Takutai Kapiti

Northern Adaptation Area Shortlisted Pathway information for MCDA process

Presentation: CAP Workshop 24 May 2023

Information compiled by the Takutai Kāpiti Technical Advisory Group (KCDC, GWRC, Mitchell Daysh, Jacobs)

Short-list Adaptation Options



How to read the Adaptation Area Draft Pathways sheets



Other steps in Decision-making process



= Signals and triggers determined by CAP to transition from one action to the next.

Note for CAP: This process will be covered in the 3 April 2024 workshop for whole Kāpiti Coast District.



Source: Hurunui District Council. Example of symbols for adaptation pathways.

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RESULTS OF DECISION MAKING

Te Awanga

The Decision-Making Process: Steps to Come

Te Awanga Coastal Unit Example

Unit K2: Te Awanga												
Pathway	Short term	→	Medium term	+	Long term	MCDA Score	MCDA ranking	Cost + Loss¹ (\$m)	Cost + Loss¹ ranking	VFM ² (\$'000/ point)	VFM ² ranking	Short Term build costs ³ (\$m)
PW 1	Renourishment	+	Retreat the Line	+	Managed Retreat	50	4	24.15	6	403	6	8.84 (0.55 / yr)
PW 2	Renourishment + Control Structures	+	Renourishment + Control Structures	+	Retreat the Line	58	2	17.08	2	194	2	8.98 (0.60 / yr)
PW 3	Renourishment + Control Structures	+	Renourishment + Control Structures	+	Renourishment + Control Structures	62	1	16.77	1	171	1	8.98 (0.60 / yr)
PW 4	Renourishment + Control Structures	÷	Renourishment + Control Structures	+	Sea wall	53	3	18.48	3	232	3	8.98 (0.60 / yr)
PW 5	Renourishment	→	Sea wall	+	Retreat the Line	43	5=	20.00	5	329	5	8.84 (0.55 / yr)
PW 6	Sea wall	+	Sea wall	+	Sea wall	43	5=	18.67	4	291	4	9.08 (0.66 / yr)
PW 30	Retreat the Line					_	_	14.94	_		-	

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RESULTS OF DECISION MAKING

Westshore

Westshore Coastal Unit Example

Unit D: Westshore												
Pathway	Short term	+	Medium term	+	Long term	MCDA Score	MCDA ranking	Cost + Loss ¹ (\$m)	Cost + Loss ¹ ranking	VFM ² (\$'000/ point)	VFM ² ranking	Short Term build costs ³ (\$m)
PW 1	Renourishment	+	Managed Retreat	+	Managed Retreat	65	1	91.6	6	1392	6	13.26 (0.71 / yr)
PW 2	Renourishment	+	Renourishment + Control Structures	+	Managed Retreat	60	2	53.2	5	839	5	13.26 (0.71 / yr)
PW 3	Renourishment	+	Renourishment + Control Structures	+	Renourishment + Control Structures	51	4=	25.2	1	387	1	13.26 (0.71 / yr)
PW 4	Renourishment	+	Renourishment + Control Structures	+	Sea wall	54	3	28.9	2	432	2	13.26 (0.71 / yr)
PW 5	Renourishment + Control Structures	+	Renourishment + Control Structures	+	Sea wall	51	4=	29.0	3	459	3	16.17 (1.09 / yr)
PW 6	Sea wall	+	Sea wall	+	Sea wall	47	5	31.2	4	546	4	21.96 (1.59 / yr)
PW 9	Renourishment + Control Structures		Renourishment + Control Structures		Renourishment + Control Structures		-	25.3				

Northern Adaptation Area Management Units



Unit 1A: Otaki Beach Open Coast



4 km

logy, Land Information New Zealand, GEBCO, C





Notes:

Extensive foredune and backdune planting over the short-medium term with weed and pest control to enhance the existing dune system, and to provide good protection in storms and faster recovery.

bulk to the beach profile.

As sea levels rise and erosion of the dune system becomes more extensive, imported sand would be distributed along the foredune to add volume to the beach and reduce erosion. Additional replenishments and dune maintenance would be undertaken as required to maintain dune volumes which provide sufficient protection.

0.5

1 km

Eagle Technology, Land Information New Zealand, GEBCO

0.25



Over the medium term, as sea levels rise and erosion of the dune system becomes more extensive, imported sand would be distributed along the foredune to add volume to the beach and reduce erosion. Additional replenishments and dune maintenance would be undertaken as required.

As sea levels rise, increased replenishments and maintenance would be required to reduce the effects of erosion.

0.5

0.25

1 km



Eagle Technology, Land Information New Zealand, GEBCO, Community

revetment would be constructed along the front of the settlement to protect infrastructure and property, and effectively 'hold the line'.





dune system, and to provide good protection in storms and faster recovery.

Over the medium term, as sea levels rise and erosion of the dune system becomes more extensive, imported sand would be distributed along the foredune to add volume to the beach and reduce erosion. Additional replenishments and dune maintenance would be undertaken as required.

When soft engineering is no longer cost effective, beachfront properties exposed to the erosion hazard would undergo managed retreat and be proactively relocated away from the hazard.

Unit 1B: Otaki Beach Rivers/Inlets



4 km

Land Information New Zealand, GEBCO, Community r



Installation of floodgates, pump stations and stopbanks to prevent sea water entering the settlements



infrastructure

Notes:

Over the short term, upgrades and maintenance of existing infrastructure to manage the short-medium term flood risk for the settlement. This could include enhancing existing stopbanks, increasing drainage capacity of the existing stormwater outfalls.

Over the medium term, dwellings where the flood risk is not being effectively managed through the broader flood protection scheme would be proactively raised so floor levels were above projected water levels in large storms to avoid being flooded.

Over the longer term, feasibility of increased hard protection schemes would be investigated and installed to manage coastal water entering the settlement via low lying waterways, overtopping the seafront, or via the stormwater network. 14





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Over the medium term, feasibility of increased hard protection schemes would be investigated and installed to manage coastal water entering the settlement via low lying waterways, overtopping the seafront, or via the stormwater network.

As sea levels continue to rise, where the flood protection scheme is not longer effective in managing the risks to coastal inundation, dwellings at risk would be retreated away from the hazard.





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Over the medium term, dwellings where the flood risk is not being effectively managed through the broader flood protection scheme would be proactively raised so floor levels were above projected water levels in large storms to avoid being flooded.

As sea levels continue to rise, dwellings with inundation risks that are no longer effectively being managed through the broader flood protection scheme or raised floor levels would be retreated away from the hazard.





Initially, dwellings at immediate risk of frequent flooding during storm events with significant water depths would be proactively raised so floor levels were above projected water levels in large storms to avoid being flooded.

Over the medium term, feasibility of increased hard protection schemes would be investigated and installed to manage coastal water entering the settlement via low lying waterways, overtopping the seafront, or via the stormwater network.

As sea levels continue to rise, dwellings with inundation risks that are no longer effectively being managed through the broader flood protection scheme or raised floor levels would be retreated away from the hazard.

Unit 2A: Te Horo Beach Open Coast



4 km

ology, Land Information New Zealand, GEBCO, Community n





Notes:

Extensive foredune and backdune planting over the short-medium term with weed and pest control to enhance the existing dune system, and to provide good protection in storms and faster recovery.

As sea levels rise and erosion of the beach becomes more extensive, beach scraping would be undertaken along the gravel beach to increase the crest elevation and reduce erosion as a result of overtopping.





Notes:

Extensive foredune and backdune planting over the short-medium term with weed and pest control to enhance the existing dune system, and to provide good protection in storms and faster recovery.

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Notes:

Extensive foredune and backdune planting over the short-medium term with weed and pest control to enhance the existing dune system, and to provide good protection in storms and faster recovery.

As sea levels rise and erosion of the beach becomes more extensive, beach scraping would be undertaken along the gravel beach to increase the crest elevation and reduce erosion as a result of overtopping.

When beach scraping is no longer cost effective, a rock revetment would be constructed along the front of the settlement to protect properties, and effectively 'hold the line'.



Unit 2B: Te Horo Beach Rivers/Inlets



4 km

Land Information New Zealand, GEBCO, Community r



stations and stopbanks to prevent sea water entering the settlements

Notes:

Over the short term, upgrades and maintenance of existing infrastructure to manage the short-medium term flood risk for the settlement. This could include enhancing existing bunds, increasing drainage capacity of the existing stormwater outfalls.

Over the medium term, dwellings where the flood risk is not being effectively managed through the broader flood protection scheme would be proactively raised so floor levels were above projected water levels in large storms to avoid being flooded.

Over the longer term, feasibility of increased hard protection schemes would be investigated and installed to manage coastal water entering the settlement via low lying waterways, overtopping the beach, or via the stormwater network.





Over the medium term, feasibility of increased hard protection schemes would be investigated and installed to manage coastal water entering the settlement via low lying waterways, overtopping the seafront, or via the stormwater network.

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As sea levels continue to rise, where the flood protection scheme is no longer effective in managing the risks of coastal inundation, dwellings at risk would be retreated away from the hazard.





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Over the medium term, dwellings where the flood risk is not being effectively managed through the broader flood protection scheme would be proactively raised so floor levels were above projected water levels in large storms to avoid being flooded.

As sea levels continue to rise, dwellings with inundation risks that are no longer effectively being managed through the broader flood protection scheme or raised floor levels would be retreated away from the hazard.





Initially, dwellings at immediate risk of frequent flooding during storm events with significant water depths would be proactively raised so floor levels were above projected water levels in large storms to avoid being flooded.

Over the medium term, feasibility of increased hard protection schemes would be investigated and installed to manage coastal water entering the settlement via low lying waterways, overtopping the seafront, or via the stormwater network.

As sea levels continue to rise, dwellings with inundation risks that are no longer effectively being managed through the broader flood protection scheme or raised floor levels would be retreated away from the hazard.

Unit 3A: Peka Peka Open Coast



4 km

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Notes:

Extensive foredune and backdune planting over the short-medium term with weed and pest control to enhance the existing dune system, and to provide good protection in storms and faster recovery.

bulk to the beach profile.

As sea levels rise and erosion of the dune system becomes more extensive, imported sand would be distributed along the foredune to add volume to the beach and reduce erosion. Additional replenishments and dune maintenance would be undertaken as required to maintain dune volumes which provide sufficient protection.



Unit 3B: Peka Peka Rivers/Inlets

4 km

ogy, Land Information New Zealand, GEBCO, Community r

stations and stopbanks to prevent sea water entering the settlements

Notes:

Over the short term, upgrades and maintenance of existing infrastructure to manage the short-term flood risk for the settlement. This could include enhancing existing bunds, increasing drainage capacity of the existing stormwater outfalls.

Over the medium term, dwellings where the flood risk is not being effectively managed through the broader flood protection scheme would be proactively raised so floor levels were above projected water levels in large storms to avoid being flooded.

Over the longer term, feasibility of increased hard protection schemes would be investigated and installed to manage coastal water entering the settlement via low lying waterways, overtopping the beach, or via the stormwater network.

Over the short term, upgrades and maintenance of existing infrastructure to manage the short-medium term flood risk for the settlement. This could include enhancing existing bunds, increasing drainage capacity of the existing stormwater outfalls.

Over the medium term, feasibility of increased hard protection schemes would be investigated and installed to manage coastal water entering the settlement via low lying waterways, overtopping the seafront, or via the stormwater network.

As sea levels continue to rise, where the flood protection scheme is no longer effective in managing the risks of coastal inundation, dwellings at risk would be retreated away from the hazard.

Over the short term, upgrades and maintenance of existing infrastructure to manage the short-medium term flood risk for the settlement. This could include enhancing existing bunds, increasing drainage capacity of the existing stormwater outfalls.

Over the medium term, dwellings where the flood risk is not being effectively managed through the broader flood protection scheme would be proactively raised so floor levels were above projected water levels in large storms to avoid being flooded.

As sea levels continue to rise, dwellings with inundation risks that are no longer effectively being managed through the broader flood protection scheme or raised floor levels would be retreated away from the hazard.

Initially, dwellings at immediate risk of frequent flooding during storm events with significant water depths would be proactively raised so floor levels were above projected water levels in large storms to avoid being flooded.

Over the medium term, feasibility of increased hard protection schemes would be investigated and installed to manage coastal water entering the settlement via low lying waterways, overtopping the seafront, or via the stormwater network.

As sea levels continue to rise, dwellings with inundation risks that are no longer effectively being managed through the broader flood protection scheme or raised floor levels would be retreated away from the hazard.

Unit 4A: Rural NAA Open Coast

4 km

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Notes:

Over the short term, undertake no additional changes to the current management of the erosion hazard in rural areas, and continue to monitor any changes in risk.

As sea level rise continues and greater risk is identified, extensive foredune and backdune planting over the short-medium term with weed and pest control to enhance the existing dune system, and provide good protection in storms and faster recovery, and slow the rate of erosion on the open coast.

Notes:

Over the short term, undertake no additional changes to the current management of the erosion hazard in rural areas, and continue to monitor any changes in risk.

As sea level rise continues and greater risk is identified, extensive foredune and back dune planting over the short-medium term with weed and pest control to enhance the existing dune system, and provide good protection in storms and faster recovery, and slow the rate of erosion on the open coast.

When dune enhancement mechanisms are no longer managing the erosion risks, undertake beach renourishment (or scraping on gravel beaches) to further reduce the rate of erosion.

km

backdune planting

Soft engineering protection - Sand renourishment

position 2130

Projected future shoreline

nformation New Zealand, GEBCO, Community maps

Undertake foredune and back dune planting over the short-medium term with weed and pest control to enhance the existing dune system, and provide good protection in storms and faster recovery, and slow the rate of erosion on the open coast.

When dune enhancement mechanisms are no longer managing the erosion risks, undertake beach renourishment (or scraping on gravel beaches) to further reduce the rate of erosion.

Unit 4B: Rural NAA Rivers/Inlets

4 km

ology, Land Information New Zealand, GEBCO, Community r

Over the short term, undertake no additional changes to the current management of the flood hazard in rural areas, and continue to monitor any changes in risk.

Over the medium term as SLR increases, strengthen stopbanks and stormwater networks to manage the flood risk across the wider rural area.

Over the long-term, dwellings at risk of frequent and deep flooding that can not be managed through the wider protection scheme would be proactively raised so floor levels were above projected water levels in large storms to avoid being flooded.

Over the short-medium term, dwellings that were impacted by frequent and deep flooding would have floor levels proactively raised about projected flood levels with SLR.

Over a longer timeframe as SLR accelerates, dwellings where the flood risk was no longer effectively being managed via accommodation options would be proactively retreated away from the flood hazard.