

	Ahuriri – Pathway 1		Status quo ^{1,2,6,7} → Retreat the Line ¹⁷ → Managed Retreat ¹⁸						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	3	3	3	5	2	4	5	25	4
Comments	<p>In short term, 2-3 waterfront land parcels remain exposed.</p> <p>Involves moving out of hazard areas progressively. Residual risk remains for properties seaward of retreat the line in medium term. Long term properties move out of hazard area.</p> <p>Scores lower because 2-3 waterfront land parcels remain exposed in retreat the line.</p>	<p>Ultimately removes assets from hazard areas, however retreat the line.</p> <p>Scores lower because 2-3 waterfront land parcels remain exposed which have higher risk in short term.</p> <p>Also, greater risk of existing seawall failure as nothing is being done to this structure in this pathway.</p>	<p>It is considered that all pathways in this unit are equally adaptable (albeit for different reasons) and therefore score the same for this criterion.</p> <p>Note that for this unit there are already defence structures in place.</p>	<p>Note that in the Ahuriri Unit there is very limited longshore transfer of sediment north, therefore no significant transfer of risk to other units will occur from actions taken at Ahuriri. However intergenerational risk transfer still needs to be considered.</p> <p>In this pathway, properties are moved out of the hazard area in the long term so scores highly for this criterion.</p> <p>Note, assumption that Port will look after itself and options exist to purchase land etc to maintain access.</p>	<p>Loss of amenity, decline in recreational values and community facilities and associated effect on tourism.</p> <p>With this pathway there will be a reasonably constant change as erosion effects the foreshore.</p> <p>A lot of debate within the panel about the time issue where short term status quo will see little change 20-30 yrs but long term will be significant social disruption and effects.</p> <p>This pathway has no coastal protection works and the trigger to major erosion will be when the current wall fails.</p>	<p>Perfume Point is a new name – historic name is Te Karaka. Foreshore along Ahuriri used to be an area to collect kaimoana, still has values for this today. Harding Rd area is nursery for shellfish and other sea life. Scores well because allows coast to maintain its natural state. Retreat the line does not impact on community because only commercial properties affected, however people are still displaced in the long term.</p>	<p>The panel agreed with the cultural values comment that this pathway scores well because it allows the coast to maintain its natural state.</p>		
Weighting	3	3	1	2	3	3	1		
W. Score	9	9	3	10	6	12	5	54	

	Ahuriri – Pathway 2		Status quo ^{1,2,6,7} → Retreat the Line ¹⁷ → Sea wall ¹⁶						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	3	3	3	4	3	3	4	23	5
Comments	In short term, 2-3 waterfront land parcels remain exposed. Slightly higher risk as properties aren't retreated out of hazard area in long term, but with sea wall in place they do receive a level of protection, therefore score is same as Ahuriri PW1. Scores lower because 2-3 waterfront land parcels remain exposed in retreat the line.	Ultimately removes assets from hazard areas, however retreat the line. Scores lower because 2-3 waterfront land parcels remain exposed. Also, greater risk of existing seawall failure as noting is being done to this structure in this pathway.	It is considered that all pathways in this unit are equally adaptable (albeit for different reasons) and therefore score the same for this criterion Note that for this unit there are already defence structures in place.	Note that in the Ahuriri Unit there is very limited longshore transfer of sediment north, therefore no significant transfer of risk to other units will occur from actions taken at Ahuriri. However intergenerational risk transfer still needs to be considered. With sea wall option residual risk to future generations will exist.	This is seen as a better pathway than PW1 for socio economic effects because at the key trigger point a seawall will be built and the road and houses are protected. However, the beach is lost with the sea wall. The recreational facilities at the western end would be lost in the medium term.	Scores lower than Ahuriri PW1 because a sea wall in the long term doesn't allow coast to return to natural state. Will lose beach. But does keep community together.	With this pathway the reef along Hardinge Road is unlikely to be adversely affected from its current state as there is already a rock revetment in place. Ultimately over time the current ecosystem and natural character values would be modified.		
Weighting	3	3	1	2	3	3	1		
W. Score	9	9	3	8	9	9	4	51	

Ahuriri – Pathway 3		Status quo/Renourishment ^{1,3,16} → Renourishment + Control Structures ^{3,13,14,15} → Managed Retreat ¹⁸							
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	3A* = 4 3B+ = 4	3A* = 5 3B+ = 5	3	5	3	2	3	25	3≡
Comments	Would need a bigger beach at western end and then maintain – not as effective as a seawall for inundation protection.	Provides improved protection over Ahuriri PW1 and PW2.	It is considered that all pathways in this unit are equally adaptable (albeit for different reasons) and therefore score the same for this criterion Note that for this unit there are already defence structures in place	Note that in the Ahuriri Unit there is very limited longshore transfer of sediment north, therefore no significant transfer of risk to other units will occur from actions taken at Ahuriri. However intergenerational risk transfer still needs to be considered. In this pathway, properties are moved out of the hazard area in the long term. Note, assumption that Port will look after itself and options exist to purchase land etc to maintain access.	The panel sees this as similar to PW1. However, the recreation and community assets would be retained for a longer period as compared with pathways 1&2.	Renourishment is biggest concern given potential to impact on reef areas / sea life along Harding Rd, regardless of type of control structure used – value at stake is kaitiakitanga.	Unlike pathways 1&2 this would introduce significant amounts of new material in front of the seawall which would change the ecosystems of the area in the short to medium term (major impacts on the reefs if sand is used). Eventually with managed retreat a new environment state will develop.		
Weighting	3	3	1	2	3	3	1		
W. Score	12	15	3	10	9	6	3	58	

For Pathways in Ahuriri, the term ‘Control Structures’ may refer to groynes, breakwater or offshore reef

* For scoring purposes, A = groynes

+ For scoring purposes, B = breakwater or offshore reef

	Ahuriri – Pathway 4		Status quo/ Renourishment ^{1,3,16} → Renourishment + Control Structures ^{3,13,14,15} → Sea wall ¹⁶						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	4A* = 4 4B+ = 4	4A* = 5 4B+ = 5	3	4	5	1	2	24	3≡
Comments	Properties remain in hazard zone for long term, so residual risk exists, however not materially different to Ahuriri PW3.	Provides improved protection over Ahuriri PW1 and PW2.	It is considered that all pathways in this unit are equally adaptable (albeit for different reasons) and therefore score the same for this criterion. Note that for this unit there are already defence structures in place.	Note that in the Ahuriri Unit there is very limited longshore transfer of sediment north, therefore no significant transfer of risk to other units will occur from actions taken at Ahuriri. However intergenerational risk transfer still needs to be considered. With sea wall option residual risk to future generations will exist.	Sea wall may not be considerate to the amenity value of the area. Preference is to retain the status quo (existing rock revetment) for along a time as possible.	Renourishment is biggest concern given potential to impact on reef areas / sea life along Harding Rd, regardless of type of control structure used – value at stake is kaitiakitanga – plus does not allow coast to return to natural state on long term.	This pathway affects the reef systems in the short to medium term and would involve some modification of the natural character in the long term with a higher sea wall (1mtr?) and the loss of the beach at the western end.		
Weighting	3	3	1	2	3	3	1		
W. Score	12	15	3	8	15	3	2	58	

For Pathways in Ahuriri, the term ‘Control Structures’ may refer to groynes, breakwater or offshore reef

* For scoring purposes, A = groynes

+ For scoring purposes, B = breakwater or offshore reef

Ahuriri – Pathway 5		Status quo ^{1,2,6,7} → Sea wall ¹⁶ → Managed Retreat ¹⁸							
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	5	4	3	5	2	5	4	28	1
Comments	While in short term, 2-3 waterfront land parcels remain exposed, this exposure is proportionate to the scale of risk, and unit overall is well protected from inundation.	There is a present-day risk to business from erosion therefore scores lower because of status quo in short term. Otherwise an effective pathway at mitigating erosion risk. Note that erosion effects are permanent and higher consequences than inundation.	It is considered that all pathways in this unit are equally adaptable (albeit for different reasons) and therefore score the same for this criterion. Note that for this unit there are already defence structures in place.	Note that in the Ahuriri Unit there is very limited longshore transfer of sediment north, therefore no significant transfer of risk to other units will occur from actions taken at Ahuriri. However intergenerational risk transfer still needs to be considered. In this pathway, properties are moved out of the hazard area in the long term. Note, assumption that Port will look after itself and options exist to purchase land etc to maintain access.	Similar socio economic effect to PW 3. The difference with this pathway as compared to PW3 is that some of the land used for recreational beach use would be lost including its amenity value	Doesn't impact on the reef area (i.e. no nourishment), keeps community together for as long as possible, but allows coast to return to its natural state in the long term.	As with pathway 2 the reef along Hardinge Road is unlikely to be adversely affected from its current state as there is already a rock revetment in place. With managed retreat the materials used in the revetment wall would become part of the environment and ecosystems would adapt.		
Weighting	3	3	1	2	3	3	1		
W. Score	15	12	3	10	6	15	4	65	

Ahuriri – Pathway 6		Status quo ^{1,2,6,7} → Sea wall ¹⁶ → Sea wall ¹⁶							
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	5	4	3	4	4	3	2	25	2
Comments	While in the short term, 2-3 waterfront land parcels remain exposed, this exposure is proportionate to the scale of risk, and unit overall is well protected from inundation.	There is a present-day risk to business from erosion therefore scores lower because of status quo in short term. Otherwise an effective pathway at mitigating erosion risk. Note that erosion effects are permanent and higher consequences than inundation.	It is considered that all pathways in this unit are equally adaptable (albeit for different reasons) and therefore score the same for this criterion. Note that for this unit there are already defence structures in place.	Note that in the Ahuriri Unit there is very limited longshore transfer of sediment north, therefore no significant transfer of risk to other units will occur from actions taken at Ahuriri. However intergenerational risk transfer still needs to be considered. With sea wall option residual risk to future generations will exist.	If a sea wall is built early for long term property protection it would be have a larger foundation and affect the beach use and amenity from the medium term going forward. The advantage of this pathway would be it retained community and private assets for longer. It is harder to maintain a beach with a vertical concrete wall with the beach likely to erode quicker making it harder to maintain beach amenity.	Doesn't allow coast to return to natural state, loss of beach, however would have minimal impact on reef areas and does keep community together.	The panel agreed with the comments in the cultural values related to beach and reef. With this pathway the beaches at the eastern and western ends would be lost after the short term.		
Weighting	3	3	1	2	3	3	1		
W. Score	15	12	3	8	12	9	2	61	

	Pandora – Pathway 1		Status quo ^{1,2,6,7} → Inundation Protection ¹⁰ → Managed Retreat ¹⁸						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	4	0	4	5	3	4	4	24	2
Comments	Sailing Club remains at some risk in short term, long term unit receives good level of protection.	Note there is no erosion risk in this unit so all pathways score the same.	Good level of adaptability – stopbanks are relatively easy to raise / widen as required.	No longshore issues, only future generation impacts to consider. Scores well because issues addressed, minimal residual risk from managed retreat. This high score assumes industrial area will be successfully re-established in another location.	In the short term part of the marina area would have a high risk of inundation with significant socio economic effects. Pandora pond would have an extended and deeper area, seen as a positive (it is noted that these factors are the same for all Pandora pathways). The stopbank built in the medium term would maintain the Pandora industrial area for a period but ultimately that area would need to be vacated.	Retreat in long term will allow for creation of more natural areas / wetland areas. Community is not being affected as this is primarily an industrial area. Not materially different to Pandora PW2 in terms of this criteria.	Not stopping natural processes in the longer term with this pathway.		
Weighting	3	3	1	2	3	3	1		
W. Score	12	0	4	10	9	12	4	51	

	Pandora – Pathway 2		Inundation Protection ¹⁰ → Inundation Protection ¹⁰ → Managed Retreat ¹⁸						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	5	0	4	5	3	4	4	25	1
Comments	High level of protection achieved.	Note there is no erosion risk in this unit so all pathways score the same.	Good level of adaptability – stopbanks are relatively easy to raise / widen as required.	No longshore issues, only future generation impacts to consider. Scores well because issues addressed, minimal residual risk from managed retreat This high score assumes industrial area will be successfully re-established in another location.	In the short term part of the marina area would have a high risk of inundation with significant socio economic effects. Pandora pond would have an extended and deeper area, seen as a positive (it is noted that these factors are the same for all Pandora pathways). Very similar option to PW1	Allows estuary to end up in a natural state, potential for more wetland areas.	Not stopping natural processes in the longer term with this pathway		
Weighting	3	3	1	2	3	3	1		
W. Score	15	0	4	10	9	12	4	54	

	Pandora – Pathway 3		Inundation Protection ¹⁰ → Inundation Protection ¹⁰ → Inundation Protection ¹⁰						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	5	0	4	3	4	3	3	22	3
Comments	High level of protection achieved.	Note there is no erosion risk in this unit so all pathways score the same.	Good level of adaptability – stopbanks are relatively easy to raise / widen as required.	No longshore issues, only future generation impacts to consider. More residual risk from this option from long term defence approach.	In the short term part of the marina area would have a high risk of inundation with significant socio economic effects. Pandora pond would have an extended and deeper area, seen as a positive (it is noted that these factors are the same for all Pandora pathways). Protection throughout the hundred years could lead to some residual risk that business expectation is the area will be safe regardless or future uncertainty.	Scores higher than Pandora PW4 as no flood gate (with its concerns), but is highly interventionist and doesn't allow natural areas to form.	Protecting the industrial area maintains the status quo from a natural environments perspective.		
Weighting	3	3	1	2	3	3	1		
W. Score	15	0	4	6	12	9	3	49	

	Pandora – Pathway 4		Inundation Protection ¹⁰ → Inundation Protection + Flood Gate ^{9,10} → Inundation Protection + Flood Gate ^{9,10}						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	5	0	3	3	4	2	3	20	4
Comments	High level of protection achieved. Noted that protection from flood gate relies on fully operational system – potential failure of this system (and the consequences of failure) but do not consider that this should reduce the score	Note there is no erosion risk in this unit so all pathways score the same.	More complex to make this pathway adaptable because flood gates are fixed structures that are difficult to alter.	No longshore issues, only future generation impacts to consider. More residual risk from this option from potential failure of flood gate.	In the short term part of the marina area would have a high risk of inundation with significant socio economic effects. Pandora pond would have an extended and deeper area, seen as a positive (it is noted that these factors are the same for all Pandora pathways). Social impact of flood gate is negative as it could restrict access and use of the area under the bridge but noting that this would not be a common event.	Unsure of design, but concern that the flood gate could restrict waka access to lagoon and to the sea, and fish passage. Concern that could cause upstream effects (flooding). Scored low on a precautionary basis.	A structure that inhibits the natural flow of water in and out of the estuary has an adverse effect on habitat values Takes the extreme events out of the upper estuary which could cause damage Note: the scoring for this criterion went to a vote for a majority 8 : 3 in favour of a score of 3 over 2		
Weighting	3	3	1	2	3	3	1		
W. Score	15	0	3	6	12	6	3	45	

	Westshore – Pathway 1		Renourishment ^{2,3,4,6,7} → Managed Retreat ¹⁸ → Managed Retreat ¹⁸						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	5	5	5	4	2	4	4	29	1
Comments	Effective – minimal short-term inundation risk, longer term assets are moved away from hazard areas.	Effective at mitigating risk – assets will be moved out of hazard area.	Options remain open in short term until retreat commences as required.	Fully resolving risk for future generations. Some benefit north from nourishment in short term however with end of nourishment this benefit is no longer realised to the north therefore not a score of 5.	Managed retreat happening in the medium term has an effect on the Westshore community in terms of expectations and time to prepare for change.	Biggest risk culturally is impacts on Te Pania and other reefs from sediment / turbidity. Expect that controls are in place to ensure that only appropriate material is used i.e. fine to coarse sand, not silt. Expect that consent conditions are imposed requiring appropriate monitoring of any effects on Pania / Rangatira Reefs and reefs to the north + that appropriate actions would be required in the event that an adverse effect is identified Doesn't score a 5 because some risk of impacts to reefs remain. Retreat will allow coast to return to natural state over time	Least intervention in natural processes, ecosystems will adjust, however there will be continued intervention in the short term.		
Weighting	3	3	1	2	3	3	1		
W. Score	15	15	5	8	6	12	4	65	

	Westshore – Pathway 2		Renourishment ^{2,3,4,6,7} → Renourishment + Control Structures ^{3,13,14} → Managed Retreat ¹⁸						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	4	4	4	4	3	4	3	26	2
Comments	<p>Scores lower than Westshore PW1 because of residual risk in medium term – structures remain in hazard areas.</p> <p>Note: offshore reef and offshore breakwater will not work with sand bar option. Control structures in this pathway are groynes.</p>	<p>Retreat occurs later, therefore higher residual risk than Westshore PW1.</p>	<p>Not as flexible – committed to control structures in medium term which is a commitment to a certain design standard and remaining in hazard area to medium term. Risk of additional investment occurring in the area in medium term because area is protected, making a long-term retreat more problematic.</p>	<p>Control structures will slow down the transport of material north + change in current benefit north from current nourishment regime – however effects north aren't materially different than Westshore PW1.</p>	<p>This pathway protects the recreational values and assets for the short to medium term and provides more time to prepare for managed retreat.</p>	<p>Biggest risk culturally is impacts on Te Pania and other reefs from sediment / turbidity.</p> <p>Expect that controls are in place to ensure that only appropriate material is used i.e. fine to coarse sand, not silt</p> <p>Expect that consent conditions are imposed requiring appropriate monitoring of any effects on Pania / Rangatira Reefs and reefs to the north + that appropriate actions would be required in the event that an adverse effect is identified</p> <p>While community protected for a longer period, from a cultural perspective this pathway is not significantly different to Westshore PW1</p>	<p>Intervention to the natural processes will continue through to the medium term so less favoured than PW 1</p>		
Weighting	3	3	1	2	3	3	1		
W. Score	12	12	4	8	9	12	3	60	

	Westshore – Pathway 3		Renourishment ^{2,3,4,6,7} → Renourishment + Control Structures ^{3,13,14} → Renourishment + Control Structures ^{3,13,14}						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	3	3	3	3	4	3	3	22	4 [≡]
Comments	<p>Long term defence – control structures maintain beach however higher residual risk – storm events can remove beach, need quick turnaround time to respond with renourishment.</p> <p>Note: offshore reef and offshore breakwater will not work with sand bar option. Control structures in this pathway are groynes.</p>	<p>Long term defence therefore higher residual risk than Westshore PW2, scores lower– storm events can remove beach, need quick turnaround time to respond with renourishment – will get harder and harder to maintain beach in long term with sea level rise sourcing and placing gravel.</p>	<p>Long term commitment to defence. There is a limit to how much groynes can be raised.</p>	<p>Nourishment in long term will provide benefit north in long term. Residual risk transferred to future generations – balance out at 3.</p>	<p>Retains social values and amenities through long term protection of private and community assets.</p>	<p>Biggest risk culturally is impacts on Te Pania and other reefs from sediment / turbidity.</p> <p>Expect that controls are in place to ensure that only appropriate material is used i.e. fine to coarse sand, not silt. Expect that consent conditions are imposed requiring appropriate monitoring of any effects on Pania / Rangatira Reefs and reefs to the north + that appropriate actions would be required in the event that an adverse effect is identified</p> <p>Assume nourishment at medium and long term is with gravel, not sand</p> <p>Does not allow coast to return to its natural state in the long term</p>	<p>Retains beach with soft defences and maintains the current ecosystem.</p>		
Weighting	3	3	1	2	3	3	1		
W. Score	9	9	3	6	12	9	3	51	

	Westshore – Pathway 4		Renourishment ^{2,3,4,6,7} → Renourishment + Control Structures ^{3,13,14} → Sea wall ¹⁶						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	4	4	4	3	4	2	2	23	3
Comments	Easier to maintain a sea wall in the long term than maintain a beach, therefore scores better than Westshore PW3. Note: offshore reef and offshore breakwater will not work with sand bar option. Control structures in this pathway are groynes.	Easier to maintain a seawall in the long term than maintain a beach, therefore scores better than Westshore PW3. Note: offshore reef and offshore breakwater will not work with sand bar option. Control structures in this pathway are groynes.	Comparable Westshore PW3. Long-term commitment to defence. However, sea wall design will commence at medium term point when more is known about sea level rise.	Initial period of benefit to the north, however sea wall in long term will significantly inhibit sediment flow north.	Having a sea wall as an option in the pathway gives added surety to the community – asset protection from inundation and flooding. Potentially the beach will be lost through erosion as much as it would with construction of a sea wall, social recreational amenity is the trade off.	Biggest risk culturally is impacts on Te Pania and other reefs from sediment / turbidity. Expect that controls are in place to ensure that only appropriate material is used i.e. fine to coarse sand, not silt. Expect that consent conditions are imposed requiring appropriate monitoring of any effects on Pania / Rangatira Reefs and reefs to the north + that appropriate actions would be required in the event that an adverse effect is identified Hard structure in long term, high intervention, loss of beach, sea wall would cause loss of access.	Maintains beach in the short to medium term which will maintain that element of natural character. In the long term, the beach is lost with the construction of a sea wall.		
Weighting	3	3	1	2	3	3	1		
W. Score	12	12	4	6	12	6	2	54	

	Westshore – Pathway 5		Renourishment + Control Structures ^{3,13,14} → Renourishment + Control Structures ^{3,13,14} → Sea wall ¹⁶						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	4	4	5A* = 4 5B+ = 3	3	3	2	2	22	4 [≡]
Comments	Easier to maintain a seawall in the long term than maintain a beach, therefore scores better than Westshore PW3. Not materially different to Westshore PW4. Assumption that groynes provide an equivalent replacement for the sandbar option in Westshore PW4 and therefore score is the same.	Easier to maintain a seawall in the long term than maintain a beach, therefore scores better than Westshore PW3. Not materially different to Westshore PW4. Assumption that groynes provide an equivalent replacement for the sandbar option in Westshore PW4 and therefore score is the same.	Offshore structures are less flexible than onshore groynes, therefore 5B scores lower than 5A. Overall similar to Westshore PW4.	Not materially different to Westshore PW4. Initial period of benefit to the north, however sea wall in long-term will significantly inhibit sediment flow north.	Similar to PW4, however, this option has no sand renourishment offshore. A gravel beach is considered to have less amenity value than a sand beach.	No perceived risk on Te Pania or other reefs given no sand nourishment will take place However sea wall in long term, high intervention, loss of beach, sea wall would cause loss of access. Note that we do not consider that an offshore breakwater or groyne would score differently given long term outcome (sea wall) is the same	Harder control structures being employed which will change the character significantly.		
Weighting	3	3	1	2	3	3	1		
W. Score	12	12	4	6	9	6	2	51	

For Pathways in Westshore, the term ‘Control Structures’ may refer to groynes or breakwater

* For scoring purposes, A = groynes

+ For scoring purposes, B = breakwater or offshore reef

	Westshore – Pathway 6		Sea wall ¹⁶ → Sea wall ¹⁶ → Sea wall ¹⁶							
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking	
Raw Score	5	5	2	1	2	2	1	18	5	
Comments	Sea wall can be designed for high level of inundation protection.	Sea wall can be designed for high level of erosion protection.	Sea wall - commits to long term defence at all costs. Inflexible option.	Sea wall in short term will significantly inhibit sediment flow north.	Keeping the recreation on land but losing the shore based recreation value.	Does not enable coast to return to natural state, however no impact on Te Pania is anticipated from this pathway. Very long sea wall, impact on natural coast.	Will have the greatest impact on natural character.			
Weighting	3	3	1	2	3	3	1			
W. Score	15	15	2	2	6	6	1	47		

	Bayview – Pathway 1		Status quo ^{2,3,6,7} → Managed Retreat ¹⁸ → Managed Retreat ¹⁸						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	4	4	5	5	3	3	5	29	2
Comments	Strongly linked to erosion – scores the same.	Le Quesne Road has present-day risk of erosion loss – score marked down from 5 to reflect this – otherwise good protection in long-term.	Retains good flexibility and ability to adapt.	Fully resolving risk for future generations.	Le Quesne Rd area is vulnerable with erosion in the medium term. Significant community effects, however there is opportunity to retreat within the same area. Managed retreat happening in the medium term has an effect on the community in terms of expectations and time to prepare for change.	Allows coast to return to natural state but negative is that people are displaced in the medium term	Lowest intervention pathway.		
Weighting	3	3	1	2	3	3	1		
W. Score	12	12	5	10	9	9	5	62	

	Bayview – Pathway 2		Status Quo/Renourishment ^{1,3} → Renourishment + Control Structures ^{3,13} → Managed Retreat ¹⁸						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	4	4	4	4	4	4	4	28	1
Comments	Strongly linked to erosion – scores the same.	Only groynes considered. Deals with short-term risk to Le Quesne Road through renourishment – good response to erosion in long-term. Defending in medium-term does create residual risk as properties remain in hazard area.	Not as flexible – committed to control structures in medium-term which is a commitment to a certain design standard and remaining in hazard area to medium term. Risk of additional investment occurring in the area in medium term because area is protected, making a long-term retreat more problematic.	Control structures will slow down the transport of material north therefore scores slightly less than Bayview PW1.	This pathway provides the community more time to prepare for a managed retreat approach which would maintain the community social fabric and amenity for a longer period than pathway 1.	Minor concern about impacts on reefs further north including at Whirinaki and Panepaoa from renourishment – scoring reflects assumption that impacts on reef will be less than minor. Does allow coast to revert to natural state in long term	This pathway is lower than pathway one because it introduces some control structures in the medium term. Planting will create some positive ecosystem improvement value		
Weighting	3	3	1	2	3	3	1		
W. Score	12	12	4	8	12	12	4	64	

	Bayview – Pathway 3		Status Quo /Renourishment ^{1,3} → Renourishment + Control Structures ^{3,13} →Renourishment + Control Structures ^{3,13}						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	3	3	3	3	4	3	3	22	5
Comments	Strongly linked to erosion – scores the same.	Only groynes considered. Scores less than Bayview PW2 because greater residual risk in long term defend approach.	Long term commitment to defence. There is a limit to how much groynes can be raised.	Nourishment in long-term will provide benefit north in long-term. Residual risk transferred to future generations – balance out at 3.	Retains social values and amenities through long term protection of private and community assets.	Scores less than Bayview PW2 because coast is not allowed to revert to natural state.	This pathway has no managed retreat with structures in place from the medium term. Planting will create some positive ecosystem improvement value		
Weighting	3	3	1	2	3	3	1		
W. Score	9	9	3	6	12	9	3	51	

	Bayview – Pathway 4		Status Quo/Renourishment ^{1,3} → Renourishment + Control Structures ^{3,13} → Sea wall ¹⁶						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	5	4	4	3	4	2	2	24	4
Comments	Better inundation mitigation in the long-term with a sea wall than is achieved by earlier pathways.	Only groynes considered. Scores better than Bayview PW3 because residual risk is reduced by a sea wall which is designed at the medium-term point and provides greater certainty.	Same as Westshore Pathway 4. Long-term commitment to defence. However, sea wall design will commence at medium term point when more is known about sea level rise .	Nourishment in long term will provide benefit north in long term. Residual risk transferred to future generations – balance out at 3.	Having a sea wall as an option in the pathway gives added surety to the community – asset protection from inundation and flooding. Potentially the beach will be lost through erosion as much as it would with construction of a sea wall, social recreational amenity is the trade off.	Hard structure in long term, high intervention, loss of beach, beach highly used for fishing sea wall would cause loss of access.	The sea wall will alter the natural character in the long term.		
Weighting	3	3	1	2	3	3	1		
W. Score	15	12	4	6	12	6	2	57	

	Bayview – Pathway 5		Status quo ^{2,3,6,7} → Sea wall ¹⁶ → Managed Retreat ¹⁸						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	4	4	4	4	3	4	3	26	3
Comments	Strongly linked to erosion – scores the same.	Short-term risk from erosion to Le Quesne Rd exists, however this pathway provides good erosion protection from the medium-term onwards.	Retains good flexibility because not trying to defend in long-term, however does not score a 5 because sea wall reduces adaptation options.	Ultimately resolves risk for future generations but sea wall in medium-term will restrict sediment supply north.	This pathway introduces a lot of change and signals uncertainty. Maintains value of assets for their expected life.	Coast reverts to natural state in long term, no concerns with impacts on reefs.	The sea wall will alter the natural character in the long term but the beach will eventually revert as the sea wall becomes part of the environment.		
Weighting	3	3	1	2	3	3	1		
W. Score	12	12	4	8	9	12	3	60	

	Bayview – Pathway 6		Status quo ^{2,3,6,7} → Sea wall ¹⁶ → Sea wall ¹⁶						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	4	3	3	2	4	2	2	20	6
Comments	Better inundation mitigation in the long term with a sea wall.	Higher residual risk than Bayview PW5 with long term commitment to defence – properties remain in hazard area in long-term.	Retain short-term flexibility but intention is to defend in the long term with a sea wall which limits options.	Sea wall will significantly inhibit sediment flow north, however impact is less than reducing supply from Westshore. Residual risk passed on to future generations.	Reasonably low loss of amenity value because the beach is currently gravel with the main recreation being fishing which will not change with a sea wall. Any impacts will affect local community rather than the wider region as it is primarily used by the local people. Sea wall provides protection for the assets. The panel was split on the scoring with a majority scoring 4	Similar scoring to Bayview PW4 as while there is no concern from nourishment, the beach is still lost and coast not allowed to revert to natural state.	The sea wall will alter the natural character in the long term. May have positive impact on habitat.		
Weighting	3	3	1	2	3	3	1		
W. Score	12	9	3	4	12	6	2	48	

	Whirinaki – Pathway 1		Status quo ^{2,3,6,7} → Managed Retreat ¹⁸ → Managed Retreat ¹⁸						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	4	4	5	5	3	2	5	28	3 [≡]
Comments	Strongly linked to erosion – scores the same.	North Shore Road present-day risk of erosion loss – score marked down from 5 to reflect – otherwise good protection in long-term.	Retains good flexibility and ability to adapt.	This Unit is at the top end of the northern cell, therefore any impacts on longshore sediment transport from activities in this unit will have a less than minor effect. Minimal transfer risk to future generations form this pathway.	Whirinaki area is vulnerable to erosion in the medium term. Significant community effects, however there may be opportunity to retreat within the same area. Managed retreat happening in the medium term has an effect on the community in terms of expectations and time to prepare for change.	Old urupā, but still in use, is at end of North Shore Road and would be lost in long-term retreat with this option – consultation with Petane is required. Nourishment a potential concern for reefs.	Lowest intervention pathway.		
Weighting	3	3	1	2	3	3	1		
W. Score	12	12	5	10	9	6	5	59	

	Whirinaki – Pathway 2		Status Quo/Renourishment ^{1,3} → Renourishment + Control Structures ^{3,13} → Managed Retreat ¹⁸						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	4	4	4	5	4	2	4	27	2
Comments	Strongly linked to erosion – scores the same.	Only groynes considered. Deals with short-term risk to North Shore Road through nourishment – good response to erosion in long term. Defending in medium-term does create residual risk as properties remain in hazard area.	Not as flexible – committed to control structures in medium-term which is a commitment to a certain design standard and remaining in hazard area to medium term. Risk of additional investment occurring in the area in medium-term because area is protected, making a long-term retreat more problematic.	This Unit is at the top end of the northern cell, therefore any impacts on longshore sediment transport from activities in this unit will have a less than minor effect. Minimal transfer risk to future generations from this pathway.	This pathway provides the community more time to prepare for a managed retreat approach which would maintain the community social fabric and amenity for a longer period than pathway 1.	Old urupā, but still in use, is at end of North Shore Road and would be lost in long term retreat with this option – consultation with Petane is required. Nourishment a potential concern for reefs.	This pathway is scored lower than pathway one because it introduces some control structures in the medium term. Planting will create some positive ecosystem improvement value		
Weighting	3	3	1	2	3	3	1		
W. Score	12	12	4	10	12	6	4	60	

	Whirinaki – Pathway 3		Status Quo/Renourishment ^{1,3} → Renourishment + Control Structures ^{3,13} → Renourishment + Control Structures ^{3,13}						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	3	3	3	4	4	4	3	24	4
Comments	Strongly linked to erosion – scores the same.	Only groynes considered. Scores less than Whirinaki PW2 because greater residual risk in long-term defend approach.	Long-term commitment to defence. There is a limit to how much groynes can be raised.	More residual risk to future generations because maintaining defence in long-term.	Retains social values and amenities through long term protection of private and community assets.	Urupā is protected with this pathway, maintains a beach, but higher score given assumes any impacts from nourishment on the reefs are mitigated.	This pathway has no managed retreat with structures in place from the medium term. Planting will create some positive ecosystem improvement value		
Weighting	3	3	1	2	3	3	1		
W. Score	9	9	3	8	12	12	3	56	

	Whirinaki – Pathway 4		Status Quo/Renourishment ^{1,3} → Renourishment + Control Structures ^{3,13} → Sea wall ¹⁶						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	5	4	4	4	4	3	2	26	1
Comments	Better inundation mitigation in the long-term with a sea wall than is achieved by earlier pathways.	Only groynes considered. Scores better Whirinaki PW3 because residual risk is reduced by a sea wall which is designed at the medium-term point and provides greater certainty.	Same as Westshore PW4. Long-term commitment to defence. However, sea wall design will commence at medium term point when more is known about sea level rise .	More residual risk to future generations because maintaining defence in long-term.	Having a sea wall as an option in the pathway gives added surety to the community – asset protection from inundation and flooding. Potentially the beach will be lost through erosion as much as it would with construction of a sea wall, social recreational amenity is the trade off.	Still protects urupā but at greater cost to natural character of coast – note that concept plan shows protection stopping short of urupā, assumption is that final design will fix this.	The sea wall will alter the natural character in the long term.		
Weighting	3	3	1	2	3	3	1		
W. Score	15	12	4	8	12	9	2	62	

	Whirinaki – Pathway 5		Status quo/Renourishment ^{1,3} → Sea wall ¹⁶ → Managed Retreat ¹⁸							
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking	
Raw Score	4	4	4	5	3	3	3	26	3 [≡]	
Comments	Strongly linked to erosion – scores the same.	Short term risk to Le North Shore Road exists, however good protection from medium-term on.	Retains good flexibility because not trying to defend in long term, however does not score a 5 because sea wall reduces adaptation options.	This Unit is at the top end of the northern cell, therefore any impacts on longshore sediment transport from activities in this unit will have a less than minor effect. Minimal transfer risk to future generations form this pathway.	This pathway introduces a lot of change and signals uncertainty. Maintains value of assets for their expected life.	Conflict – urupā is not protected but natural character of coast is returned. Score of 3 reflects this balance. Panel Members noted that Petane Marae should be consulted to determine whether this score should be higher or lower, based on which element (protect urupā or natural coast) should be given precedence.	The sea wall will alter the natural character in the long term but the beach will eventually revert as the sea wall becomes part of the environment.			
Weighting	3	3	1	2	3	3	1			
W. Score	12	12	4	10	9	9	3	59		

	Whirinaki – Pathway 6		Status quo ¹ → Sea wall ¹⁶ → Sea wall ¹⁶						
	Manages the risks of storm surge inundation	Manages the risks of coastal erosion	Ability to adapt to increasing risks	Risk transfer	Socio-economic Impacts	Relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Natural Environments Impacts	Total Raw Score	Ranking
Raw Score	5	3	3	4	3	3	2	23	5
Comments	Better inundation mitigation in the long term with a sea wall. Provides comparable levels of protection to Whirinaki PW4 – note an assumption that while there is a risk in the short term of inundation, a trigger point will require the medium term action to be implemented	Higher residual risk than Whirinaki PW5 with long-term commitment to defence – properties remain in hazard area in long-term.	Retain short-term flexibility but intention is to defend in the long term with a sea wall which limits options.	More residual risk to future generations because maintaining defence in long-term.	Reasonably low loss of amenity value because the beach is currently gravel with the main recreation being fishing which will not change with a sea wall. This varies from Bay view in that there is road access all the way along. More people use the beach to fish than at Bay View. Sea wall provides protection for the assets.	Urupā protected, but at cost of natural character and loss of beach to erosion in-front of wall, minimal impacts on reefs to the north expected compared with a nourishment option.	The sea wall will alter the natural character in the long term.		
Weighting	3	3	1	2	3	3	1		
W. Score	15	9	3	8	9	9	2	55	

Recommendations

- The area between Westshore and Bayview is vulnerable to erosion and effects on lifeline assets eg state highway, railway, gas pipeline, fibre optic and other utilities.
- The panel would like there to be more commonality between HDC and NCC in the interpretation of the building code and the provisions of the district plans.
- The panel would see value in remaining as a reference group while the implementation plan is developed including considering the trigger points between steps within the pathways (Edge is working on the trigger points).
- The panel supports the ongoing monitoring of sediment around Pania reef currently being undertaken by the Port of Napier.