# Paekākāriki Adaptation Area: Draft Adaptation Pathways

CAP Meeting 9th February 2024

Information prepared by TAG



# This workshop:

The aim of this part of the workshop session is for CAP to:

- 1. Develop a short-list of pathways for each management unit that should be considered further in the MCDA scoring;
- 2. Define at a high-level what package of actions could be used for each option in the short-listed pathways.

A long list of possible high–level pathways which could give effect to the draft PAA Objective and risk assessment have been drafted as a starter for CAP discussion.



# **Overview of Management Units**

The Paekākāriki AA has been split into three sub-units:

- 1. 11A Paekākāriki Seawall (erosion management unit)
- 2. 12A South of Paekākāriki Seawall (erosion management unit)
- 3. 11B Paekākāriki (inundation management unit)

The **inundation hazard** from coastal flooding in the PAA is generally confined to the area around the Wainui Stream. Approaches to dealing with inundation will likely be consistent throughout the PAA, and therefore there is no need to geographically split the inundation unit into smaller sub-units.

The **erosion hazard** in the PAA is generally consistent across the whole adaptation area. There are some differences in how the shoreline is currently managed, however in general the shoreline is currently protected by seawalls, with majority of the area being protected by the public Paekākāriki seawall.

Because of Council's short-term plans of the proposed replacement of the wooden section of the Paekākāriki seawall and a similar expected lifetime of the existing rock revetments on either side of this seawall, the PAA has been split into two erosion management units (11A – Paekākāriki Seawall; 12A – South of Paekākāriki Seawall).

North of the Paekākāriki Seawall is Queen Elizabeth Park, which falls into the GW jurisdiction, so this short section of coast is not included in the erosion and inundation management units for pathway development.



# Paekākāriki Coastal Protection Structures

- Most of the shoreline within the PAA has protection structures, with the exception of Ames Street Reserve.
- Most structures are maintained by KCDC, with private structures being in front of properties at Ames Street and Fisherman's Table. NZTA is responsible for the structure along SH59.
- The timber portion of the public Paekākāriki Seawall in the short term is proposed to be replaced as 'like for like' and will likely effectively manage the erosion risks for the next 20 years.



# Paekākāriki Adaptation Area Management Units

Properties Exposed in Paekākāriki Adaptation Area						
	Coastal erosion		Coastal flooding*			
	SSP2-4.5	SSP5-8.5	SSP2-4.5	SSP5-8.5		
0m SLR ~2020	44 (6%)	44 (6%)	32 (4%)	32 (4%)		
0.2m SLR ~2050	48 (6%)	48 (6%)	35 (5%)	35 (5%)		
0.35-0.45m SLR ~2070	122 (16%)	149 (20%)	36 (5%)	36 (6%)		
0.85-1.25m ~2130	166 (22%)	225 (30%)	45 (6%)	53 (7%)		
* Number of properties impacted by coastal flooding in PAA appears high, however these numbers are largely made up of beachfront properties where the edge of the boundary intersects with the hazard, or where flooding is generally very shallow. This is reflected by the 'low' risk to properties in the risk assessment from coastal flooding.						

Property counts are cumulative.



# **OPTIONS**

ACTIONS

# ENHANCE ACCOMMODATE

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# PROTECT

We keep the hazard away

# RETREAT

## **AVOID**



- Enhance existing erosion
   protection structures
- Enhance existing
   inundation protection
- Enhance access and ramps
- Dune and wetland
   enhancement/resilience
- Emergency management
- Environmental monitoring
- Community education and risk awareness
- Private owners'
   responsibility





- Relocatable buildings
- Raising floor levels
- Flood-proofing buildings
- Flood proofing
   infrastructure



- Soft Engineering (Erosion)Renourishment
- Renc
   Dune
  - Dune reconstruction

#### Hard Engineering (Erosion)

Sea walls (vertical, revetment, buried, interlocking)

#### Inundation controls

- Culvert outfalls
- Stopbanks
- Earth bunds
- Pump stations

#### We move away from the hazard



- Retreat
- Re-establish the line with a setback protection structure

## We don't move into the way of the hazard in the first place



Raising minimum floor levels of new builds

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- Reduce further intensification or development
- Trigger-based or time limited land use consents
- Zoning and setback controls

# Draft Adaptation Pathways for each Management Unit



# Management Unit: 11A Paekākāriki Seawall (Erosion Unit)

	Properties Exposed in Management Unit 11A Paekākāriki						
		Coastal erosion					
		SSP2-4.5	SSP5-8.5				
	0m SLR ~2020	0	0				
0.2m SLR ~2050		0	0				
	0.35-0.45m SLR ~2070	69	92				
	0.85-1.25m ~2130	99	145				

- Property counts are cumulative.
- Property count is low up to 2050 as the proposed Paekākāriki seawall and existing rock revetment has a 20 year residual life incorporated into the coastal modelling, so coastal erosion with up to a 0.2 m of sea level rise is based on what could happen in a significant storm causing these walls to fail and land behind to erode. However, because there is a road immediately behind the existing wall, the erosion line does not touch the property edges until the 2070 timeframe.



## **Pathways Template**

### Sub-area: 11A Paekākāriki Seawall (Erosion Unit)



Management Unit	Pathway	Short term	$\rightarrow$	Medium term	$\rightarrow$	Long term
	Pathway 1*	Status Quo <sup>1</sup> and Community Education and Emergency Management <sup>4</sup>	$\rightarrow$	Enhance existing protection structure <sup>2</sup> , Community Education and Emergency Management <sup>4</sup> (Enhance)	$\rightarrow$	Sea wall <sup>13</sup> (Protect – Hard Engineering)
Management Unit: 11A Paekākāriki (Erosion Unit)	Pathway 2*	Status Quo <sup>1</sup> and Community Education and Emergency Management <sup>4</sup>	$\rightarrow$	Enhance existing protection structure <sup>2</sup> , Community Education and Emergency Management <sup>4</sup> (Enhance)	$\rightarrow$	Re-establish the line with a setback protection structure <sup>10</sup> & Dune reconstruction <sup>12</sup> (Retreat & Protect)
	Pathway 3	Status Quo <sup>1</sup> and Community Education and Emergency Management <sup>4</sup>	$\rightarrow$	Sea wall <sup>13</sup> (Protect – Hard Engineering)	$\rightarrow$	Enhance Sea wall <sup>2</sup> (Protect – Hard Engineering)
	Pathway 4	Status Quo <sup>1</sup> and Community Education and Emergency Management <sup>4</sup>	$\rightarrow$	Re-establish the line with a setback protection structure <sup>10</sup> (Retreat & Protect)	$\rightarrow$	Enhance protection structure <sup>2</sup> (Protect – Hard Engineering)
	Pathway 5	Status Quo <sup>1</sup> and Community Education and Emergency Management <sup>4</sup>	$\rightarrow$	Re-establish the line with a setback protection structure <sup>10</sup> & Dune reconstruction <sup>12</sup> (Retreat & Protect)	$\rightarrow$	Beach renourishment <sup>11</sup> (Protect – Soft Engineering)
	Pathway 6*	Status Quo <sup>1</sup> and Community Education and Emergency Management <sup>4</sup>	$\rightarrow$	Beach renourishment <sup>11</sup> (Protect – Soft Engineering)	$\rightarrow$	Beach renourishment <sup>11</sup> (Protect – Soft Engineering)

- \*TAG does not believe this is an appropriate option for the PAA
- The proposed works for the Paekākāriki seawall replacement will have a design life of 20 years. Under 'status quo' it is assumed that these works will go ahead, and therefore will
  provide protection along this section of coastline for the short-term period. This is the same design life as the existing rock revetment which are on either of the proposed new
  seawall upgrade. Therefore, "status quo" for these walls will also provide protection for the short-term period.
- All pathways at all timeframes to include "Avoid" option through land-use planning (e.g short term is new coastal hazard provisions in Coastal Environment District Plan Change).
- Under existing RMA legislation, the success of planning actions is limited to re-developments and new developments. For re-development, this is dependent on the "turn-over" of building stock.

# Management Unit: 12A South of Paekākāriki Seawall (Erosion Unit)

Properties Exposed in Management Unit 12A Paekākāriki						
	Coastal erosion					
	SSP2-4.5	SSP5-8.5				
0m SLR ~2020	44	44				
0.2m SLR ~2050	48	48				
0.35-0.45m SLR ~2070	53	57				
0.85-1.25m ~2130	67	80				

• Property counts are cumulative.



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## **Pathways Template**

#### Sub \*\*\*\*\*\*\*

Sub-area: 12A South of Paekākāriki Seawall (Erosion Unit)						
Management Unit	Pathway	Short term	$\rightarrow$	Medium term	$\rightarrow$	Long term
ion Unit)	Pathway 1	Status Quo <sup>1</sup> and Community Education and Emergency Management <sup>4</sup>	$\rightarrow$	Enhance existing protection structure <sup>2</sup> , Community Education and Emergency Management <sup>4</sup> (Enhance)	$\rightarrow$	Re-establish the line with a setback protection structure <sup>10</sup> (Retreat & Protect)
	Pathway 2	Enhance existing protection structure <sup>2</sup> , Community Education and Emergency Management <sup>4</sup> (Enhance)	$\rightarrow$	Sea wall <sup>13</sup> (Protect – Hard Engineering)	$\rightarrow$	Re-establish the line with a setback protection structure <sup>10</sup> (Retreat & Protect)
Seawall Ero	Pathway 3	Enhance existing protection structure <sup>2</sup> , Community Education and Emergency Management <sup>4</sup> (Enhance)	$\rightarrow$	Re-establish the line with a setback protection structure <sup>10</sup> (Retreat & Protect)	$\rightarrow$	Enhance Sea wall <sup>2</sup> (Protect – Hard Engineering)
Paekākāriki	Pathway 4	Enhance existing protection structure <sup>2</sup> , Community Education and Emergency Management <sup>4</sup> (Enhance)	$\rightarrow$	Re-establish the line with a setback protection structure <sup>10</sup> & Dune reconstruction <sup>12</sup> (Retreat & Protect)	$\rightarrow$	Beach renourishment <sup>10</sup> (Protect – Soft Engineering)
South of	Pathway 5	Sea wall <sup>13</sup> (Protect – Hard Engineering)	$\rightarrow$	Enhance Sea wall <sup>2</sup> (Protect – Hard Engineering)	$\rightarrow$	Enhance Sea wall <sup>2</sup> (Protect – Hard Engineering)
Management Unit:11B (S	Pathway 6	Sea wall <sup>13</sup> (Protect – Hard Engineering)	$\rightarrow$	Re-establish the line with a setback protection structure <sup>10</sup> (Retreat & Protect)	$\rightarrow$	Enhance Sea wall <sup>2</sup> (Protect – Hard Engineering)
	Pathway 7	Status Quo <sup>1</sup> and Community Education and Emergency Management <sup>4</sup>	$\rightarrow$	Enhance existing protection structure <sup>2</sup> , Community Education and Emergency Management <sup>4</sup> (Enhance)	$\rightarrow$	Sea wall <sup>13</sup> (Protect – Hard Engineering)
	Pathway 8	Status Quo <sup>1</sup> and Community Education and Emergency Management <sup>4</sup>	$\rightarrow$	Sea wall <sup>13</sup> (Protect – Hard Engineering)	$\rightarrow$	Sea wall <sup>13</sup> (Protect – Hard Engineering)
	Pathway 9	Status Quo <sup>1</sup> and Community Education and Emergency Management <sup>4</sup>	$\rightarrow$	Beach renourishment <sup>10</sup> (Protect – Soft Engineering)	$\rightarrow$	Beach renourishment <sup>10</sup> (Protect – Soft Engineering)

Retreat

Protect

Accommodate

Avoid

Enhance

• All pathways at all timeframes to include "Avoid" option through land-use planning (e.g short term is new coastal hazard provisions in Coastal Environment District Plan Change).

• Under existing RMA legislation, the success of planning actions is limited to re-developments and new developments. For re-development, this is dependent on the "turn-over" of building stock.

• Seawall is a coordinated approach, yet to be determined if it is publicly or privately funded.

# Management Unit: 11B Paekākāriki (Inundation Unit)

Properties Exposed in Management Unit Paekākāriki 11B						
	Coastal flooding					
	SSP2-4.5	SSP5-8.5				
0m SLR ~2020	32	32				
0.2m SLR ~2050	35	35				
0.35-0.45m SLR ~2070	36	36				
0.85-1.25m ~2130	45	53				

• Property counts are cumulative.



## **Pathways Template**

Sub-area: 11B Paekākāriki (Inundation unit)



Management Unit	Pathway	Short term	$\rightarrow$	Medium term	$\rightarrow$	Long term
Management Unit 11B: Paekākāriki (Inundation Unit)	Pathway 1	Status Quo <sup>1</sup> and Community Education and Emergency Management <sup>4</sup>	$\rightarrow$	Enhance Existing Inundation Protection <sup>3</sup> and Community Education and Emergency Management <sup>4</sup> (Enhance)	$\rightarrow$	Additional Hard Protection (e.g. Stopbanks <sup>14</sup> , Pumpstations <sup>15</sup> ) (Protect)
	Pathway 2	Status Quo <sup>1</sup> and Community Education and Emergency Management <sup>4</sup>	$\rightarrow$	Enhance Existing Inundation Protection <sup>3</sup> and Community Education and Emergency Management <sup>4</sup> (Enhance)	$\rightarrow$	Elevate floor levels of buildings <sup>8</sup> (Accommodate)
	Pathway 3	Status Quo <sup>1</sup> and Community Education and Emergency Management <sup>4</sup>	$\rightarrow$	Enhance Existing Inundation Protection <sup>3</sup> and Community Education and Emergency Management <sup>4</sup> (Enhance)	$\rightarrow$	Flood proofing buildings and infrastructure <sup>6</sup> (Accommodate)
	Pathway 4	Status Quo <sup>1</sup> and Community Education and Emergency Management <sup>4</sup>	$\rightarrow$	Additional Hard Protection (e.g. Stopbanks <sup>14</sup> , Pumpstations <sup>15</sup> ) (Protect)	$\rightarrow$	Enhance New Inundation Protection <sup>3</sup> (Enhance)
	Pathway 5	Enhance Existing Inundation Protection <sup>3</sup> and Community Education and Emergency Management <sup>4</sup> (Enhance)	$\rightarrow$	Additional Hard Protection (e.g. Stopbanks <sup>14</sup> , Pumpstations <sup>15</sup> ) (Protect)	$\rightarrow$	Enhance New Inundation Protection <sup>3</sup> (Enhance)
	Pathway 6	Enhance Existing Inundation Protection <sup>3</sup> and Community Education and Emergency Management <sup>4</sup> (Enhance)	$\rightarrow$	Elevate floor levels of buildings <sup>8</sup> (Accommodate)	$\rightarrow$	Elevate floor levels of buildings <sup>8</sup> (Accommodate)
	Pathway 7	Enhance Existing Inundation Protection <sup>3</sup> and Community Education and Emergency Management <sup>4</sup> (Enhance)	$\rightarrow$	Flood proofing buildings and infrastructure <sup>6</sup> (Accommodate)	$\rightarrow$	Flood proofing buildings and infrastructure <sup>6</sup> (Accommodate)

• All pathways at all timeframes to include "Avoid" option through land-use planning (e.g short term is new coastal hazard provisions in Coastal Environment District Plan Change).

Under existing RMA legislation, the success of planning actions is limited to re-developments and new developments. For re-development, this is dependent on the "turn-over" of • building stock.

• Pathways in Italics were presented for the long-list of pathways in the RAA but discounted by the CAP.