at the St Clair Esplanade was identified also.

Another key theme from engagement was support of the underlying aim of the St Clair – St Kilda Coastal Plan; to protect the dunes from coastal erosion, the coast from contamination from the old landfill (beneath Kettle Park) and South Dunedin from inundation and rising sea levels. People are concerned about these things and want to see action. There is community appetite for positive change.

The artwork and quotes on the following page have been taken directly from the community.

The artwork conveys some of the common themes of feedback.



COMMUNITY VISION FOR OUR COAST

Our vision for the St Clair to St Kilda coast is to enhance the natural environment, for it to be resilient to coastal hazards and future sea level rise and for future generations to be provided with access, and recreational opportunities.

The community vision for the coast has been developed following 18 months of community engagement where we have developed a deep understanding of the community's values and ambition for the area.

The vision brings together the core values expressed by the community during the engagement process.

There will be future opportunities for the vision and objectives of this plan to be reviewed – engagement with the community will need to occur in the future around key decision points.

The graphic on the following page captures the three key parts of the community's vision for the coast.

enhance
the natural
environment

resilient
to coastal
erosion and
future sea
level rise

a safe
accessible
place

COMMUNITY-DERIVED MANAGEMENT OBJECTIVES

It is important that future coastal management decisions are made within the context of this plan and its associated vision and objectives.

To give the community feedback influence on the future direction of management, the vision statement and the values have been translated into objectives. These management objectives will guide future management and help to outline the desired outcomes for the coast. All future decisions will need to be considered in the context of these objectives. Using the community feedback to create the management objectives means the community's voice will be at the heart of future decision making for the St Clair to St Kilda coast.

The objectives aim to keep future management activities on track and aligned with this plan – ensuring that future investments, whether proactive or reactive (e.g. in response to storms) do not create new issues and work to achieve the vision established in this plan.

All future management decisions that relate, either directly or indirectly to coastal hazard risk, will need to be considered within the context of these objectives.

For each management objective we describe some of the ways that we can support it. We also describe how each objective aligns with community feedback (community values) and good coastal management practice (technical considerations).

OBJECTIVE 1

Ensure that the coast and inland area are resilient to the effects of coastal hazards and climate change and that resilience is achieved through sustainable practices.

TO SUPPORT THIS OBJECTIVE WE WILL:

- Reduce flood and erosion risk as far as practical and encourage the use of nature-based solutions where possible
- Ensure robust technical assessment of coastal management options
- Ensure investments do not unnecessarily restrict future possibilities and that the full stretch of coast is considered, including the inland area.

COMMUNITY VALUES

- To see better management of existing public assets along the coast
- To reduce the risk of landfill exposure and structural failures
- To reduce the risk of dune erosion and the effects of sea level rise
- To feel safe at the coast and know that the coast is being appropriately managed.

TECHNICAL CONSIDERATIONS

- Future climate variability and scenarios
- Full range of coastal management options considered, using robust data and modelling.
- The Department of Conservation's South East Marine Protected Area programme is to be considered with regards to the suitability of coastal management options and any resulting marine effects.

OBJECTIVE 2

Work with nature to create a long term solution that benefits natural landscapes and wildlife – fostering a culture of care.

TO SUPPORT THIS OBJECTIVE WE WILL:

- Consider the value of natural coastal systems, including their cultural values and ecosystem services
- Maintain and enhance the natural functioning of the coastal system
- Encourage the use of nature-based solutions whenever possible in alignment with mana whenua
- Further develop our understanding of the natural system to ensure that future investments avoid any negative effects.

COMMUNITY VALUES

- To enhance the natural environment
- To create a cleaner, safer beach
- To encourage natural spaces that support biodiversity, particularly native plants and wildlife.

TECHNICAL CONSIDERATIONS

- The hazard management value and ecosystems services of natural landscapes are to be considered
- Limit carbon intensive interventions.

OBJECTIVE 3

Work with the community to plan for the future and support the community in staying connected to the plan.

TO SUPPORT THIS OBJECTIVE WE WILL:

- Continue to provide fair and open opportunity for further community input as the plan is implemented
- Provide opportunities for the community to reflect on, and contribute further to this plan through time
- Provide opportunities for the community to learn about the coast and contribute to environmental monitoring.

COMMUNITY VALUES

- To stay connected and contributing to the plan through time
- To be supported in providing further input over time.

TECHNICAL CONSIDERATIONS

- More focus on stewardship, provides opportunity for the community to contribute to coastal management i.e. plantings and citizen science (monitoring)
- Keeping the community involved will support alignment between investments and community values.

OBJECTIVE 4

Create connected, accessible public spaces and encourage recreational-use in safe and appropriate ways.

TO SUPPORT THIS OBJECTIVE WE WILL:

- Consider how management options might enhance or diminish public access to and along the coast
- Manage public spaces to ensure that land-use does not unnecessarily restrict future management options including coastal setback
- Look for opportunities to improve connectivity along the coast and access to the beach
- Control access through and over the dunes to support dune stability.

COMMUNITY VALUES

- To improve to public access
- To create a safe and accessible place
- To encourage access along the coast, between St Clair and St Kilda.
- To provide access for all, including those with a disability.

TECHNICAL CONSIDERATIONS

- Pedestrian access to be managed, particularly through dune areas
- Open space can be used to buffer the effects of coastal erosion
- Public spaces managed to ensure that the option of coastal setback remains available.

OBJECTIVE 5

Implement the plan through: (a) embedding and aligning the plan within relevant policy and plans, and (b) utilising emerging and innovative best practice.

TO SUPPORT THIS OBJECTIVE WE WILL:

- Embed the coastal plan into relevant plans and policies (i.e. Reserve Management Plan)
- Consider and give effect to national coastal guidance, particularly when it relates to adaptation planning
- Share learnings with other councils and organisations working through similar processes
- Through the process of plan review and iteration consider any advancements in policy, planning and technology that might benefit the coast.

COMMUNITY VALUES

- For this plan to be long-lasting
- To achieve consistency among policies and plans.

TECHNICAL CONSIDERATIONS

- Supports alignment between this plan and best practice
- Enables this plan to influence broader decision-making at this coast, reducing the risk of investments and activities that we might later regret
- Enables collaboration between organisations, i.e. DCC and DOC.

MANA WHENUA VALUES AND THE MANAGEMENT OBJECTIVES

As rakatira, mana whenua have an inherited duty to protect all areas of their takiwā (area where mana is held). In particular, mana whenua seek to ensure that places of cultural significance are protected and preserved for future generations – mō tātou, ā, mō kā uri ā muri ake nei (for us and our children after us).

The community-derived objectives are directly aligned with this duty, particularly objectives one, two and three. The coastal area from Whakahekerau (St Clair) to Rakiātea (St Kilda) is an area steeped in mana and is an important feature in the whakapapa of mana whenua. As stated in the Kāi Tahu ki Otago Natural Resource Management Plan (NRMP): "Whakapapa is central to our identity and describes a familial relationship in which mana whenua are enveloped through custom and tradition with their lands, waters or sea. It is a bond that is reciprocal, manifested in our language through waiata, pūrākau, whakataukī and place names." Through a cultural lens, mana whenua believe that all things, whether living or inanimate, possess mauri. Mauri can be thought of as a 'life force' of a place or thing. The NRMP states that the primary management principle is the protection of mauri and the life-giving essence of an ecosystem or landscape from desecration. As such, it is imperative to mana whenua that the community works together to protect the area from coastal hazards and the looming impacts of climate change. Mana whenua support the use of nature-based solutions to restore and protect the dune systems, to protect the mauri of an area that holds great significance for mana whenua as well as the wider community of Dunedin.

COASTAL RISK MANAGEMENT

Erosion, inundation and tsunami, pose a risk to people and infrastructure on land adjacent to the coast.

CURRENT RISKS AND MANAGEMENT

As the climate changes, the nature of these hazards also changes. We expect more frequent and severe storms, which will increase the threat to our coast.

Over the years, the DCC has tried a variety of ways to manage these risks. These measures have varied in effectiveness.

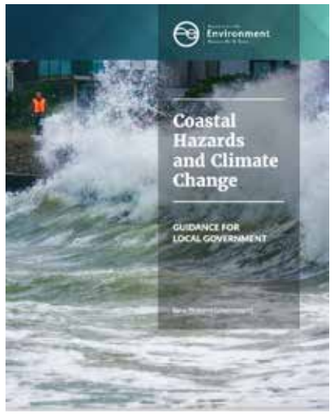
NEED FOR CHANGE

We have heard from the community that the way you want to use the coast would be supported by improvements to the infrastructure. We have also heard that the community values the wild and natural environment. The increasing frequency and severity of storms mean that the coast is more exposed to erosion and release of historic contaminants than ever before. A future-focused proactive approach to managing the coast would enable appropriate management of the long-term risks and provide an opportunity to support the community's aspirations.

We want a longterm plan to manage the coast and to work with, rather than against, natural processes. We want to improve the experience for future generations and address the key hazards that threaten the coast.

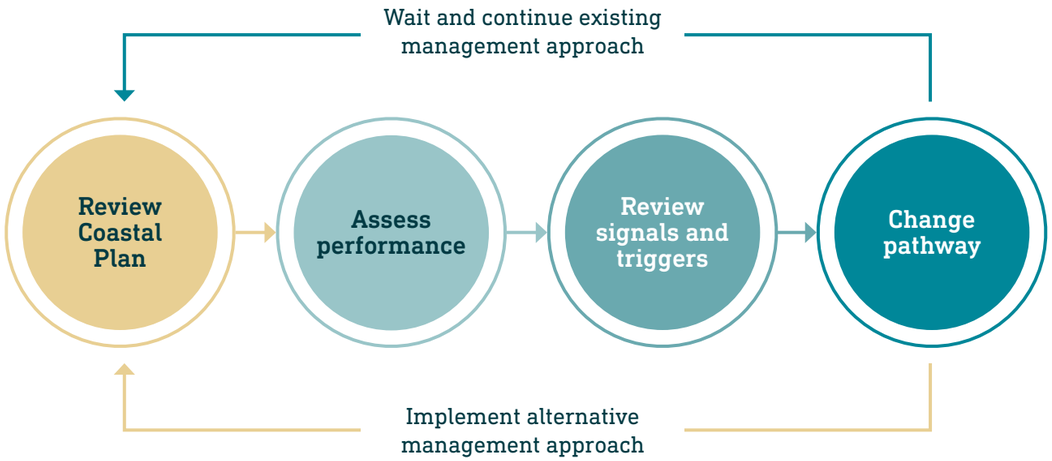
The following sections of this plan introduce and describe the adaptive management approach that is to be used. They outline key management concepts around timing, signals and triggers to help the community understand the approach, and the factors that will influence decision-making.

ADAPTIVE MANAGEMENT APPROACH



The figure below shows a structured approach to coastal risk management. This is a cyclical process of reviewing performance and implementing repairs and/or physical works. These decisions will be guided by this plan and the use of decision making signals and triggers as described in the following sections. This plan draws on the Ministry for the Environment's guidance on coastal hazards and climate change. This best practice guidance for coastal management has been used throughout the development of this plan and is being used across New Zealand.

The key decision for each section of the coast (St Clair, Middle Beach and St Kilda) relates to when the current management approach is no longer viable. This is shown in the figure below by the top arrow, if the current approach is still appropriate and by the lower arrow if an alternative is needing to be implemented. This process of decision making is described in the Management Pathways section of this plan.



This figure shows a simplified adaptive management framework. It describes how future adjustments in management can be made as the factors that determine the type and timing of intervention become better understood. These factors are described on the following page.

TIMING

A range of factors will contribute to the timing of management action. The questions below are examples of what must be considered when determining the timing of management intervention.

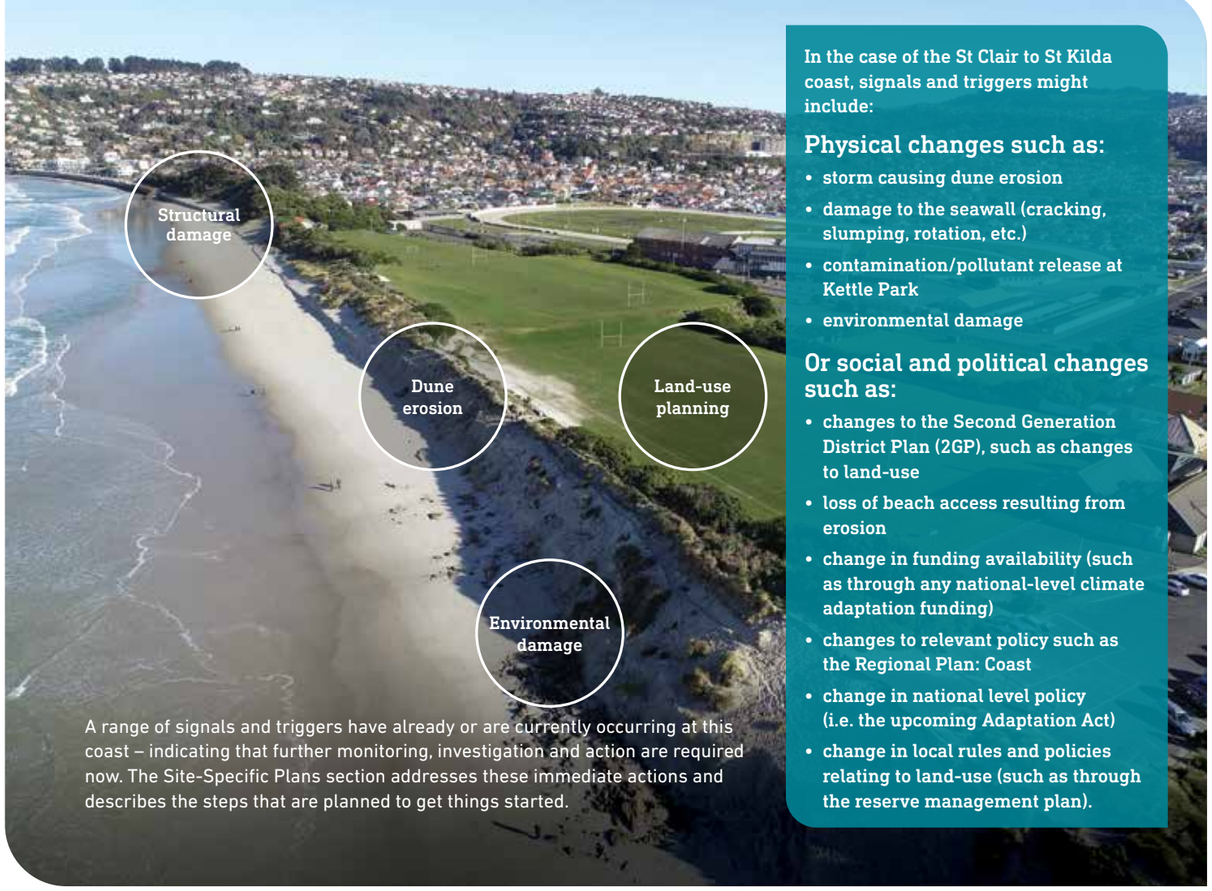
- When do we change from our current management of the coast to something else?
- Do we wait for storm damage to respond?
- Do we need to align with land-use changes and funding to implement an alternative?
- Can we be proactive in our management approach?

SIGNALS & TRIGGERS

When managing the coast, signals and triggers can be used to identify the timing of key decisions. Signals provide early warning of a pending change of management approach so that plans can be put in place to secure funding and develop detailed implementation plans for a change in approach.

Signals serve to indicate when the current management approach is being pressured or stretched and help to inform planning, decision making and the timing of action.

Triggers indicate that the time for changing approach has been reached, or at least that a change in approach should be considered. Triggers should provide sufficient lead time to implement the change.



A range of signals and triggers have already or are currently occurring at this coast – indicating that further monitoring, investigation and action are required now. The Site-Specific Plans section addresses these immediate actions and describes the steps that are planned to get things started.

In the case of the St Clair to St Kilda coast, signals and triggers might include:

Physical changes such as:

- storm causing dune erosion
- damage to the seawall (cracking, slumping, rotation, etc.)
- contamination/pollutant release at Kettle Park
- environmental damage

Or social and political changes such as:

- changes to the Second Generation District Plan (2GP), such as changes to land-use
- loss of beach access resulting from erosion
- change in funding availability (such as through any national-level climate adaptation funding)
- changes to relevant policy such as the Regional Plan: Coast
- change in national level policy (i.e. the upcoming Adaptation Act)
- change in local rules and policies relating to land-use (such as through the reserve management plan).

KEY DECISIONS FOR ST CLAIR TO ST KILDA

There are three key decisions to be made in the management of the St Clair to St Kilda coast. These relate to when the current management approaches for St Clair, Middle Beach and St Kilda need to change. At each trigger point shown by the circles in the figure below, there are a number of pathways or options that can be taken. The figure below shows the three key decisions for the coast.

We currently expect to make these decisions in the following order:

1. **Middle Beach**
   Management/ removal of historic contamination
2. **St Clair**
   Replacement/ alternative to existing seawall
3. **St Clair – St Kilda**
   Restoration of dunes and changes to John Wilson Ocean Drive

This order prioritises addressing the landfill at Kettle Park. This order could change, but is an honest reflection of a risk-based approach to prioritising action at this stage.

In advance of these major changes, we will still look to do things at St Clair and St Kilda, such as access improvements, structural repairs and dune management – these actions are described in the Site-Specific Plans section of this plan. The priority area in terms of large-scale change is likely to be Middle Beach due to the current and growing risk that the landfill poses.

Work is planned to support in better understanding this risk and evaluating the options for management.

	Option	Today									Future
St Clair	Current approach										
	Alternative approach										
Middle Beach	Current approach										
	Alternative approach										
St Kilda	Current approach										
	Alternative approach										

MANAGEMENT APPROACH

There are four high-level management approaches that could be applied at the coast. Different approaches may be used at different parts of the coast. This section explains the thinking behind the different management approaches and why some approaches are more suitable than others. The approaches include:

1. **No active intervention**
   No further management of erosion and allow the coast to respond naturally to future erosion and inundation events
2. **Hold the line**
   Undertake work to hold the coastline in the current location
3. **Coastal setback**
   Undertake works to accommodate coastal processes and allow the sea to move landward
4. **Advance the line**
   Undertake works to push the coast seawards and provide space to establish new protection

No active intervention (approach 1) would mean accepting deterioration of the coast and doesn't align well to what we've heard is important to the community (vision and management objectives). Advancing the line (approach 4) is contrary to the New Zealand Coastal Policy Statement and the management objectives of this plan and therefore difficult to obtain consent and potentially prohibitively costly to construct.

The coastal setback approach most closely aligns with the vision and management objectives established in this plan and offers the best option to develop a natural and resilient coast for the long term. The holding the line approach will also need to be used – at least as an interim approach. This approach potentially commits to a future of maintenance and engineering work but could meet the needs and aspiration for improved access and amenity over a shorter time scale.

The entire stretch of coast does not need to be setback soon, but rather in time, some form of coastal setback is likely to be of value and is the approach that is most likely to meet the aspiration and management objectives presented in this plan.

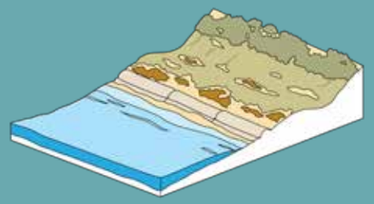
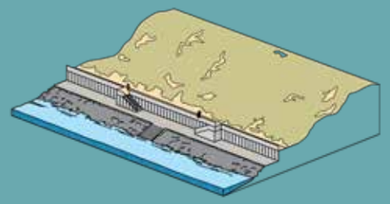
The following section of this plan shares the short-listed management options that fall under the preferred approaches of coastal setback and hold the line. A range of other options fall under approaches 1 and 4. However, these options are considered to lack alignment with this plan and are likely unsuitable.

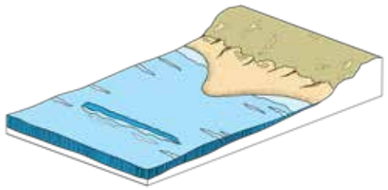
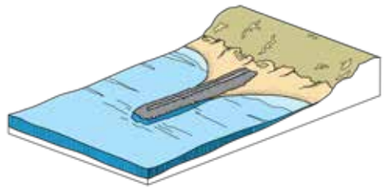
MANAGEMENT OPTIONS

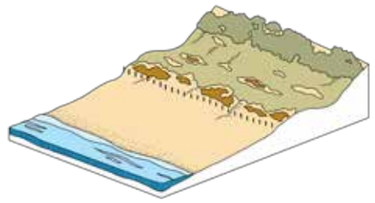
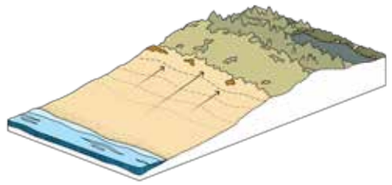
For each of the management approaches shown, there are a range of ways to achieve the desired outcome.

We have started to narrow down the range of possible options by considering which align most closely to the community vision and management objectives of this plan. We'll continue to develop and assess these options and engage more with the community as we do. This way we'll be ready to switch options.

It is recognised that some options presented are more appropriate at certain areas of the coast (i.e. dune management is of limited value at St Clair as there is little space).

	1	2
Options	**Maintain existing defence**	**New or upgraded seawall (rock or concrete)**
		
High level approach	Hold the line	Hold the line
Comments	Current structures do not meet the needs of the community and the effects of climate change will increase the risk.	Could improve access but would require ongoing maintenance and upgrades and therefore might not be sustainable/resilient. Walls will generally erode (lower) the beach.

	3	4
Options	**Offshore structure**	**Groynes/beach nourishment**
		
High level approach	Hold the line	Hold the line
Comments	Costly to construct and requires active maintenance. Could impact surf amenity, positively or negatively depending on design. May need fine tuning to mitigate negative effects on coastal processes. Doesn't align with New Zealand Coastal Policy Statement.	Multiple groynes likely to be required to retain sufficient sand. Alternatively, large import sand volume and periodic top-up would be expensive and disruptive.

	5	6
Options	**Enhanced dunes**	**Coastal setback**
		
High level approach	Hold the line	Coastal setback
Comments	Current dune system over-steep so a longer-term option would include some setback (retreat). Shorter term dune management, including plantings and notching will support resilience.	Most closely aligned to community aspiration. Able to work with natural systems to create a resilient system and more space for the coast to respond to natural events. Would require changes to land-use and substantial lead-time to implement.

MANAGEMENT PATHWAYS – AN INTRODUCTION

This plan uses management pathways to explain how different options might be used and sequenced overtime.

Management pathways are systems of individual and connected actions and options that are sequenced to help manage the coast through time.

The figure below helps to explain this concept, whereby individual pathways are effective for a time, with signals and triggers helping to indicate a need for change – informing a decision to switch to a new pathway. The management pathways for this plan – St Clair, Middle Beach and St Kilda are presented in the Site-Specific Plan section.

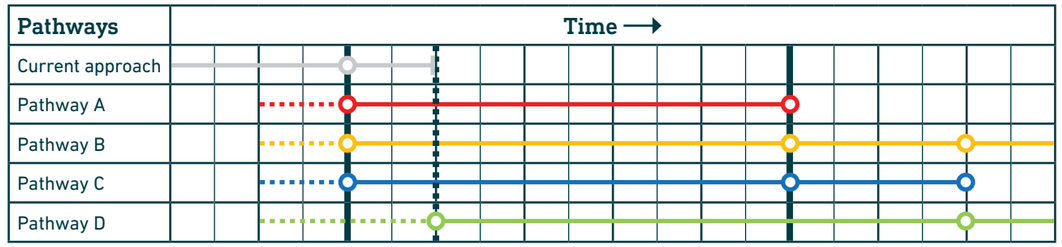
There is no 'silver bullet' – a range of pathways will be considered and may be drawn on through time. All investments will be made within the context of this plan and its associated vision and objectives.

We know that changes will need to be made in time to manage the coast as sea levels rise and storms become more frequent. A range of pathways will need to be considered. These pathways will help to navigate the changes ahead. Importantly, and wherever possible, we would like to stay on pathways that align well with the management objectives and vision established in this plan. There may be times when this is difficult – it may be costly or otherwise challenging.

Pathways may include a range of interventions to achieve a desired outcome. For example, one pathway might include dune management which could help to reduce erosion risk, before a more substantial option such as coastal setback is required. Conversely, we could decide to complete the setback sooner or build a structure to mitigate landward erosion – these pathways would have very different impacts on the coast.

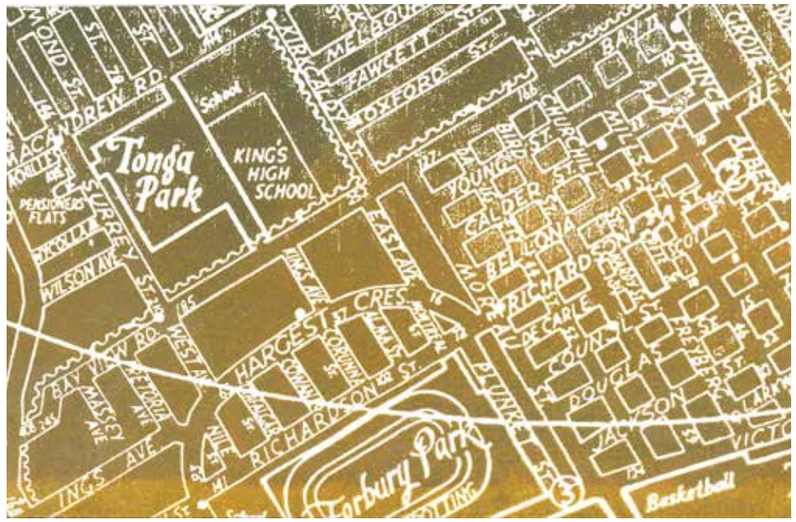
There are a wide range of potential pathways to choose from. Each will need to be further assessed and tested for alignment with the management objectives established in this plan.

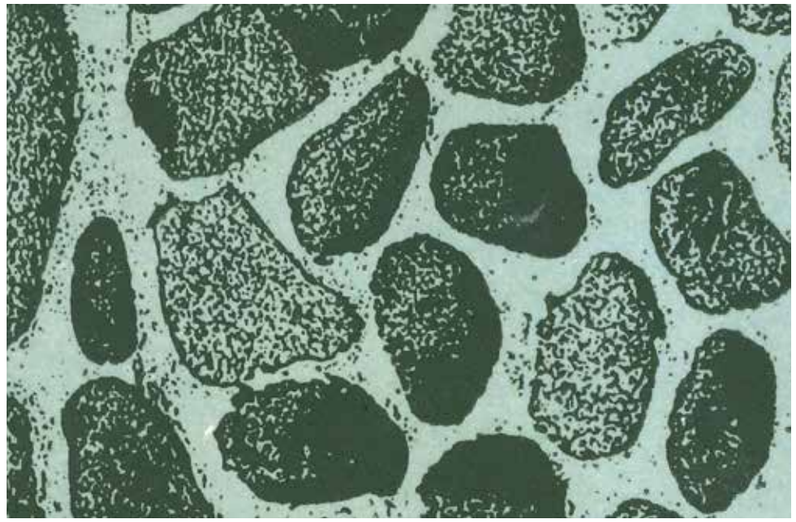
The figure (below) is an example only and helps to describe the pathways approach used in this plan.



Legend	
Transfer to new pathway	○
Pathway	———
Opportunity for early transfer	- - - - - -
Switch of pathways	|

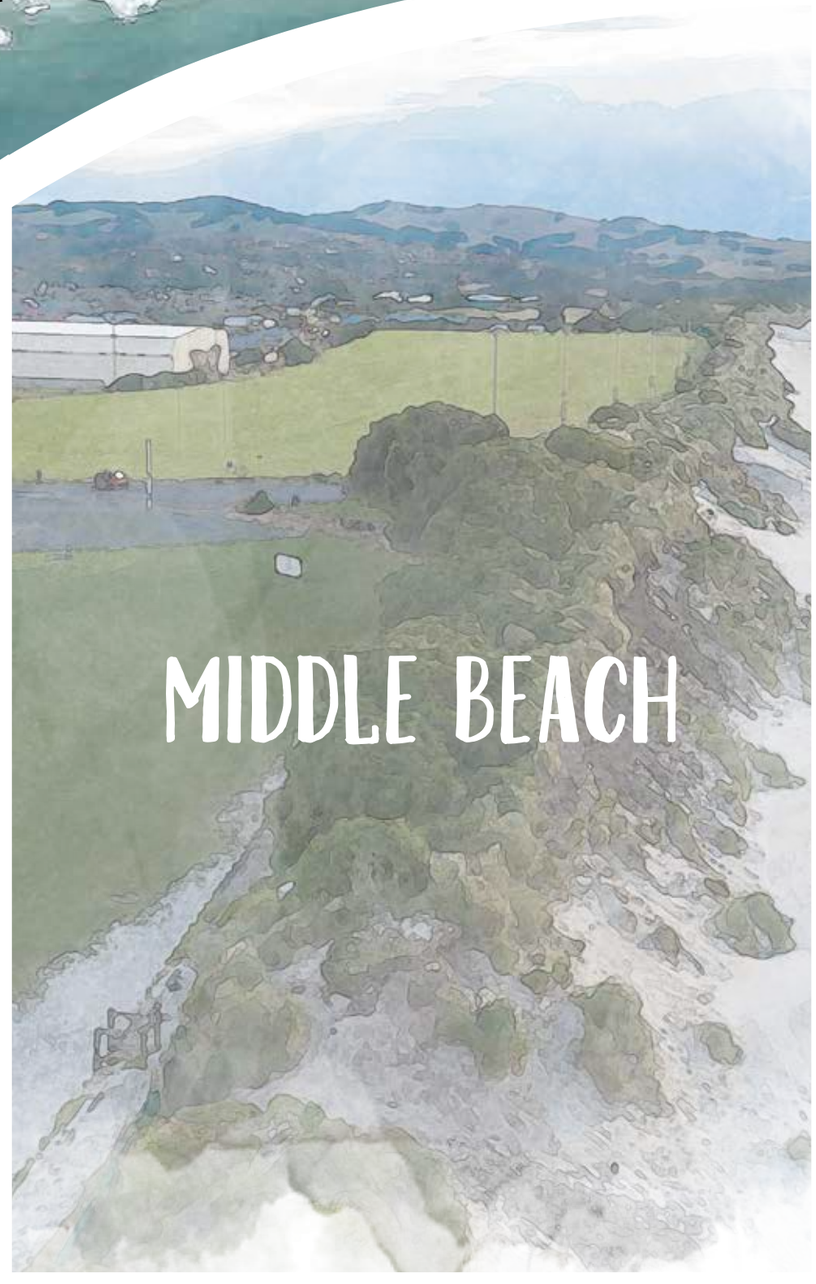
This figure provides an example of what pathways can look like. Decisions to switch between pathways can be made at any time, but often require lead time to implement the change.



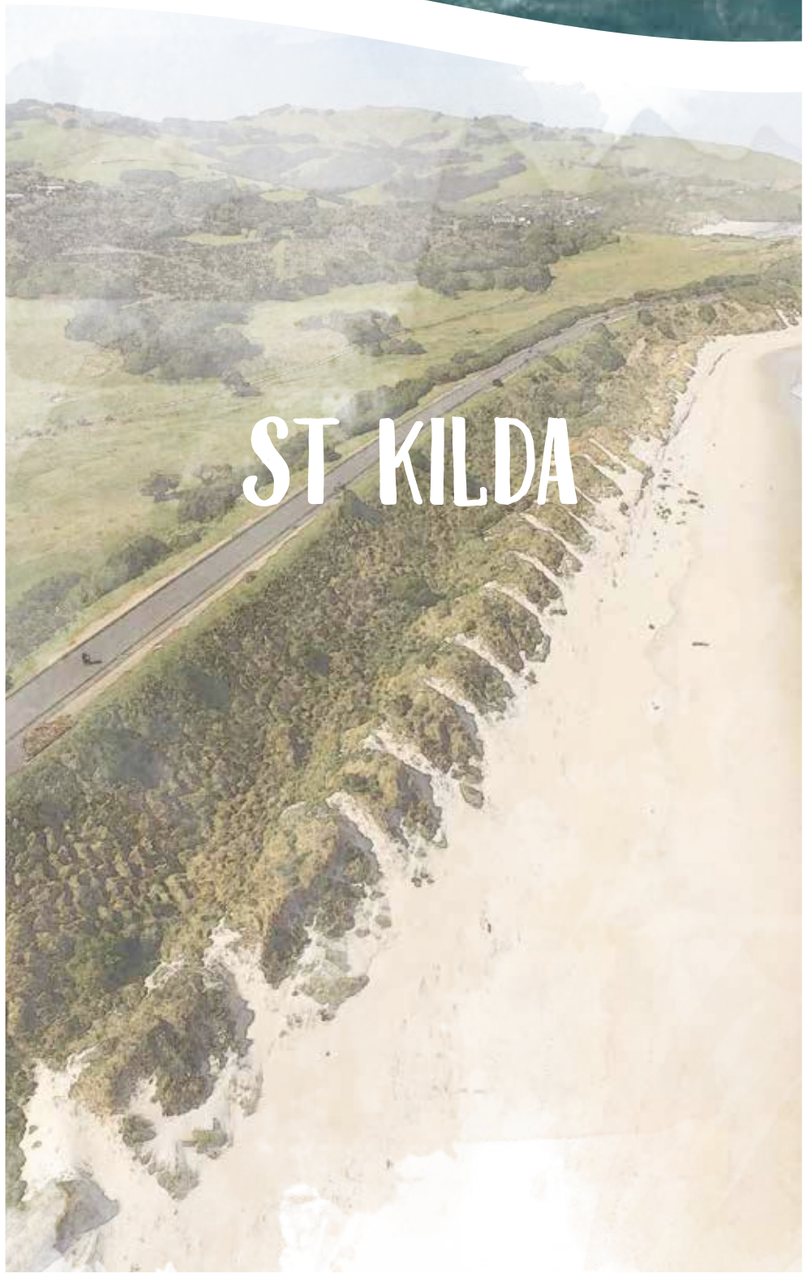


SITE-SPECIFIC PLANS

ST CLAIR



MIDDLE BEACH



ST KILDA

ST CLAIR

COMMUNITY ASPIRATION

We have heard that the community values access and close proximity to the coast at St Clair and there is a desire to see a sandy beach restored to support with access, surf amenity and safety. The community has told us that changes to the sea wall would positively impact their experience of the coast to support access and recreation opportunities. People viewed the retention of sand as positively impacting their experience of the coast as they want to have a sandy beach.

To improve and otherwise modify the area to reduce erosion, improve safety and allow access to St Clair Beach.

SHORT-TERM ACTIONS

Outlined below are the physical actions planned for the coming years. These actions will support in the management of St Clair, in alignment with the management objectives of this plan. The work described below is already budgeted for and scheduled to take place within the next three years.

- Repairs and enhancements to public access points
- Removal of redundant infrastructure from the sea wall (old stairways and piles)
- Dune fencing/ planting to control access and support in dune stability.

The following items relate to the short-term investments that will support in informing the management of St Clair.

- Coastal modelling to support in assessing management options
- Sea wall risk assessment to inform its remaining life
- Ongoing beach monitoring to inform management
- Ongoing monitoring of sea wall and geobags (sand sausages) – informing maintenance.

Some items of work described above, i.e. monitoring have been taking place over recent years and are set to continue.

EMERGENCY RESPONSE

Storms and other events may trigger a need for urgent reactive work. It is critical that emergency management responses are made within the context of this plan and its management objectives. This will help to ensure that remedial activities do not preclude the longer-term direction of management and that we avoid reactive actions that we regret later.

In the case of structural failure (of the sea wall or geobags), repairs are advised if timing is inappropriate for implementation and transition towards a more sustainable long-term option. The information shared in the previous section details the work that will take place in parallel – supporting to develop a more proactive plan for managing this area.

The use of any temporary risk mitigation methods will be informed by ongoing coastal monitoring.

SHORTLISTED PATHWAYS

This Plan utilises an adaptive management approach to support in developing a set of management pathways for the coast. The following page shows the pathways for St Clair that best align with the vision and management objectives of this plan. Further work is planned, to inform which options will be used and when.

The following option descriptions relate to the content shown on the next page.

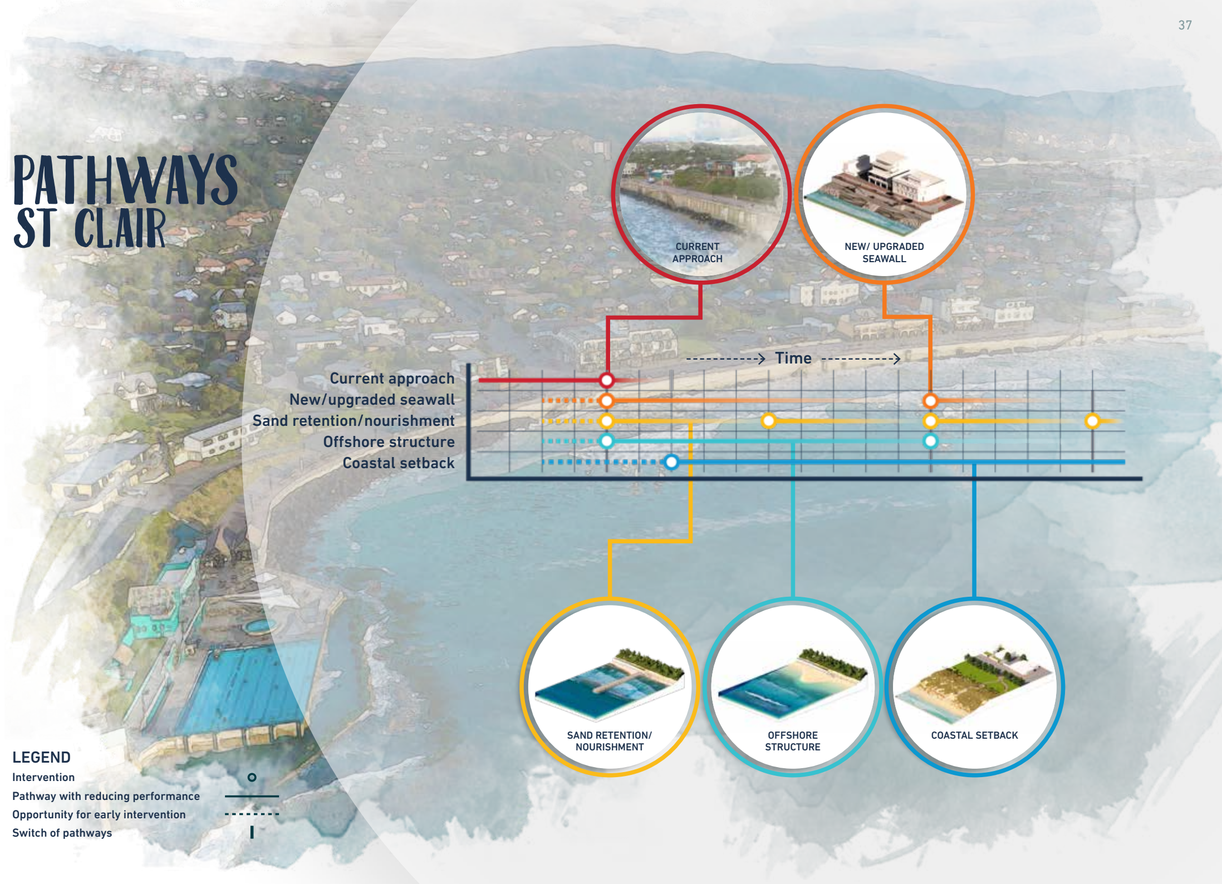
The current approach *is to reactively manage periods of erosion and address structural/public access issues on an ad hoc basis. This management approach has involved re-positioning of rocks at the base of wall as well as more substantial repairs following failure of sections of the wall (such as in 2015).*

New/upgraded seawall *– this would involve replacement of the existing wall with a new wall, or upgrades to the existing seawall. A new seawall might be constructed on a new alignment to work better with coastal processes. There would be an opportunity to improve access, enhance the public spaces and re-imagine how this area works for the community.*

Sand retention/nourishment *– this would involve importing sand and/or construction of structures to try to retain sand. This could include a groyne or similar structure designed to trap sand. This could create an enhanced high tide beach. It would require ongoing investments to top-up and sustain sand levels over longer periods.*

Offshore structure(s) *– this would involve creating a structure offshore, which would provide a more sheltered wave climate and reduce the loss of sand from the beach. This could be combined with nourishment to create a suitable beach profile. It would impact surf amenity/quality.*

Coastal setback *– this would provide an opportunity to make space for natural processes and reimagine the experience at the coast. It would likely require changes to existing land-use. This is likely to be the most sustainable long term risk management option but would take time to implement.*



MIDDLE BEACH

COMMUNITY ASPIRATION

We have heard that our community values the naturalness of Middle Beach, the sandy beach environment and the recreational and access benefits that come with it. The community is concerned about the landfill under Kettle Park and feels that nature-based interventions such as dune management and setback would be preferable to engineered modifications.

To reduce the risk of the landfill eroding onto the beach and enhance the natural habitat and encourage wildlife benefits, while providing safe access to the beach.

SHORT-TERM ACTIONS

Outlined below are the physical actions planned for the coming years. The work described below is already budgeted and scheduled to take place within the next three years.

- Stockpiling of sand to support in dune remediation and storm response
- Removal of contaminated material from the dune
- Active control on access to dune area to support dune stability.

The following items relate to the short-term investments that will support in informing the management of Middle Beach.

- Investigation of Kettle Park landfill composition and extent – to inform the shortlisted options
- Coastal modelling – supporting in the assessment of shortlisted options
- Ongoing beach monitoring to inform management
- Ongoing monitoring of contaminated material in the dunes.

Some items of work described above, i.e. monitoring have been taking place over recent years and are set to continue.

EMERGENCY RESPONSE

Storms and other events may trigger a need for urgent reactive work. It is critical that future emergency management responses are made within the context of this plan and its management objectives. This will help to ensure that remedial activities do not preclude the longer-term direction of management and that we avoid, wherever possible, reactive actions that we regret later.

In the coming years, the most suitable emergency management approach is to use temporary risk mitigation methods – avoiding larger-scale protection methods that might otherwise preclude the longer-term direction established in this plan. More substantive protection measures should only be considered in the most extreme situations (i.e. large-scale landfill exposure), with consideration being given to how any intervention might be adapted, removed or abandoned to support in longer-term adaptation and possible coastal setback.

SHORTLISTED PATHWAYS

This plan utilises an adaptive management approach to support in developing a set of management pathways for the coast. The figure on the following page shows the pathways for Middle Beach that best align with the vision and management objectives of this plan. Further work is planned, to inform which options will be used and when.

The following option-descriptions relate to the content shown on the next page.

The current approach *is to manage periods of erosion, for example by deploying temporary sandbags or nourishing the beach with sand brought from elsewhere. This poses a risk of exposing the historic landfill materials because the approach is largely reactive.*

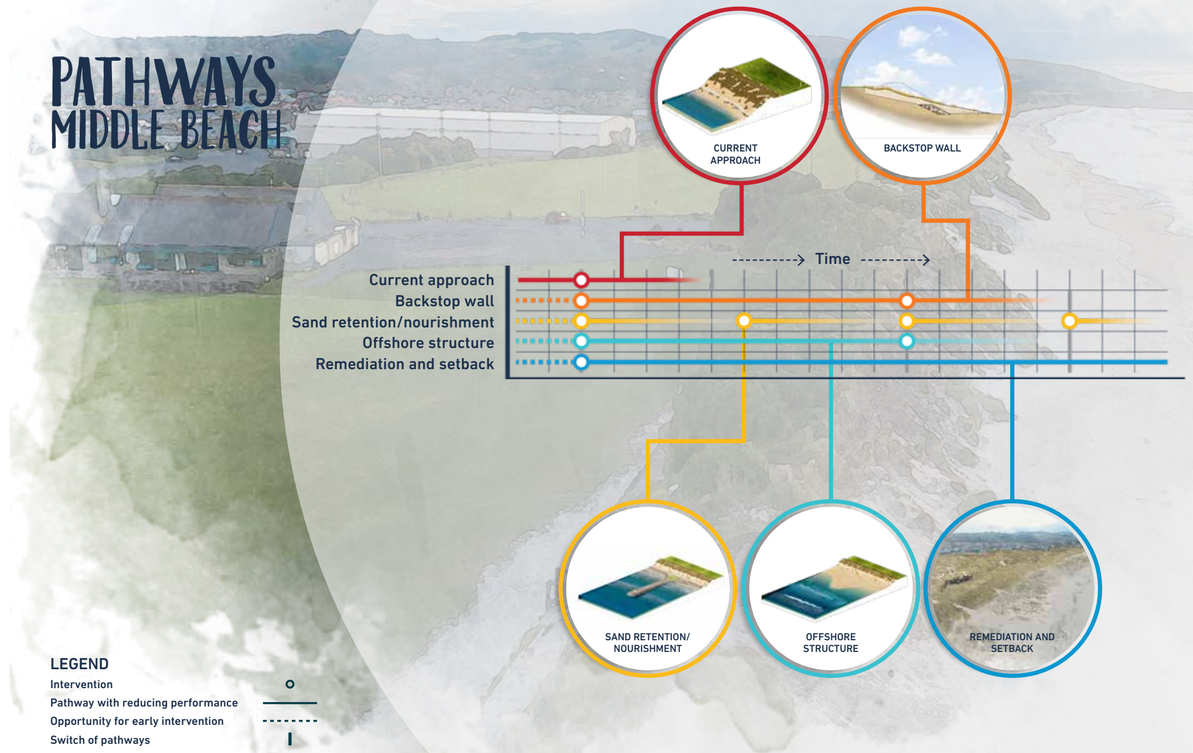
Backstop wall *– this would involve excavating into the dune face to construct a concrete or rock wall. This could be buried below the sand level to reduce visual and environmental impact. In periods of erosion, it would be exposed and would provide protection to the historic landfill material. A risk of exposing the historic landfill materials would remain particularly in extreme events. The wall would exacerbate erosion (lowering of the beach) during periods that it is exposed.*

Sand retention/nourishment *– would place additional sand seaward of the existing dune and may include additional structures on the beach to retain this material. This material would provide a buffer to erosion and could significantly reduce the risk of exposing historic landfill materials. It is likely to need periodic top-up and maintenance with associated disruption and cost. Sand retention could be achieved with structures (such as groynes) or with lower-impact works such as planting.*

Offshore structure(s) *– would work in a similar manner to sand retention structures by reducing the energy of waves arriving at the beach. This would reduce the risk of erosion and beach lowering and could lead to accumulation of sand. This would mean a reduced erosion risk with a lower risk of exposing historic landfill materials. Periodic maintenance would be required to keep the approach operating efficiently and impacts on the surf would be expected.*

Remediation and setback *– this would involve removal of the landfill material to create space for the dune and beach to respond more naturally to future storms. It would require change of land-use landward of the existing dune. It could produce a sustainable landscape requiring less active intervention and is the only option that would entirely remove the long-term risk posed by the landfill.*

PATHWAYS MIDDLE BEACH



ST KILDA

COMMUNITY ASPIRATION

We have heard that the community values the naturalness and wildness of St Kilda, the sandy beach and the opportunities to be close to wildlife and that access to and along the coast is important. The community told us that nature-based interventions such as dune management and setback would be preferable to engineered modifications.

To manage the dune to provide long term resilience, enhancing the natural environment and encouraging more use by wildlife, while providing safe access to the beach and connectivity along the coast.

SHORT-TERM ACTIONS

Detailed below are the physical actions planned for the coming years. The majority of work described below is already budgeted and scheduled to begin within the next five years.

- Dune management including planting works
- Continuation of dune notching to supplement sand transport into the dune area
- Access enhancements from John Wilson Ocean Drive to St Kilda Beach.

No substantial management actions are required at St Kilda in the coming years (to support in erosion management). It is proposed that efforts here are focused on maximising dune resilience through notching, planting and control on public access – both to serve the stability of the dune, but also to help manage the area as a valued space for wildlife.

The following items relate to the short-term investments that will support in informing the management of St Kilda.

- Coastal modelling to support in assessing management options
- Ongoing beach monitoring
- Establishment of beach monitoring points for public-use (Citizen Science)
- Planning for native dune restoration area.

Some items of work described above, i.e. monitoring have been taking place over recent years and are set to continue.

EMERGENCY RESPONSE

Storms and other events may trigger a need for urgent reactive work. It is critical that future emergency management responses are made within the context of this plan, to ensure that remedial activities do not preclude the longer-term direction of management and that we avoid, wherever possible, reactive actions that we regret later.

In the coming years, the most suitable emergency management approach is to use temporary risk mitigation methods – avoiding larger-scale protection methods that might otherwise preclude the longer-term direction established in this plan. More substantive protection measures should only be considered in the most extreme situations (i.e. large-scale erosion of John Wilson Ocean Drive), with consideration given to how any intervention might be adapted, removed or abandoned to support in longer-term adaptation.

SHORTLISTED PATHWAYS

This Plan utilises an adaptive management approach to support in developing a set of management pathways for the coast. The figure on the right shows the pathways for St Kilda that best align with the vision and management objectives of this plan. Further work is planned, to inform which options will be used and when.

The following option descriptions relate to the content shown on the next page.

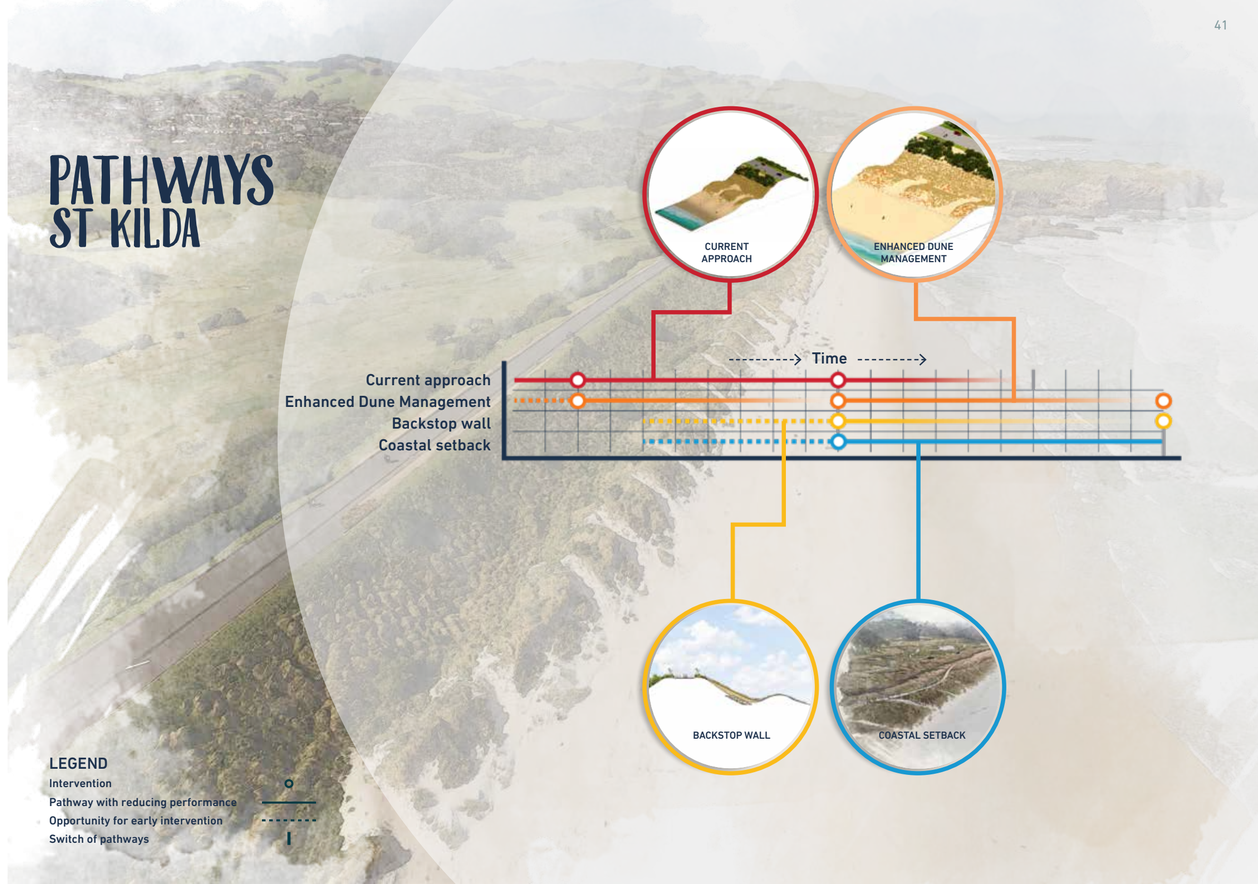
The current approach *is to notch the foredune to promote sand deposition to build a buffer to erosion. This approach is currently suitable. However, increasing sea level and potential change to the frequency and severity of storms could mean increasing maintenance costs and ultimately could mean this option is unsustainable.*

Enhanced dune management *– this would involve a continuation of notching of the foredune combined with additional planting (potentially with alternative species of plants), fencing areas of higher pedestrian movements to reduce damage to dune plants, providing improved access to the foreshore, and improvements to John Wilson Ocean Drive including landscaping and/or pedestrianisation. There would be potential to lower the height of the dune to allow wind-blown sand further landward to promote sand retention and an increased buffer against erosion.*

Backstop wall *– this would involve excavating into the dune face and foreshore to construct a concrete or rock wall. This could be buried below the sand level to reduce visual and environmental impact. In periods of erosion it would be exposed and would provide protection to the area landward of the dune but would lead to lowering (erosion) of the beach when exposed.*

Coastal setback *– this would involve changing land-use to make more space for natural processes. This could include a boardwalk/pedestrian alternative to John Wilson Ocean Drive on a more landward alignment and a more gently sloping (more natural) dune promoting landward movement of wind-blown sand. Planting with native dune species could re-establish the natural system. This approach would likely require the least active intervention on an ongoing basis.*

PATHWAYS ST KILDA



NEXT STEPS

This final section sets out the next steps to support further planning and implementation of the St Clair - St Kilda Coastal Plan. Three key items are addressed here.

1. Identification of a preferred pathway for each section of the coast
2. Engagement on preferred pathways and implementation
3. Developing implementation plan(s) & securing funding

IDENTIFICATION OF A PREFERRED PATHWAY

The previous sections of this plan have shared some of possible pathways for the coast. To further assess and select the preferred pathway for each section of the coast we will:

- Undertake further work to assess the performance of alternative options. In particular, consider the implications of any future land-use changes at the coast
- Develop concept designs and cost estimates for shortlisted pathways
- Score each pathway against community aspirations and technical and cost criteria

While the preferred pathway is being identified for each section of the coast there are short term actions that will help to progress the vision and community aspiration at each section of coast in the meantime – these are outlined in the Site-Specific Plans section.

FUTURE ENGAGEMENT

The vision established in this plan will guide future decision-making and management of the coast. We anticipate the community being provided with further opportunities for input, particularly around key decision points when they relate to significant management actions or policy change. Smaller scale management activities that align with this plan's objectives and do not indicate a change in management approach will be managed by the DCC.

IMPLEMENTATION PLAN

Once we have identified a preferred pathway, we will develop a plan for the implementation of that option. This will include:

- Securing funding for implementation
- Developing a consenting strategy
- Developing an implementation programme.

We are committed to keeping the community involved in this process as things move forward. The community's views and values are central to this plan's vision and objectives and demonstrate a commitment to an ongoing conversation about what will be done to manage this coast.

For advice or information

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SOUTH DUNEDIN FUTURE