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Paekākāriki Adaptation Area Risk Assessment

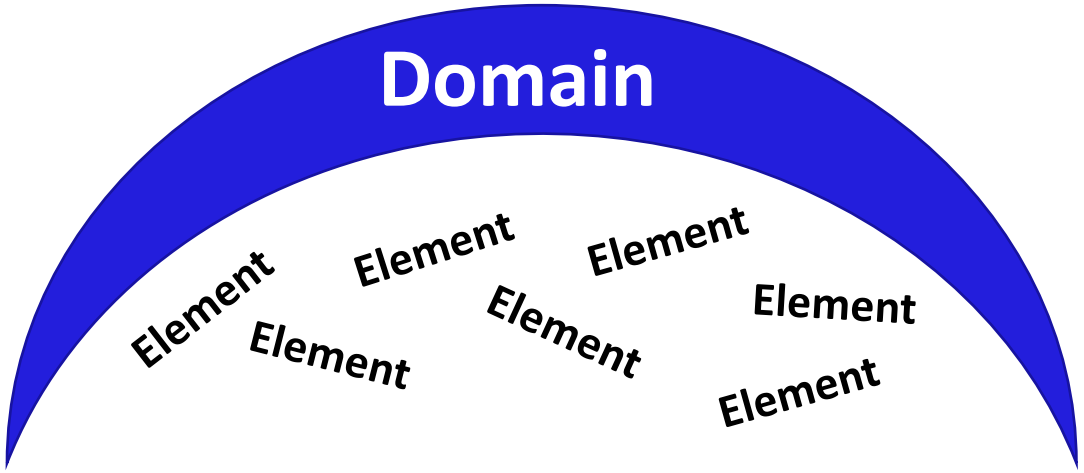
CAP Workshop 9h February 2024

(Updated May 2024)

Agenda

- Risk Assessment Re-cap: Purpose and process
- Risk Assessment Results – By Domain
  - Built Environment (Jacobs)
  - Natural Character (Boffa Miskell)
  - Ecological (Dr Astrid Dijkgraaf)
  - Human (NIWA)
  - Cultural (Still to be completed by Mana Whenua)

Terminology

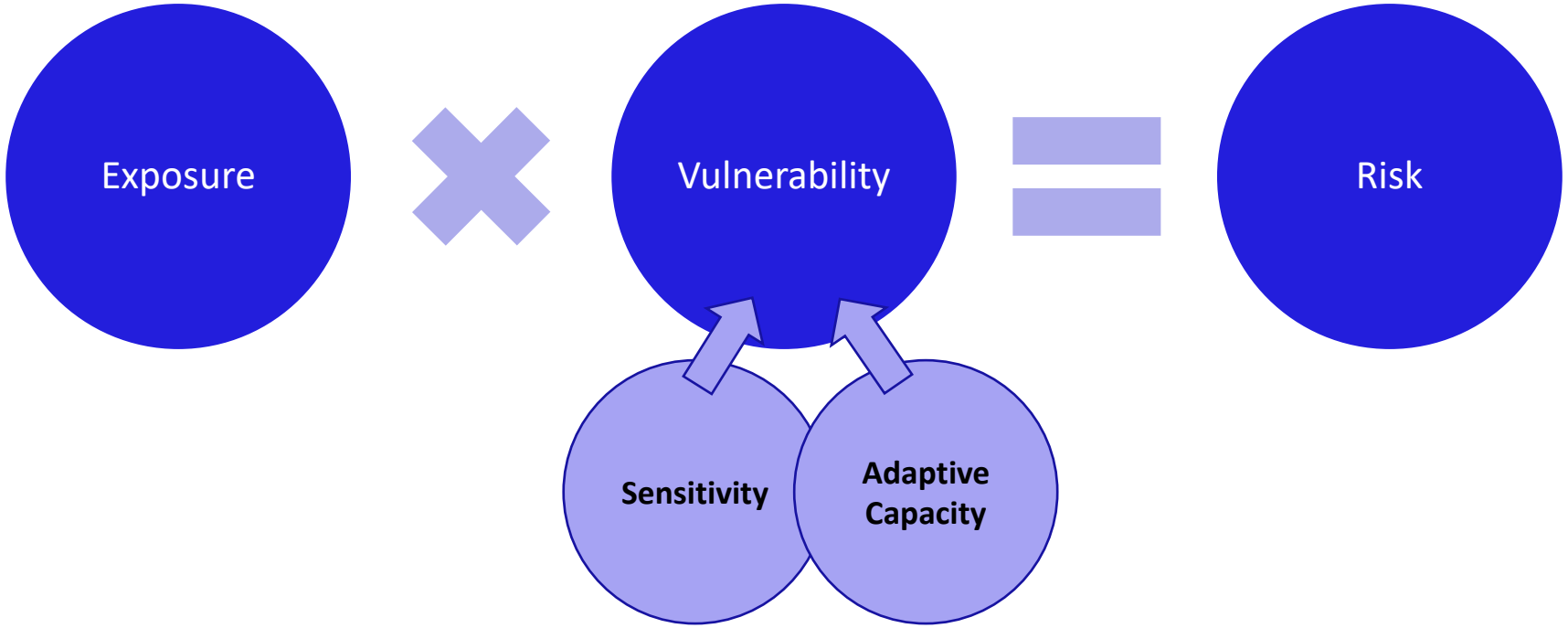


Domain	Element
Built Environment	e.g. Roads, Property, Water Supply
Ecological	e.g. Wetlands, dunes, ecological sites
Natural Character	e.g. Areas of high natural character
Human	e.g. Physical health, social infrastructure and amenity, exacerbating inequities
Cultural	**Still to be completed by Mana Whenua**

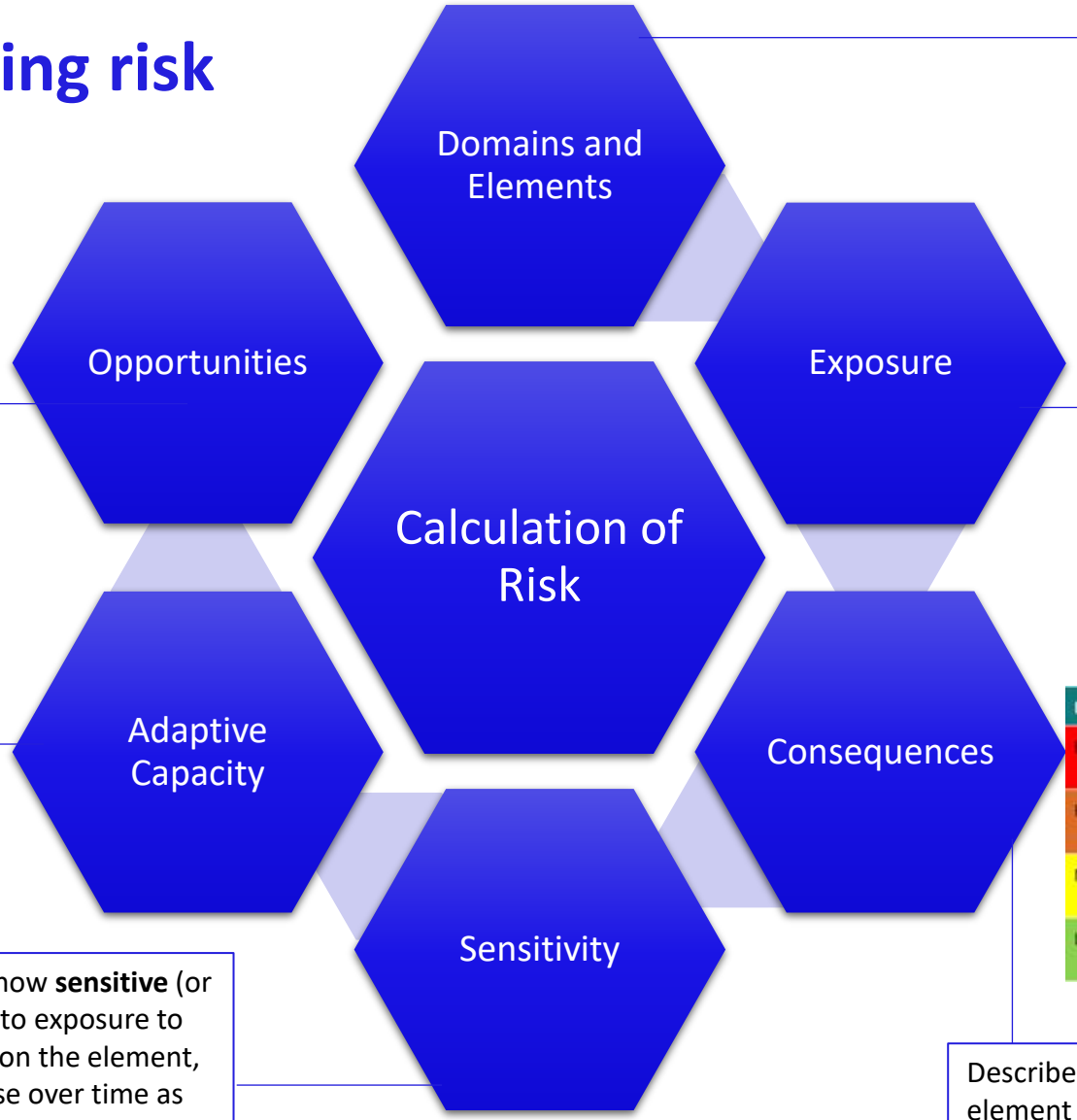
Purpose

What is a risk assessment?	Why do we need one?	What is it not?
A systematic way to assess the potential risks that may impact a person, activity, or asset from a hazard over time. It considers: - How **exposed** is an element to the hazard? - What are the **consequences** of the element being exposed? - And therefore, how **sensitive** is the element to being exposed? - Can the element **naturally adapt** with the hazard? It is a snapshot of what a 'do nothing' scenario may look like in the future. It looks at the PAA as a whole unit. It provides a 'baseline' that throughout the TK process we can use to assess our pathways against – e.g. do our pathways achieve what we need? It is based on the data we have available now, and can be built on in the future.	• To understand **what is in the Paekākāriki Adaptation Area (PAA), and what is at risk** to coastal erosion and inundation - now and in the future with SLR. • To understand **when** elements may become at risk. • To help us determine **where** we should focus our efforts to reduce risks in the future. • To help inform our objectives (what are we trying to achieve).	• Domains aren't prioritised – That is for the CAP to decide in your objectives. • It does not include economics or governance Domains– it is based on the information we have available to date. • It is not a broad climate change risk assessment. It only deals with coastal erosion and coastal inundation information available at this stage (e.g does not include AWA fluvial/pluvial-groundwater flooding). • This is not an extensive risk assessment – does not include every single council asset. It recognises the key infrastructure and values of the district and uses available data to assess the risk. • It is not going to solve all our problems today! This will show us what is at risk. In our next few sessions we will be determining how best to reduce the risks in the future.

Process – Calculating Risk



Process – Calculating risk



Identify the **domains and elements** that will be assessed.
- Built environment
- Human
- Ecological
- Natural Character
- Cultural (to be completed)

Description of potential **opportunities** there are for the element to have positive outcomes as a result of the hazard occurring, or potential opportunities outside of the adaptation planning scope to deal with the hazard.

Identify the **exposure** of the element to the hazard. Where possible, this is done using geospatial information to overlay with the hazard, and the exposure rating scale (MfE, 2017) is used, as per below. In some cases where the geospatial data was not available, these have been subjectively assessed.
Extreme, high, moderate, low ranking

A subjective measure of how easily/efficiently an element at risk can **adapt** naturally when exposed to a climate hazard.
Very low, low, moderate, high ranking

Exposure rating	Qualitative definition	Quantitative definition
Extreme	Significant and widespread exposure of elements to the hazard	>75% of sector or element is exposed to the hazard
High	High exposure of elements to the hazard	50–75% of sector or element is exposed to the hazard
Moderate	Moderate exposure of elements to the hazard	25–50% of sector or element is exposed to the hazard
Low	Isolated elements are exposed to the hazard	5–25% of sector or element is exposed to the hazard

Subjective measure of how **sensitive** (or tolerant) an element is to exposure to the hazard. Depending on the element, sensitivity could increase over time as the likelihood of exposure increases.
Extreme, high, moderate, low ranking

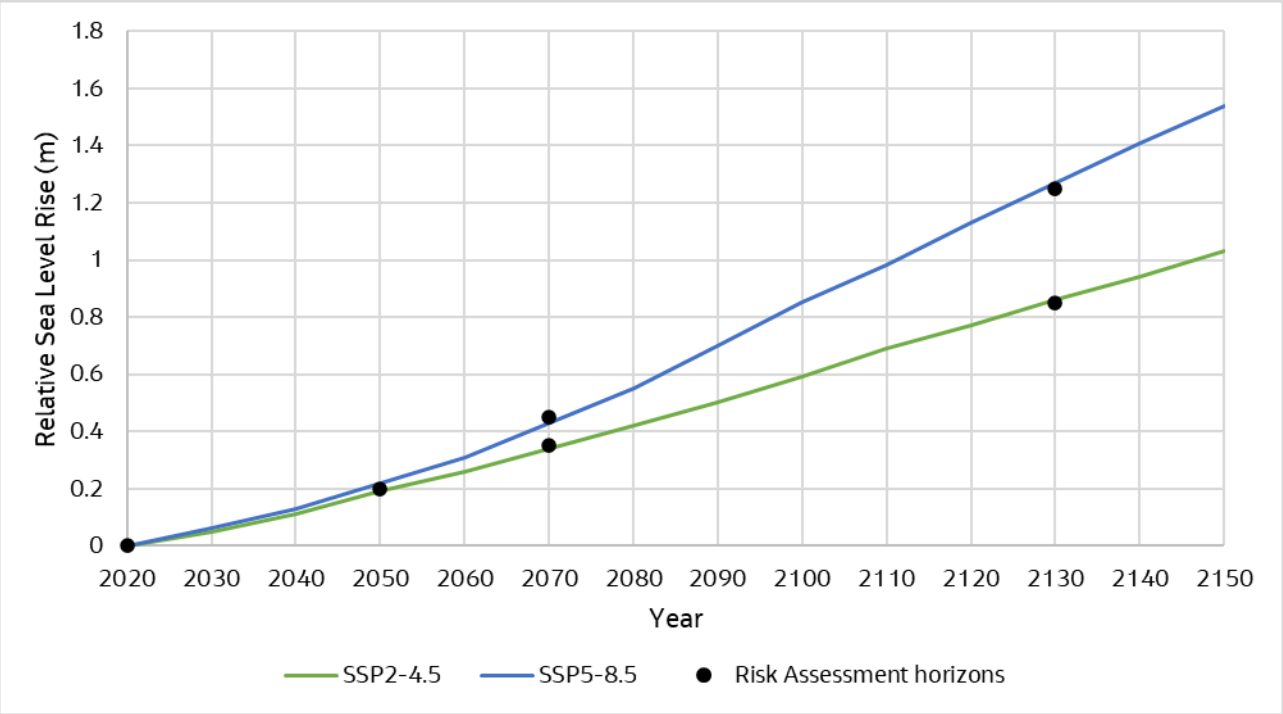
Describe the **consequences** of an element being exposed to the hazard.

Process - Risk Ranking

		Exposure			
		Low (L)	Moderate (M)	High (H)	Extreme (E)
Vulnerability	Extreme (4)	Moderate	High	Extreme	Extreme
	High (3)	Low	Moderate	High	Extreme
	Moderate (2)	Low	Moderate	Moderate	High
	Low (1)	Low	Low	Moderate	High

From: Ministry for the Environment. 2021. *He kupu ārahi mō te aromatawai tūraru huringa āhuarangi ā-rohe / A guide to local climate change risk assessments.* Wellington: Ministry for the Environment.

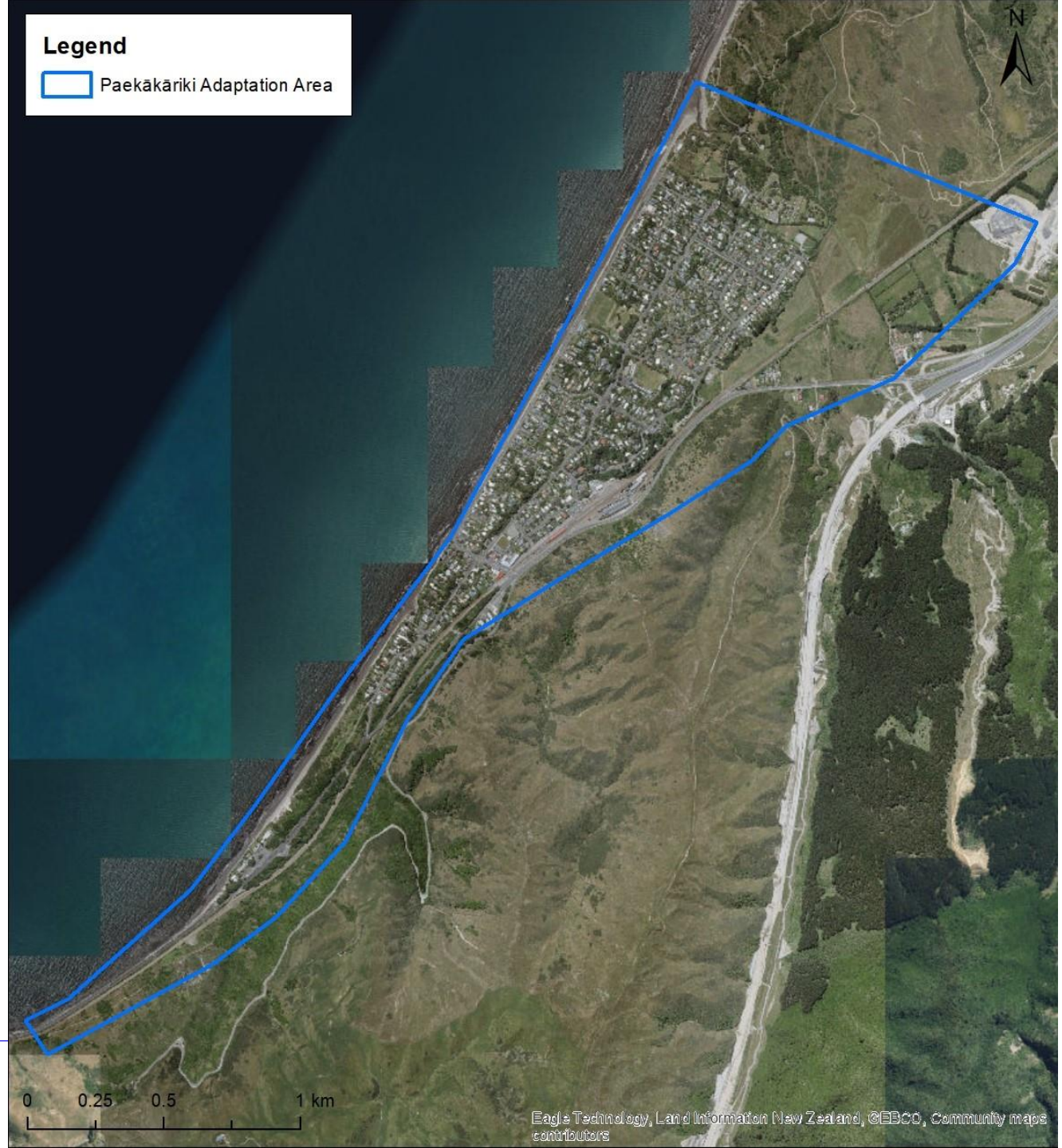
Process – Likelihoods and Scenarios



Timeframe	Sea level rise scenario	Erosion Hazard Probability Used	Inundation Hazard Probability Used
Present Day	0m RSLR	10% Probability of shoreline exceeding landward limit of mapped extent (e.g. P10)	1% Annual Exceedance Probability storm event
2050 (30 years)	0.2 m RSLR (SSP2-4.5 & SSP5-8.5)		
2070 (50 years)	0.35 m RSLR (SSP2-4.5) 0.45 m RSLR (SSP5-8.5)		
2130 (110 years)	0.85 m RSLR (SSP2-4.5) 1.25 m RSLR (SSP5-8.5)		

Paekākāriki Adaptation Area Risk Assessment Results

Paekākāriki Adaptation Area

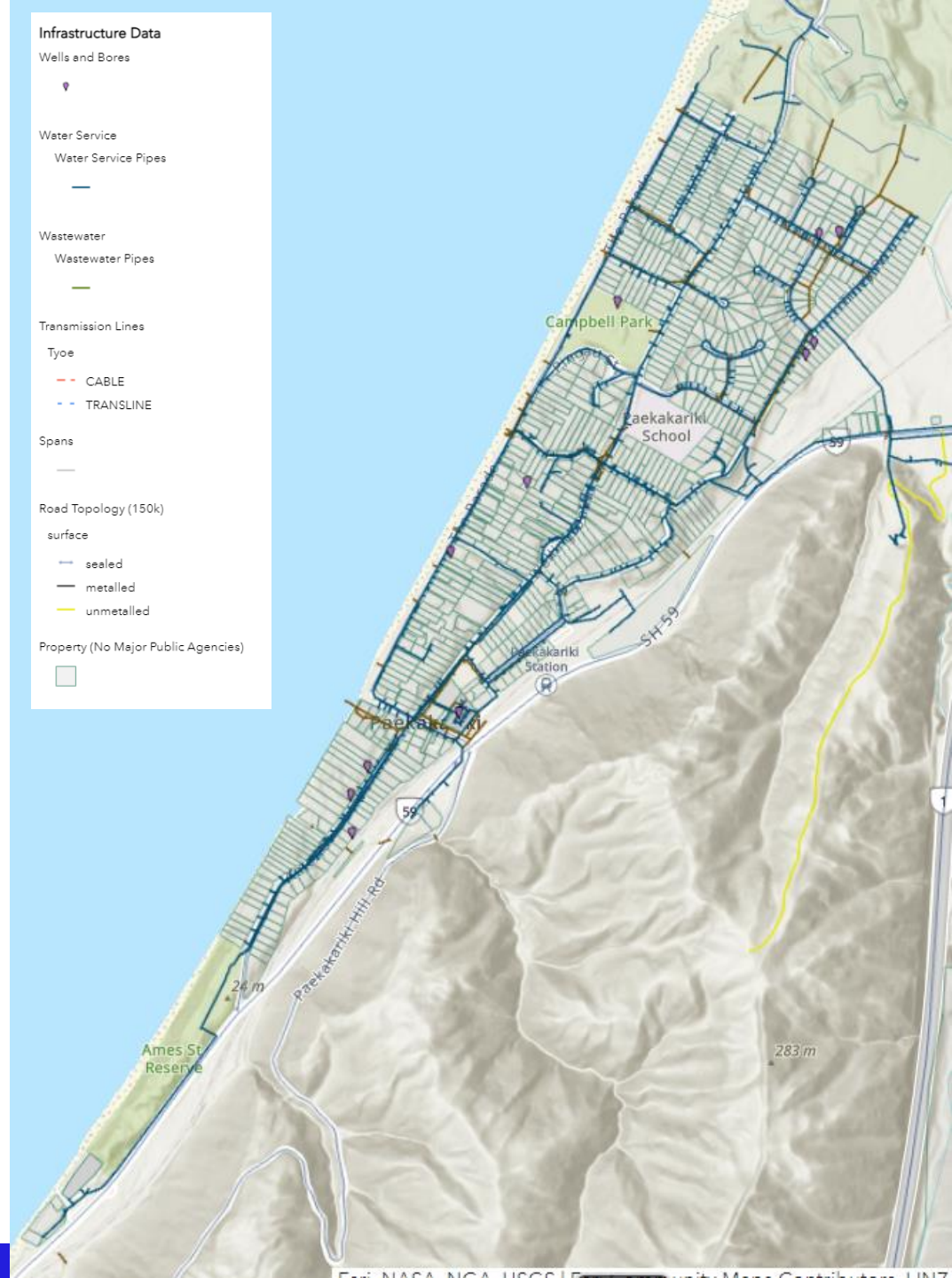


Built Environment Domain

The built environment encompasses assets, infrastructure and property that provide a service or critical function to the livelihood of the community.

Elements assessed:

- Private property
- Roads and bridges
- Water supply services (pipes, bores, treatment plants, pump stations)
- Stormwater services (pipes, outfalls, pump stations)
- Electrical supply and transmission (overhead and underground transmission lines)
- There is no public wastewater infrastructure or natural gas supply mains within the PAA, and therefore this is not assessed.



Built Environment Domain - Risk

	Coastal Erosion						Coastal Inundation					
Climate Change Scenario	**Both**		**SSP2-4.5**		**SSP5-8.5**		**Both**		**SSP2-4.5**		**SSP5-8.5**	
Element	Present	2050	2070	2130	2070	2130	Present	2050	2070	2130	2070	2130
Built Environment												
Properties - Whole Adaptation Area	M	M	M	M	M	H	L	L	L	L	L	L
Beachfront Properties only**	H	H	E	E	E	E	-	-	-	-	-	-
Water Supply Infrastructure	L	L	H	H	H	H	L	L	L	L	L	L
Stormwater Infrastructure	L	L	L	L	L	L	L	L	L	L	L	L
Roads and Bridges	L	L	M	H	M	H	L	L	L	L	L	L
Electrical Transmission and Supply Infrastructure	L	L	L	M	M	H	L	L	L	L	L	L
Wastewater infrastructure*	No exposure						No exposure					
Natural Gas Supply*	No exposure						No exposure					

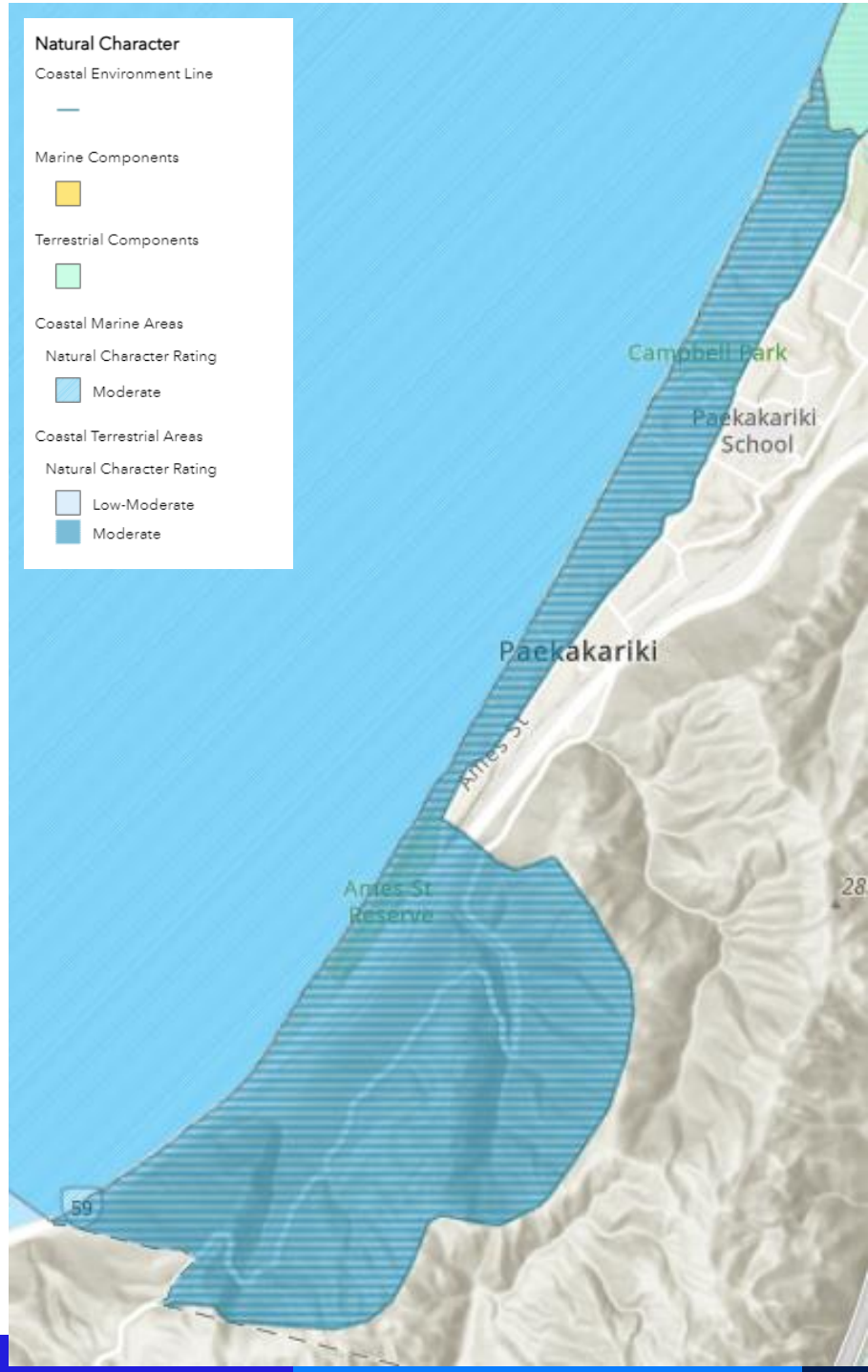
*Public wastewater and natural gas supply infrastructure are not present within the PAA, however for completeness with other adaptation areas (where this element has been assessed) it has been included.
**Beachfront only for coastal flooding is not assessed for consistency with other Adaptation Area Risk Assessments.

Natural Character Domain

Natural character is the ‘naturalness’ or degree or modification of an area, as well as an area’s distinct combination of natural characteristics and qualities.

Elements assessed:

- **CTA3: Paekākāriki**
- **Queen Elizabeth Park (Part of)**



Natural Character - Risk

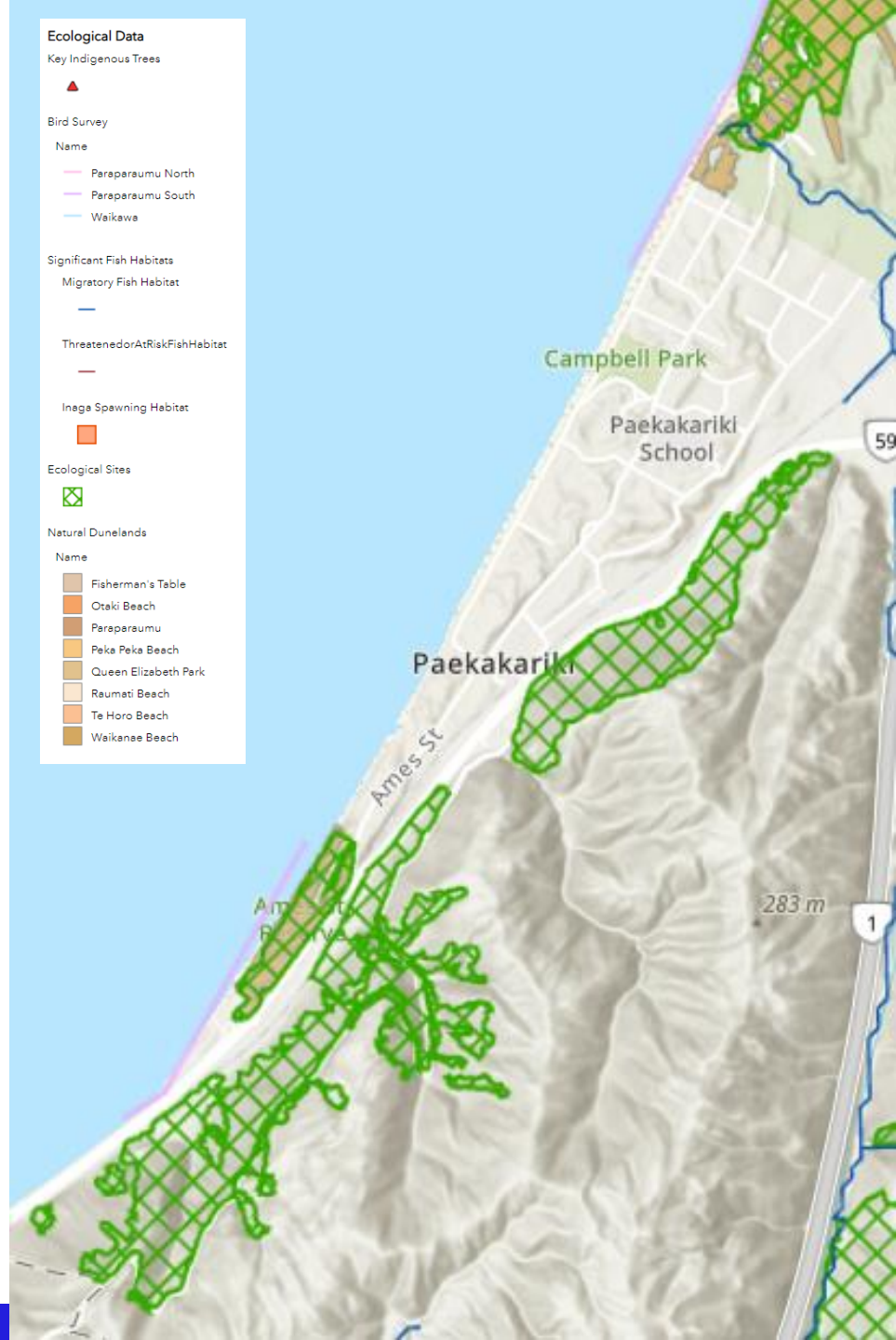
	Coastal Erosion						Coastal Inundation					
SLR Scenario	**Both**		**SSP2-4.5**		**SSP5-8.5**		**Both**		**SSP2-4.5**		**SSP5-8.5**	
Element	Present	2050	2070	2130	2070	2130	Present	2050	2070	2130	2070	2130
CTA3: Paekākāriki	L	L	L	M	L	M	L	L	L	L	L	L
Queen Elizabeth Park (Part of)	L	L	L	L	L	L	L	L	L	L	L	L

Ecological Domain

The ecological domain encompasses the natural flora and fauna of the district.

Elements assessed:

- Coastal Dunes
- Wetlands
- Mapped ecological sites
- Indigenous trees
- Rare and Threatened Species
- Bird Habitat
- Fish Habitat
- Indigenous Biodiversity (Coastal)



Ecological - Risk

	Coastal Erosion						Coastal Inundation					
Climate Change Scenario	**Both**		**SSP2-4.5**		**SSP5-8.5**		**Both**		**SSP2-4.5**		**SSP5-8.5**	
Element	Present	2050	2070	2130	2070	2130	Present	2050	2070	2130	2070	2130
Ecological												
Coastal dunes	M	M	M	H	H	E	L	L	L	L	L	M
Wetlands	L	M	M	H	M	H	L	M	M	M	M	M
Ecological sites	L	M	M	H	M	E	L	M	M	M	M	M
Indigenous trees*												
Rare and threatened species	M	M	M	M	M	H	M	M	M	M	M	M
Bird habitat	M	H	H	E	H	E	M	M	M	M	M	M
Fish habitat	M	M	M	M	M	M	M	M	M	M	M	M
Indigenous biodiversity (coastal)	M	M	E	E	E	E	M	M	H	E	H	E

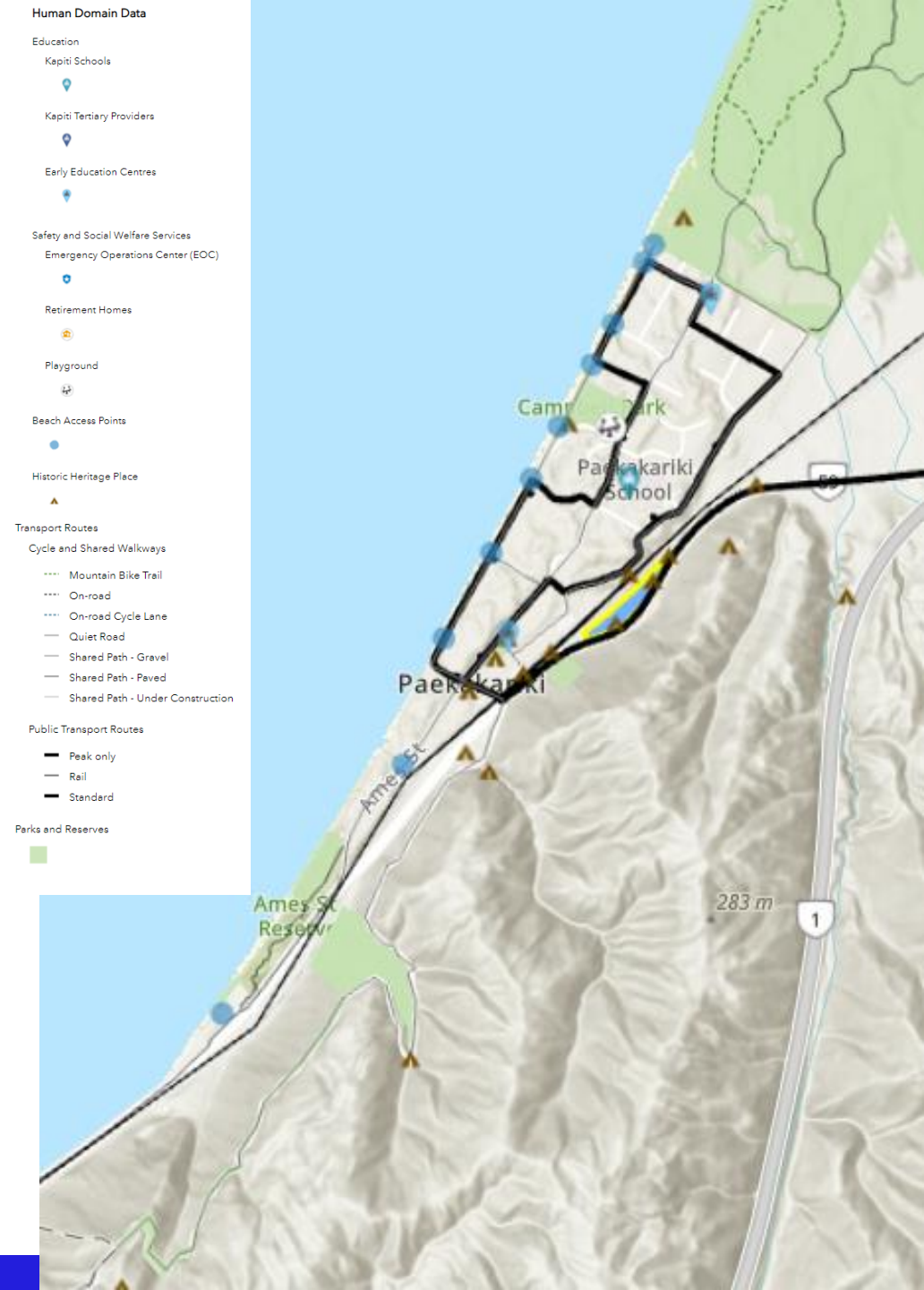
*There are no indigenous trees identified in within the Operative Kapiti Coast District plan that are located within the PAA, and therefore there is no identified risk, however for completeness with other adaptation areas (where this element has been assessed) it has been included.

Human Domain

The human domain encompasses individual and community health and wellbeing, and disruptions to everyday life.

Elements assessed:

- Physical health
- Mental health and wellbeing
- Social infrastructure and amenity
- Exacerbating inequities
- Social cohesion and wellbeing
- Conflict, disruption and loss of trust in government



Human - Risk

	Coastal Erosion						Coastal Inundation					
Climate Change Scenario	**Both**		**SSP2-4.5**		**SSP5-8.5**		**Both**		**SSP2-4.5**		**SSP5-8.5**	
Element	Present	2050	2070	2130	2070	2130	Present	2050	2070	2130	2070	2130
Human												
Physical Health	L	L	L	L	L	M	L	L	L	L	L	L
Mental Health and Wellbeing	L	L	M	M	H	E	L	L	L	L	L	L
Social Infrastructure and Amenity	L	L	M	M	M	M	L	L	L	L	L	L
Exacerbating Inequalities	L	L	M	M	M	H	L	L	L	L	L	L
Social Cohesion and Community Wellbeing	L	L	M	M	M	M	L	L	L	L	L	L
Conflict, Disruption, and Loss of Trust in Government	L	M	M	H	H	E	L	L	L	L	L	L

Summary Matrices

Climate Change Scenario	Coastal Erosion						Coastal Inundation					
	Both		SSP2-4.5		SSP5-8.5		Both		SSP2-4.5		SSP5-8.5	
Element	Present	2050	2070	2130	2070	2130	Present	2050	2070	2130	2070	2130
Built Environment												
Properties - Whole Adaptation Area	M	M	M	M	M	H	L	L	L	L	L	L
Beachfront Properties only*	H	H	E	E	E	E	-	-	-	-	-	-
Water Supply Infrastructure	L	L	H	H	H	H	L	L	L	L	L	L
Stormwater Infrastructure	L	L	L	L	L	L	L	L	L	L	L	L
Roads and Bridges	L	L	M	H	M	H	L	L	L	L	L	L
Electrical Transmission and supply infrastructure	L	L	L	M	M	H	L	L	L	L	L	L
Wastewater Infrastructure**	No Exposure						No Exposure					
Natural Gas Supply**	No Exposure						No Exposure					
Human												
Physical Health	L	L	L	L	L	M	L	L	L	L	L	L
Mental Health and Wellbeing	L	L	M	M	H	E	L	L	L	L	L	L
Social Infrastructure and Amenity	L	L	M	M	M	M	L	L	L	L	L	L
Exacerbating Inequalities	L	L	M	M	M	H	L	L	L	L	L	L
Social Cohesion and Community Wellbeing	L	L	M	M	M	M	L	L	L	L	L	L
Conflict, Disruption, and Loss of Trust in Government	L	M	M	H	H	E	L	L	L	L	L	L
Ecological												
Coastal dunelands	M	M	M	H	H	E	L	L	L	L	L	M
Wetlands	L	M	M	H	M	H	L	M	M	M	M	M
Mapped ecological sites	L	M	M	H	M	E	L	M	M	M	M	M
Indigenous trees***	No Exposure						No Exposure					
Rare and threatened species	M	M	M	M	M	H	M	M	M	M	M	M
Bird habitat	M	H	H	E	H	E	M	M	M	M	M	M
Fish habitat	M	M	M	M	M	M	M	M	M	M	M	M
Indigenous biodiversity (coastal)	M	M	E	E	E	E	M	M	H	E	H	E
Natural Character												
CTA3: Paekākāriki	L	L	L	M	L	M	L	L	L	L	L	L
Queen Elizabeth Park (Part of)	L	L	L	L	L	L	L	L	L	L	L	L
Cultural												
A risk assessment for the Cultural domain in relation to coastal hazard is still to be undertaken with Mana Whenua, and will be added to this document prior to being finalised.												

**Beachfront only' for coastal flooding is not assessed for consistency with other Adaptation Area Risk Assessments.
**There is no public wastewater infrastructure or natural gas supply mains in the PAA, however for completeness with other adaptation areas (where this element has been assessed) it has been included.
***There are no Key Indigenous Trees nor Notable Trees identified in within the Operative Kapiti Coast District plan that are located within the PAA, and therefore there is no identified risk, however for completeness with other adaptation areas (where this element has been assessed) it has been included.

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