

An aerial photograph showing a paved road that has been blocked by a large, irregular rockfall. The rockfall is a mix of brown soil and grey rocks, situated in the center of the road. Several orange traffic cones are placed around the rockfall, and a few workers in high-visibility vests are visible near the road. The surrounding area is a dense forest of green trees and ferns. The water of a lake or river is visible at the bottom of the image.

Marlborough Sounds Future Access

PROGRAMME BUSINESS CASE

PREPARED FOR MARLBOROUGH DISTRICT COUNCIL | OCTOBER 2023

Revision schedule

Rev No	Date	Description	Signature of Typed Name (documentation on file)			
			Prepared by	Checked by	Reviewed by	Approved by
1	28/4/23	Draft Strategic Case for comment	C McCrostie	S Connolly	S Connolly	A Maughan
2	14/9/23	Draft PBC for peer review	CM and SC	S Connolly	P Peet	A Maughan
3	22/9/23	Final	CM and SC	S Connolly		A Maughan
4	3/10/23	Amendments to Section 2.2	C McCrostie	S Connolly		A Maughan

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. Any use that a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document. This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

The conclusions in the report are Stantec’s professional opinion, as of the time of the report, and concerning the scope described in the report. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. The report relates solely to the specific project for which Stantec was retained and the stated purpose for which the report was prepared. The report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorised use or reliance is at the recipient’s own risk.

Stantec has assumed all information received from the Client and third parties in the preparation of the report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This report is intended solely for use by the Client in accordance with Stantec’s contract with the Client. While the report may be provided to applicable authorities having jurisdiction and others for whom the Client is responsible, Stantec does not warrant the services to any third party. The report may not be relied upon by any other party without the express written consent of Stantec, which may be withheld at Stantec’s discretion.

Quality statement

Project manager	Project technical lead
Sarah Pownall	Andrew Maughan

PREPARED BY

Courtney McCrostie, Sarah Connolly



3/10/2023

CHECKED BY

Sarah Connolly



3/10/2023

REVIEWED BY

Phil Peet



21/09/2023

APPROVED FOR ISSUE BY

Andrew Maughan



3/10/2023

NELSON
 Level 1, 66 Oxford Street, Richmond, Nelson, 7020
 P.O. Box 13052, Christchurch 8141
 Tel +64 3 546 8728
 STATUS FINAL | Project No 310205564

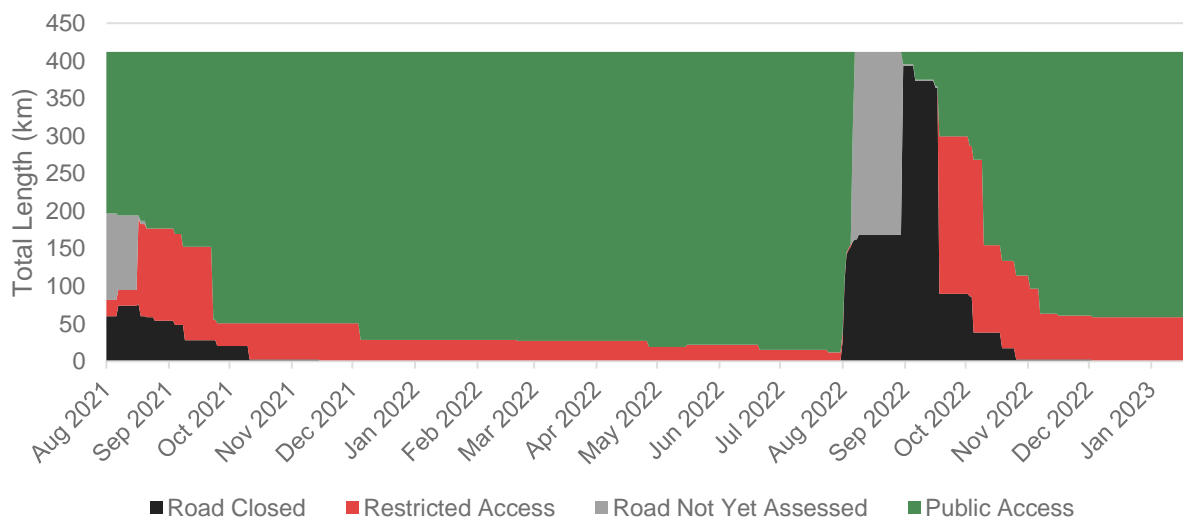


Executive Summary

Context

Marlborough Sounds (the Sounds) suffered four high intensity rainfall events over the past two years which have caused significant damage to the transport network. The July 2021 event caused approximately 900 faults across the Sounds and \$85M funding (Phase 1) was received to repair damage to roads across the Marlborough District including the damage to roads in the Marlborough Sounds.

Following the August 2022 event, approximately 500 km of roads in the Sounds experienced slips and dropouts, with 2,750 faults identified¹. Approximately 2,000 permanent residents and 150 business owners in the Sounds were affected. Communities were cut off from service centres and markets in Marlborough and Nelson with both State Highway 6 (SH6) and State Highway 63 (SH63) closed. The graph below shows the length of key roads across the Sounds that were closed or have had restricted access since August 2021. Following the August 2022 event, the road network was closed for six weeks, and Kenepuru Road is still under restricted access.

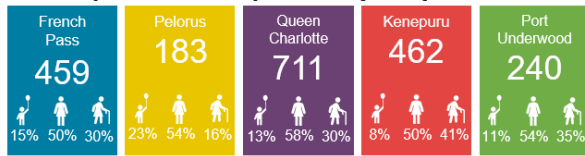


Some of the initial funding for repairs was diverted to emergency response works following the high intensity rainfall in July and August 2022. A funding application for an additional \$53M (Phase 2) has been approved by Waka Kotahi, to complete repair works outside the Sounds and essential repairs within the Sounds. Phase 1 and 2 funding address 2,105 of identified faults in the Sounds, but there are **1,535 faults outstanding**, pending the outcome of this Programme Business Case. This includes sites under permanent traffic management, requiring ongoing maintenance and regular safety checks. The road is down to one lane at these sites and traffic is managed by signals, which require a manual battery change every two days. These outstanding faults present a risk to road users and maintenance crews and continue to affect access for businesses and communities. The standard to which the repair works completed to, will be confirmed as an outcome of the PBC. No minimum level of investment has been agreed to by MDC or Waka Kotahi for repairing the roads damaged by storm events.

¹ Over 670 km of roads were affected, and over 4,000 faults were identified across the Marlborough district following the August 2022 event.



Usually Resident Population (2018)



Business

Top 3 industries in the Sounds (2023)

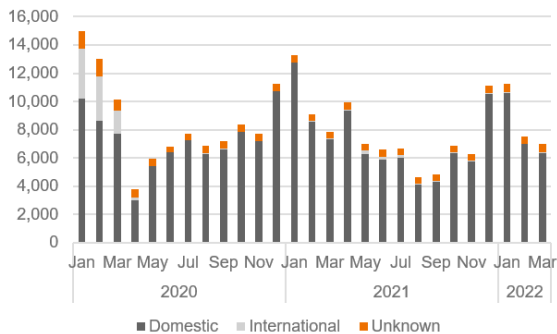
1. Agriculture, Forestry & Fishing:	31%
2. Accommodation and Food Services:	29%
3. Construction:	9%

2018 median personal income

87%

of national average

Visitors to the Marlborough Region



Transport (2023)

Zone	Total dwellings	Dwellings that have never had road access
FP	733	14%
P	111	50%
QC	562	0%
K	1,250	46%
PU	410	49%
Total	3,066	30%

Land

525 km road

- 49% sealed
- 51% unsealed

Water

- 2 ports
- 6 barge sites
- 17 boat ramps
- 32 public jetties

The current situation where access to services and markets is severely affected for long periods following a storm event is considered unsustainable economically and socially. A residents and business survey indicates that the effect of the storm events has created ongoing stress and uncertainty for residents and businesses. Transport has become an onerous problem, and alternatives are either not available, or have added time and cost to what were straightforward journeys prior to the storms. Authorities and the local community are concerned about the effect that subsequent storms and rainfall events could have on an already fragile road network.

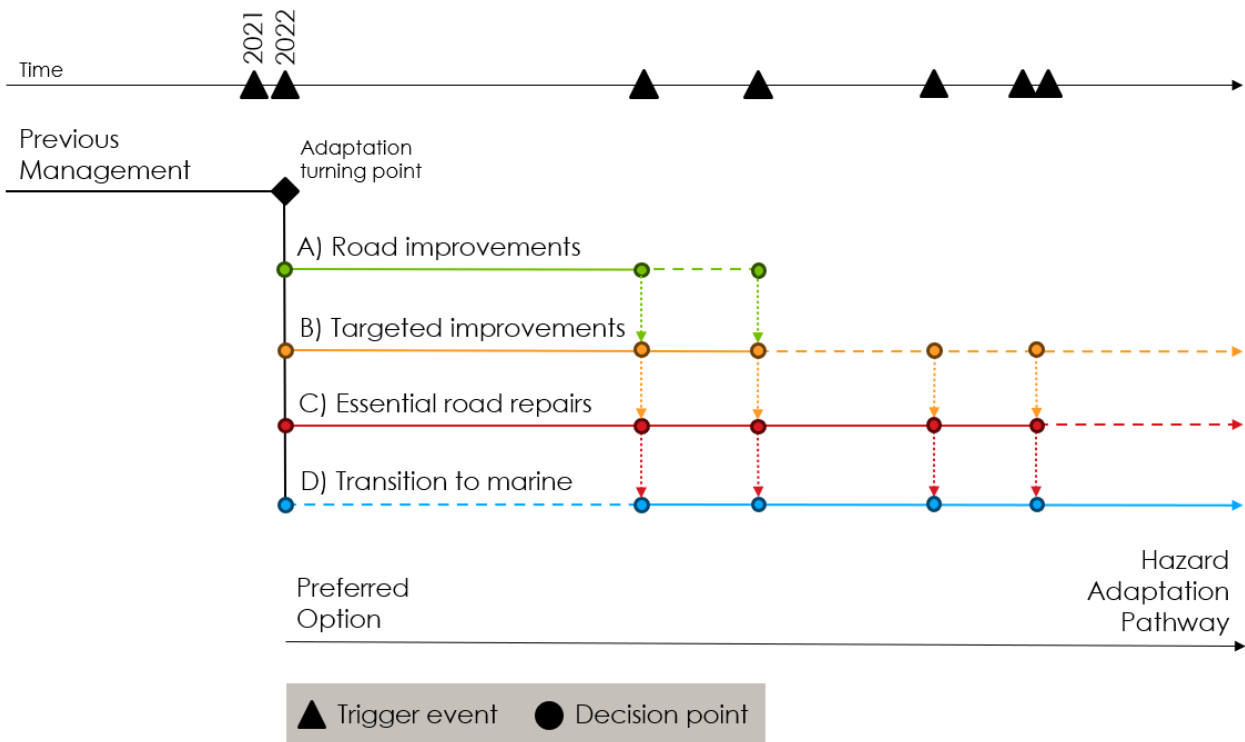
MDC committed to this Programme Business Case (PBC) to establish a “sustainable long-term solution for safe and resilient transport access to the Sounds²” and provide certainty about future access. This is the first PBC of this nature in New Zealand. Guidelines and policies that assist in the process of accommodating climate forced adaptation are still being developed. This lack of established guidance means that the business case must rely on a balance of best practice, local knowledge, engineering judgement and ‘what feels right’. There are no previous studies to lean on or learn from. In addition, the business case has been proceeding at pace to provide certainty to the community. By necessity investigations have been high level with more detailed work required to finalise design and provide greater cost certainty.

During the course of the PBC it became apparent that a long-term hazard adaptation option would also need to be identified. The Hazard Adaptation Pathway (HAP) recognises that future events such as earthquakes, storms and sea level rise are likely in the future and will cause damage to the transport network. The HAP represents the journey Council could take in providing continued access into the future with the end point representing the lowest level of service Council is willing to provide, while still delivering safe transport solutions and access.

Adaptation is a journey – a series of steps. The Preferred Programme is the starting point of that journey, and the HAP the end point. Any significant event that causes substantial damage to the transport network will start the adaptation process. The event would be a trigger for Council to assess the Road Management Strategy for that road segment and decide whether it is realistic to continue with the agreed strategy, or transition to a different strategy for that segment.

² Confirmed Outcome Statement for the PBC.



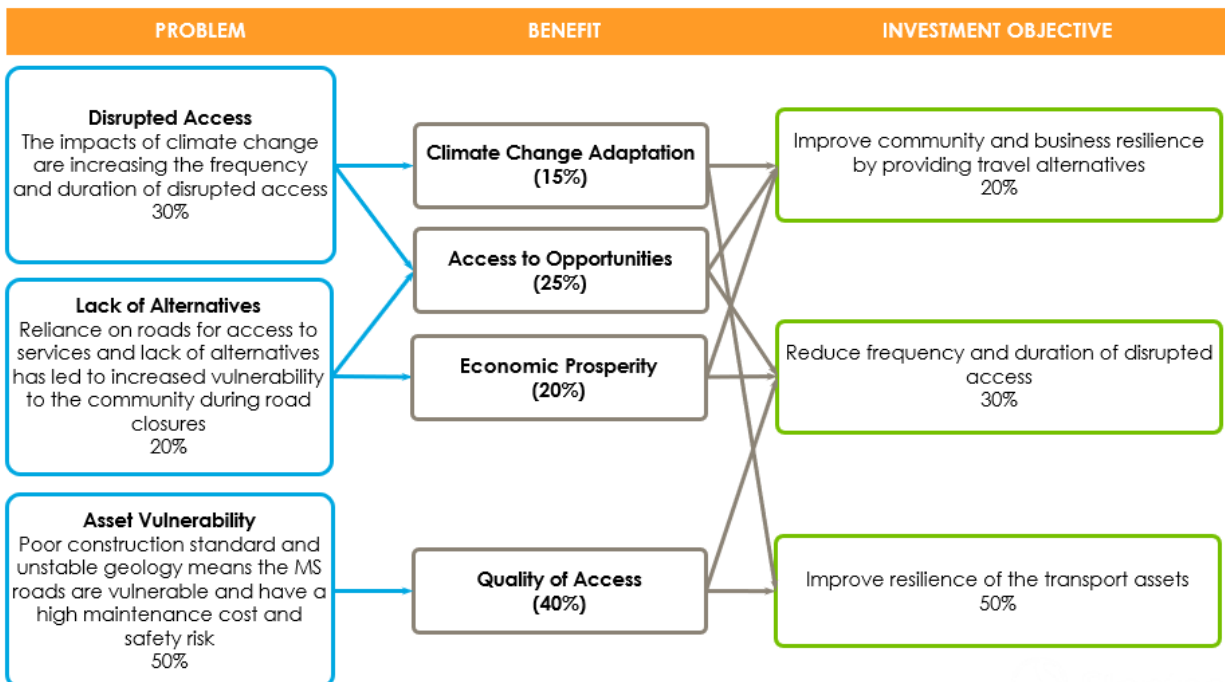


Problems and Benefits

The three problems this PBC aims to solve are:

- **Disrupted Access:** The impacts of climate change are increasing the frequency and duration of disrupted access.
- **Lack of Alternatives:** Reliance on roads for access to services and lack of alternatives has led to increased vulnerability to the community during road closures.
- **Asset Vulnerability:** Poor construction standard and unstable geology means the Marlborough Sounds roads have a high maintenance cost and safety risk.

There are four benefits this PBC aims to realise, as shown in the Investment Logic Map:



Investigation of the problems found:

- Sea level is expected to rise by 30 cm by 2050 at Portage and could rise by up to 1 m by 2100. Areas under 3 m elevation are at a high risk of inundation and erosion.
- Damaging storm events are expected to occur approximately twice as often as they have historically, and rainfall intensities are expected to increase with climate change.
- After both the 2021 and 2022 storm there were months of road closures. The maximum duration roads were closed varies between the areas as follows:
 - Te Aumiti/French Pass: 64 days
 - Te Hoiere/Pelorus: 28 days
 - Queen Charlotte: 63 days
 - Kenepuru: 63 days
 - Te Whanganui/Port Underwood: 122 days.
- Kenepuru Road between Linkwater and the Heads is still under restricted access, over a year following the August 2022 event.
- 83% of roads have no alternative route. If one part of the road fails, everyone beyond that point loses access.
- Marine access is expensive and difficult to access for many, and there are tidal restraints and issues with silting as much of the Sounds is shallow.
- 2,145 permanent residents and at least 150 businesses have been affected, including farming, aquaculture, forestry and many tourism offerings. It has been challenging for residents to access health care, education, supermarkets, and for businesses to get product to market. A survey showed people's mental health has been strongly affected, with scores declining 30%. Around 18% of residents operating businesses reported a loss of income because of the storms, and business confidence has dropped 20-30%. Business owners in Kenepuru, Queen Charlotte and Te Aumiti/French Pass have been disproportionately affected.
- Queen Charlotte Drive is strategically important for state highway network resilience, providing an alternative in the event of a closure of SH6 or SH1. This road is also important for access to the Queen Charlotte Track, which is popular with national and international tourists.
- Port Underwood Road and Tumbledown Bay Road are strategically important providing access to lifeline infrastructure - the Cook Strait electricity cable, which supplies electricity to the North Island.
- 73% of roads are highly susceptible to slope instability following man-made adaptations, such as building roads, and 13% are highly susceptible to natural slope instability. Many sections of road are built on unstable land to a standard that would not be acceptable today. Slips account for 63% of total recorded faults, and most slips occurred on roads built on unstable land, with the highest concentration on Kenepuru Road, Queen Charlotte Drive and Port Underwood Road.
- Emergency works spending in the Sounds is ten times higher than the rest of Marlborough District.

Programme Development

As the study area was large, the Sounds were divided into five zones, and within each zone, roads (or combinations of roads) were split into separate segments, to reflect different road functions and hazard susceptibility. A total of 28 segments were identified across the five zones.

A range of Road Network Management strategic responses were identified, using the Resilience Response Framework and the Protect Accommodate Retreat Avoid (PARA) framework from the National Adaptation Plan. The strategic responses represent different approaches to the hazard risk, from a build back stronger approach (protect) to a marine access approach (retreat) where roads are not fixed unless required for access to a marine hub (hub and spoke model). Each strategic response provides a different level of service in terms of number of lanes and surface type, and different levels of investment in stormwater and geotechnical improvements, as shown in the table below.

Road Management Strategic Response		Capital Works				
Approach		Vehicle restrictions	Lane width	Surface	Stormwater	Geotechnical
Ai	Build back stronger (protect)	No additional restrictions	As existing	As existing	Whole route upgrades	Targeted: existing failures and improvements
Aii	Build back stronger (protect)	Additional restrictions	More one lane sections	More unsealed sections	Whole route upgrades	Targeted: existing failures and improvements

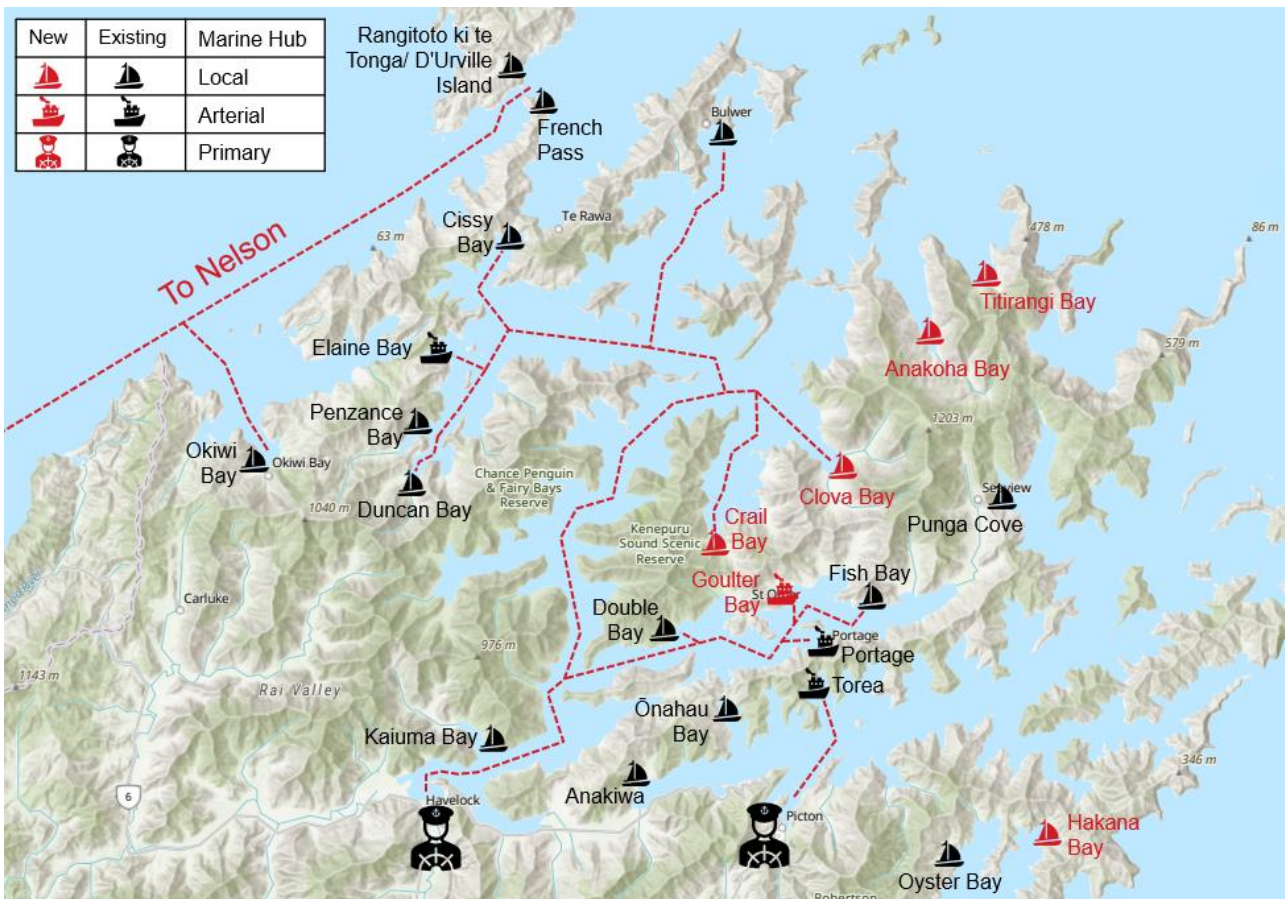


Road Management Strategic Response		Capital Works				
Approach		Vehicle restrictions	Lane width	Surface	Stormwater	Geotechnical
Bi	Targeted improvements (accommodate)	No additional restrictions	As existing	As existing	Targeted: existing failures and improvements	Essential: address existing failures
Bii	Targeted improvements (accommodate)	Additional restrictions	More one lane sections	More unsealed sections	Targeted: existing failures and improvements	Essential: address existing failures
C	Essential repairs (accommodate/retreat)	Additional restrictions	More one lane sections	More unsealed sections	Essential: address existing failures	Essential: address existing failures
D	Marine access (retreat)	Additional restrictions	More one lane sections	More unsealed sections	Essential: address existing failures	None

Each road segment was considered separately, and the range of suitable Road Management Strategies identified, with some excluded. For example, if there was no coastline, approach D was excluded. This left a range of approaches for each segment. These approaches were then put together into different programmes for each zone. This allocation of approaches by segment and then into programmes was underpinned by local knowledge, susceptibility to geohazards, road function and use, and scope for marine access.

In tandem, a draft marine network was developed based on existing marine infrastructure and services, which could both be further developed if required. Marine hub locations were based on likely demand for marine services, and consideration of resilience risk for the roads and the extent to which this could be addressed through engineering works. Most marine hub sites which have potential to be used (or used more) for this purpose already have some marine infrastructure, such as a jetty or ramp. Siltation is an issue and this limits the feasibility of some potential marine sites, and/or requires very long jetties to enable deeper water to be accessed. Additional dredging is likely to be required to maintain the proposed marine network. Primary, arterial, and local marine hubs were identified, and indicative concepts developed. Marine interventions were then added to each zone, to complement the Road Management Strategy.

The figure below shows the existing marine infrastructure in the Sounds, and the location of possible new hub sites. Not all new sites shown in the figure were progressed.



Five potential programmes were identified:

- **Programme 1: Road Focus:** Many road segments in the zone strengthened where this is justified, to provide a resilient road network where roads can withstand events and unplanned closures are minimised. Marine access is primarily for emergency response
- **Programme 2: Road Access:** The most important road segments in the zone are strengthened. Where marine access is available, this provides an alternative if roads are closed during or following an event.
- **Programme 3: Balanced:** Essential road segments are strengthened where this is possible. Other road segments are repaired to a basic level. Marine alternatives start to represent a real choice, particularly where road segments have a high exposure to geohazard risk.
- **Programme 4: Marine Access:** Essential road segments are repaired to a basic level. Marine alternatives are a significant part of the network within the zone and are more available and resilient.
- **Programme 5: Marine Focus:** Roads are repaired where affordable, by roads primarily providing access to the marine hub, where this exists, and marine transport is the primary mode for access into and out of the zone.

A total of 26 Programmes were identified across the five zones. Finally, land use and planning interventions were added to all programmes. These are primarily part of MDC's BAU and will be progressed outside the business case process.

Programme Assessment

The programmes were assessed using multi-criteria analysis (MCA), economic impact (likelihood of option enabling full restoration of previous economic activity) assessment, and indicative, high level engineering cost estimates. The assessment was used to identify an Emerging Preferred Programme. A summary of the performance of each programme is provided below.

Considerations		Do Minimum	Road Focus	Road Access	Balanced	Marine Access	Marine Focus
Te Aumiti/French Pass	Weighted MCA Score	-0.36	0.40	0.70	0.88	0.87	-0.16
	BCR	0.30	0.57	0.76	0.83	0.61	0.49
	WEI Factor	2.33	4.06	5.46	5.35	4.1	3.44
	Initial Cost Estimate	\$4.1M	\$75.4M	\$43.1M	\$27.0M	\$22.0M	\$20.2M
	Economic Impact	Unlikely	Almost Certain	Almost Certain	Likely	Likely	Possible
	Emerging Preferred			Road Access			
Te Hoiere/Pelorus	Weighted MCA Score	0.435	1.095	0.94	0.52	-0.025	
	BCR	0.39	0.51	0.63	1.14	0.82	
	WEI Factor	7.43	9.01	10.91	22.91	17.94	
	Initial Cost Estimate	\$0.8M	\$6.1M	\$4.2M	\$2.2M	\$1.8M	
	Economic Impact	Unlikely	Almost Certain	Almost Certain	Almost Certain	Likely	
	Emerging Preferred		Road Focus				
Queen Charlotte	Weighted MCA Score	-0.155	0.39	0.16	-0.245	-0.94	
	BCR	0.68	1.68	3.01	1.97	0.68	
	WEI Factor	6.57	16.36	27.47	16.27	16.29	
	Initial Cost Estimate	\$1.9M	\$32.2M	\$12.2M	\$9.2M	\$7.9M	
	Economic Impact	Unlikely	Almost Certain	Likely	Possible	Possible	
	Emerging Preferred		Road Focus/Road Access				
Kenepuru	Weighted MCA Score	-0.52	-1.06	-0.67	0.07	-0.24	-0.38
	BCR	0.57	0.86	1.07	1.12	0.59	0.53
	WEI Factor	5.57	7.72	9.56	10.2	5.81	5.56
	Initial Cost Estimate	\$8.6M	\$145.2M	\$81.9M	\$57.6M	\$46.5M	\$41.6M
	Economic Impact	Unlikely	Almost Certain	Likely	Likely	Possible	Possible
	Emerging Preferred				Balanced		

Considerations		Do Minimum	Road Focus	Road Access	Balanced	Marine Access	Marine Focus
Te Whanganui/Port Underwood	Weighted MCA Score	0.06	1.27	1.12	1.01	0.14	-0.09
	BCR	0.22	0.37	0.49	0.51	0.73	0.72
	WEI Factor	1.54	2.6	3.34	3.41	4.95	4.95
	Initial Cost Estimate	\$3.2M	\$41.4M	\$21.4M	\$17.0M	\$7.2M	\$6.7M
	Economic Impact	Unlikely	Almost Certain	Likely	Likely	Likely	Possible
	Emerging Preferred			Road Access			

For Te Hoiere/Pelorus, Queen Charlotte and Kenepuru, the top ranked MCA programme was selected, as decision makers were comfortable with the initial cost estimates and likely economic impact. However, for Te Whanganui/Port Underwood the second ranked programme was chosen. This was because the MCA scores were very close, yet the second ranked programme was around half the cost, so was better value for money. For Te Aumiti/French Pass the third ranked programme was selected. This was because the MCA scores were very close between the top three scoring programmes, but the emerging preferred programme preferred a better balance between level of disruption and provision of alternatives, and the marine programmes too big a step change for the community, with too much uncertainty around feasibility of implementation. Marine Access was therefore presented as the HAP.

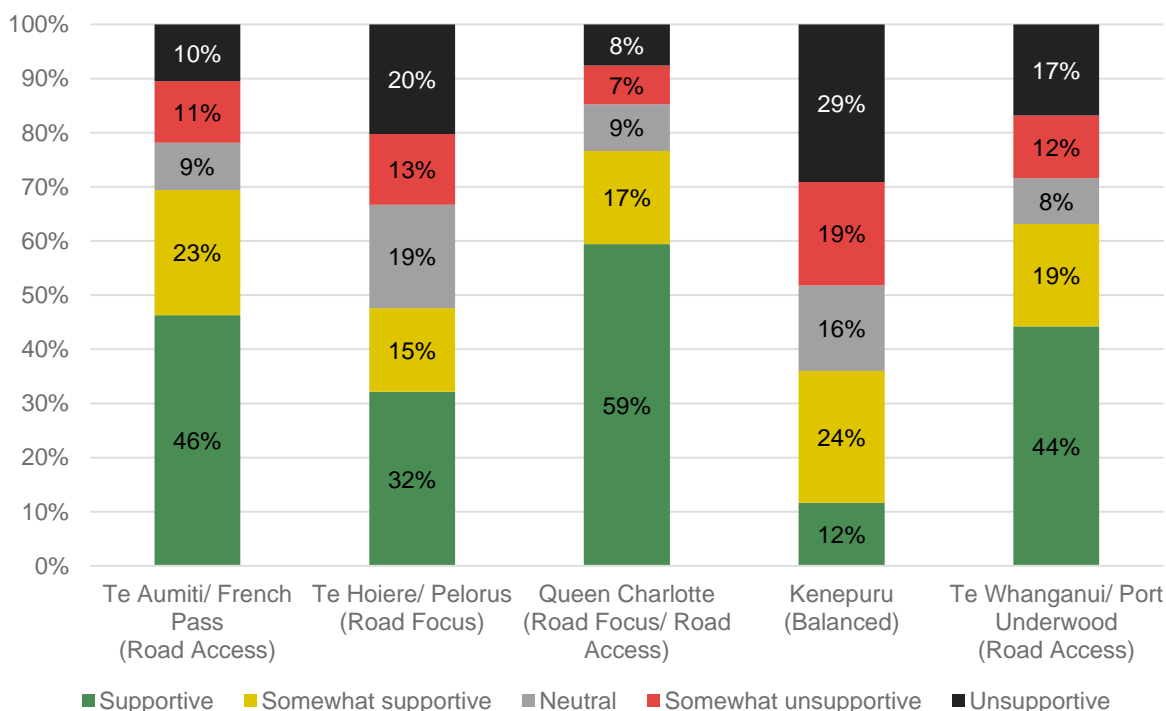
Consultation

Consultation commenced on 16 June with the opening of the online survey, to which 1,700 responses were received. This was followed by a stakeholder workshop and seven drop-in sessions across the Sounds, attended by around 500 people, and an online session attended by 50 people. An additional 43 written submissions were provided.

Consultation focussed on the Emerging Preferred Option, but the HAP was also presented to initiate a conversation and indicate that further engagement would follow post-PBC. Marine Focus was identified as the HAP for Kenepuru, and Marine Access for all other zones.

The graph shows levels of support for the Emerging Preferred Option. People were supportive of Te Aumiti/French Pass, Queen Charlotte and Te Whanganui/Port Underwood, with 69%, 76% and 63% ticking 'supportive' or 'somewhat supportive', respectively.

Support was lower for Te Hoiere/Pelorus (47% supportive or somewhat supportive) and Kenepuru (36%). Minor changes were made to these programmes to reflect the issues that people raised through consultation. For example, the approach for Kenepuru Road (Portage to the Heads) remained as 'essential repairs', but with some low-cost targeted improvements added to improve resilience.



Preferred Programme

Consultation feedback, PV analysis and MCA scores were considered, and the Preferred Programme was finalised. The Preferred Programme includes the following components:

- Rooding Maintenance and Operations: Changes to maintenance and operations, that can improve resilience of the rooding asset. These will be completed within existing budgets.
- Road Repairs: Confirmed outcome for the 1,535 outstanding faults on the road network that have not yet been repaired and are still affecting access.
- Road Improvements: To improve resilience of the road network, where this is justified. If above the low-cost, low-risk³ (LCLR) improvements threshold, these may require a separate business case.
- Marine Improvements: To improve resilience of the marine network, where this is justified. In this way the marine network can be used to improve access to the Sounds in the long term.
- Marine Maintenance: Maintenance of marine infrastructure.
- Sounds wide studies: a Marine Study and a Resilience (drainage) Study, to determine further investigate options, priorities, feasibility and detailed costs, and determine a clear way forward for Marine Improvements and Road Improvements, plus a Plan Change to incorporate land use/development changes.
- Other Activities: Non-infrastructure solutions, such as land use controls and community preparedness/response planning. These will be completed within existing budgets.

The peer reviewed P50 cost estimate for the overall programme is \$234M. The cost breakdown is shown below.

Zone	Road Repairs	Road Improvements	Marine Improvements	Total
Sounds wide studies	-	\$3M	\$7M	\$10M
Te Aumiti/French Pass	\$26M	\$15M	\$9M	\$50M
Te Hoiere/Pelorus	\$2M	\$4M	-	\$6M
Queen Charlotte	\$14M	\$6M	\$6M	\$26M
Kenepuru	\$94M	\$12M	\$18M	\$124M
Te Whanganui/Port Underwood	\$11M	\$8M	-	\$19M
Total	\$146M	\$48M	\$40M	\$234M

The Preferred Programme has been assessed to have a base BCR of 1.8 based on the expected cost estimate and the consideration of a range of costs and benefits relating to conventional travel time and vehicle operating costs through to resilience-based disruption costs. Under the base scenario, the Preferred Programmes for Queen Charlotte, Kenepuru and Te Whanganui/Port Underwood areas all result in BCRs above 1 or present value cost savings. The Te Aumiti/French Pass and Te Hoiere/Pelorus areas have area level BCRs less than 1.0; however, these areas are balanced by considering the Preferred Programme as a package of investment across the Sounds.

Zone	Preferred Programme	Do Minimum Factor: 150%/150% (Base)		
		NPV Cost	NPV Benefit	BCR
Te Aumiti/French Pass	Road Access	\$24	\$18	0.7
Te Hoiere/Pelorus	Road Focus	\$3	\$0	0.1
Queen Charlotte	Road Focus/Road Access	-\$5	\$17	-PV
Kenepuru	Balanced	\$30	\$55	1.8
Te Whanganui/Port Underwood	Road Access	\$2	\$4	2.7
Total		\$53	\$94	1.8

Sensitivity analysis plays an important role in understanding the impact of key assumptions on the overall case for investment, particularly during the development of a PBC. A suite of sensitivity testing shows that the BCR is robust in the 'Low BCR 1-2.9' range. The exceptions include the 95th percentile cost (BCR 0.7), assuming events under the Do minimum would only be 25% worse than the baseline (BCR 0.8) and a higher 6% discount rate (BCR 0.8). Sensitivity

³ The construction/implementation of local road low-cost, low-risk improvements is approved up to a total cost of \$2 million per project. The \$2 million implementation approved cost limit is inclusive of all costs such as professional services, administration and related overheads, property and construction / implementation costs.



tests that would result in the programme BCR having a “Medium BCR 3-5.9” or higher rating involve excluding marine investment (BCR 12.8), including higher climate change growth, further speed restrictions in the Do-Minimum or higher strategy effectiveness values.

The Preferred Programme will provide:

Benefit / Outcome	Contribution of Preferred Programme
Climate Change Adaptation	<p>Addresses a known climate change issue by</p> <ul style="list-style-type: none"> • Improving marine alternatives to road by: <ul style="list-style-type: none"> ○ completing resilience works on two primary hubs (Havelock and Picton) ○ upgrading three arterial hubs (Elaine Bay, Portage and Torea Bay) ○ constructing one new arterial hub (Goulter Bay) ○ improving nine local marine hubs • Improving road network resilience on 77% of roads to reduce susceptibility to human induced instability by 30% and 50% • Reducing carbon emissions from freight transport by progressively transitioning freight within Kenepuru from road to marine.
Access to Opportunities and Economic Prosperity	<p>Support economic prosperity and access to opportunities by reducing average duration of road closures across the Sounds by</p> <ul style="list-style-type: none"> • 6% by 2027 through repair work at priority sites • 26% by 2034 through road improvement work • 32% by 2044 through road improvement work <p>Support economic prosperity across the Sounds by</p> <ul style="list-style-type: none"> • Decreasing travel times by 15% through the removal of 30km/hr restrictions in parts of Kenepuru • Reducing vehicle operating costs through the removal of temporary speed restrictions (including signals) • Providing an alternative Kenepuru Road, which will continue to be vulnerable due to underlying geology, by providing enhanced marine access • Protecting primary marine hubs at Picton and Havelock for emergency response and for future marine networks.
Quality of Access	<p>Improve quality of access across the Sounds by:</p> <ul style="list-style-type: none"> • Addressing 232 simple, 1,128 minor, 175 complex site repairs to provide a safe and fit for purpose road network. • Adding resilience to the road network by completing a programme of drainage improvements across the Sounds, which will result in approximately 31% less drainage related faults⁴ • Addressing 232 simple, 1,128 minor, 175 complex site repairs to provide a safe and fit for purpose road network. • Providing more consistent and reliable access • Providing more viable and resilient marine alternatives • Providing more consistent, reliable access • Providing better marine alternatives and completing emergency response planning

Assessment Profile

The Preferred Programme has an overall priority of Priority 2 of 12. The highest expected contribution to each investment factor is detailed below.

⁴ Culvert issues, scour, and under slips



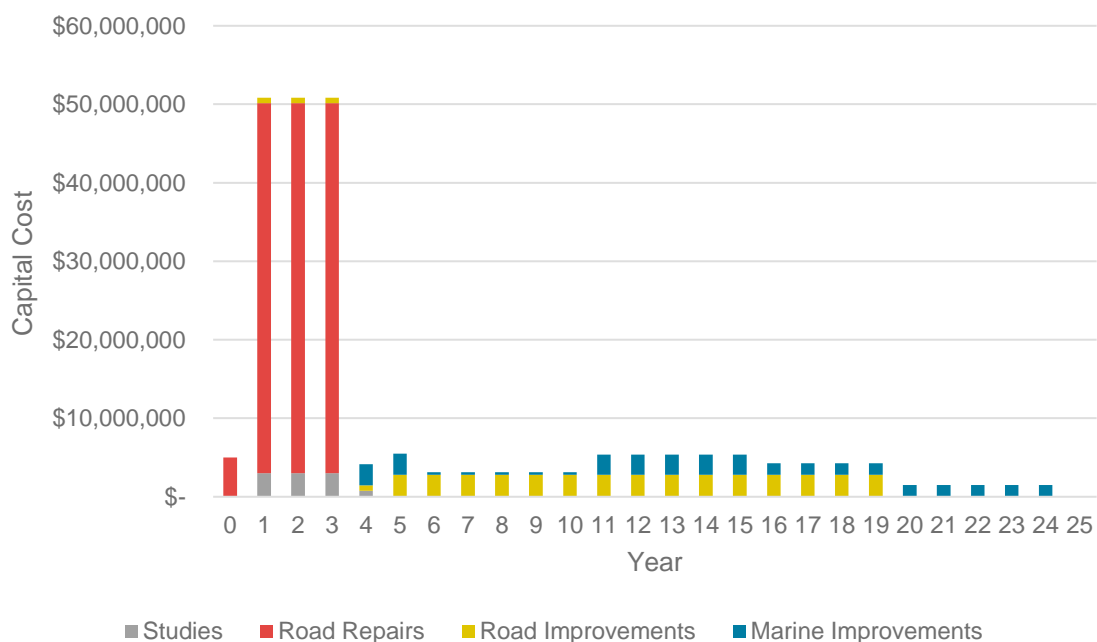
Factor	Comment	Rating
GPS Alignment	Strategic Priority: Improving Freight Connections Benefit: Economic Prosperity Criterion: >31% reduction in duration of unplanned road closures/service disruptions of >2hrs	Very High
Scheduling	Scheduling Factor: Criticality Criterion: Delivery of the programme is urgent and needs to begin in 2021-24. Unplanned loss of service (more than 2 hours) results in most users needing to use alternative routes or modes which take more than 2 hours extra travel time.	High
BCR	1.8	Low

Implementation Plan

The implementation timeline is shown below. Road Repairs are the immediate priority and will be completed in years one to three. In parallel, area wide studies will be completed as these will need to guide implementation of road improvements over years four to 10, and marine improvements over years four to 30.

Activity	Years one to four	Years five to 10	Years 10 to 30
Road Repairs	Complete road repairs	-	-
Road Improvements	Resilience (drainage) study and pre-implementation	Pre-implementation and implementation	Pre-implementation and implementation
Marine Improvements	Marine study Plan changes	Pre-implementation Implementation of essential items	Implementation of Long-Term Plan
Maintenance	Maintenance planning Implementation	Implementation	Implementation
Area wide studies	Plan Change Marine Study Resilience (drainage) Study		

Cash flow by year and type of activity is shown below. Costs are around \$50M in years one to three as repairs are completed. Expenditure then drops significantly, with Road Improvements costing between \$1-3M per annum from Year four to 20. The highest priority marine improvements are completed in Years 4 and 5.



Funding

At this stage, the assumption is that the Preferred Programme will be funded through rates and National Land Transport Fund (NLTF) allocation. The funding categories and assumed Waka Kotahi Funding Assistance Rates (FARs) are shown below. Supplementary funding sources have been identified to assist offset the costs to residents and to the NLTF.

The funding immediately sought from the PBC is not the full \$234M, rather \$146M for immediate road repairs and \$10M for further investigations into roading improvements (\$3M) and marine improvements (\$7M).

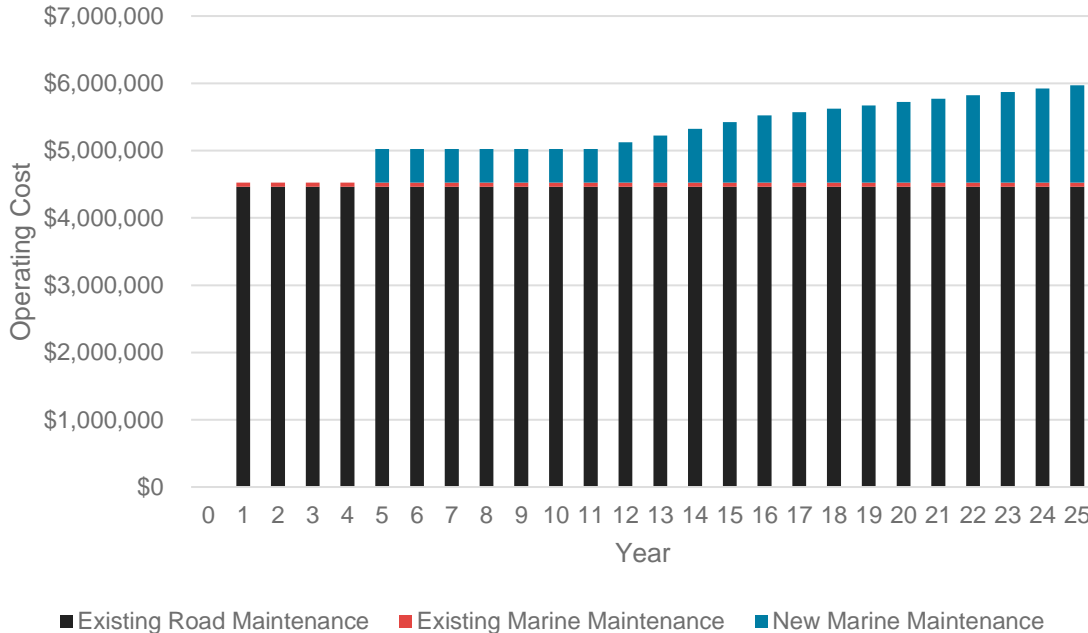
P50 capital cost estimates are shown in the table below.

Activity	Funding Category	Assumed FAR	P50 Cost Est
Road Repairs	Emergency Works	71%	\$146M
Road Improvements	Low-Cost Low Risk (<\$2M), Resilience (>\$2M)	51%	\$45M
Marine Improvements	NA	0%	\$33M
Area wide studies: Resilience Study	Network and Asset Management	51%	\$3M
Area wide studies: Marine Study, Plan Change	NA	0%	\$7M

Potential investment partners including the community have finite funding availability. MDC will urgently seek to pursue funding through a Direct Budget Bid and through the Transport Resilience Fund for roading resilience improvements.

MDC will also seek supplementary funding from the International Visitor Conservation and Tourism Levy Fund for works on Queen Charlotte Drive.

Maintenance costs are shown in the figure below. The additional marine costs do not start until year five as marine infrastructure is built or upgraded. It is assumed this will be fully rates funded unless supplementary funding can be sourced.



Risks

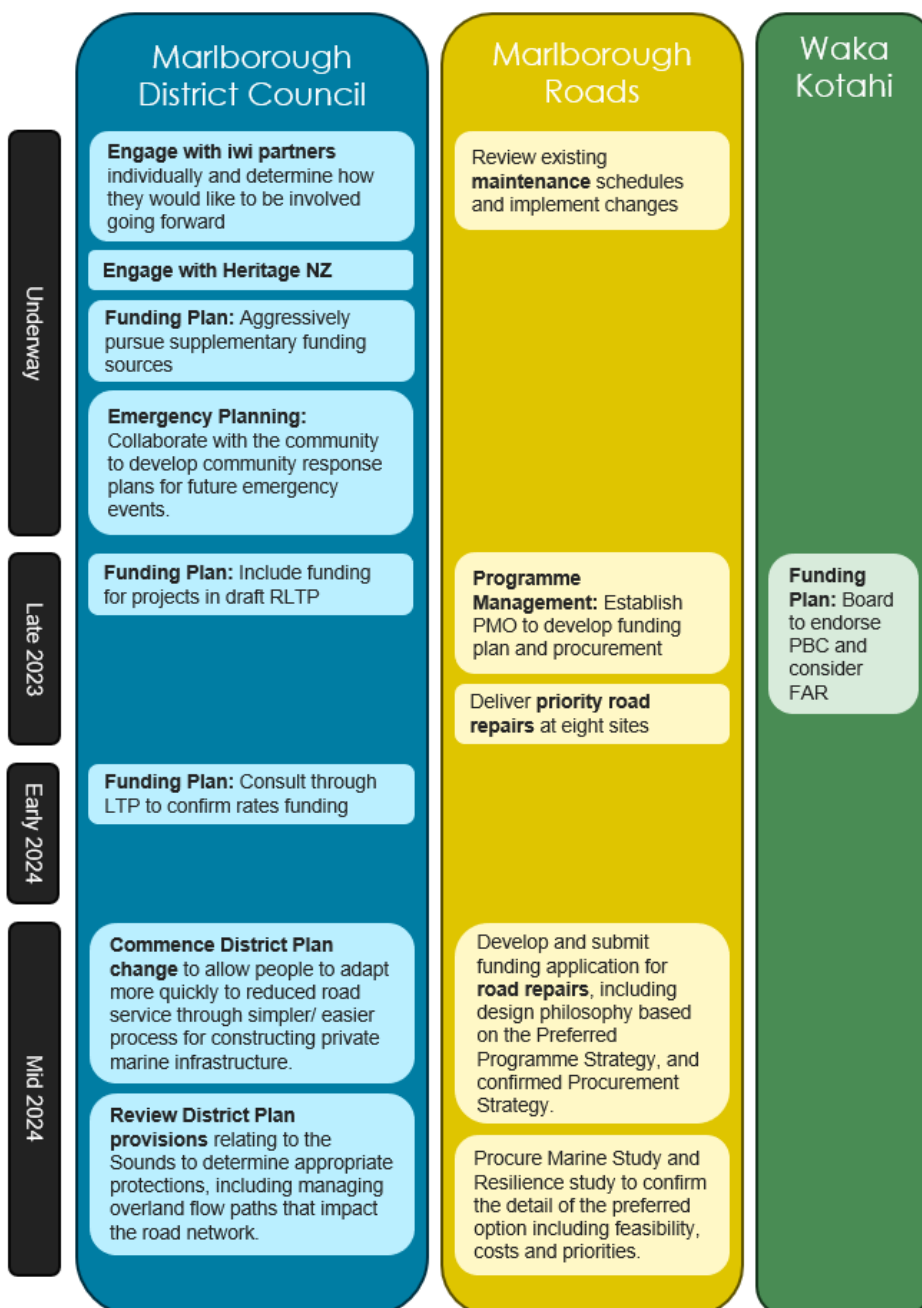
Six critical risks were identified at a Risk Workshop:

- There is a risk that iwi rights and interests are not adequately addressed due to time constraints. Ongoing collaboration post-PBC is required with iwi to continue input on the business case and programme of works as it emerges.
- There is a risk that Heritage NZ interests are not adequately addressed due to time constraints. Ongoing collaboration post-PBC is required with Heritage NZ to continue input on the business case and programme of works as it emerges.

- MDC has a small ratepayer base, and the programme is \$234M. The preferred programme needs to compete against other MDC priorities for limited funding. Nationally there is uncertainty about access to other funding streams, as well as uncertainty about availability of national funding through the NLTF. The principal government funding stream is via Waka Kotahi, who do not have the remit to fund some of the proposed works e.g., marine. In this constrained funding environment, there is a risk that MDC may not be able to afford to deliver the preferred programme. Pursuit of the full range of potential supplementary revenue streams post-PBC is required.
- There is a known lack of capacity within the contractor/consultant market as many are responding to damage from Cyclone Gabrielle. MDC may be unable to secure a contractor, and/or costs may increase leading to poorer outcomes. Early engagement with potential contractors is needed.
- The resource consent process may be challenging for marine infrastructure, which could add delay or make the marine programme unaffordable. Ongoing dialogue with iwi, stakeholders and community is essential to manage this risk and community expectations. Marine services viability and consenting will be investigated further as part of the Marine Study.
- Marine based infrastructure may require additional dredging, increasing pollution and environmental degradation. This should be part of the Marine Study scope.

Next Steps

The next steps, timing and responsible party are shown below:



Contents

Revision schedule	i
Quality statement.....	ii
Executive Summary.....	iii
Abbreviations.....	xxiii
Glossary	xxiv
Part A – The Strategic Case	1
1 Introduction.....	1
1.1 Background	1
1.2 Purpose.....	2
1.3 Scope.....	2
1.4 Governance.....	3
1.5 Extent.....	3
2 Programme Context.....	5
2.1 Geographic and Environmental Context	5
2.2 Cultural Context.....	6
2.3 Social Context	7
2.3.1 Overview.....	7
2.3.2 Permanent Residents	8
2.3.3 Business Owners	9
2.3.4 Visitors.....	10
2.3.5 Access to Service Centres	11
2.4 Economic Context	12
2.4.1 Summary	12
2.4.2 Key Economic Activities.....	12
2.4.3 Freight Access	12
2.5 Transport Context.....	13
2.5.1 Key Journeys.....	13
2.5.2 Roads	15
2.5.3 Walking and Cycling	18
2.5.4 Public Transport.....	19
2.5.5 Water Access.....	19
2.5.6 Air Access.....	22
3 Partners and Key Stakeholders	23
3.1 Investment Partners	23
3.1.1 Waka Kotahi NZ Transport Agency.....	23
3.1.2 Marlborough District Council	23
3.1.3 Iwi.....	23
3.2 Key Stakeholders	23



3.3	Engagement with Stakeholders	24
3.4	Engagement with Community	24
3.5	On Going Engagement with Iwi	25
4	Problems	26
4.1	Defining the Problems	26
4.2	Problem 1: Disrupted Access	26
4.2.1	Cause: Sea Level Rise and Vertical Land Movement.....	26
4.2.2	Cause: Coastal Erosion and Inundation	28
4.2.3	Cause: Storm Frequency and Intensity Change.....	29
4.2.4	Effect: Increased Frequency and Duration of Road Closures.....	30
4.2.5	Consequence: Impacted Access.....	32
4.3	Problem 2: Lack of Alternatives	32
4.3.1	Cause: Groups Affected.....	33
4.3.2	Cause: No Alternative Overland Routes.....	33
4.3.3	Cause: Limited Air Routes	34
4.3.4	Cause: Challenges with Water Routes.....	34
4.3.5	Effect: Risks to Lifeline Infrastructure	35
4.3.6	Effect: Loss of Access to Community Facilities	37
4.3.7	Consequence: Uncertainty.....	38
4.3.8	Consequence: Negative Health Impacts	38
4.3.9	Consequence: Economic Impacts.....	40
4.4	Problem 3: Asset Vulnerability	41
4.4.1	Cause: Geology	41
4.4.2	Cause: Poor Construction	42
4.4.3	Cause: Maintenance	44
4.4.4	Effect: 2021 and 2022 Weather Event Faults.....	45
4.4.5	Effect: Susceptibility to Landslips	46
4.4.6	Consequence: Increased Spending	47
4.4.7	Consequence: Safety.....	48
4.5	Problem Summary.....	49
4.6	Investment Objectives and Benefits of Assessment.....	52
4.6.1	Investment Objectives.....	52
4.6.2	Benefits.....	52
4.7	Alignment to Existing Strategies, Policies and Plans	56
4.8	Uncertainties and Constraints.....	58
5	Investment Prioritisation	60
5.1	GPS Alignment.....	60
5.2	Scheduling	60
5.3	Efficiency.....	60
Part B(i) – The Economic Case: Developing the Programmes.....		61
6	Do Nothing	61
7	Do Minimum	62
7.1	Description	62
7.2	Components.....	62
7.3	Resilience Risk and Access.....	62



7.4	Maps	63
8	Programme Options Identification.....	64
8.1	Programme Development Process.....	64
8.2	Inputs	64
8.2.1	Route Segmentation	64
8.2.2	Natural Hazards.....	67
8.3	Strategic Response	69
8.3.1	Road Network Management Strategic Response.....	69
8.3.2	Marine Network.....	70
8.4	Assignment Process and Excluded Options	72
8.4.1	Te Aumiti/French Pass.....	72
8.4.2	Te Hoiere/Pelorus, Queen Charlotte and Te Whanganui/Port Underwood.....	73
8.4.3	Kenepuru	74
8.5	Programme Development.....	75
8.5.1	Programme Overview	75
8.5.2	Common Interventions.....	77
9	Programme Assessment	78
9.1	Multi Criteria Analysis	78
9.1.1	Assessment Criteria.....	78
9.1.2	Scoring	79
9.1.3	Assessment Process and Moderation	79
9.1.4	Weightings.....	79
9.1.5	Sensitivity Analysis	80
9.1.6	Multi Criteria Analysis Results.....	80
9.1.7	Sensitivity Tests.....	81
9.2	Initial Cost Estimate.....	85
9.3	Benefit Cost Ratios.....	85
9.4	Economic Impact.....	86
10	Emerging Preferred Programme.....	88
10.1	Programme Evaluations	88
10.1.1	Overview of Process	88
10.1.2	Te Aumiti/French Pass.....	88
10.1.3	Te Hoiere/Pelorus.....	89
10.1.4	Queen Charlotte	90
10.1.5	Kenepuru	91
10.1.6	Te Whanganui/Port Underwood.....	91
10.2	Emerging Preferred Programme Summary.....	92
10.3	Hazard Adaptation Pathways Summary	92
10.4	Iwi.....	94
10.5	Engagement.....	94
10.5.1	Summary	94
10.5.2	Survey Results.....	94
10.6	Revised Programme Benefits Assessment.....	97

10.6.1	Overview.....	97
10.6.2	Te Aumiti/French Pass.....	97
10.6.3	Te Hoiere/Pelorus.....	98
10.6.4	Queen Charlotte	98
10.6.5	Kenepuru	99
10.6.6	Te Whanganui/Port Underwood.....	99
10.6.7	Emerging Preferred Programme	99
Part B(ii)	– Economic Case: Preferred Programme.....	101
11	Preferred Programme	101
12	Cost Estimate for Preferred Programme	103
13	Economic Analysis of the Preferred Programme.....	104
13.1	Do Minimum	104
13.2	Preferred Programme.....	104
13.3	Assessment of Transport Costs and Benefits	104
13.3.1	Resilience – Estimated Cost of future Disruption Events.....	105
13.3.2	Travel Time Costs and Vehicle Operating Costs.....	106
13.3.3	Road user costs from Disruption Events	107
13.4	Cost Benefit Analysis.....	108
13.5	Sensitivity Testing	108
13.6	Summary.....	110
14	Programme Outcomes.....	111
15	Reconfirm Investment Profile.....	112
Part C	– Readiness and Assurance	113
16	Financial Case.....	113
16.1	Indicative Cost.....	113
16.2	Project Funding Milestones	114
16.3	Funding Risks.....	114
16.4	Funding Sources	115
16.4.1	Overview.....	115
16.4.2	Waka Kotahi Funding.....	116
16.5	Cost by Funding Source	117
16.6	Overall Affordability	118
17	Commercial Case	119
17.1	Procurement Strategy.....	119
17.1.1	Programme Management of Repairs	119
17.1.2	Road.....	120
17.1.3	Marine Improvements	121
17.1.4	Other.....	121
18	Management Case	122
18.1	Marlborough Transport Network Management.....	122
18.2	Outline Programme Plan	122
18.3	Benefits Realisation Management	123
18.4	Risk Management	124

List of appendices

Appendix A Dwelling Occupancy
 Appendix B Existing Marine Infrastructure
 Appendix C Stakeholder Engagement
 Appendix D Iwi Engagement
 Appendix E Community Engagement
 Appendix F Wider Community Impacts Survey January 2023 Results Summary
 Appendix G Emerging Preferred Option Survey Results
 Appendix H Road Status Graphs Following 2021 Event
 Appendix I Social Health and Impact Assessment
 Appendix J Changing Construction Standards
 Appendix K Event Fault Summary
 Appendix L Indicative Efficiency Rating
 Appendix M Do Minimum Maps and Descriptions
 Appendix N Route Segment Maps
 Appendix O Faults and Hazards Susceptibility Summary
 Appendix P Road Network Management Strategic Response
 Appendix Q Programme Development Tables, Maps and Descriptions
 Appendix R Multi Criteria Analysis
 Appendix S Engagement Summary Report
 Appendix T Appraisal Summary Tables
 Appendix U Preferred Programme Cost Estimate
 Appendix V Revised Programme Benefits Assessment
 Appendix W Funding Cashflow Tables
 Appendix X Risk Register

List of tables

Table 2-1: Traffic volume estimates for a selection of Sounds roads 18
 Table 2-2: Existing scheduled marine services 20
 Table 2-3: Dwellings with no road access prior to the storm events 21
 Table 3-1: Stakeholders..... 23
 Table 4-1: Cause, Effect and Consequence for Problem 1 26
 Table 4-2: Cause, Effect and Consequence for Problem 2 33
 Table 4-3: Summary of key services in the Sounds 38
 Table 4-4: Physical health results summary..... 39
 Table 4-5: Mental health results summary 39
 Table 4-6: Economic impact of storm events 40
 Table 4-7: Business owner confidence 40
 Table 4-8: Cause, effect, and consequence for Problem 3 41
 Table 4-9: 2021 event faults by zone and fault type 45
 Table 4-10: 2022 event faults by zone and fault type 46
 Table 4-11: Access Roads peer group comparison of spend per lane kilometre (\$/km) 47
 Table 4-12: Problem evidence summary..... 50
 Table 4-13: Benefit measures..... 53
 Table 4-14: Baseline benefit data 54
 Table 4-15: Strategic alignment 56
 Table 4-16: Uncertainties, assumptions, and dependencies 58
 Table 4-17: Constraints 59
 Table 5-1: GPS Alignment 60
 Table 8-1: Road segments and characteristics 65



Table 8-2: Percentage length of road segments susceptible to natural hazards.....	67
Table 8-3: Road segment approach summary	70
Table 8-4: Indicative concept for marine hubs	71
Table 8-5: Roothing approaches excluded or carried through for Te Aumiti/French Pass	72
Table 8-6: Roothing approaches excluded or carried through for Te Hoiere/Pelorus	73
Table 8-7: Roothing approaches excluded or carried through for Queen Charlotte.....	73
Table 8-8: Roothing approaches excluded or carried through for Te Whanganui/Port Underwood	74
Table 8-9: Roothing approaches excluded or carried through for Kenepuru	74
Table 8-10: Te Hoiere/Pelorus Programme Development.....	76
Table 9-1: Criteria groupings and descriptions.....	78
Table 9-2: Multi criteria analysis scoring scale.....	79
Table 9-3: Base weighting	80
Table 9-4: Sensitivity testing weighting scenarios	80
Table 9-5: Multi Criteria Analysis Results.....	82
Table 9-6: Ranked sensitivity analysis results.....	83
Table 9-7: Initial capital cost estimates for each programme.....	85
Table 9-8: Initial transport efficiency benefit cost ratios	86
Table 9-9: Initial wider economic impact factors.....	86
Table 9-10: Likelihood of returning to previous level of economic activity	87
Table 10-1: Summary of evaluation method results for Te Aumiti/French Pass	89
Table 10-2: Summary of decision rationale for Te Aumiti/French Pass	89
Table 10-3: Summary of evaluation method results for Te Hoiere/Pelorus.....	89
Table 10-4: Summary of decision rationale for Te Hoiere/Pelorus	90
Table 10-5: Summary of evaluation method results for Queen Charlotte	90
Table 10-6: Summary of decision rationale for Queen Charlotte.....	90
Table 10-7: Summary of evaluation method results for Kenepuru.....	91
Table 10-8: Summary of decision rationale for Kenepuru	91
Table 10-9: Summary of evaluation method results for Te Whanganui/Port Underwood.....	91
Table 10-10: Summary of decision rationale for Te Whanganui/Port Underwood	92
Table 10-11: Road management strategy by zone and segment for the EPP and the HAP	93
Table 10-12: Summary of engagement completed for the emerging preferred options	94
Table 10-13: Key engagement findings for each zone	95
Table 10-14: Te Aumiti/French Pass NPV (\$M), Benefits (\$M) and BCRs	98
Table 10-15: Te Hoiere/Pelorus NPV (\$M), Benefits (\$M) and BCRs	98
Table 10-16: Queen Charlotte NPV (\$M), Benefits (\$M) and BCRs	98
Table 10-17: Kenepuru NPV (\$M), Benefits (\$M) and BCRs.....	99
Table 10-18: Te Whanganui/Port Underwood NPV (\$M), Benefits (\$M) and BCRs	99
Table 10-19: Emerging Preferred Programme NPV (\$M), Benefits (\$M) and BCRs.....	100
Table 11-1: Proposed changes to the preferred programmes	101
Table 12-1: Programme level initial and final cost estimates for the preferred programme	103
Table 12-2: P50 estimates for the preferred programme.....	103
Table 13-1: Baseline event risks and probabilities	105
Table 13-2: An overview of strategy effectiveness	106
Table 13-3: Refined Preferred Programme NPV (\$M), NPV Benefits (\$M) and BCR	108
Table 13-4: Refined Preferred Programme sensitivity analysis	109
Table 13-5: Preferred Programme Summary BCR.....	110
Table 14-1: Programme Outcomes.....	111
Table 15-1: Investment priority ratings.....	112
Table 16-1: Indicative capital cost breakdown of the preferred programme	113
Table 16-2: Project milestones for funding.....	114
Table 16-3 Potential Funding Streams.....	115
Table 16-4: Normal FAR for MDC Activities	116
Table 17-1: Possible procurement strategies for the programme management delivery model...	119
Table 17-2: Possible procurement strategies for road repairs	120
Table 17-3: Possible procurement strategies for road improvements.....	121
Table 17-4: Possible procurement strategies for road maintenance.....	121



Table 18-1: Anticipated delivery outline for the preferred programme	122
Table 18-2: Key milestones	122
Table 18-3: Benefit management.....	123
Table 18-4: Critical risks	125
Table 19-1 Next Steps	126

List of figures

Figure 1-1: Overslip on Anakiwa Road	1
Figure 1-2: Underslip on Moetapu Bay Road	1
Figure 1-3: Possible adaptation route map for the Sounds	2
Figure 1-4: Project extent	4
Figure 2-1: Looking southwest towards Elaine Bay from the Outer Pelorus Sounds	5
Figure 2-2: People living, working in, or visiting the Marlborough Sounds.....	8
Figure 2-3: Comparison of the age of people across the Sounds.....	9
Figure 2-4: Age of people in the Sounds compared to Marlborough and New Zealand.....	9
Figure 2-5: Business classification.....	10
Figure 2-6: Usually resident population vs census night population	11
Figure 2-7: Monthly average of daily visitors present in Marlborough at noon.....	11
Figure 2-8: Location of community facilities	13
Figure 2-9: School bus routes for the Sounds.....	14
Figure 2-10: Travel to work comparison across the Sounds, Marlborough and New Zealand	15
Figure 2-11: Travel to work in the Sounds	15
Figure 2-12: Croisilles-French Pass Road	16
Figure 2-13: One Network Road Classification	17
Figure 2-14: Posted speed limits.....	18
Figure 2-15: Mean operating speeds	18
Figure 2-16: Existing marine infrastructure and scheduled transport routes.....	19
Figure 2-17: Properties with no road access (Sounds Admin Rating Area)	22
Figure 4-1: Vertical land movement for the Sounds	27
Figure 4-2: Sea level rise with vertical land movement for Portage under SSP2-4.5.....	27
Figure 4-3: Roads with potential risk of future coastal inundation or erosion.....	28
Figure 4-4: August rainfall comparison	29
Figure 4-5: Increase in rainfall on account of climate change for 1:100 AEP rainfall	30
Figure 4-6: Road status in the week following the August 2022 weather event.....	31
Figure 4-7: Road closure data for the Sounds	32
Figure 4-8: Roads in the Marlborough Sounds.....	33
Figure 4-9: Areas identified as too shallow for barges.....	34
Figure 4-10: Locations of Cook Strait power infrastructure	35
Figure 4-11: Interisland communication cable locations.....	36
Figure 4-12: Marlborough Lines infrastructure	37
Figure 4-13: Areas of high and very high natural and man-made slope instability.....	42
Figure 4-14: Typical failure method.....	43
Figure 4-15: Modern road design features	43
Figure 4-16: Map of susceptibility to human induced slope stability	44
Figure 4-17: Maintenance spend per kilometre in the Sounds and outside the Sounds	45
Figure 4-18: Most expensive rural road costs per kilometre.....	48
Figure 4-19: Death and serious injury crashes in the Marlborough Sounds	49
Figure 4-20: Investment logic map.....	52
Figure 4-21: Linkage between Investment Objectives, Benefits, and measures.....	53
Figure 6-1: Repaired and outstanding faults from the 2021 and 2022 weather events.....	61
Figure 8-1: Programme Development Process Overview	64
Figure 8-2: Proposed additional marine infrastructure and new or increased scheduled services.....	71
Figure 8-3: Te Hoiere/Pelorus Road Focus option map	76
Figure 8-4: Te Hoiere/Pelorus Marine Focus option map.....	76
Figure 10-1: Comparison of emerging preferred options and hazard adaptation pathways.....	88



Figure 10-2: Possible adaptation route map for the Sounds.....	93
Figure 10-3: Respondents preferred option by zone	96
Figure 10-4: Respondents support for the emerging preferred options	96
Figure 10-5: Respondents support for the hazard adaptation pathways	97
Figure 13-1: Accumulated total effectiveness over time	106
Figure 16-1: Indicative additional annual marine maintenance of the preferred programme.....	114
Figure 16-2: Capital costs by item and year.....	118
Figure 16-3: Operating costs by item and year	118



Abbreviations

Abbreviation	Full Name
AEP	Annual Exceedance Probability
DSI	Death and Serious Injury crashes
GDP	Gross Domestic Product
GPS	Government Policy Statement for Land Transport
ILM	Investment Logic Map
IPM	Investment Prioritisation Method
KPI	Key Performance Indicator
LCLR	Low-cost, low-risk
LTP	Long Term Plan
MDC	Marlborough District Council
ONF	One Network Framework
ONRC	One Network Road Classification
PBC	Programme Business Case
RAMM	Road Asset Maintenance and Management
RCP	Representative Concentration Pathway
SSP	Shared Socioeconomic Pathway
Waka Kotahi	Waka Kotahi NZ Transport Agency

Glossary

Term	Definition
awaawa	tributaries, streams and rivers
kawa	ceremonial rites and rituals/customs
Kura te au	red currents
mahinga hī ika	seafood harvesting area and customary practices associated with
mahinga kai	food (on land, sea and fresh water harvesting areas)
mahinga manu	bird harvesting area and customary practices associated with
Mai i uta ki tai	from the mountains/land to the sea
mana	authority, integrity, responsibility
Moana o Raukawakawa	Cook Strait
murū me te raupatu	confiscated lands and possessions taken with force
pā kāinga	traditional and intergenerational settlements
pā tūwatawata	fortified settlements
papa kāinga	traditional estates and settlements
puna wai	springs and water bodies
ritenga	customary practices
take ahi kā	traditional rites/rights of occupation
take kitea	discovery and exploration rites/rights
take taunaha	discovery and exploration rites/rights
Te Tauihu o Te Waka-a-Māui	The bow of the waka of Māui
tikanga	cultural practices
Taonga	prized possessions tangible and intangible, natural resources
urupā	burial sites
wāhi tapu	sacred site/area, various caves, trees, wetlands, swamps, sand dunes
wāhi tupuna	ancestral site/area (site of significance) archaeological
wairua	spirit, spiritual connection, aura
whakapapa	genealogy

Part A – The Strategic Case

1 Introduction

1.1 Background

Marlborough has suffered multiple high intensity rainfall events over the past two years which have caused significant damage to Marlborough's transport network. There have been four events requiring a significant response: July 2021, February 2022, July 2022, and August 2022. The July 2021 event caused approximately 900 faults and \$85M of damage to roads across the Marlborough Sounds (the Sounds). It is estimated that the recovery from the August 2022 event could be in the order of three to four times this figure. Approximately 500 km of roads were affected and 2,750 faults were identified in the Sounds following the August 2022 event. Rai River experienced a 1 in 60-year event, its biggest flood on record. Communities in Canvastown and Rai Valley were cut off from Marlborough and Nelson with both State Highway 6 (SH6) and State Highway 63 (SH63) closed. Access in and out of the Sounds was seriously affected as roads experienced the effects of severe erosion, with a significant number of slips and dropouts making many roads unpassable.

The effect of the storm events has created stress and uncertainty for residents and businesses in the Sounds, many of whom can no longer rely on the roads they normally use to reach goods and services, or to get products to market. Transport has become an onerous problem, and alternatives are either not available, or have added time and cost to what were quite straightforward journeys prior to the storms. Authorities and the local community are concerned about the effect that subsequent storms and rainfall events could have on an already fragile road network.

Restoring access and repairing the damage following the storm events has been managed by the Marlborough Roads Recovery Team as a variation to the Network Outcomes Contract (NOC) being delivered by a Fulton Hogan HEB Joint Venture. Highways and local roads in Marlborough are collectively managed by 'Marlborough Roads', a contractual arrangement between Waka Kotahi NZ Transport Agency (Waka Kotahi) and Marlborough District Council (MDC, the principal).

Marlborough Roads Recovery Team have submitted two emergency works applications to Waka Kotahi for repairs to damage arising from the four events. When approval and works are complete 2,105 repairs will have been completed across the Sounds. This leaves **1,535 faults outstanding** in the Sounds, pending the outcome of this Programme Business Case (PBC). These 1,535 faults include sites under permanent traffic management, requiring ongoing maintenance and regular safety checks. The road is down to one lane at these sites and traffic is managed by signals, which require a manual battery change every two days. Examples of faults outstanding are shown in Figure 1-1 and Figure 1-2.



Figure 1-1: Overslip on Anakiwa Road



Figure 1-2: Underslip on Moetapu Bay Road

These outstanding faults present a risk to road users and maintenance crews and affect access for businesses and communities. For example, a comprehensive assessment completed by Marlborough Roads and GoBus reported that they do not feel that it is safe for them to run the school bus down Moetapu Bay Road and Kenepuru Road past the Moetapu Bay turnoff (Kenepuru Zone) due to health and safety concerns. As the road is expected to be in this condition for some time, the Moetapu Bay Road section, and the last 4.5 km along Kenepuru Road has been removed from the school bus route. This means parents need to transport their children to the recycling station located near the Moetapu Bay turn off where they can catch the school bus. There are approximately 13 children⁵ who attend Linkwater School that are affected by the shortening of the bus route. This demonstrates the way in which normal trips have become a challenge.

⁵ Linkwater community drop in session comment, June 23, 2023

1.2 Purpose

The current situation where access is severely affected for long periods following a storm event is unsustainable economically and socially for authorities and locals alike. To provide certainty for all parties, this business case has been established to identify a sustainable long-term solution for safe and resilient transport access to the Sounds. The Preferred Programme considers the likely implications of future storm events and proposes the most appropriate resilience response⁶ to the geotechnical hazard risk.

A Hazard Adaptation Pathway (HAP) was also identified. The HAP recognises that future events such as earthquakes, storms and sea level rise are likely in the future and will cause damage to the transport network. The HAP represents the journey Council could take in providing continued access into the future with the end point representing the lowest level of service Council is willing to provide, while still delivering safe transport solutions and access in and out of the Sounds.

Adaptation is a journey – a series of steps. The Preferred Programme is the starting point of that journey, and the HAP the end point. Any significant event that causes substantial damage to the transport network will start the adaptation process. The event would be a trigger for Council to assess the Road Management Strategy for that road segment and decide whether it is realistic to continue with the agreed strategy, or transition to a different strategy for that segment. Figure 1-3 provides an overview of a possible adaptation map for the Sounds.

For more information on the HAP, refer to Section 10.3.

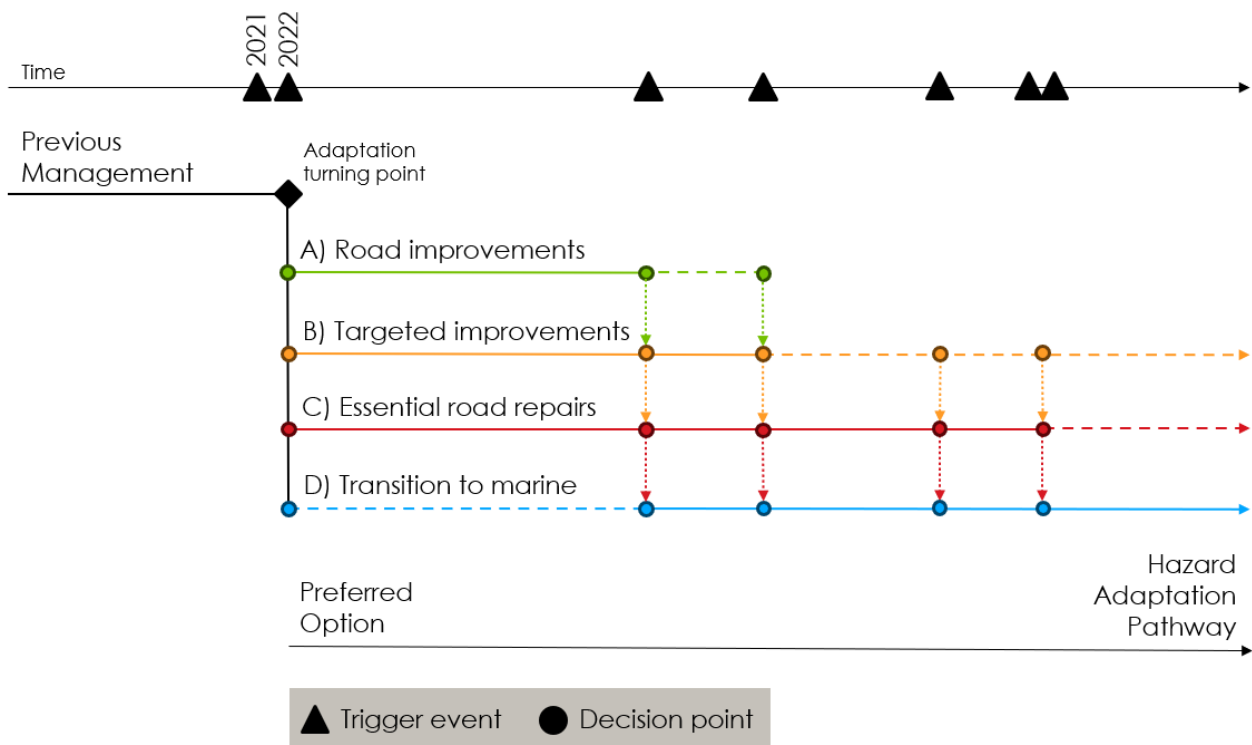


Figure 1-3: Possible adaptation route map for the Sounds

1.3 Scope

The preferred programme includes the following components:

- **Preferred Programme** by zone, consisting of an overall network standard that includes completion of:
 - Road Repairs: Confirmed outcome for the 1,535 outstanding faults on the road network that have not yet been repaired and are still affecting access.
 - Road Improvements: To improve resilience of the road network, where this is justified. If above the low-cost, low-risk⁷ (LCLR) improvements threshold, these may require a separate business case.

⁶ Waka Kotahi Resilience Response Framework

⁷ The construction/ implementation of local road low-cost, low-risk improvements is approved up to a total cost of \$2 million per project. The \$2 million implementation approved cost limit is inclusive of all costs such as professional services, administration and related overheads, property and construction/ implementation costs.

- Rooding Maintenance and Operations: Any changes to maintenance and operations, that can improve resilience of the rooding asset.
- Marine Infrastructure: To improve resilience of the marine network, where this is justified. In this way the marine network can be used to improve access to the Sounds in the long term.
- Other Activities: Non-infrastructure solutions, such as land use controls and community preparedness / response planning.
- **Hazard Adaptation Pathway** by zone, to:
 - Commence a conversation with the community what future access by road and marine may look like and cost.
 - Identify additional work needed outside of this business case to identify triggers that will prompt Council to review its approach and potentially move along the pathway, and continued conversations with the community to allow for a 'no surprises' approach.

It is noted that safer speed limits are being considered in a parallel workstream managed by Marlborough Roads and are excluded from the scope of this business case.

1.4 Governance

Marlborough District Council led the development of this Programme Business Case, working with iwi and Waka Kotahi partners. A Governance Group was established to oversee the process, ensure milestones were met, the right organisations involved, and to consider recommendations. The Governance Group consisted of representatives from:

- Marlborough District Council
- Marlborough Roads
- Mana whenua and tangata whenua representatives
- Te Kotahi o Te Te Tauihu Charitable Trust
- Port Marlborough
- Waka Kotahi NZ Transport Agency
- Department of Internal Affairs
- National Emergency Management Agency
- Department of Conservation
- Regional Public Service Lead – Te Tau Ihu.

1.5 Extent

The extent of the study area is shown in Figure 1-4 and encompasses the Sounds. As shown the Sounds are split into five zones according to the primary access road for each area. All local roads were considered within each zone.

The five zones are as follows:

- **Te Aumiti/French Pass:** access to the Sounds from Ronga Road (Rai Valley)
- **Te Hoiere/Pelorus:** access to the Sounds from Kaiuma Bay Road
- **Queen Charlotte:** alternative for SH6 between Havelock and Blenheim, alternative for SH1 between Blenheim and Picton.
- **Kenepuru:** access to the Sounds from Queen Charlotte Drive, Kenepuru Road and outer Sounds
- **Te Whanganui/Port Underwood:** access to the Sounds from Port Underwood Road (Picton to Rarangi).

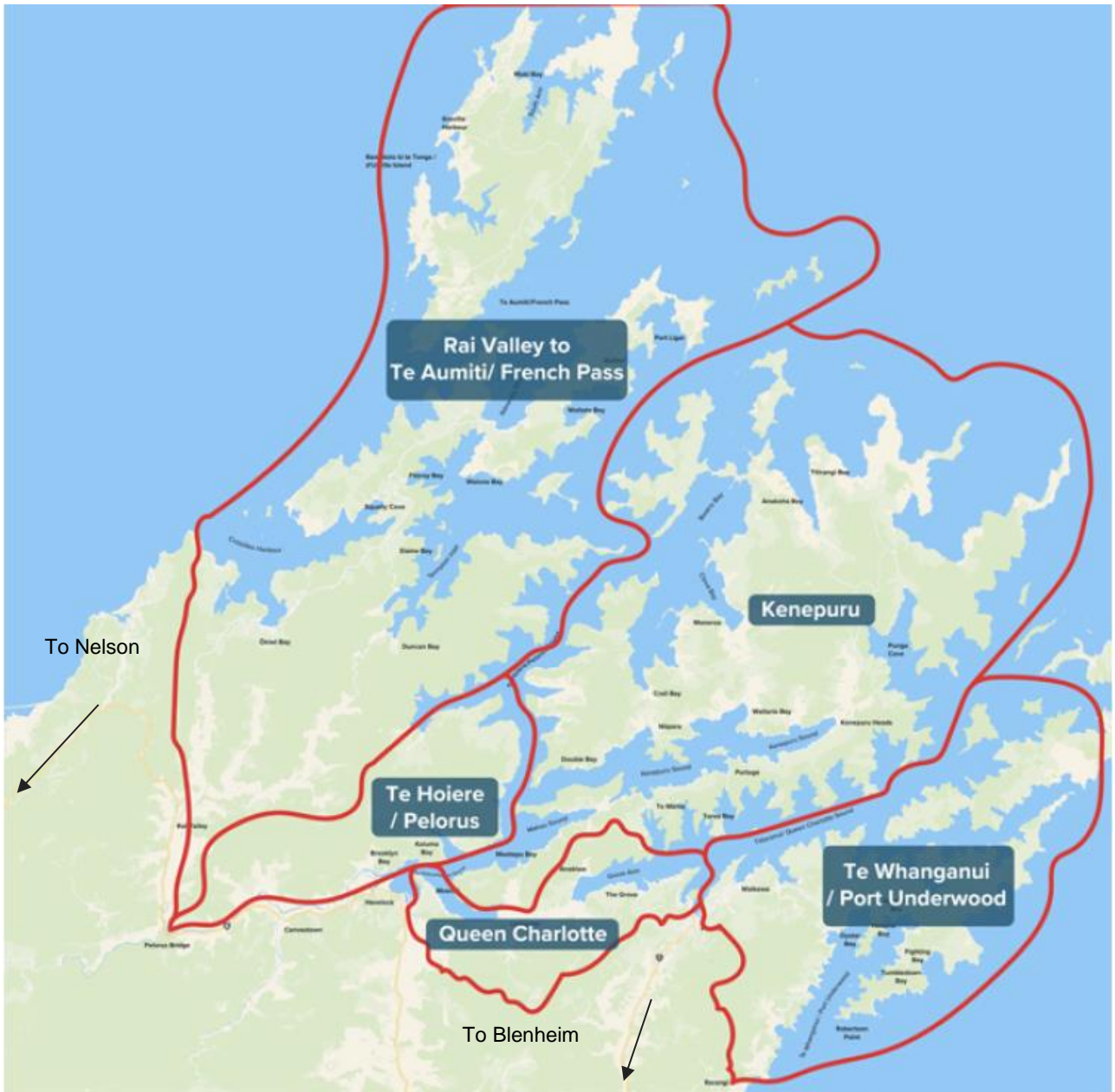


Figure 1-4: Project extent

2 Programme Context

2.1 Geographic and Environmental Context

The Sounds form part of the northern extent of the South Island. They are drowned river valleys which extend inland as far south-east as the Rai Valley⁸. To the west of the Rai Valley lie the Whangamoa Ranges through which Nelson and the west coast of the South Island can be accessed by road. The port town of Picton borders the study area to the south, along with the wider Marlborough Region. Directly north of the study area the Cook Strait separates the North and South Islands; ferries traverse the Strait transporting passengers and freight, and travel through the Queen Charlotte Sound.

The topography of the study area is varied. The Sounds comprise an array of small inlets, coves and islands which make up more than 10% of New Zealand's coastline⁹. Its larger islands, as shown in Figure 2-1, are mostly of hilly terrain and untouched native forests. There are also pockets of flat, high producing exotic grassland, which host livestock farms. The area, particularly the Pelorus Sound, is also home to many marine farms. Further inland, the Rai Valley is largely low-lying farmland surrounded by forested hilly to mountainous terrain. This area is the catchment for the Rai River; a primary watercourse which has many interactions with State Highway 6 on the edges of the study area.



Figure 2-1: Looking southwest towards Elaine Bay from the Outer Pelorus Sounds¹⁰

It is generally accepted that the Marlborough Sounds were formed by tectonic movements and sea level changes over the past 15-20 million years. River erosion and subsidence of uplifted land followed¹¹. This formation mechanism provides little protection from coastal erosion. The strike-slip Wairau Fault, a segment of the larger Alpine Fault tectonic border, passes south of the region and is considered as having a relatively high seismic hazard¹². The geology of the study area is mainly sedimentary greywacke and metamorphic semi-schist, materials with typically poor slope stability performances during earthquakes. These rock types are susceptible to coastal erosion and erosion during storm events. Rising sea levels and more extreme weather events because of climate change are predicted to further exacerbate this vulnerability.

There are a number of conservation programmes in the area. The absence of introduced predators has allowed kiwi and various native birds to thrive on predator-free islands, as well as tuatara, gecko and native frogs. Pelorus Sound is home to one of New Zealand's two native bat species. The waterways within the Sounds are excellent habitats for dolphins,

⁸ For simplicity, the total study area including the Rai Valley is referred to as the "Sounds" or "Marlborough Sounds study area" within this report.

⁹ Boffa Miskell, "Introduction to the Marlborough Landscape," in *Marlborough Landscape Study* (2015). https://www.marlborough.govt.nz/repository/libraries/id:2ifzr1o01cxbymxkyvz/hierarchy/documents/environment/land/marlborough-landscape-study-list/Marlborough_Landscape_Study_2015_Section_B.PDF

¹⁰ Marlborough District Council, "Regional Policy Statement" <https://www.marlborough.govt.nz/your-council/resource-management-policy-and-plans/regional-policy-statement>

¹¹ A Nicol (2011) "Landscape history of the Marlborough Sounds, New Zealand." *New Zealand Journal of Geology and Geophysics*, 54:2, 195-208, DOI: 10.1080/00288306.2010.523079

¹² Judith Zachariassen, Kelvin Berryman, Robert Langridge, Carol Prentice, Michael Rymer, Mark Stirling and Pilar Villamor (2006) "Timing of late Holocene surface rupture of the Wairau Fault, Marlborough, New Zealand." *New Zealand Journal of Geology and Geophysics*, 49:1, 159-174, DOI: 10.1080/00288306.2006.9515156



stingrays, seals and locally farmed sea life, and often host seasonally migrating orca and whales. Continued access is important to continue pest control programmes and protect native species.

2.2 Cultural Context

The following section has been written by Stantec's Pou Ārahi Māori Cultural Leader, who is involved in ongoing conversations with Te Tau Ihu o te Waka a Māui¹³ iwi regarding this cultural context and ongoing iwi involvement in the project. Iwi have not yet given this cultural context section their blessing or approval.

Marlborough Sounds holds important spiritual, cultural, social and physical significance to the tāngata whenua of Te Tau Ihu o te Waka a Māui. It is where the first Māori landed eight hundred years ago at Te Pokohiwi, the Boulder Bank at the Wairau Lagoon. The eight iwi of Te Tau Ihu o te Waka a Māui (Te Tau Ihu iwi) who have customary and statutory acknowledgments within the scope of the project scope are

- Ngāti Apa ki te Rā Tō
- Ngāti Kuia
- Rangitāne o Wairau
- Ngāti Koata
- Ngāti Rārua
- Ngāti Tama ki Te Tau Ihu
- Te Ātiawa o Te Waka-a-Māui
- Ngāti Toa Rangatira

The statutory acknowledgement recognises the cultural, spiritual, historical and traditional association of an iwi with the identified site or area. This type of redress enhances the ability of the iwi to participate in specified Resource Management Act 1991 process. Whilst Te Tau Ihu iwi are recognized to have statutory acknowledgement in the top of the South Island and specifically to Marlborough Sounds. There are only a few iwi who maintain traditional rights and interests based on take ahikā, take kitea, take taunaha, take tūpuna, take whakapapa, kawa, tikanga, ritenga, wairua, mana, tapu and noa to the area over much longer period. Many of the eight iwi have either migrated to the area or obtained access to whenua and kāinga succession and or conquest. Each of Te Tau Ihu o Te Waka a Māui iwi have their own cultural narratives and historical accounts that define their unique connection to Marlborough Sounds and Te Tau Ihu o Te Waka a Māui. As follow is a brief history of each of the eight iwi according to Te Tau Ihu statutory acknowledgements:

- **Ngāti Koata:** Ngāti Koata originates from the waka of Tainui that left Hawaiki and arrived in Aotearoa c. 1400. Tainui was captained by Hoturoa and was finally hauled ashore to rest between the two pillar stones of Puna and Hani in Kāwhia, Waikato. (Located behind the Maketū Marae).
- **Ngāti Kuia:** Ngāti Kuia first settled in the Te Hoiere/Pelorus area and then spread out across the Marlborough Sounds, Nelson and Tasman districts to Taitapu on the West Coast, and as far south as Nelson lakes.
- **Ngāti Rārua:** Ngāti Rārua are descendants of the Polynesian explorers who arrived in Aotearoa aboard the waka (canoe). Ngāti Koata whakapapa to Koata who lived near Kāwhia in the 17th century. She had two sons, Kāwharu and Te Wehi (founder of Ngāti Te Wehi). Te Tōtara pā on the south shore of Kāwhia was shared with Ngāti Toa in the early 19th century. Following the musket wars, many of the iwi moved south to Kapiti Island and then Te Tau Ihu in mid 1820s. Since the arrival in Te Tau Ihu, Ngāti Rārua have maintained continuous ahi kā in Golden Bay, various locations in the Abel Tasman National Park, Marahau, Kaiteriteri, Rīwaka, Motueka, Nelson and Wairau.
- **Ngāti Tama:** Ngāti Tama came to Te Tau Ihu o te Waka a Māui in the late 1820s and established pā and kāinga at several localities including Te Tai Tapu, Golden Bay, and Wakapuaka.
- **Ngāti Toa Rangatira:** The Ngāti Toa rangatira people, originally from Kāwhia, have survived changing fortunes. Led by famous warrior chief Te Rauparaha, they walked south in search of a safer and more prosperous life. After facing hardships along the way, they became a rich and powerful tribe on both sides of Cook Strait (Te Moana-a-Raukawa).
- **Ngāti Apa ki te Rā Tō:** Ngāti Apa migrated south in the 18th century, they first settled in the Marlborough Sounds region. In the early 19th century, they defeated Ngāti Tūmatakōkiri and took control of Golden Bay and western Tasman Bay. Whanganui Inlet on the west coast, a tidal inlet ringed with flowering rātā, is at the centre of their area. It's rohe include the areas around Golden Bay, Takaka, Tasman Bay, Motueka, Nelson and Saint Arnaud, including Taitapu and Kawatiri river catchments and Lakes Rotoiti, Rotoroa and the Tophouse.
- **Te Ātiawa o Te Waka-a-Māui:** Te Ātiawa o Te Waka-a-Māui are the people of Te Ātiawa descent who whakapapa to Te Tau Ihu o Te Waka a Māui. They originated from the Taranaki region, but by the 1830s were firmly based throughout the top of the South Island. By 1840, when Te Ātiawa o Te Waka-a-Māui signed Te Tiriti o Waitangi at Tōtaranui (Queen Charlotte Sound), they were a dynamic and robust society with their own lands and cultural customs that regulated their life both on land and at sea.

¹³ the bow of the waka of Māui, located in the northern South Island



- **Rangitāne o Wairau:** The name Wairau describes the rohe of Rangitāne and is derived from the phrase ‘ngā wairau o Ruatere’ (the hundred waters of Ruatere), meaning the confluence of the streams, rivers, wetlands, lakes and estuaries across the present-day Marlborough region.

The study area is rich in cultural heritage, genealogy and narratives that span back to the original story of the great waka of Māui. This kōrero tuku iho (traditional narrative) speaks to the formation of the North and South Islands including the bow of the waka or canoe at the top of the South Island. Equally important are the various historical links and narratives to Kupe and his arrival to Te Pokohiwi at Wairau logon and other key sites of significance. One of the traditional narratives that refers to the Sounds as the prows of the many sunken waka of Aoraki or as being the giant octopus of Te Wheke o Maturangi that Kupe killed while in te moana o Raukawakawa (Cook Strait) at Kura te au (the red current), forming the Sounds as it gasped the land within its tentacles to form the intricate waterways.

Iwi resided within the Sounds and have upheld their customary practices and obligations within the Marlborough Sounds for centuries before the signing of Te Tiriti o Waitangi. Crown official Henry Williams collected twenty-seven signatures in various bays and islands over two days including Te Awaiti Bay, Arapāoa Island; Kakapō Bay, Te Whanganui/Port Underwood; Horahora Kākahu Island; and Rangitoto ki Te Tonga¹⁴. Three years following the signing of Te Tiriti o Waitangi the first significant armed conflict occurred at Tuamarino¹⁵, Wairau north of Blenheim between iwi and the government of the day. The Wairau Affray of 17 June 1843, also called the Wairau Massacre and the Wairau incident, was the first serious clash of arms between British settlers and Māori after the signing of the Treaty of Waitangi. The war resulted in loss of life, land confiscations of various traditional settlements which was the start of te Muru me te raupatu land wars across the country of Aotearoa – New Zealand.

Mai uta ki tai, (from the mountains to the sea) is within the scope area of (Marlborough Sounds), iwi is referred to as tāngata whenua, guardians and protectors of their whenua, kāinga, taonga including all natural resources. As tāngata whenua and key Te Tiriti partners iwi have a strong customary obligation and responsibility to protect, restore and sustain their mahinga kai both coastal and inland, urupā, wāhi tapu, wāhi tūpuna, mahinga hī ika, mahinga manu, mahinga kai, papa kāinga, awaawa, water bodies, rivers, wetland and lakes puna wai and other key sites of cultural and spiritual significance across their respective heartlands. The local coasts were renowned for the abundance of mahinga kai, which both facilitated the establishment of local Māori settlements and encouraged people to travel from afar to access the rich food resources.

Culturally significant sites include several fortified pā tūwatawata (defensive Māori settlement) sites such as Te Rae o Karaka near Picton, where members of the Ngāti Toa were well positioned to see potential invaders coming down the Queen Charlotte Sound. Kenepuru Sounds also contains several wāhi tapu and sites of significance which are hold an important part of identity and cultural heritage and significance to Ngāti Kuia, Ngāti Apa ki te Rā Tō, Rangitāne o Wairau and other associated peoples. Te Hoiere/Pelorus River and Kaituna is fundamental to the identity and mauri of Ngāti Kuia. Ngāi Tahu have two historic pā located within the Sounds.

The area of this study has hundreds of archaeological sites both documented and undocumented. In this context there are several sites of significance to Te Tau Ihu o Te Waka a Maui tāngata whenua including multiple heritage resources. Many pā kāinga, urupā, wāhi tapu, occupation sites and fishing areas are in Te Hoiere regions of Mahakipaoa, Mahau, Kenepuru, Hikapu, Popoure, Karepo, Wakatahuri, Pohuenui, Waitata, Apuhau, Te Awaiti, Whakatōtara and Wakaretū pā. Ensuring iwi maintain access will help ensure that the sites of cultural significance will be protected, preserved, respected, visited and remembered for future generations.

2.3 Social Context

2.3.1 Overview

Most people living, working or visiting the Sounds will have been affected by the storms to some extent. For this study the Sounds community has been categorised into different groups with different demographics as listed below and shown in Figure 2-2:

- Permanent residents, around a third of whom are retired.
- Business owners – predominantly primary industry (agriculture, forestry, aquaculture, etc) or tourism.
- Property owners who are not permanent residents, only visiting for holiday periods. If this group rent out their property in the meantime e.g., via AirBnB, they may be part of the group above.
- Domestic and international visitors.

¹⁴ D'Urville Island

¹⁵ Tuamarina



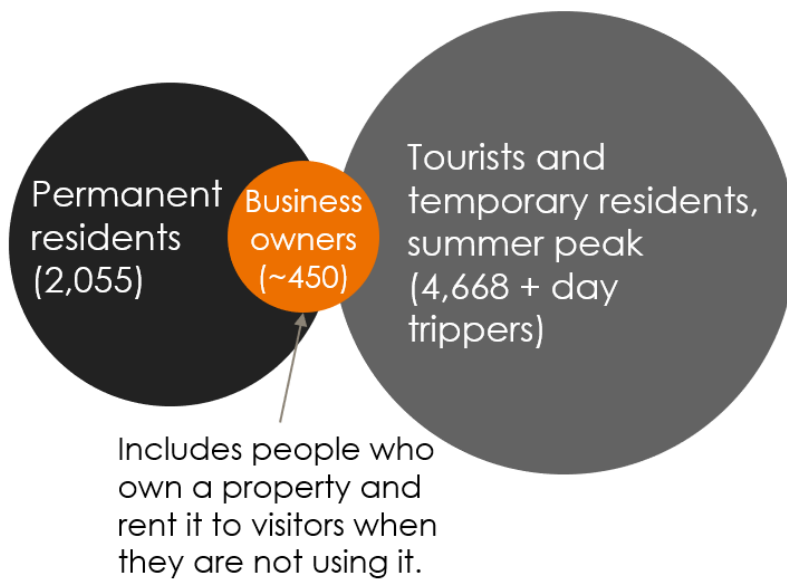


Figure 2-2: People living, working in, or visiting the Marlborough Sounds¹⁶

2.3.2 Permanent Residents

2.3.2.1 Demographics

Approximately 2,055 people usually reside within the project area¹⁷ according to the 2018 Census. Queen Charlotte is the most populated zone with 35% of the population, followed by Kenepuru (22%), Te Aumiti/French Pass (22%), Te Whanganui/Port Underwood (12%) and Te Hoiere/Pelorus (9%).

A comparison of the Sounds, Marlborough and New Zealand for some key 2018 Census data is shown in Figure 2-3, and Figure 2-4. They show that:

- Like other rural areas, the Sounds population is older than the rest of Marlborough and New Zealand
- The median age is just over 10 years greater than the Marlborough median, and 20 years greater than the New Zealand median
- The percentage of people over the age of 65 is also significantly greater for the Sounds
- Kenepuru has the oldest population, followed closely by Te Whanganui/Port Underwood and Te Aumiti/French Pass.

The exception to this is Te Hoiere/Pelorus which has a younger median age than the rest of the Sounds (more in line with the rest of the Marlborough region) and nearly double the percentage of those under 20 years of age. This means it is likely a more family centric area which may have different transport needs when compared to the rest of the Sounds.

As the 65 years and older population has been growing, the population has been shrinking in the 15-64 age bracket, with a flow on effect to the younger age group.

¹⁶ Pre weather event data

¹⁷ Statistical Area 1 (SA1) boundaries were used to build up an approximate of the areas of interest excluding the Picton urban area and the Havelock township. The SA1 boundaries do not exactly align with the areas of interest so all totals are estimates. The SA1's used are as follows:

- Te Aumiti/French Pass: 7023222, 7023225, 7023228, 7023233, 7023234, 7023236
- Te Hoiere/Pelorus: 7023224
- Queen Charlotte: 7023239, 7023241, 7023243, 7023245, 7023247
- Kenepuru: 7023242, 7023250, 7023252
- Te Whanganui/Port Underwood: 7023249, 7023251, 7023253, 7023254, 7023255

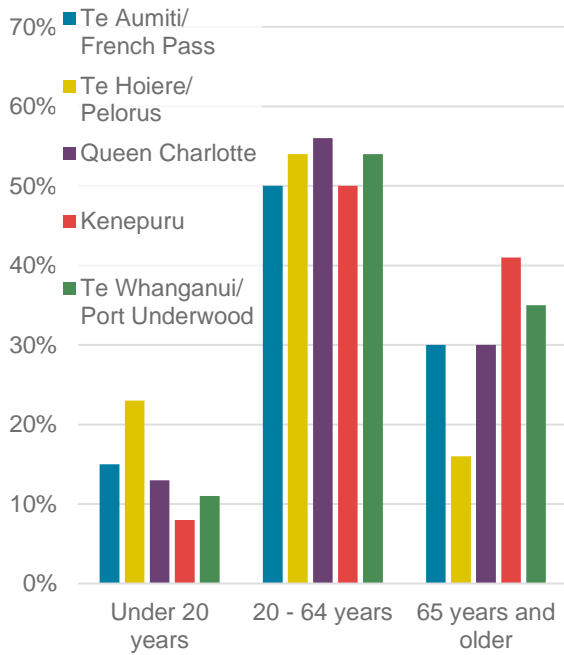


Figure 2-3: Comparison of the age of people across the Sounds

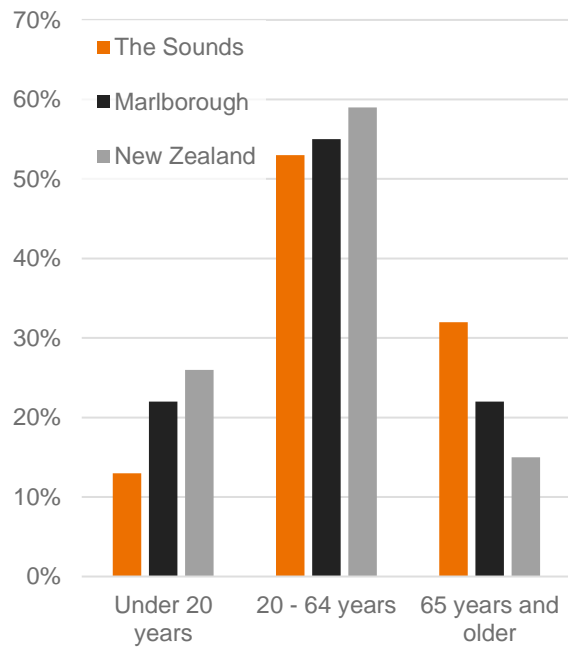


Figure 2-4: Age of people in the Sounds compared to Marlborough and New Zealand

2.3.2.2 Socio-Economic Deprivation

Socioeconomic deprivation is measured by the deprivation index¹⁸, which uses a scale of one to ten, where one is least deprived and ten is most deprived. Scores show the West Sounds (including Te Aumiti/French Pass and Te Hoiere/Pelorus) are more deprived than the East Sounds (including Queen Charlotte, Kenepuru, and Te Whanganui/Port Underwood), with a score of six and four respectively.

These averages hide the fact that there are areas within the Sounds with much higher deprivation scores. All the land north of Kenepuru Head has a deprivation score of eight, meaning it is in the top 20% of most deprived places in New Zealand. Conversely areas such as Moetapu Bay, Anakiwa, and parts of Te Whanganui/Port Underwood have deprivation scores of one or two, meaning they are some of the least deprived areas in New Zealand.

According to Environmental Health Intelligence New Zealand, people who live in more deprived areas are more susceptible to environmental risks. They may also have less capacity to cope with the effects of environmental risks, and fewer resources to protect themselves from environmental hazards.

2.3.3 Business Owners

There are many businesses operating in the Sounds. The community survey completed in early 2023 showed that 157 out of 920 respondents identified as 'Resident and Business' (17%), and 29 respondents identified as 'Businesses' (3%). This includes people who own properties that are normally rented to visitors. A breakdown by business type is shown in Figure 2-5.

¹⁸ The deprivation index is an area-based measure of socioeconomic deprivation. It measures the level of deprivation for people in each small area and is based on nine Census variables.

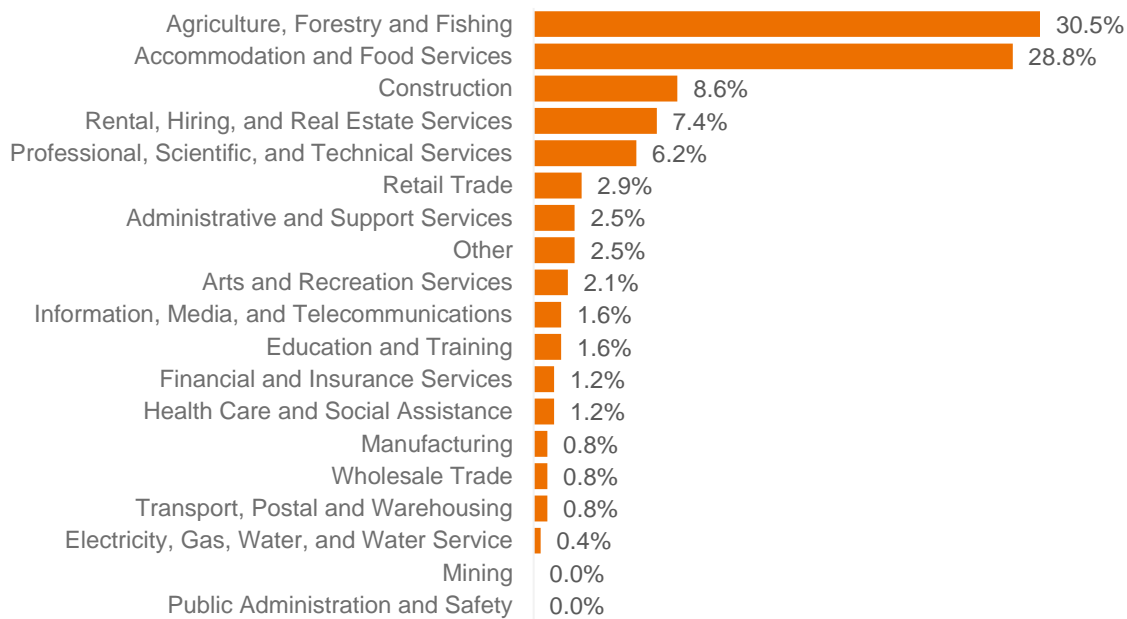


Figure 2-5: Business classification¹⁹

This data shows that the most significant business sector is agriculture, forestry and fishing, with 74 such businesses responding to the survey (31%). This category is diverse, and includes sheep, cattle, and deer farms, aquaculture (muscles, oysters, salmon, paua, crayfish, seaweed), and apiary. Accommodation and food services is the second largest business type, with 69 survey respondents (29%) identifying this as their business sector. It is believed up to 20% of these operations could be people who own family bachs that are rented out while they are not in use by the owner.

Regarding the tourism sector, an audit of tourism operations in Marlborough was completed by Destination Marlborough to inform their 2022/23 Destination management plan. The audit found that there were 227 tourism offerings in the Sounds. There were 101 accommodation business, 23 tour operators and 12 transport businesses. This number is significantly higher than those identified through the Sounds Survey 2023, which could either mean many are no longer operating, or, that there are many more operators who did not respond to the Sounds Survey.

2.3.4 Visitors

The Sounds are a popular holiday destination, and the total population is often greater than the usually resident population. Overnight visitors account for approximately 26% of the total census night population, and this is 35% greater than the usually resident population. The difference between the usually resident population and the actual population on census night is shown in Figure 2-6.

Marlborough District experiences peak population in December and January as shown in Figure 2-7, and this is expected to be true for the Sounds also. Figure 2-7 shows that in January 2022 the total visitor population in the Marlborough Region was just over 11,000 people. If just 20% of these visitors were in the Sounds (a very conservative estimate) the total population would be double the usually resident population.

¹⁹ MDC impacts survey, February 2023

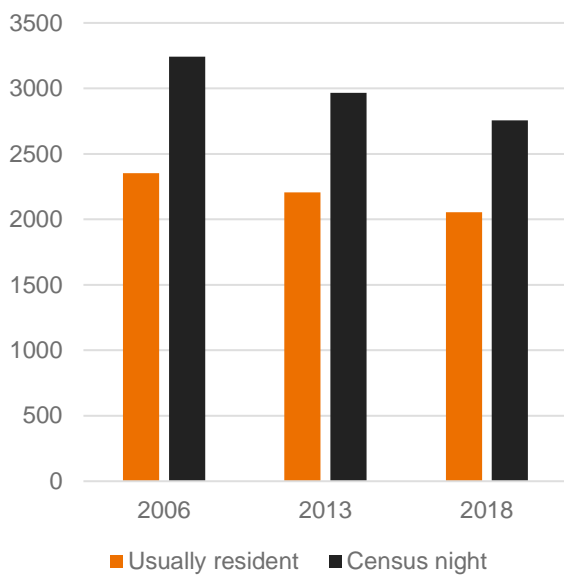


Figure 2-6: Usually resident population vs census night population

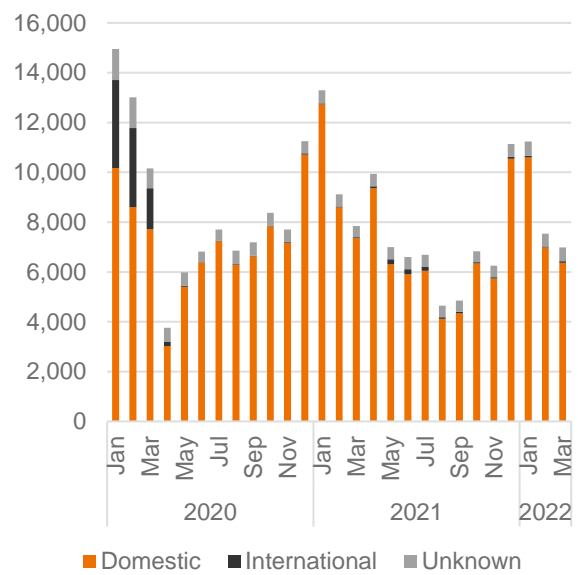


Figure 2-7: Monthly average of daily visitors present in Marlborough at noon²⁰

The 2013 Census²¹ recorded 3,369 dwellings in the project area, of which 63% were empty at the time of the census. It is believed most of these dwellings will be holiday homes. The percentage of empty dwellings for each zone is:

- Te Aumiti/French Pass: 66%
- Te Hoiere/Pelorus: 29%
- Queen Charlotte: 46%
- Kenepuru: 72%
- Te Whanganui/Port Underwood: 66%

These figures are significant – in comparison, 14.6% of dwellings are empty across the Marlborough region, and only 10.3% are empty across New Zealand.

Council’s rating database shows there are 3,057 properties with dwellings in the Sounds. This is about 9% less than the number of dwellings recorded in the 2013 Census. This is expected given the area considered using the census data is slightly greater than the actual project area. The rating database shows that 55% of properties in the Sounds are owned by people who live outside of the Marlborough district. The percentage of properties owned by people who live outside the Sounds by zone is:

- Te Aumiti/French Pass: 64%
- Te Hoiere/Pelorus: 46%
- Queen Charlotte: 40%
- Kenepuru: 61%
- Te Whanganui/Port Underwood: 48%

Please refer to Appendix A for more detailed information regarding potential holiday home numbers.

2.3.5 Access to Service Centres

Maintaining access to key service centres is critically important to the community described above. The main rural service towns are Havelock and Picton, providing supermarket shopping, medical centres, and schools. There are minor centres at Linkwater and Okiwi Bay. There are very few local services. The rural population is highly dispersed and isolated, and many people live long distances from these centres. In many cases the road is the only option for people to reach essential goods and services. Access is also crucial for emergency management responses and later recovery work.

²⁰ Data sourced from Destination Marlborough

²¹ Data from the 2018 Census is not used as the dwelling occupancy status variable did not receive a quality rating in 2018.



Key trips are explained further in Section 2.5.1.

2.4 Economic Context

2.4.1 Summary

The Marlborough Region accounted for 1.0% of the national gross domestic product (GDP) in 2022. The region is showing signs of recovery from the impacts of COVID-19 with a +5.1% growth in GDP in 2022, having experienced a decline in GDP growth from a +2.4% increase in 2020 to a +0.3% increase in 2021. The GDP growth for the region is positive and slightly less than national GDP growth which was recorded as a 5.3% increase in 2022.²²

Nationally, unemployment was 3.4% for 2022, while the wider Marlborough region recorded 2.8% unemployment.²³ Within the Sounds unemployment is estimated at 1.8%.²⁴

On average people living in the Sounds earn less than elsewhere in New Zealand. The median gross personal income is \$27,700, around 87% of the national median at \$31,800. This is supported by data from the 2023 Sounds Survey, where approximately half of respondents provided a household income range. For the year ending June 2022, the average household income across NZ was \$117,000²⁵, but for the Sounds the average household income was \$107,500.

2.4.2 Key Economic Activities

Agriculture, mainly livestock and marine (aquaculture), is a significant source of employment, with StatsNZ reporting approximately 29% of employment in 2018 within the Sounds was in this industry. Many sheep (lamb/wool), beef and deer livestock farms operate on the low-lying areas north and west of Kenepuru Head.

The drowned river valleys throughout the Sounds allow fresh seawater to continually circulate and flow around the area, creating an ideal environment for farming a variety of marine life such as salmon, mussels, oysters, seaweed, and kelp. Marine farming in Marlborough produces approximately 80% of all commercially grown seafood in New Zealand. On average 65,000 tonnes of mussels and about 6,000 tonnes of salmon are harvested each year in Marlborough, together earning more than \$300M in exports²⁶. The coasts of the Te Aumiti/French Pass and Kenepuru zones are home to most of these farms. There are also some marine farms off the coast of the Te Whanganui/Port Underwood Zone and through the Tory Channel/Kura Te Au.

The tourism industry is well established and made up approximately 12-20% of employment within the area in 2018²⁷. There are many attractions, including walking and cycling tracks (such as the Queen Charlotte Track), recreational fishing and diving, sailing, kayaking, and various wildlife, and conservation locations. These tourism activities are seriously impacted by storm events; initial disruption caused by the weather is exacerbated by the damaged road network which stifles recovery efforts and limits short-term access for tourists.

Construction activities in 2018 were estimated at 9% of total employment. This likely reflects population growth and expansion of agriculture and tourism infrastructure. This industry will be partially limited by a reduced transportation network but also stimulated by the repair and recovery of the network.

2.4.3 Freight Access

The wider economics impact survey identified 74²⁸ agriculture, forestry, and fishing businesses in the Sounds. This is the largest industry sector operating in the Sounds, and the one most likely to be affected by changes to freight access. Transporting product to the state highway network is critically important to ensuring businesses can move their product efficiently. Delays can lead to issues including product quality deterioration like seafood going off, or stock losing weight in transit.

All aquaculture products are generally transported using both land and marine transport. Products are moved by boat to the closet port²⁹ and then transferred to freight vehicles to get the products to market. This is the quickest and most efficient way to get their products to market.

Prior to the weather events farm products and stock were generally only moved using the road as it minimised the amount of loading, unloading and stress the animals experienced. Farms north of Kenepuru Head are currently having to barge their stock part of the way due to the restrictions on the road. Because of this the animals are in transit longer and lose more weight over the trip due to additional loading/unloading.³⁰ This means the farmers are receiving less

²² Infometrics (nd). "Regional Economic Profile: Marlborough District." Accessed 12/01/2023

²³ Infometrics (nd). "Regional Economic Profile: Marlborough District." Accessed 13/02/2023

²⁴ Sounds Future Access Survey. Refer to Appendix F for more detail.

²⁵ Sourced from Stats NZ

²⁶ Marlborough District Council (n.d.) "Marine Farming." Accessed 27/01/2023 <https://www.marlborough.govt.nz/environment/coastal/marine-farming>

²⁷ StatsNZ "2018 Occupation Summaries – Marlborough Region" Accessed 27/01/23. As the designation for listed tourism activities are not within one bracket, a range is provided. <https://www.stats.govt.nz/tools/2018-census-place-summaries/marlborough-region#occupation>

²⁸ The total number of businesses in this category is likely to be higher, as it is unlikely that every business owner in the Sounds responded to the survey.

²⁹ Elaine Bay, Havelock, Picton, Oyster Bay

³⁰ Comment from the Waitaria community meeting, 3/02/2023



income per animal as well as having additional transport costs as they now have to use the barge instead of Kenepuru Road.

These key trips are explained further in Section 2.5.

2.5 Transport Context

The transport network for the Sounds is heavily dependent on the road network. This is more pronounced in the inner Sounds, while the outer Sounds generally have a more balanced reliance on both the water and roading networks. There is little public transport, and the walking and cycling tracks tend to cater for recreation rather than everyday needs. Most communities have some form of water access, usually a public boat ramp or jetty.

2.5.1 Key Journeys

2.5.1.1 Services and Markets

The main community facilities are shown in Figure 2-8. Havelock and Picton are the main service centres, with smaller centres at Ōkiwi Bay, Rai Valley, Canvastown and Linkwater. These are the main destinations for most trips. The closest hospitals and a wider selection of city amenities are in Blenheim and Nelson which are between two and a half and three and a half hours drive from the most remote parts of the Sounds.

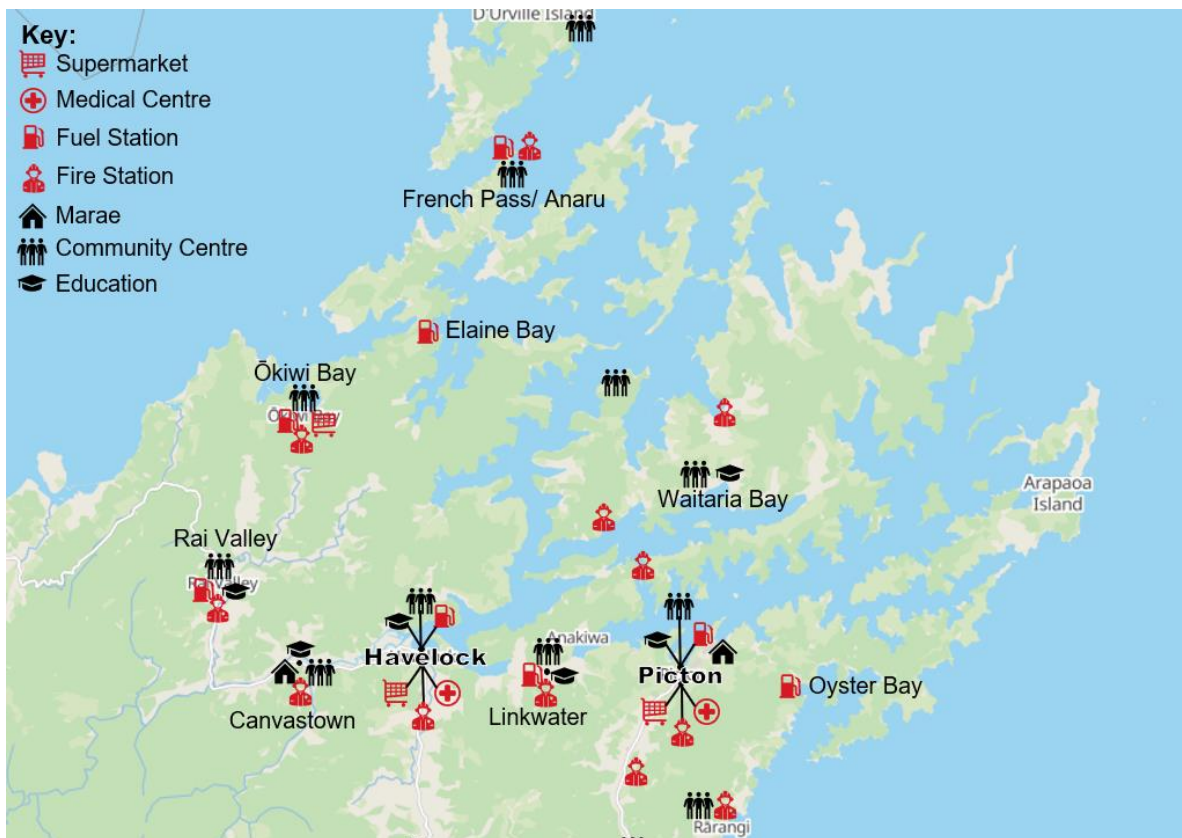


Figure 2-8: Location of community facilities

2.5.1.2 Education

Travel to and from school is also a key journey. There are six primary schools in proximity to the Sounds, as well as a composite school³¹ (Rai Valley Area School) and Queen Charlotte College (year 7 – 13). Neither Rai Valley Area School nor Queen Charlotte Collage offer boarding. Secondary school students living in the Sounds can:

- Travel to and from Rai Valley Area School or Queen Charlotte College daily
- Privately board in Rai Valley or Picton and return home in the weekends
- Board at one of the secondary schools in Nelson and return home in the weekends, or for term breaks
- Be home-schooled

³¹ Year 1 to year 13

Figure 2-9 shows the school bus routes for schools in the Sounds. It should be noted that the bus route for Waitaria Bay School is directly resourced. This means the school receives funding from the Ministry of Education and organises the transport for students themselves, which is why it is not shown in Figure 2-9.

Since the 2021 and 2022 events there have been some changes to one of the school bus routes. The route along Kenepuru Road has been cut back approximately 4.5 km to the recycling station located near the Moetapu Bay turn off. This is the last area the minibus can turn around before approaching sections of road that it cannot negotiate due to storm damage. The 13³² students that live beyond this point must now make their own way to and from the transfer station. There are also three students from Waitaria Bay Primary School who are brought out by water taxi once a week for Technology courses in Havelock.

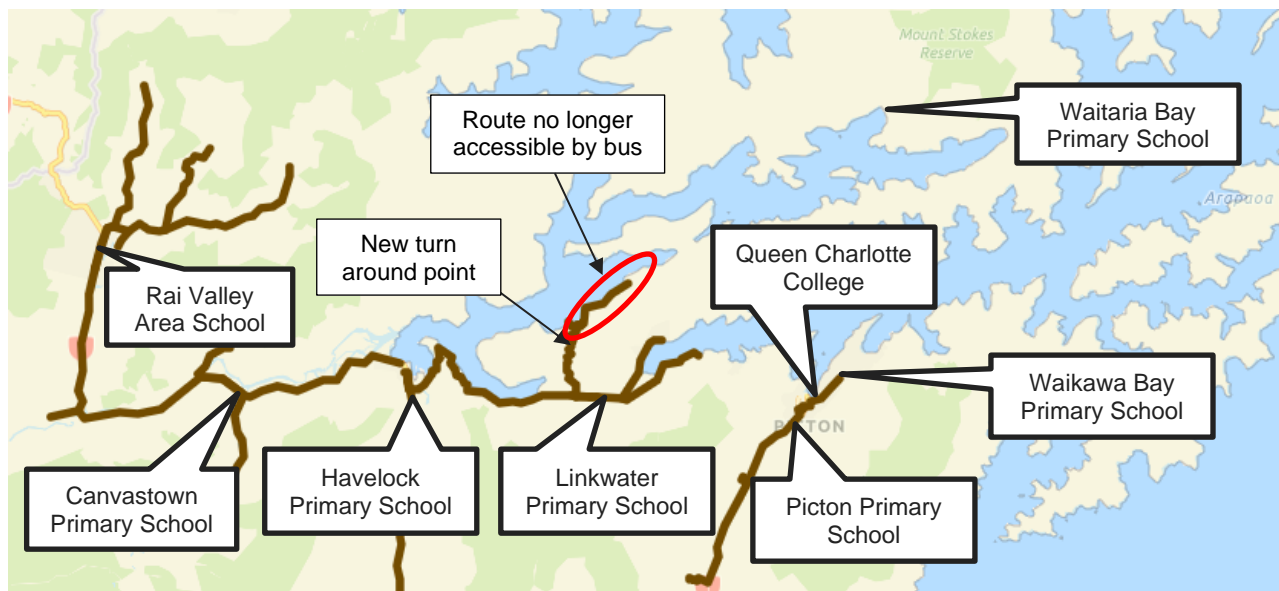


Figure 2-9: School bus routes for the Sounds³³

2.5.1.3 Travel to Work

Figure 2-10 and Figure 2-11 show the 2018 Census travel to work data for the Sounds. It shows that:

- 39% of people living in the Sounds work from home, compared to 16% for Marlborough, and 12% for New Zealand
- 50% of people living in the Sounds drove to work (or were a passenger in a car), compared to 74% for Marlborough, and 73% for New Zealand
- Kenepuru and Te Aumiti/French Pass have the greatest percentage of people working from home (both at 45%)
- Queen Charlotte and Te Whanganui/Port Underwood have the greatest percentage of people who drive to work (59% and 60% respectively) and the smallest percentage of people who work at home (32% and 33% respectively). This is still double the percentage that work from home compared to Marlborough and the rest of New Zealand.

³² Linkwater community drop in session comment, June 23, 2023

³³ <https://school-transport.maps.arcgis.com/apps/dashboards/9f200f5c371a47feaf68941dc2637b22>

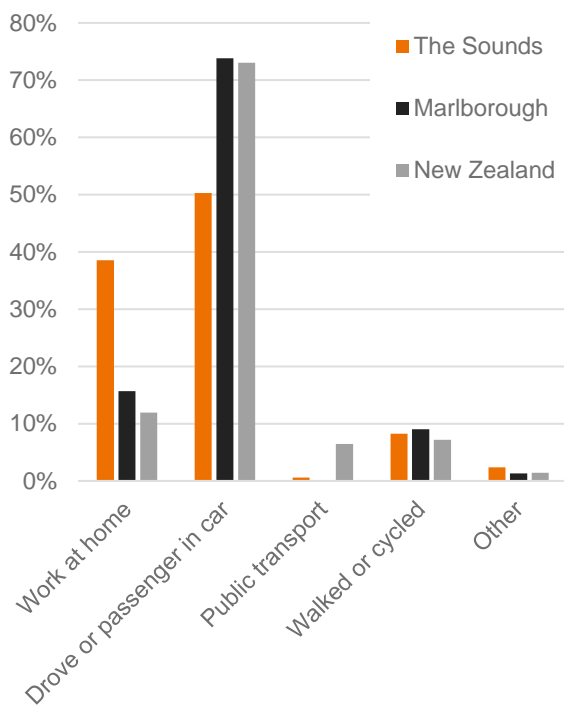


Figure 2-10: Travel to work comparison across the Sounds, Marlborough and New Zealand

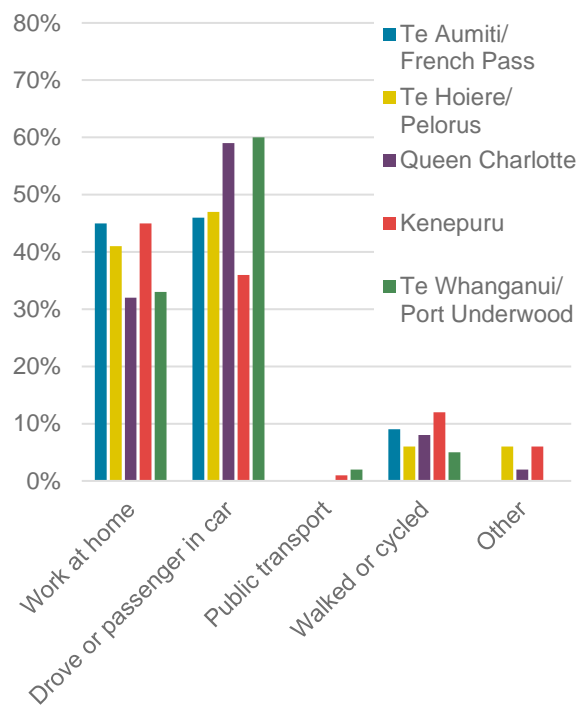


Figure 2-11: Travel to work in the Sounds

2.5.1.4 Economic Trips

For the farming industry key journeys are about getting stock and product to market and supplies to the farm. These journeys were typically made by heavy vehicles prior to the 2021 and 2022 weather events. However, following the weather events this is no longer possible for the Kenepuru zone and stock and product now must be barged to and from Havelock. The spread-out nature of these farms and the lack other businesses in the area that require large volumes of freight means there are limited opportunities to gain economies of scale for barging.

Although Port Havelock is the main port for the Inner Pelorus and Outer Sounds it does not have enough capacity to cope with all the aquaculture business in the area which is why Elaine Bay is so important for the long-term resilience of aquaculture and marine transport in the Sounds. It was also noted that Oyster Bay is very isolated if cut off by road and there are few vessels that would be able to make the trip from Oyster Bay and around the coast to the Tory Channel / Kura te Au and into Waikawa or Picton due to the coast's exposure to the Cook Strait.

Access into Kenepuru Sound is not a priority for the aquaculture industry.

2.5.2 Roads

2.5.2.1 Features

Despite the challenging environment, road transport is the preferred form of movement for residents and business owners. There are 525 km of road in the Sounds, and just under half are sealed. The roads are highly vulnerable to adverse weather events and typically have the following features, which although not uncommon for low volume rural roads in New Zealand, can be challenging to navigate safely:

- a winding alignment
- medium to narrow lane widths
- very narrow shoulders
- high-moderate to high severity roadside hazards (cliffs, deep water, aggressive vertical faces, etc)
- low intersection density
- low access density
- low traffic volumes.



Figure 2-12: Croisilles-French Pass Road³⁴

2.5.2.2 Road Classification

Figure 2-13 shows the One Network Road Classification³⁵ (ONRC) for roads in the Sounds. Each classification found in the Sounds is defined as follows:

- **Primary Collector:** These are locally important roads that provide a primary distributor/collector function, linking significant local economic areas or population areas.
- **Secondary Collector:** These are roads that provide a secondary distributor/collector function, linking local areas of population and economic sites. They may be the only route available to some places within this local area.
- **Access:** This is often where your journey starts and ends. These roads provide access and connectivity to many of your daily journeys (home, shops, school, etc). They also provide access to the wider network.
- **Low Volume:** as above, but with even lower traffic volumes.

³⁴ Source: Google Maps

³⁵ This is a Waka Kotahi tool which classifies roads according to their transport network function and assigns levels of service.

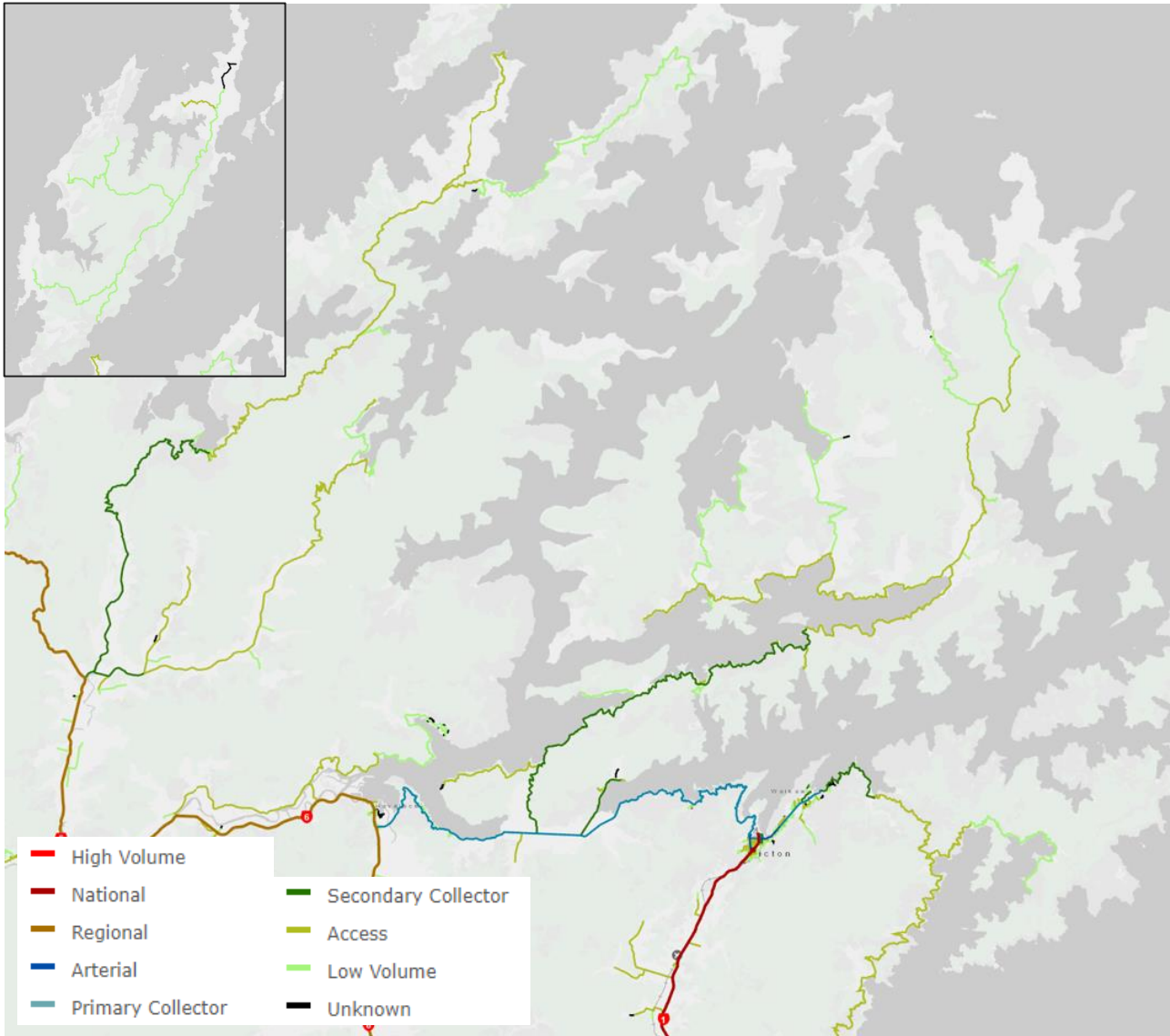


Figure 2-13: One Network Road Classification

The ONRC is being replaced by the One Network Framework (ONF) which classifies roads according to their transport network and place function but does not have associated levels of service yet. For this study the ONRC is the most useful because it provides expected levels of service which can be used to inform the options.

Under the ONF roads in the Sounds are either Rural Connectors (Rai Valley to Ōkiwi Bay, Havelock to Picton, and Linkwater to Portage) or Rural Roads (all other Sounds roads). These levels are defined as follows:

- **Rural Roads** provide access to rural land. There are low levels of traffic and roadside activity from local people going about their daily lives. Some Rural Roads are important for freight, collecting dairy and forestry and other primary produce from their source, while others, where volumes of vehicle traffic are very low, can provide safe and pleasant recreational and tourism routes.
- **Rural Connectors** make it easy for people and goods to move between different parts of rural areas, and link Rural Roads with Interregional Connectors. They support an increased level of traffic moving through the area. Land around rural connectors is usually farmland, and these roads may also run through national parks or other natural areas. There are low levels of roadside activity related to the way surrounding land is used.

2.5.2.3 Traffic Volumes

The average daily traffic (ADT) estimates for a selection of roads in the Sounds is shown in Table 2-1. These estimates were completed in March 2023 and based on traffic counts completed in late 2022 and early 2023.

Table 2-1: Traffic volume estimates for a selection of Sounds roads

Road	2015 estimates		2023 estimates	
	ADT	% heavies	ADT	% heavies
Ronga Road	381	12%	387	14%
Opouri Road	195	11%	350	15%
The Parade (Okiwi Bay)	56	12%	60	17%
Croisilles-French Pass Road at Elaine Bay Turnoff	130	11%	208	4%
Kaiuma Bay Road at Te Hoiere Road	120	11%	166	35%
Queen Charlotte Drive at Whenuanui Bay	870	9%	911	31%
Kenepuru Road at Linkwater	392	11%	340	6%
Port Underwood Road at Whatamango Bay	195	13%	492	8%
Port Underwood Road south of Robin Hood Bay	77	11%	492	8%

2.5.2.4 Travel Speeds

The posted speed limits and mean operating speeds for the Sounds are shown in Figure 2-14 and Figure 2-15. They show that the posted speed limit is typically 100 km/h, apart from Okiwi Bay, Tennyson Inlet, and all the Te Whanganui/Port Underwood zone. The operating speeds are generally much lower than the posted speeds and are typically less than 40 km/h, except for Ronga Road and Opouri Road which operate at 60km/h.

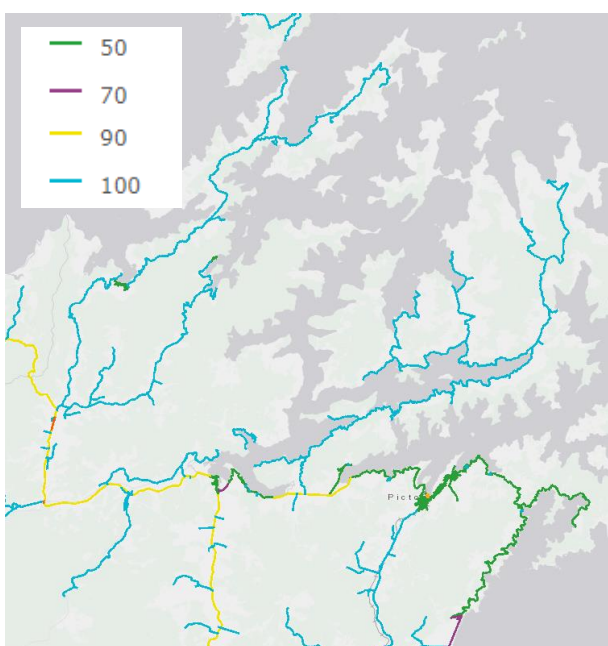


Figure 2-14: Posted speed limits

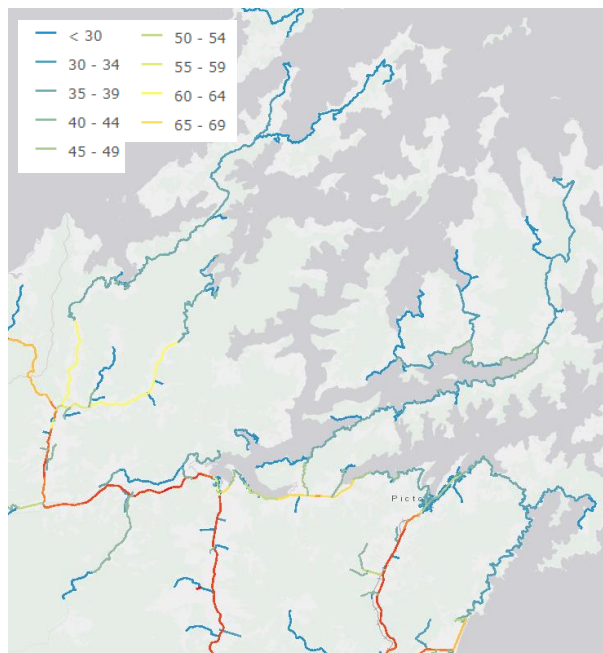


Figure 2-15: Mean operating speeds

2.5.3 Walking and Cycling

There are many walking and cycling tracks, but these are mainly used for recreation, rather than access. Data from Strava³⁶ shows that:

- Queen Charlotte Track is popular with both walkers and cyclists. It is a key attraction for national and international visitors
- Nydia Track is more popular with walkers, but is still used by cyclists

³⁶ Strava is an internet service for tracking physical exercise which incorporates social network features. It is mostly used for cycling and running using Global Positioning System data.



- Link Pathway is moderately used by walkers and cyclists
- Cyclists also use the road network to access Te Aumiti/French Pass and Kenepuru.

2.5.4 Public Transport

There are a handful of water taxis that operate in the Marlborough Sounds, with most only operating in Queen Charlotte Sound. These operations cater to tourists and visitors to the Sounds and are considered unaffordable and inconvenient by locals. A short one-way trip from Torea Bay to Picton would cost a minimum of \$50 per person and take just under three hours to complete due to the route the boat takes. As with road travel, the number of trips made peaks over the summer months.

There is no bus service. The InterCity bus has stops in Picton, Havelock, Pelorus Bridge, and Rai Valley. The stops in Havelock, Pelorus Bridge, and Rai Valley are only for pre-booked customers.

2.5.5 Water Access

2.5.5.1 Existing Marine Infrastructure and Services

Figure 2-16 outlines the existing public or community owned marine infrastructure and scheduled marine transport services that operate in the Sounds. Most of the water transport offerings are typically geared towards tourists over residents, and Table 2-2 provides more details regarding the routes shown in Figure 2-16. It should be noted that water taxis can access virtually anywhere in the Sounds if required.

For a full list of key marine infrastructure, their owners, and strategic importance as defined by Council's draft 2010 *Wharves and Jetties Policy*, refer to Appendix B .

For information regarding some of the difficulties with water access refer to Section 4.3.4.

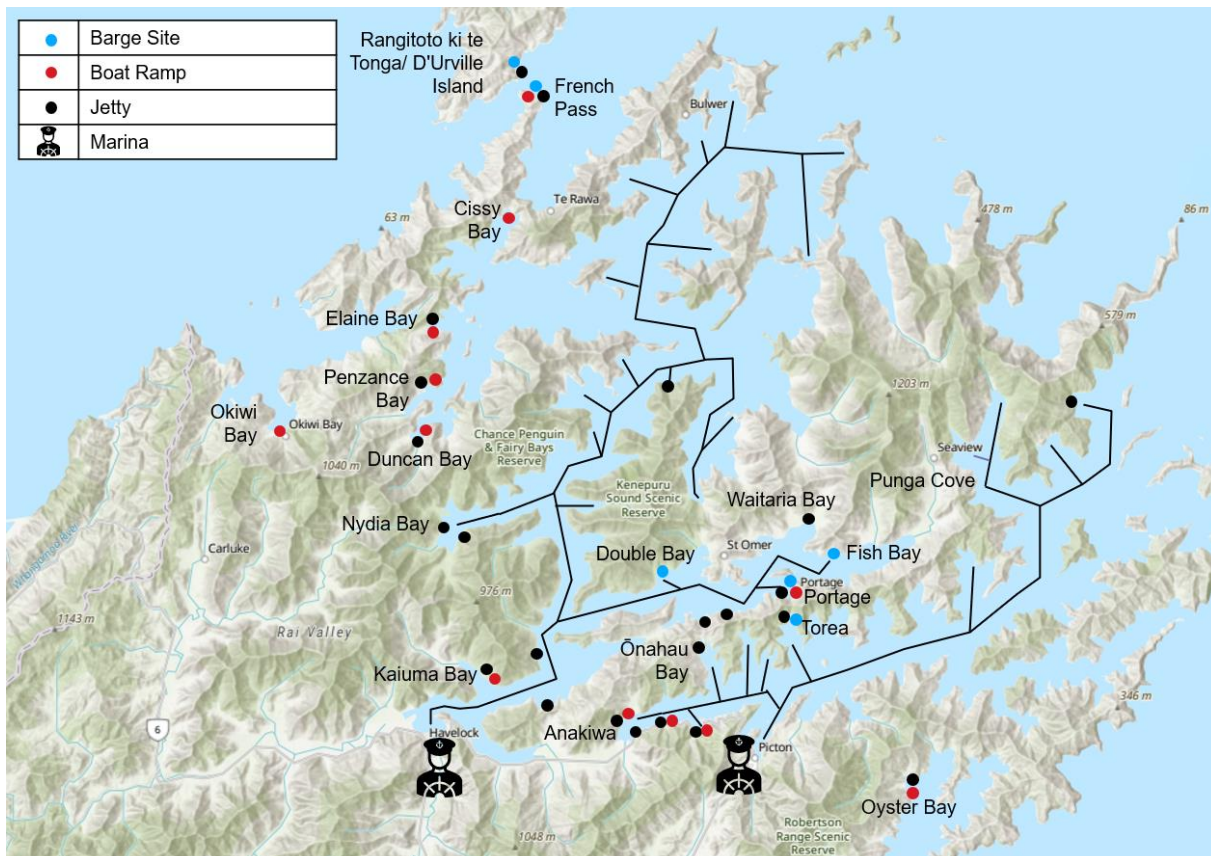


Figure 2-16: Existing marine infrastructure and scheduled transport routes

Table 2-2: Existing scheduled marine services

Provider	Route	Details
Pelorus Mailboat	All	<p>Service Type: Passenger</p> <p>Duration: A round trip takes approximately five to six hours. It depends on the number of deliveries and the tide.</p> <p>Cost: Transfers are \$50 one way per adult and \$30 one way per child</p> <p>Departures: Transfers are only available between September and April. All services depart from Havelock at 10:00 am</p>
	Eastern Route	<p>Stops: Havelock, Black Point (Te Hoiere/Pelorus), Whatanihi (Te Hoiere/Pelorus), Inner Pelorus Sound, Nydia (Te Aumiti/French Pass), Jacobs Bay (Te Aumiti/French Pass), Homewood (Kenepuru), Hopai Bay (Kenepuru), Crail Bay (Kenepuru) and Four Fathom Bay (Kenepuru).</p> <p>Stops with Road Access: Crail Bay</p> <p>Departures: This service runs on Monday.</p>
	Western Route	<p>Stops: Havelock, Nydia Bay, North West Bay, Tiraora Bay, Miro Bay, Wilson Bay, Te Pakeka Maud Island, and Brightlands Bay. All stops in the Te Aumiti/French Pass zone</p> <p>Stops with Road Access: no stops have road access</p> <p>Departures: This service runs on Wednesday.</p>
	Outer Sounds	<p>Stops: Havelock, Inner Pelorus Sound, Pohuenui Island (Kenepuru), Whakatahuri (Kenepuru), Forsyth Island (Kenepuru), Port Ligar (Te Aumiti/French Pass), Bulwer (Te Aumiti/French Pass), Homewood (Kenepuru), and Hopewell Lodge (Kenepuru).</p> <p>Stops with Road Access: Port Ligar and Bulwer</p> <p>Departures: This service runs on Friday.</p>
Cougar Line	Grove Arm	<p>Service Type: Passenger</p> <p>Stops: Picton, Waterfall Bay (Kenepuru), Lochmara Bay (Kenepuru), Double Cove (Kenepuru), Mistletoe Bay (Kenepuru), Anakiwa (Queen Charlotte), Picton</p> <p>Stops with Road Access: Waterfall Bay and Anakiwa</p> <p>Departures: This service leaves at 2:30 pm daily. Between October and April an additional 11:30 am departure is also available; however, it does not stop at Anakiwa.</p> <p>Duration: A round trip takes approximately an hour and 15 minutes</p> <p>Cost: Transfers are \$60 one way per adult and \$30 one way per child.</p>
	Queen Charlotte Sound / Tōtaranui	<p>Service Type: Passenger and freight</p> <p>Stops: Picton, Torea Bay, Bay of Many Coves, Ship Cove/Meretoto, Resolution Bay, Furneaux Lodge, Punga Cove, Bay of Many Coves, Torea Bay, Picton. All stops are in the Kenepuru zone.</p> <p>Stops with Road Access: Torea Bay and Punga Cove</p> <p>Departures: There are four daily departures between November and April, and three daily departures between May and October.</p> <p>Duration: A round trip takes approximately three hours</p> <p>Cost:</p> <ul style="list-style-type: none"> • Passenger: Transfers are approximately \$60-\$80 one way per adult and \$30-\$40 one way per child. Outer Sound destinations are more expensive. • Freight: Minimum \$30 freight charge plus item charges.
Arrow Water Taxis	Inner Sounds	<p>Service Type: Passenger</p> <p>Stops: Picton, Ngakuta Bay (Queen Charlotte), Anakiwa (Queen Charlotte), Waterfall and Mistletoe Bays (Kenepuru), Lochmara Bay (Kenepuru), Double Cove (Kenepuru), Torea (Kenepuru), Picton</p> <p>Stops with Road Access: Waterfall Bay, Anakiwa, and Torea</p> <p>Departures: This service leaves Picton at 8:15 am daily from late October to early April. A scheduled service does not operate outside these dates.</p> <p>Duration: A round trip takes approximately an hour and 45 minutes</p> <p>Cost: fares start at \$30.</p>

Provider	Route	Details
Johnson's Barge Service	Community Barge ³⁷	<p>Service Type: Freight</p> <p>Stops: Havelock, Te Mara, Fish Bay, Portage (if required), Havelock. All stops are in Kenepuru.</p> <p>Stops with Road Access: All stops have light vehicle access, but currently no heavy vehicle access.</p> <p>Departures: This service leaves Havelock at 7:00 am Monday, Wednesday, and Friday</p> <p>Duration: It is approximately two hours to Fish Bay</p> <p>Cost: varies depending on load type. A 'vehicle sized load' is from \$150+gst.</p>

2.5.5.2 Existing Properties with no Road Access

There are 923 properties with habitable buildings in the Sounds that did not have road access prior to the storm events. In Council's rating database these properties are known as the "Sounds Admin Rating Area" and are rated differently to the rest of Marlborough. The only way these people can access their properties, or the services located in Havelock and Picton is via boat. The areas with properties with no road access are shown in Figure 2-17 and detailed in Table 2-3. The area in the Kenepuru zone shown as having no road access, despite having roads running through it, is a very large Department of Conservation property where most of the property is boat access only.

Following both the 2021 and 2022 storm events the majority of the Kenepuru zone did not have any form of road access for approximately two months. Resident only access has since been restored to Kenepuru, but there are vehicle length and weight restrictions in place that prevent freight vehicles from using the road. The rest of the Sounds has had road access restored, but to a reduce level of service.

Table 2-3: Dwellings with no road access prior to the storm events

Zone	Total dwellings	No road access	Percentage with no road access
Te Aumiti/French Pass	733	100	14%
Te Hoiere/Pelorus	111	56	50%
Queen Charlotte	562	0	0%
Kenepuru	1,250	570	46%
Te Whanganui/Port Underwood	410	200	49%
Total	3,066	926	30%

³⁷ <https://www.marlborough.govt.nz/your-council/latest-news-notice-and-media-releases/all-news-notice-and-media-releases?item=id:2mljws8ew17q9safaenz>

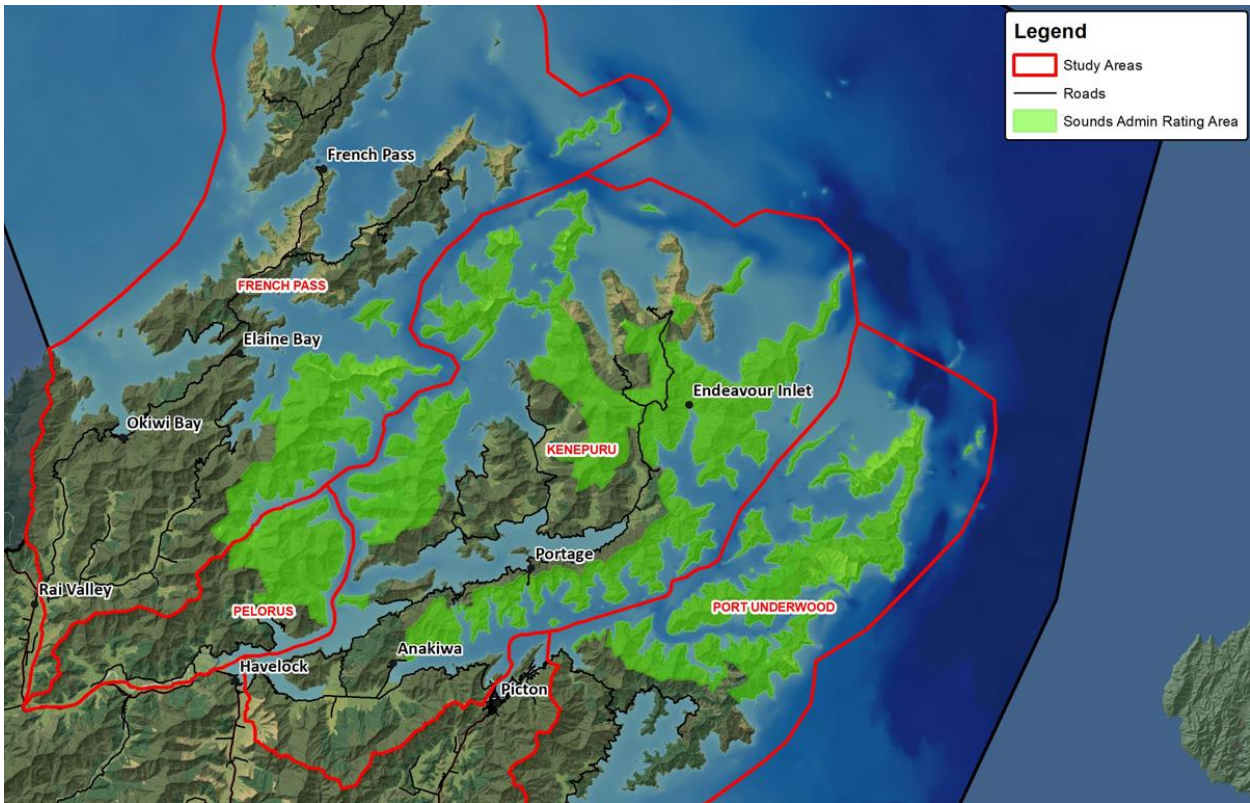


Figure 2-17: Properties with no road access (Sounds Admin Rating Area)

2.5.5.3 Port Marlborough

Port Marlborough is a Council owned business responsible for operating the region's port and marinas and facilitating the operation and growth of some of Marlborough's most significant industries including recreational boating, forestry, fishing, marine farming, and domestic and international tourism.³⁸

A summary of the infrastructure and operations supported by Port Marlborough is below³⁹:

- **Shakespeare Bay (Picton):** Accommodates the log export industry, and can accommodate cruise vessels
- **Waitohi Picton:** Caters to the inter-island ferries. The town wharf area provides berthage for commercial, fishing, aquaculture and tourism vessels and business, as well as providing recreational boating facilities.
- **Motuweka Havelock:** The port and marina at Havelock supports marine farming, tourism, forestry and commercial barging, as well as supporting recreational boating.
- **Marlborough Sounds Marinas:** This is a subsidiary of Port Marlborough and provides facilities for over 2,000 vessels in berths, boatsheds and storage in Picton, Waikawa, Havelock and Elaine Bay.
- **Marlborough Sounds:** Port Marlborough provide wharf and port landing facilities in Elaine Bay and Te Whanganui/ Port Underwood to support marine farming operators in the Sounds.

2.5.6 Air Access

The main airports available for those living in the area are at Nelson and Blenheim. There are 12 airstrips in Te Aumiti/French Pass and 12 in Kenepuru. The airstrips are largely agricultural and used to assist with farming, although a handful are used by Pelorus Air to transport people to and from the start or end of walking or biking tracks.

Limited information is available regarding helicopter landing sites.

³⁸ <https://www.portmarlborough.co.nz/about/>

³⁹ Port Marlborough (2022) "About the Port" in *Port Marlborough Annual Report 2022*.

3 Partners and Key Stakeholders

3.1 Investment Partners

3.1.1 Waka Kotahi NZ Transport Agency

Waka Kotahi is responsible for managing, operating, planning and improving state highways. The priority for Waka Kotahi is to identify a long-term solution for the ongoing access issues that have been experienced following storms in 2021 and 2022. The solution must be cost effective and provide certainty for residents and businesses.

3.1.2 Marlborough District Council

Marlborough District Council is responsible for fully managing the local road network that forms, with the state highway, the transport network connecting the Sounds to the state highway and remainder of the district's road network. It is also responsible for some public jetties and boat ramps. The priority for the Council is to identify a long-term solution for access to the Sounds. Any investment identified through this business case process will be the responsibility of Marlborough District Council, which will lead the development of any funding applications required for the preferred option as well as leading implementation.

3.1.3 Iwi

As presented in Section 2.2, the Marlborough Sounds holds great spiritual and practice significance to the eight tangata whenua iwi of Te Tau Ihu. The iwi of Te Tau Ihu o te Waka-a-Māui who have customary and statutory acknowledgments within the scope of the project scope are:

- Ngāti Apa ki te Rā Tō
- Ngāti Kuia
- Rangitāne o Wairau
- Ngāti Koata
- Ngāti Rārua
- Ngāti Tama ki Te Tau Ihu
- Te Ātiawa o Te Waka-a-Māui
- Ngāti Toa Rangatira.

3.2 Key Stakeholders

The key stakeholders described in Table 3-1 were invited to participate in the business case process. All stakeholders share the desire for long term certainty over access to the area. There are differences between how stakeholders see the long-term access being provided, with many wanting further investment in the road network to provide the levels of access that were commonplace before the two storm events. Others, however, believe the network will continue to experience outages as storms increase in intensity and sea level rises, and want alternative options such as water transport to be better developed as well as, or instead of, investment in the road network.

Table 3-1: Stakeholders

Stakeholder	Area of Focus
Department of Conservation	Landowner manages tracks and trail assets. Assisting the team understand current and future demands.
Ministry of Education	Responsible for ensuring access to education and managing education assets.
Nelson Marlborough Public Health	Part of Te Whatu Ora Health NZ, comprising health promoters, health protection officers, public health nurses, medical officers, public health analysts. Respond to public health risks and work in a variety of settings. Provide a range of services. Represent health interest and concerns relating to access.
Insurance Council	Represents insurance industry, informs and educates consumers about key insurance risks. Aims to make the insurance industry responsive and sustainable to safeguard New Zealand.
Rural Women NZ (originally Women's Division of the Farmer's Union)	Advocates for health services, education, environment and social issues in the rural sector.



Stakeholder		Area of Focus
Destination Marlborough		Not for profit Trust responsible for marketing Marlborough as a visitor destination.
Emergency Services	Civil defence, Police, Ambulance, Fire and Emergency NZ	Future and continued provision of emergency service access for the area.
Utility Owners	Marlborough Lines, Chorus, Transpower, Vodafone, Spark	Continued management and maintenance of utilities infrastructure.
Business Groups (General)	Marlborough Forest Industry Association, Chamber of Commerce, Marlborough Sounds Integrated Trust, Marine Farming Association, Fisheries NZ, Outer Queen Charlotte Sound, Tasman Pine Forests Ltd, Apiarists Association, Federated Farmers, Ministry for Primary Industries, Nova Energy.	Understand and represent different business interests across the Sounds. Advocating and assisting the team understand business needs for future access, including current and future demands.
Transport Groups	Port Marlborough – Havelock and Picton Ports, Barge companies, Water taxis, Transport companies, Automobile Association, Harbour Master, Heavy transport, Private owners of roads and jetties.	Understand and represent different business interests across the Sounds. Advocating and assisting the team understand business needs for future access, including current and future demands.
Residents Associations (13)	Port Underwood, Duncan Bay Central Pelorus, Lochmara Queen Charlotte Sound, D'Urville Island, Moetapu Community Association, Pelorus, French Pass, Kenepuru and Central Sounds, Okiwi Bay, Ngakuta Bay, Cissy Bay, Kaiuma and Wakaretu	Understand and represent residents needs including access.

3.3 Engagement with Stakeholders

Key stakeholders were invited to participate in the following workshops:

- 24 January 2023: Issues and Options Workshop (Appendix C.1)
- 14 March 2023: Hui with local iwi (Appendix D)
- 20 June 2023: Emerging Preferred Option Workshop (Appendix C.2).

3.4 Engagement with Community

The wider community have been seriously affected by the loss of access resulting from the storm events. As part of the business case, it was essential to enable the community to have their say and explain how they have been affected. Community participation was unprecedented, through the following channels:

- Council website which hosted project information, surveys, videos and other materials
- Council Marlborough Sounds Future Access Study newsletter which was targeted at the community with interests in the study area
- Other Council communications including advertising, news items, social media etc
- Council survey issued to enable comment on the scope of the study, attracting approximately 120 responses
- Community hui:
 - 31 January – 8 February 2023: A series of open days were held at six locations across the Sounds. An online zoom meeting was also held for those who could not make an in-person session. The purpose of the open days was to outline the project objectives, update the community on the study and receive feedback and information from the community. Over 500 people attended. Refer to Appendix E for a summary of the feedback received.
 - 27 January – 22 February 2023: A survey was run to help inform the economic case. Over 900 responses were received. Refer to Appendix F for a summary of the survey results.
 - 20 – 28 June 2023: A series of drop-in sessions were held across the Sounds, Blenheim, Picton, and Nelson. An online zoom session was also held for anyone who could not attend any of the in-person drop-ins. The purpose of the drop-in sessions was to allow the community to ask questions of, and provide feedback on, the emerging preferred options and hazard adaptation pathways for each area. Approximately 500 people attended. Refer to Appendix E for a summary of the events.

- 16 June – 11 July 2023: A survey was run to gauge community support for the emerging preferred options and hazard adaptation pathways. Over 1,700 responses were received. Refer to Appendix G for a summary of the survey results. An additional 43 written responses were also received.

3.5 On Going Engagement with Iwi

Te Tau Ihu GM – CE collective have clearly stipulated that each of the eight iwi have different interests across the Sounds roading network, and therefore will have differing perspectives and levels of interest and capability to effectively engage on these matters. Te Tau Ihu iwi preference is that they are individually engaged to determine how much input they wish to have within the study and furthermore the ongoing repairs, improvements, and development in the Sounds. It is also important to note that Te Ihu iwi are heavily consumed at the present time with several government reforms including:

- Local government review
- Te Mana o Te Wai
- Resource Management Act related issues.

These matters impact directly on each iwi and their ability to engage along with other key priorities concerning their respective iwi, including housing, health, education, employment and the broader social inequities and issues concerning their people.

It has been identified Te Tau Ihu iwi are certainly willing to engage however, not all iwi are adequately resourced or have the level of capacity to engage effectively on this important matter concerning the future access of the Sounds. The support of MDC will enable Te Tau Ihu iwi to be effective partners in the protection, restoration and maintenance of the Sounds as Te Tiriti partners to ensure safe access to their kāinga, whenua and all their respective taonga within their takiwā.

4 Problems

4.1 Defining the Problems

A facilitated investment logic mapping workshop was held in November 2022 with the investors - representatives from Council and Waka Kotahi - to clarify current issues and business needs. The investors agreed the following problems:

- **Problem One – Disrupted Access:** The impacts of climate change are increasing the frequency and duration of disrupted access (30%)
- **Problem Two – Lack of Alternatives:** Reliance on roads for access to services and lack of alternatives has led to increased vulnerability to the community during road closures (20%)
- **Problem Three – Asset Vulnerability:** Poor construction standard and unstable geology means the Marlborough Sounds roads have a high maintenance cost and safety risk (50%).

These problems were tested through subsequent stakeholder and community workshops, and no changes were made. Further analysis of the problem statements is presented below.

4.2 Problem 1: Disrupted Access

The cause, effect and consequence for Problem 1 are show in Table 4-1 with evidence provided below. The primary cause of this problem is that the land is susceptible to erosion and inundation from sea level rise, and also from storms, which are predicted to increase in severity as a result of climate change. This leads to slips and dropouts affecting the roads, which become unsafe to use. When this happens, people cannot reach essential goods and services. Evidence supporting Problem 1 is provided below.

Table 4-1: Cause, Effect and Consequence for Problem 1

Problem 1: The impacts of climate change are increasing the frequency and duration of disrupted access (30%)	
Causes	Sea level rise Vertical land movement Coastal erosion Storm frequency and intensity changes
Effects	Increased frequency of road closures Increased duration of road closures
Consequence	Impacts on access

4.2.1 Cause: Sea Level Rise and Vertical Land Movement

Long-term sea-level rise is predicted based on the Shared Socioeconomic Pathway (SSP) 2-4.5⁴⁰ and SSP5-8.5⁴¹ scenarios. Predictions for Portage show there is medium certainty about projected sea level rise until 2150, but after that certainty significantly decreases. Under SSP2-4.5 the sea-level rise by 2300 could be between 1.2 m and 3.5 m, but under SSP5-8.5 it could be anywhere from 5.3 m to 15.1 m.

Vertical land movement also needs to be considered when planning for sea-level rise effects. New Zealand is on a dynamic plate boundary which means the land is always moving. As well as tectonic movement, sedimentary basins compact over time and subside. Human influences such as land reclamation and drainage, groundwater extraction, and petroleum reservoir depletion also cause the land to subside. In areas with subsidence, the impacts of sea-level rise are accelerated, and impacts will be experienced sooner.

Figure 4-1 shows the predicted vertical land movement for various points around the Sounds, from the NZ Sea Rise website. It shows that while most places are sinking up to 6 mm/year, some are rising at a rate of 5 mm/year.⁴²

⁴⁰ This is a world with moderate emissions (+2.7°C warmer world). This approximates the path associated with current global policy settings.

⁴¹ This is a worst-case scenario world with very high emissions (>4°C warmer world). It is unlikely to materialize given ongoing climate mitigation.

⁴² This has been based on comparatively recent observations (predominantly 2003-2011) which reflect ongoing 'creep' adjustments but not major surface rupture events on say the Alpine or Wellington faults. There is therefore some inherent uncertainty in vertical land movement when projecting these rates far into the future.



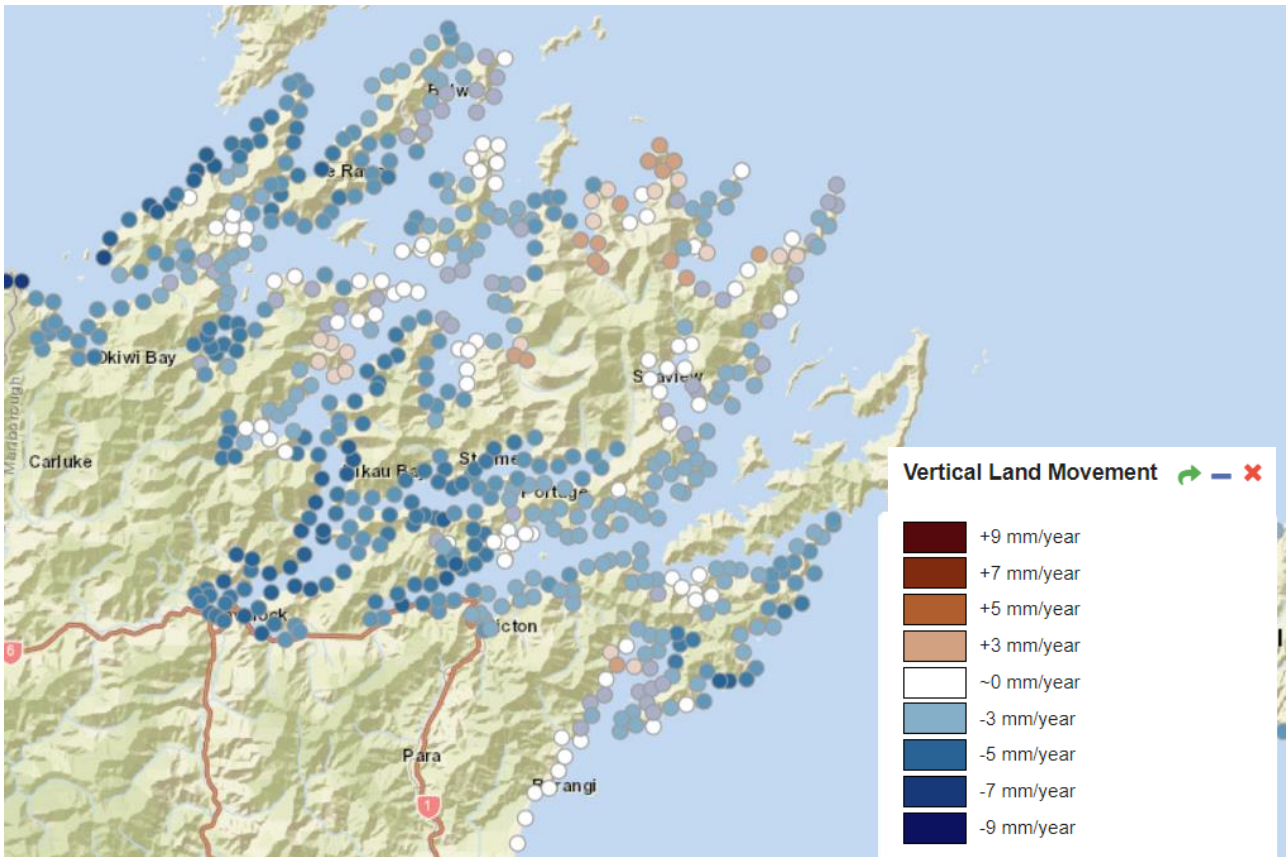


Figure 4-1: Vertical land movement for the Sounds⁴³

Figure 4-2 shows the expected sea level rise under the SSP2-4.5 scenario combined with the vertical land movement for Portage. The land at Portage is sinking at a rate of 1.59 mm/year. The land movement combined with the anticipated sea level rise under SSP2-4.5 means that by 2050 the total sea level rise will be 30 cm, and 73 cm by 2100. Under SSP5-8.5 the total sea level rise by 2100 could be up to 1 m. The total sea level rise in places with faster rates of vertical land movement will be greater than what is detailed above.

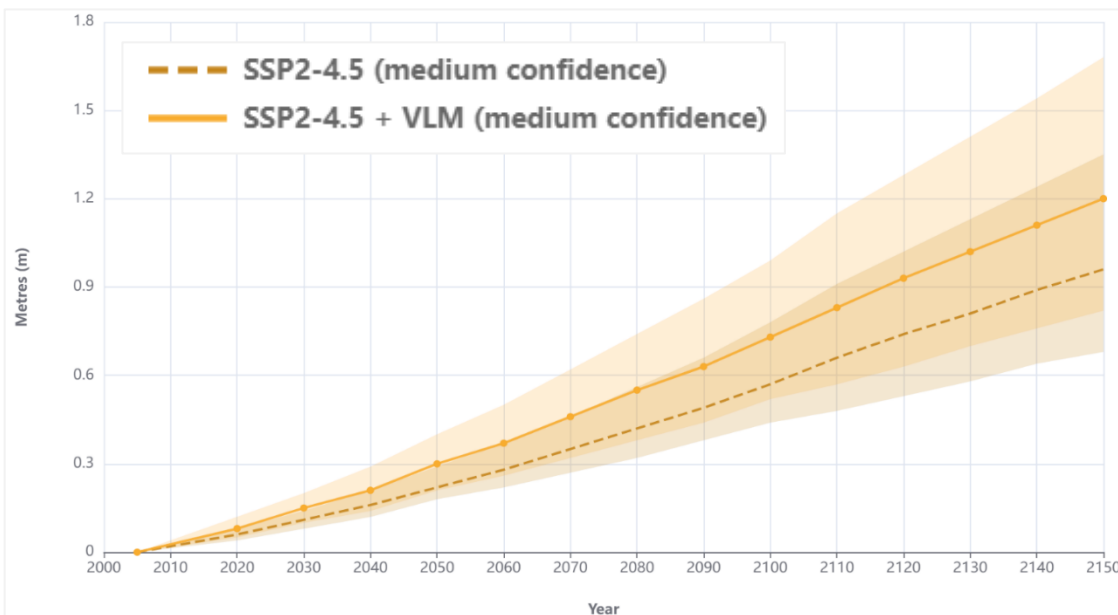


Figure 4-2: Sea level rise with vertical land movement for Portage under SSP2-4.5⁴⁴

⁴³ NZ Sea Rise Map, Takiwā. <https://searise.takiwa.co/> (11/01/2023)

⁴⁴ NZ Sea Rise Map, Takiwā. Sea Level Rise Predictions by Decade for site 6768, <https://searise.takiwa.co/> (11/01/2023)

4.2.2 Cause: Coastal Erosion and Inundation

According to the Ministry for the Environment's climate change projections for Marlborough, coastal roads and infrastructure may face increased risk from coastal erosion and inundation, increased storminess and sea-level rise. This is already happening in parts of the Sounds with the following areas experiencing inundation during exceptionally high tides:

- Okiwi Bay along the Esplanade and the Parade
- Queen Charlotte Drive between addresses 882 and 924
- Kenepuru Road (Heads to Raetihi):
 - Ohauparuparu Bay/Taradale
 - Waitaria Bay
 - Goulter Bay
 - Nopera Bay.

The above areas are all identified as high risk in Figure 4-3 which shows the sections of roads within the Sounds that are considered at high risk and medium risk from coastal erosion and/or inundation. Areas of high risk are below 3 m elevation, and areas of medium risk are between 3m and 5m elevation, or within 100 m of the coastline.

Any area lower than 3 m is considered at high risk due to the high tidal ranges possible, such as the top of Kenepuru Sounds. This area currently has a high tide of 1.5 m which in addition to sea level rise and vertical land movement (Section 4.2.1) could lead to a high tide level around 3 m by 2150 and extended inundation during exceptionally high tide events. This could lead to road closures but also potentially to accelerated erosion and damage to the road pavement.

Areas between 3 m and 5 m elevation may be at risk from combinations of high astronomical tides, storm surge, wave run up and erosion effects which would extend above the static water level described above. This would be dependent on the bathymetry, wind fetch, rocky/sandy shoreline, topography etc. In addition, roads within lateral 100 m of the coast have also been flagged as potentially medium risk for further investigation due to the potential for erosion, depending on geological conditions (for example by erosion at the coast accelerating upslope instabilities).

Only 3.3% of the network is highly susceptible to coastal inundation or erosion, but if these sections of road are closed, 57% of the network would be inaccessible.

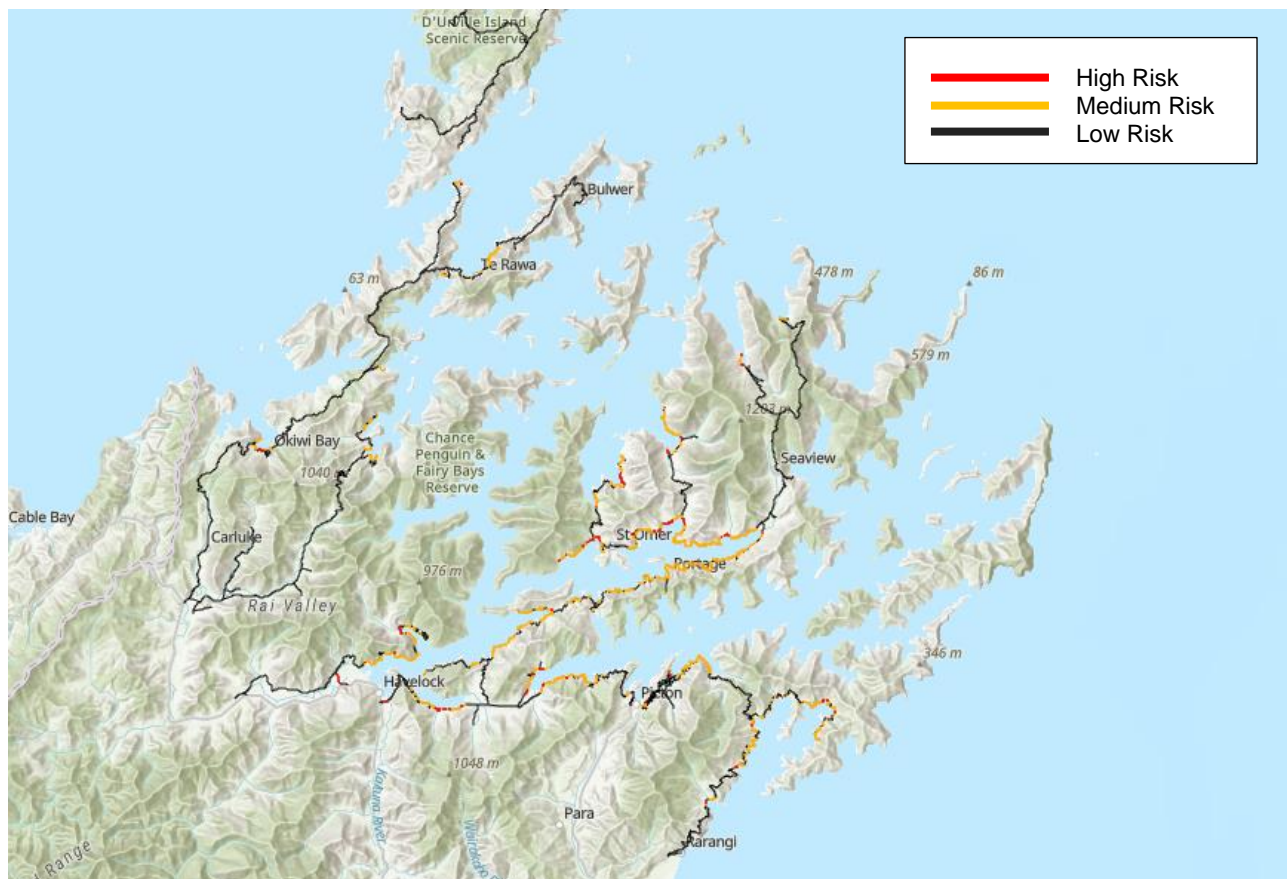


Figure 4-3: Roads with potential risk of future coastal inundation or erosion

4.2.3 Cause: Storm Frequency and Intensity Change

Scientists globally agree that climate change is increasing the frequency and intensity of extreme weather events, and that those impacts will continue to worsen in the future. The Ministry for the Environment’s summary of recent research into the impacts of climate change on severe weather in Aotearoa found⁴⁵:

- Floods will continue to become more frequent between now and 2050
- Severe thunderstorms will carry more rain in a warming world
- More intense regional cyclonic storms are projected by 2100, as is an increase in the frequency and extent of atmospheric rivers affecting Aotearoa New Zealand, which could bring more rain.

The effects of climate change are already being experienced in Marlborough. The Ministry for the Environment’s climate change projections for Marlborough are that infrastructure may face increased risk from increased storminess. Anecdotally the duration and frequency of storms affecting the region has been increasing.

Data demonstrating that such events are increasing in intensity is more readily available. Figure 4-4 shows a comparison of the August rainfall at Tunakino and Rai Falls. It shows that the August 2022 rainfall was:

- Tunakino (data from 1979 to 2022):
 - Two and a half times larger than the previous August maximum recorded in 2017
 - 36% greater than the previous monthly maximum recorded in October 1998
 - Five times larger than the historic August average
- Rai at Rai Falls (data from 2000 to 2022):
 - Two times larger than the previous August maximum recorded in 2010
 - 53% greater than the previous monthly maximum recorded in December 2010
 - Four times larger than the historic August average

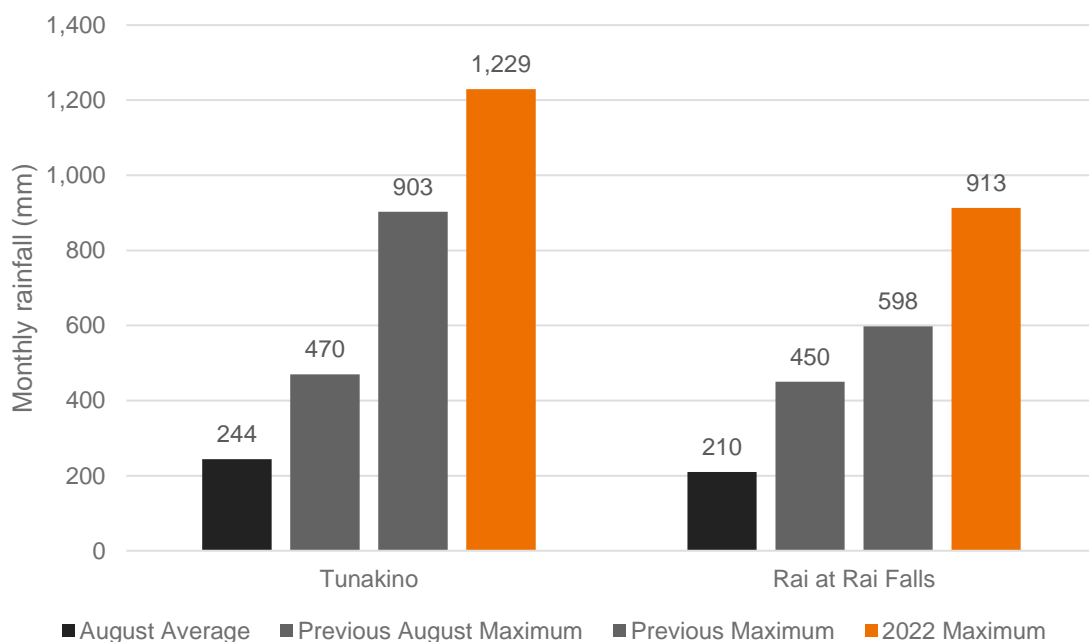


Figure 4-4: August rainfall comparison

It is predicted the recent trend of extreme rain events will continue, albeit sporadically, on account of climate change. Short duration high intensity rainfall is expected to experience greater increases than long duration events. This is illustrated in Figure 4-5 for the 1:100 annual exceedance probability (AEP) event⁴⁶, showing two emissions scenarios, based on NIWA’s High Intensity Rainfall Design System (HIRDS) version 4⁴⁷.

⁴⁵ “The science linking extreme weather and climate change,” Ministry for the Environment, Last updated: 3 February 2023, <https://environment.govt.nz/news/the-science-linking-extreme-weather-and-climate-change/>

⁴⁶ An annual exceedance probability (AEP) is the probability of an event occurring in any given year. i.e. A 1:100 AEP means that on average one event of this size will occur every 100 years. This means there is a 1% chance in any given year of the event occurring.

⁴⁷ NIWA’s high intensity rainfall design system

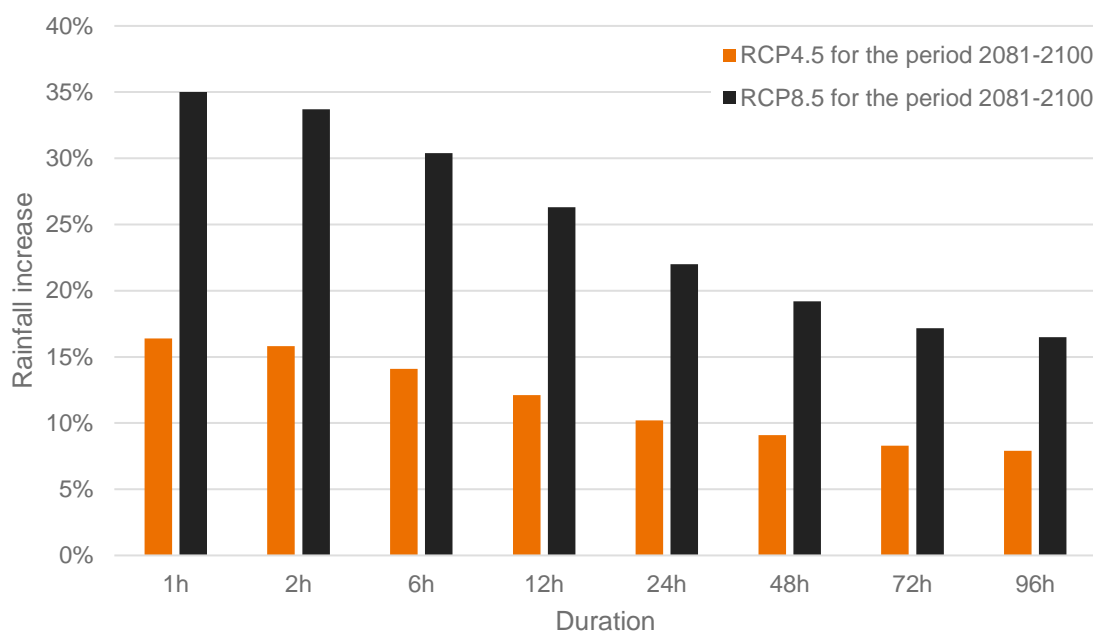


Figure 4-5: Increase in rainfall on account of climate change for 1:100 AEP rainfall

Based on the climate change factors from HIRDS version 4, it is anticipated that:

- Under RCP4.5 2081-2100:
 - the 1:100 AEP future event will be about as intense as the 1:200 AEP historic intensity.
 - the 1:100 AEP historic event will be roughly twice as frequent (~1:60 AEP).
- Under RCP8.5 2081-2100, the 1:100 AEP historic event will be roughly three times as frequent (~1:33 AEP) for long duration storms, and five times as frequent (~1:20 AEP) for short duration storms.
- Short duration storms (e.g., summer thundershowers, up to a few hours) produce the highest intensity rainfall in a short time, and the highest peak water flow from small catchments. Overtopping of any undersized culverts may be short-lived and may produce less damage per storm event but occur more frequently than long storms. Climate change impacts on these events will be higher than on longer duration storms, as illustrated above.

4.2.4 Effect: Increased Frequency and Duration of Road Closures

The combined effect of sea level rise and increasing storm frequency and intensity will likely lead to an increase in frequency and duration of periods when roads are unavailable for use. Figure 4-6 shows the status of all roads in the Sounds immediately following the 2022 event. Most roads were either closed, or yet to be assessed.

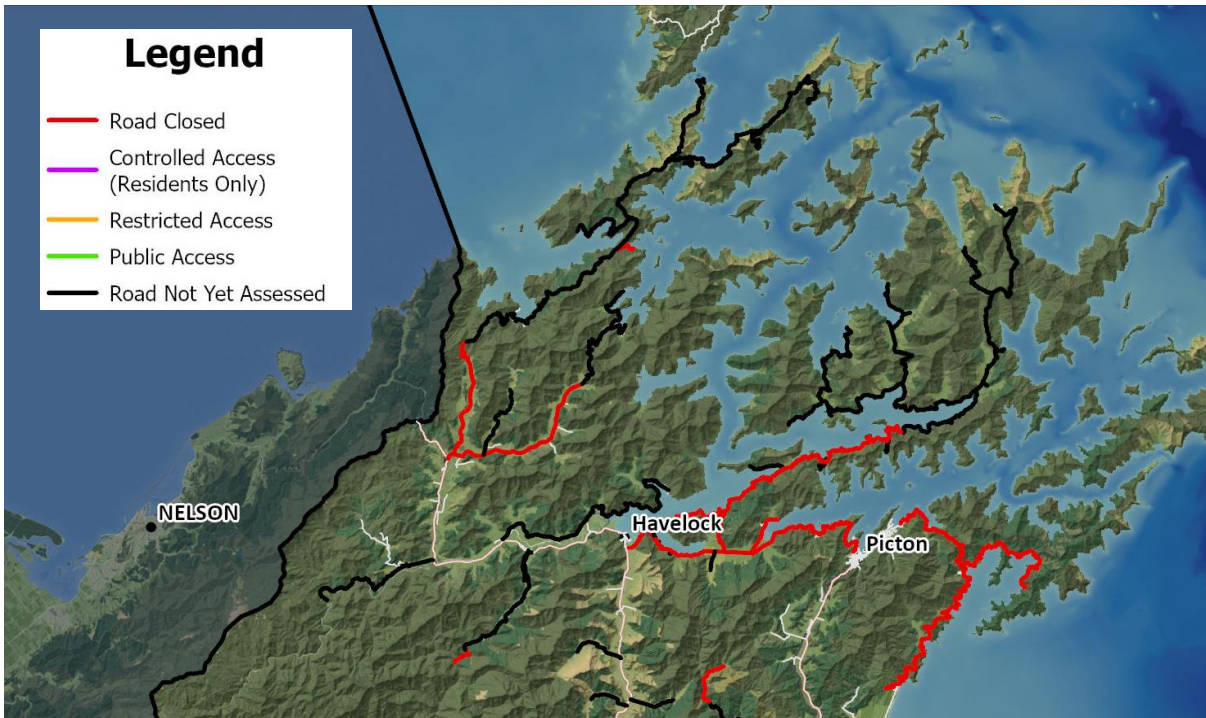


Figure 4-6: Road status in the week following the August 2022 weather event

Prior to 2021 there is limited easily accessible information available regarding road closures. Figure 4-7 shows the status of the roads in the Sounds following the 2021 weather event to the end of 2022. There has been no change in the status of any roads since the end of 2022. Refer to 0for more detailed information regarding individual zone. Some key points from the available closure information are:

- The August 2022 event impacted an additional 230 km of road compared to the July 2021 event
- Te Hoiere/Pelorus:
 - 17 km of road were closed for one month, and under restricted access (residents only) for another month following the July 2021 event
 - Following the August 2022 event the roads were unassessed for a month, and then assessed and opened to the public.
- Queen Charlotte:
 - 7 km of road was closed, and an additional 20 km was restricted access (residents only) access for a month following the July 2021 event
 - Following the August 2022 event 37 km of road was closed for a month. After this 19 km of road was opened to the public, and the remaining 18 km remained closed for another two weeks.
- Kenepuru:
 - Between 20 km and 50 km of roads were closed for three months following the July 2021 event
 - Some roads were under restricted access (residents only) for at least a year following the 2021 event
 - All roads in Kenepuru were closed for two weeks following the August 2022 event, and 40 km of road was closed for an additional two weeks.
 - 60 km of road is still under restricted access following the August 2022 event.
- Te Aumiti/French Pass, Te Whanganui/Port Underwood:
 - No roads were closed following the July 2021 event
 - Up to 210 km of roads were closed following the August 2022 event.

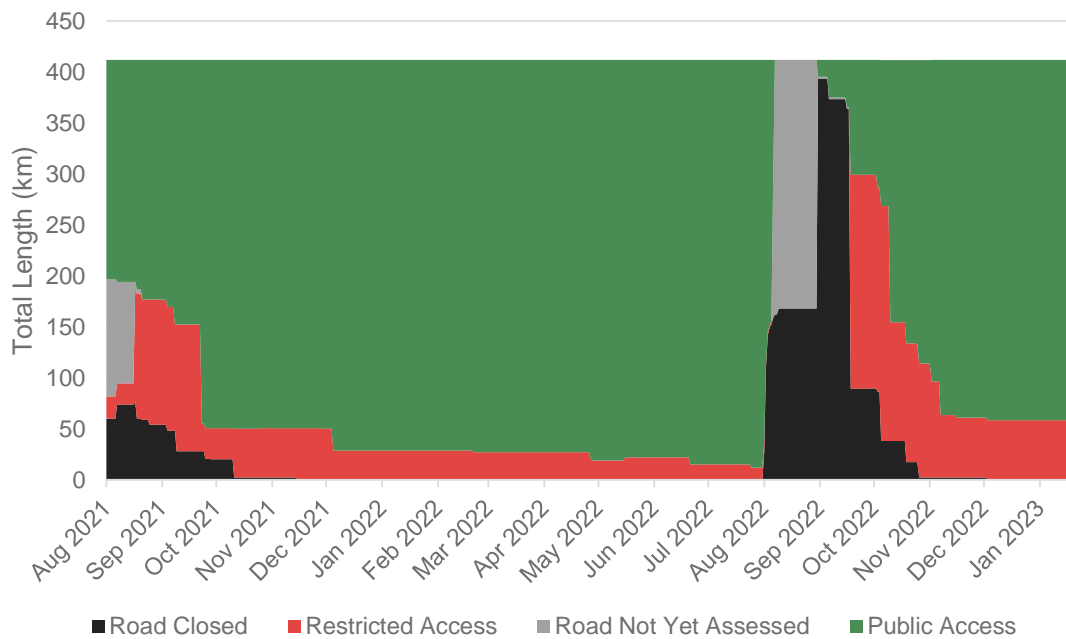


Figure 4-7: Road closure data for the Sounds

4.2.5 Consequence: Impacted Access

As discussed in Section 4.2.4 there were months of road closures following both the 2021 and 2022 events. This peaked at 380 km of road closed for two and a half weeks following the August 2021 event.

As there are no alternate routes for the majority of these roads (Section 4.3.2), and current water and air travel is not suitable or affordable for residents or most businesses (Section 4.3.3 and Section 4.3.4), access during this time was challenging.

As the area is so remote, there are very few services provided locally and most are accessed by road (Section 2.5.1 and 4.3.6). The key services people were unable to access in the normal way during this period included:

- Routine healthcare including regular prescriptions and visits to healthcare providers
- Education
- Supermarket
- Getting stock to markets
- Connecting with friends and family.

To ensure people could at least access these essential goods and services once or twice a week, the Council organised subsidised water taxi services for residents, workers and visitors. Council and Port Marlborough also provided fully subsidised parking for residents at marinas in Havelock and Picton, until September 2023.⁴⁸

4.3 Problem 2: Lack of Alternatives

Table 4-2 provides the root cause analysis for Problem 2. The primary cause of this problem is that people rely on roads, alternative routes do not exist, and water or air travel is underdeveloped. This means that if the road is unavailable, lifelines are lost, and people cannot reach services or markets. This leads to uncertainty, and has physical and mental health impacts, as well as economic impacts. Evidence supporting Problem 2 is presented below.

⁴⁸ Marlborough District Council (n.d.) "Water taxi subsidies and marina parking." Accessed 14/02/2023. <https://www.marlborough.govt.nz/civil-defence-emergency-management/august-storm-event-2022/general-recovery-information-august-2022-storm-event/water-taxi-subsidies-and-marina-parking>

Table 4-2: Cause, Effect and Consequence for Problem 2

Problem Two: Reliance on roads for access to services and lack of alternatives has led to increased vulnerability to the community during road closures (20%)	
Cause	Permanent and temporary residents live here Businesses are established here No alternative overland routes Limited air routes Water options underdeveloped
Effect	Loss of lifelines during events Loss of access to services and markets
Consequence	Uncertainty Health impacts Economic impacts

4.3.1 Cause: Groups Affected

One of the main groups affected by Problem 2 are permanent and temporary (holiday) residents. This means that the total number of people impacted by road closures will vary depending on the time of year. For example, storm events that occur in summer will affect around 7,000 people, whereas winter storm events will impact around 3,000 people.

Section 2.3.3 provides details of the number and type of business affected, estimated from responses to the Sounds Survey 2023. The total number of businesses affected is at least 150.

4.3.2 Cause: No Alternative Overland Routes

As shown in Figure 4-8 most of the roads connecting key services within the project scope do not have an alternate route. This means that should a section of road get washed out, flooded, or need to be closed all points beyond the closure are also cut off. Kenepuru Road, Queen Charlotte Drive, Ronga Road and Opouri Road are all roads where closure has widespread implications for all communities beyond the closure.

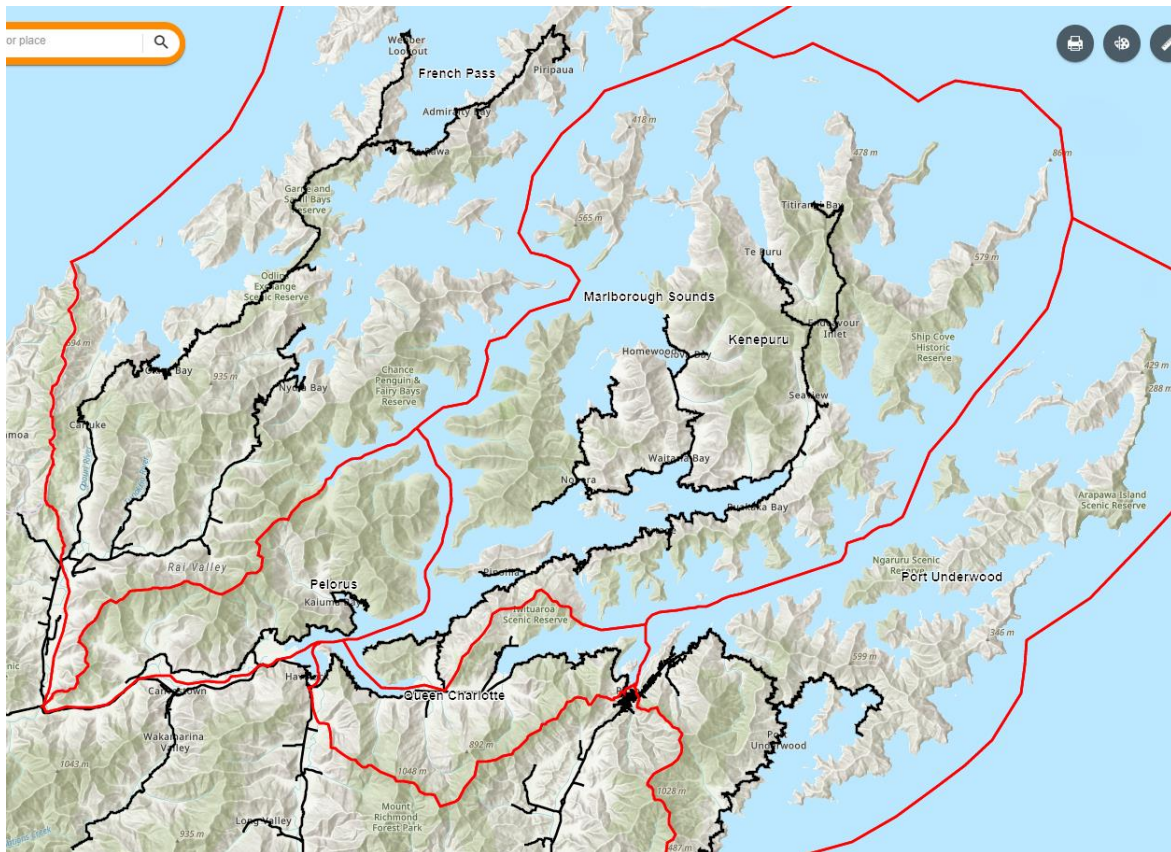


Figure 4-8: Roads in the Marlborough Sounds

Queen Charlotte Drive is critically important for resilience of the state highway network as it provides an alternative route between Blenheim and Havelock in the event of a closure of SH6, and between Blenheim and Picton in the event of a closure of SH1.

4.3.3 Cause: Limited Air Routes

As discussed in Section 2.5.6 there are a number of air strips located in the Te Aumiti/French Pass and Kenepuru zones. However, there are largely agricultural airstrips and used to assist with farming. While there may be good coverage of airfields, they are often very remote and in private ownership so are unavailable to other users. Also, air travel is not considered an affordable everyday option for most people. The same is true of helicopters – these are used by some, including emergency services, and there are landing sites across the Sounds. However, these are not an affordable option for many.

4.3.4 Cause: Challenges with Water Routes

The existing water routes and boating infrastructure in the Sounds are discussed in Section 2.5.5. While there is reasonable coverage of the Sounds, there are issues with water transport. Constraints for users include:

- Not everyone is able to easily get on or off the water taxis as they often don't have steps - people must climb on
- It is not considered an affordable option (as discussed in Section 2.5.4)
- It is not considered a convenient option when compared to road access
- Not every property has direct water access.
- Deep draft barges are required for larger loads, ie freight, and are restricted to areas with suitable water depth. Figure 4-9 shows areas in the Kenepuru and Pelorus Sounds that have been highlighted as too shallow for a barge to access.

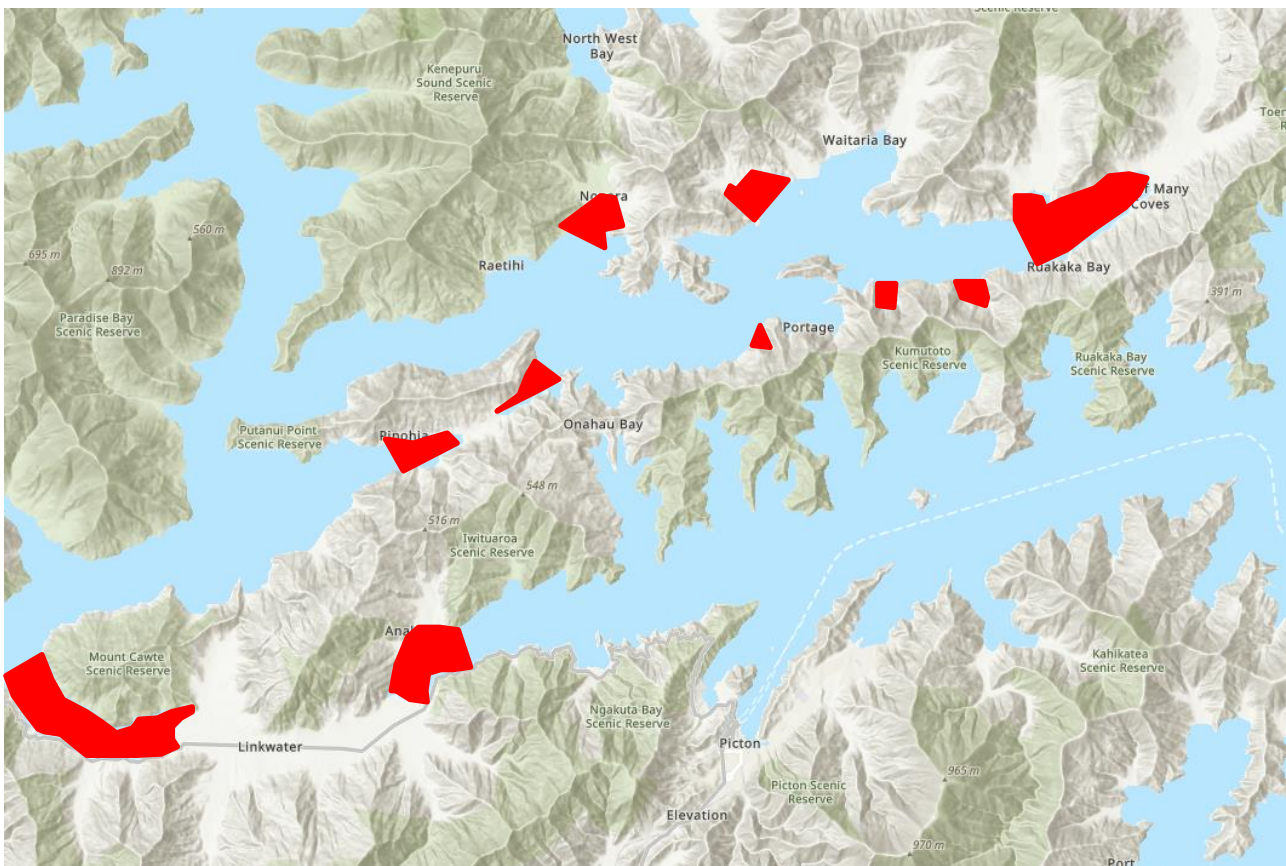


Figure 4-9: Areas identified as too shallow for barges

There are also challenges with the Sounds themselves, such as shallowness, silting, tidal ranges, and adverse weather conditions. Silting and sedimentation decreases water depth and particularly at lower tides can restrict the size of boats able to access certain areas of the Sounds. Dating of seabed sediment layers in the inner Pelorus Sound/Te Hoiere

shows sedimentation rates have experienced a ten-fold increase since the early 1900's.⁴⁹ Water transport can also be temporarily limited by adverse weather conditions. The smaller the vessel the greater the limitations, i.e. a large barge can still be used in conditions where a small water taxi would be unsuitable.

4.3.5 Effect: Risks to Lifeline Infrastructure

4.3.5.1 National Power Supply

Transpower's high voltage direct current (HVDC) cable, otherwise known as the Cook Strait Power cable, is **critically important national** infrastructure. The cable supplies the North Island with electricity generated in the South Island. It is the only interisland power cable. The cable is 610 km long, much longer than the Cook Strait section.

The cable is on overhead lines along Port Underwood Road and Tumbledown Road. These roads are essential for cable maintenance – there are no other access options. The cable then passes 40 km underneath Cook Strait to Wellington, within the Cable Protection Zone shown in Figure 4-10. This zone is principally for the HVDC cable but is also host to other cables, including critical fibre communication cables.

The HVDC submarine cables are nearing the end of their operational life and will be due for replacement around 2030. Any replacement or new cables are likely to be installed in the late 2020's and early 2030's.⁵⁰

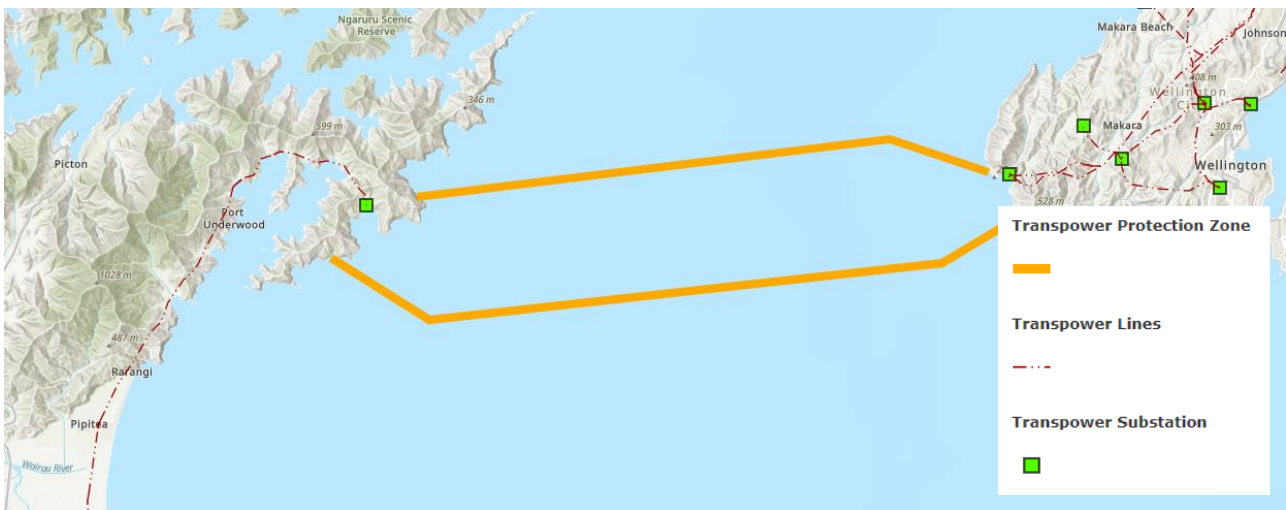


Figure 4-10: Locations of Cook Strait power infrastructure

4.3.5.2 National Communication Cables

There are three fibre optic submarine cables that connect the North and South Islands for mobile, internet and critical communication services. All submarine cables and the subsequent on land connections form part of the national telecommunications network. They are of equal importance to telecommunications services in New Zealand. Transpower's Cook Strait cable is the only one accessed via the Sounds. The approximate locations of the submarine fibre optic cables are shown in Figure 4-11.

⁴⁹ NIWA (2021) Sources of fine sediment and contribution to sedimentation in the inner Pelorus Sound/Te Hoiere. https://www.marlborough.govt.nz/repository/libraries/id:2ifzr1o01cxbymxkvwz/hierarchy/documents/environment/coastal/sedimentation-reports-list/Sources_of_fine_sediment_Pelorus-NIWA_report.PDF

⁵⁰ <https://www.transpower.co.nz/projects/hvdc-submarine-cable-replacement-and-enhancement-investigation>

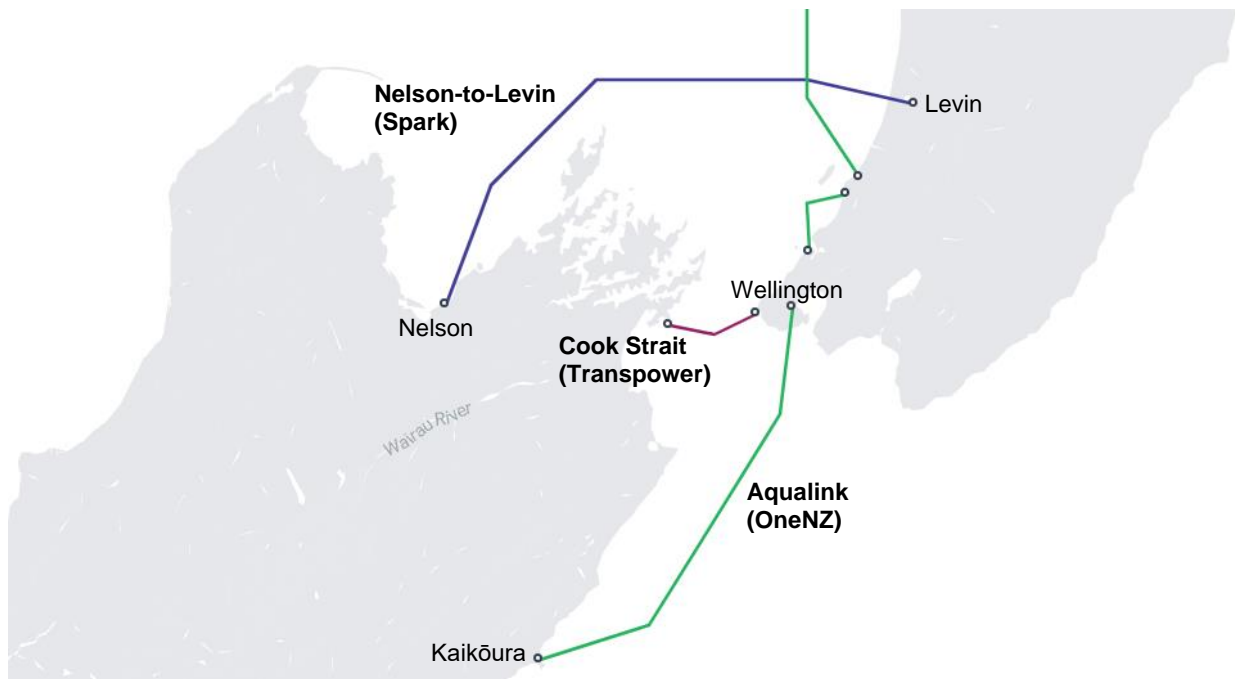


Figure 4-11: Interisland communication cable locations⁵¹

4.3.5.3 Local Power Supply

At a local level, there are high voltage (HV) overhead spur lines, low voltage (LV) overhead distribution lines, and customer owned LV overhead service lines throughout the Sounds. Figure 4-12 shows the existing Marlborough Lines HV infrastructure servicing the Sounds. Diesel generators at Elaine Bay and Kenepuru Head provide back up in the event of outages. The generators can meet power needs for at least 26 and 40 hours respectively. There are no generators in the Te Hoiere/Pelorus or Te Whanganui/Port Underwood zones.

Marlborough Lines have indicated there are 3,173 electricity consumer connections within the Sounds. During the July 2021 event 6,075 consumer connections were impacted across Marlborough, while during the August 2022 event 5,027 consumer connections were impacted across the region. In both events the Kenepuru area was the most heavily impacted, accounting for 55% to 58% of the total disruption.

During both storm events, the fixed diesel generators located at Kenepuru Head were utilised to restore power supply to customers in the area until lines could be repaired. During the August 2022 event there were issues with resupplying the generators with fuel as roads were closed. Tankers were eventually barged into Fish Bay and then drove to the generator site. This highlights the importance of being able to easily access these generators.

Although the power assets in the Sounds are predominately accessed by vehicle (four-wheel drive utes, trucks, side-by-side utility all-terrain vehicles, and rugged utility e-bikes), some sites are accessed by boat, helicopter, or even on foot. However, Marlborough Lines highlighted their concern at losing road access via Kenepuru Road, as it provides access to the south side of the Kenepuru and to all the HV spur lines, LV distribution lines and maintenance tracks that supply Queen Charlotte Sound and beyond.

⁵¹ <https://www.submarinecablemap.com/country/new-zealand> Accessed 8/08/2023



Figure 4-12: Marlborough Lines infrastructure⁵²

4.3.5.4 Local Communication Infrastructure

There are a variety of local communication assets owned by a variety of providers located throughout the Sounds. These assets are installed, maintained and replaced using roads where possible, but boat and barge access are already used extensively throughout Queen Charlotte Sound/Tōtaranui, Kenepuru Sound and Rangitoto ki te Tonga/D'Urville Island.

Most of these telecommunication assets are powered by the Marlborough Lines network and any power outages result in service outages. During the 2022 event multiple Chorus sites were affected due to power outages and landslips damaging cables and cabinets. In locations where cables were damaged or destroyed temporary cables have been installed to restore service. Permanent cables will not be installed decisions are made about future access.

4.3.6 Effect: Loss of Access to Community Facilities

As discussed in Section 2.5.1 Havelock and Picton are the main service centres, with smaller centres at Okiwi Bay, Rai Valley, Canvastown and Linkwater. These are the main destinations for most trips. As discussed in Section 4.3.2 there are no alternative overland routes, so if one section of road is cut off, everyone beyond that point is cut off, unless they have marine access.

Figure 2-8 (Section 2.5.1) shows the location of community facilities throughout the Sounds. A summary of key services is given in Table 4-3.

⁵² Source: Marlborough Lines, received via email, 24/02/2023

Table 4-3: Summary of key services in the Sounds

Area	Emergency Services	Health Care	Education	Groceries/Supplies
Te Aumiti / French Pass	Fire: French Pass, Okiwi Bay, Rai Valley	None	Primary and secondary school - Rai Valley	Fuel - French Pass, Elaine Bay, Okiwi Bay, Rai Valley Groceries - Okiwi Bay
Te Hoiere / Pelorus	Fire: Canvastown	None	Primary school - Canvastown	None
Queen Charlotte	Fire: Linkwater	None	Primary schools - Linkwater	Fuel - Linkwater
Kenepuru	Fire: Nopera, Sounds, Waitaria / Clova Bay	None	Primary schools - Waitaria	None
Te Whanganui / Port Underwood	Fire: Rarangi	None	Not available	Fuel - Oyster Bay
Havelock	Police, Fire	Pharmacy, Medical Centre	Primary schools	Groceries and fuel
Picton	Police	Pharmacy, Medical Centre	Primary and secondary schools	Groceries and fuel
Blenheim and Nelson	Ambulance	Wairau Hospital (Blenheim), Nelson Hospital	Primary and secondary schools	Supermarkets and fuel

4.3.7 Consequence: Uncertainty

A common theme throughout the early 2023 community engagement sessions were the impacts of the uncertainty around future access (refer to Appendix E for summary notes). This was particularly apparent for Kenepuru community. Some of the comments received regarding uncertainty include:

- *“It’s the not knowing with regards to the roads. It has placed a huge amount of cost on normal activities. Breakdowns etc cannot be fixed quickly and easily and any activities or requirements need to be organised days/weeks in advance”⁵³*
- *“Not knowing creates inability to plan anything. We have no barge facility. Stock in and out a nightmare.”⁵⁴*

It was also reported that people are selling their homes, or are considering doing so, and have concerns about whether they will have the same access as when they brought their property, and how that will affect house prices.

Community expectations of the access provided by the roads in the Sounds is generally higher than detailed by the ONRC. Customer Levels of Service as defined by Waka Kotahi for Access Roads are that users will experience varied travel times because of other users, weather conditions or the physical condition of the road. It states the route may not be available in weather events, and alternatives may not exist. Clearance of incidents affecting road users will have the lowest priority. The road will be of variable standard and alignments, with lower speeds and greater driver vigilance required on some sections.

This mismatch between community expectations and the guidance given by the Waka Kotahi for Access Roads has increased the overall feelings of uncertainty as the community expectations of an appropriate level of service does not match what is likely to be proposed. A proportion of people appear to rely on roads as if they are in town and have the expectation that they can run down to one day of supplies as the road will always be open.

4.3.8 Consequence: Negative Health Impacts

4.3.8.1 Marlborough Sounds Flood Assessment Report (2022)

Following the August 2022 storm event a survey was provided to 22 livestock farms in the Sounds, to gain an understanding of the wellbeing of those working in livestock farming following the event. Fourteen responses were received. It was concluded from the survey that all farmers affected by the storm event are experiencing significant mental health and welfare impacts.

The survey also asked a series of wellbeing questions, and the top three impacts from the 2022 weather events were:

⁵³ Sheppard Agriculture Ltd (2022) *Marlborough Sounds Post Flood Assessment: Report of Farm Survey*

⁵⁴ As above



- Losing interest in activities and tasks that were previously enjoyed
- Long periods of fatigue and tiredness
- Sleep problems – too much or too little.

Additionally, several comments from the survey indicated that road closures and uncertainty influenced mental health. This is supported by the feedback received at the community engagement sessions where a common theme was the stress caused by uncertainty around the future of the roads in the Sounds (refer to Appendix E for summary notes).

4.3.8.2 Wider Community Impacts Survey 2023

As part of this business case a community survey was available from 31 January to 22 February 2023. This was completed by 919 respondents. There were a number of health-related questions where respondents were asked to score their physical and mental health before and after the storm events, on a scale of 1 to 10. A summary of results for physical health is provided in Table 4-4, and mental health in Table 4-5. Please refer to Appendix I for the detailed results of the Social and Health Impact Assessment.

Table 4-4: Physical health results summary

Zone	Residents				Business and Resident			
	Count	Mean Score			Count	Mean Score		
		Before	After	Drop		Before	After	Drop
Te Aumiti/French Pass	47	8.28	7.72	0.55	3	8.88	7.38	1.50
Te Hoiere/Pelorus	6	8.50	6.83	1.67	3	9.33	8.00	1.33
Kenepuru and Queen Charlotte	167	8.29	7.30	0.97	47	8.87	6.89	1.98
Te Whanganui/Port Underwood	16	8.31	7.50	0.81	4	8.25	8.75	-0.50
TOTAL	236	8.29	7.39	0.89	62	8.85	7.13	1.73

Table 4-5: Mental health results summary

Zone	Residents				Business and Resident			
	Count	Mean Score			Count	Mean Score		
		Before	After	Drop		Before	After	Drop
Te Aumiti/French Pass	48	8.81	6.79	2.02	8	9.13	6.00	3.13
Te Hoiere/Pelorus	6	7.50	6.00	1.50	3	9.33	7.00	2.33
Kenepuru and Queen Charlotte	186	8.62	6.23	2.41	47	8.87	5.61	3.26
Te Whanganui/Port Underwood	16	8.06	6.69	1.38	4	9.50	9.00	0.50
TOTAL	238	8.59	6.37	2.24	62	8.97	5.95	3.02

The survey results show that:

- Mental health score decreased more significantly than physical health score, with the overall score across all zones for mental health dropping by 3 points on average, compared to 1.7 points on average for physical health.
- Those who are resident and operate a business in Kenepuru/Queen Charlotte had the biggest reported drop in physical health, by 2 points on average (from 8.9 to 6.9). This group also reported the biggest drop in mental health, of 3.3 points on average (from 8.9 to 5.6). Residents who operate a business in Te Aumiti/French Pass also reported a significant effect negative effect on mental health, with a 3.1 points drop on average.
- Words with strong negative connotations (isolation, separation, etc.) appeared frequently in survey responses.
- Words related to social relationships (parents, partners, friends, council, neighbourhood, etc.) showed high word frequency, indicating that social relations carried heavy weights when respondents described social impacts.

These findings demonstrate that the effect of the storm event on health, particularly mental health have been significant. This is true particularly for those residents operating a business in Kenepuru, Queen Charlotte or Te Aumiti/French Pass.



4.3.9 Consequence: Economic Impacts

4.3.9.1 Marlborough Sounds Flood Assessment Report (2022)

The following comments were made about the direct economic impact of the event:

- Having to buy or hire new equipment as the roads and farm tracks were not suitable for trucks
- Stock loss potentially due to the work required to gain access
- Increased costs associated with travel, the water taxis and barge usage
- *“The freezing company looks like covering increased costs due to barging. We have increased costs of freight getting goods and fertilizer in”*
- *“Having to have goods shipped out via barge that we could normally pick up has cost us a lot these past two years. Coordinating collecting from Fish Bay barge ramp can be difficult.”*
- *“We have Bookabach accommodations. We have had to cancel 95% of these bookings.”*

4.3.9.2 Wider Community Impacts Survey 2023

The survey asked respondents who identified as residents whether their household income had been affected by the storm event and subsequent access difficulties, and asked respondents who identified as businesses whether their turnover and business costs had been affected. Respondents who identified as resident/business (residents operating a business in the Sounds) were asked both sets of questions.

A total of 715 respondents provided information about income. The results are shown in Table 4-6.

Table 4-6: Economic impact of storm events

Percentage Loss	Lost Household Income (715)		Lost Business Turnover (152)	
0%	503	(70%)	45	(29%)
25%	156	(22%)	52	(33%)
50%	43	(6%)	29	(19%)
75%	7	(1%)	13	(8%)
100%	6	(1%)	17	(11%)
Average Loss	\$28,555		\$68,046	
Maximum Loss	\$250,000		\$337,500	

The data shows that 70% of residents have not experienced loss of income as a result of the storms. However, 30% estimate they have lost between 25% and 100% of their income, with a small number being very severely affected. The average income lost across all households was estimated at \$28,555, and the maximum reported was \$250,000.

The data shows that 29% of businesses have not experienced a loss of turnover due to the storm events. However, 33% estimate they have lost around 25% of their turnover, and 38% estimate they have lost between 50% and 100% of their turnover. The average loss of turnover is estimated at \$68,046 and the maximum reported was \$337,500.

Business confidence has been negatively affected by the storm event, as shown in Table 4-7. Business owners' level of confidence in their business going concern dropped from 8.8/10 (prior to the storm events) to 6.3/10 (after the storm events), indicating negative impacts on business confidence and future outlook. Business owners living in Kenepuru and Queen Charlotte are the worst affected, with a drop of 3.1 (from 9.1 to 6.0), followed by those in Te Aumiti/French Pass, with a drop of 2.0 (from 8.4 to 6.4). Business owners in Te Whanganui/Port Underwood have been little affected.

Table 4-7: Business owner confidence

Zone	Count	Mean Score Before	Mean Score After	Mean Score Drop
Te Aumiti/French Pass	34	8.38	6.38	2.00
Te Hoiere/Pelorus	12	8.17	6.75	1.42
Kenepuru and Queen Charlotte	94	9.06	5.98	3.12
Te Whanganui/Port Underwood	13	8.92	8.31	0.62
TOTAL	153	8.83	6.33	2.52

4.3.9.3 Community Workshops

Anecdotally, there have been many comments made at the Stakeholder and Community Workshops about the increased cost of transporting stock, fertiliser, and farmed export products around the Sounds via barge instead of heavy truck and trailers. This is due to the light vehicles only restriction on some roads, particularly the Kenepuru Road. The cost of barging is currently 50% subsidised by Council. The barge companies say that the current way they are being utilised is not efficient and with some changes productivity could be improved.

The storm events also directly impacted farms as areas of productive farmland were damaged following deposits of silt, gravel, and logs, and damage was incurred to waterways and fences⁵⁵. As discussed above, getting equipment in to fix these issues now requires far more planning than previously and is believed to be more expensive.

4.4 Problem 3: Asset Vulnerability

The cause, effect and consequence for Problem 3 are show in Table 4-8 and evidence provided below. Problem 3 results from a poor road construction standard combined with unstable geology. As a result, the roads are very vulnerable to landslips, and require a lot of maintenance and emergency works following events. There is also an increased safety risk for road users.

Table 4-8: Cause, effect, and consequence for Problem 3

Problem Three: Poor construction standard and unstable geology means the Marlborough Sounds roads have a high maintenance cost, high emergency works cost and an increased safety risk (50%)	
Cause	Geology (Natural Slope Instability Hazards, Debris Flow Hazards) Poor construction standard (human induced slope stability hazards) Infrequent maintenance
Effect	A large number of faults were experienced during the 2021 and 202 weather events Parts of the Sounds are highly susceptible to global slope instabilities The road corridor is highly susceptible to over slips and under slips
Consequence	Increase maintenance cost High emergency works cost Increased safety risk

4.4.1 Cause: Geology

The Marlborough Sounds lie in the most seismically active part of the country near the southern limit of the Pacific plate, with the Wairau (alpine) fault to the south and the Waimea-Whangamoia fault to the west. The area is subject to frequent deep earthquakes and numerous shallow earthquakes. Earthquake events causing serious structural damage can be expected every 55 to 60 years.⁵⁶

Climate, topography and geology all contribute to natural slope instability. In the Sounds there are numerous fault zones and rock types that are inherently unstable. The most significant effects of slope instability are slope failures and ground subsidence. These failures are naturally present and would occur even if the terrain wasn't altered by human influences.

13% of roads in the Sounds are highly or very highly susceptible to slope instability. The bulk of this instability is in the Kenepuru zone. Kenepuru has 70% of the roads that are highly or very highly susceptible to natural slope instability, but only 32% of the total road length of the Sounds. The next most susceptible zone is Te Aumiti/French Pass which has 22% of the naturally unstable roads, but 42% of the total road length of the Sounds.

When natural instability is combined with human-induced instability (refer to Section 4.4.2), the extent of the issue across the Sounds is apparent, as shown in Figure 4-13.

For more information regarding the natural hazards of the Sounds, refer to the *Marlborough Sounds Future Assess Study Preliminary Natural Hazard Susceptibility, Implications and Interventions Report*.

⁵⁵ Marlborough District Council, "Fortnightly Recovery Updates," <https://www.marlborough.govt.nz/civil-defence-emergency-management/august-storm-event-2022/general-recovery-information-august-2022-storm-event/weekly-recovery-updates/marlborough-recovery-update-02>

⁵⁶ Marlborough District Council, "Natural Hazards," in *Marlborough Sounds Resource Management Plan Volume 1*, (2003), 16-1, https://www.marlborough.govt.nz/repository/libraries/id:2ifzri1o01cxbymxkvwz/hierarchy/documents/your-council/environmental-policy-and-plans/msrmp-volume-1-list/Chapter_16_Natural_Hazards.pdf



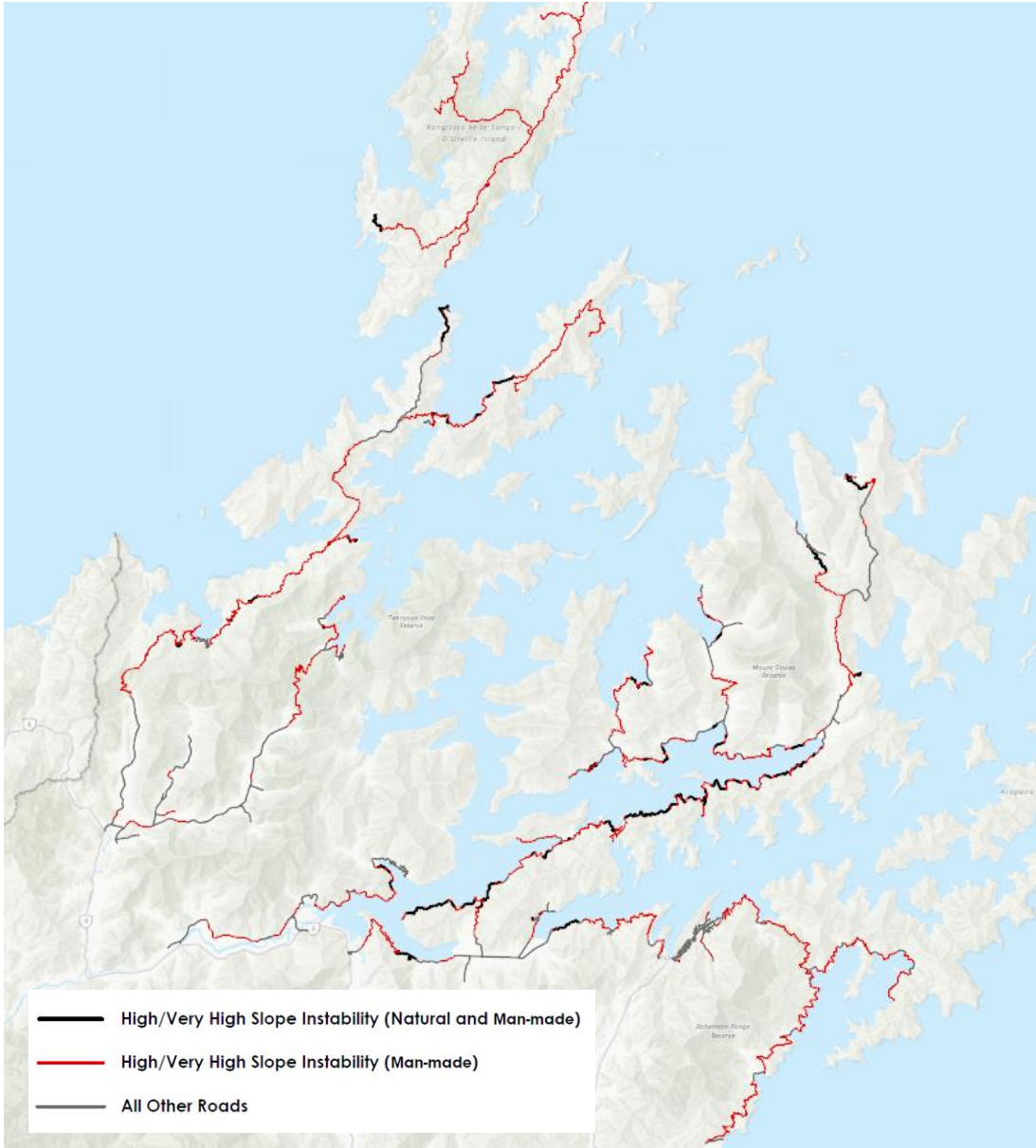


Figure 4-13: Areas of high and very high natural and man-made slope instability

4.4.2 Cause: Poor Construction

Road construction methods can contribute to slope instability, and this is known as human induced slope instability. Over steepened cut batters and non-benched side-cast fill slopes are common features of many Sounds roads that contribute to this instability. This is largely due to the inadequate design or poor construction techniques of the time (going through with a bulldozer) when compared to modern standards.

Vegetation removal and the alteration of drainage patterns can also be a contributing factor in this instability. The alteration of drainage patterns associated with reshaping the land tend to accumulate and focus water discharge which can adversely affect terrain stability. Roothing, forestry and residential development can all contribute to changes in drainage patterns.

The road construction method at that time most of the roads in the Sounds were built was 'cut and cast'. The road is created by driving through with a bulldozer or excavator, cutting out the up-slope side. That 'side cast' material is then used fill the down slope side. There is minimal engineering effort that goes into this type of construction with essentially loose fill material used on the downslope side to support the road, rather than engineered material which would be uniformly dense. In addition, the cut slopes were often over steep, with minimal drainage provided.

This process was repeated when the roads were widened from single lane to dual lane in the mid-1900s. The widening made the over steepened slopes higher and increased the amount of side cast material used as fill on unready unstable slopes. These poorly constructed and non-compacted roads were then sealed for amenity reasons – to reduce dust and provide a smoother driving surface – from the 1980s onwards.

Figure 4-14 shows the typical failure scenario that was experienced by many of the roads during the recent storm events. Figure 4-15 shows how these roads would be constructed today. Refer to Appendix J for more images detailing the historic construction process.

Figure 4-16 shows the susceptibility of roads in the Sounds to human induced slope instability. It shows that approximately 70% of the length of road in the Sounds is either highly or very highly susceptible to human induced slope instability. Nearly 90% of the length of Te Whanganui/Port Underwood roads are either highly or very highly susceptible to human induced slope instability. Kenepuru Road between Linkwater and the Heads is also of concern, as much of this road is very highly susceptible to human induced slope instability. This is compounded between Te Mahia Bay and the Heads where areas of very high human induced slope instability coincide with areas of very high natural slope instability.

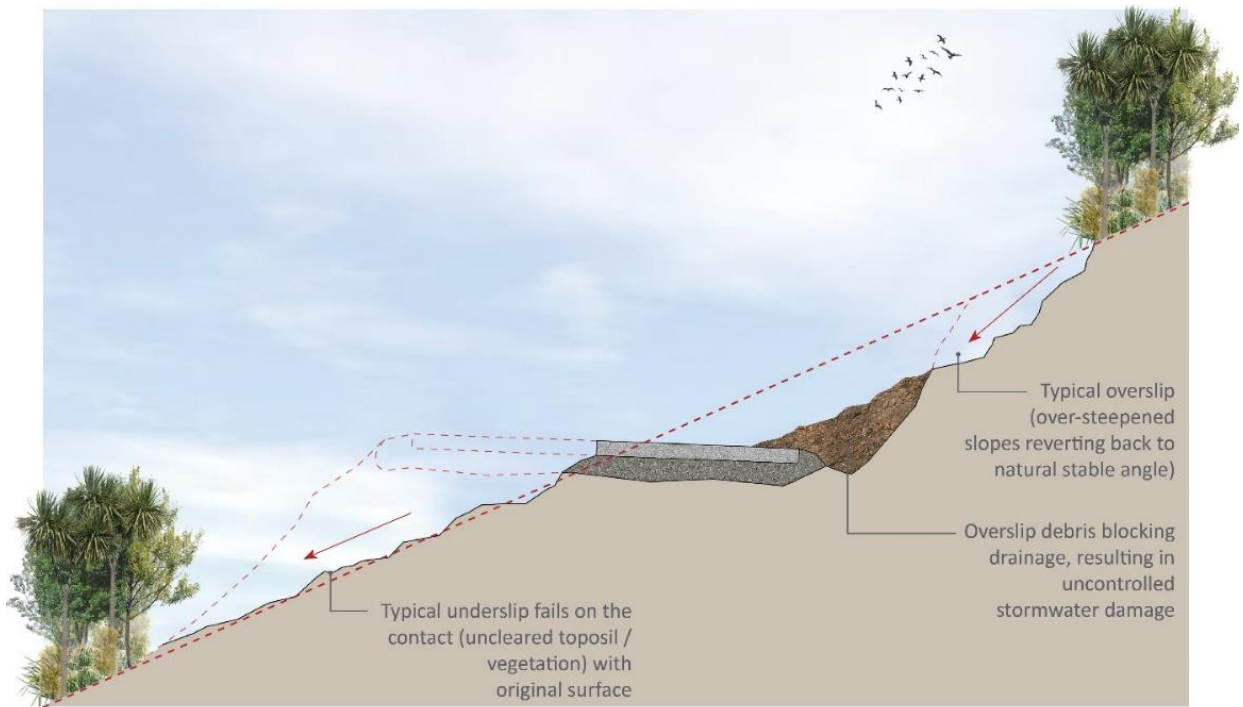


Figure 4-14: Typical failure method

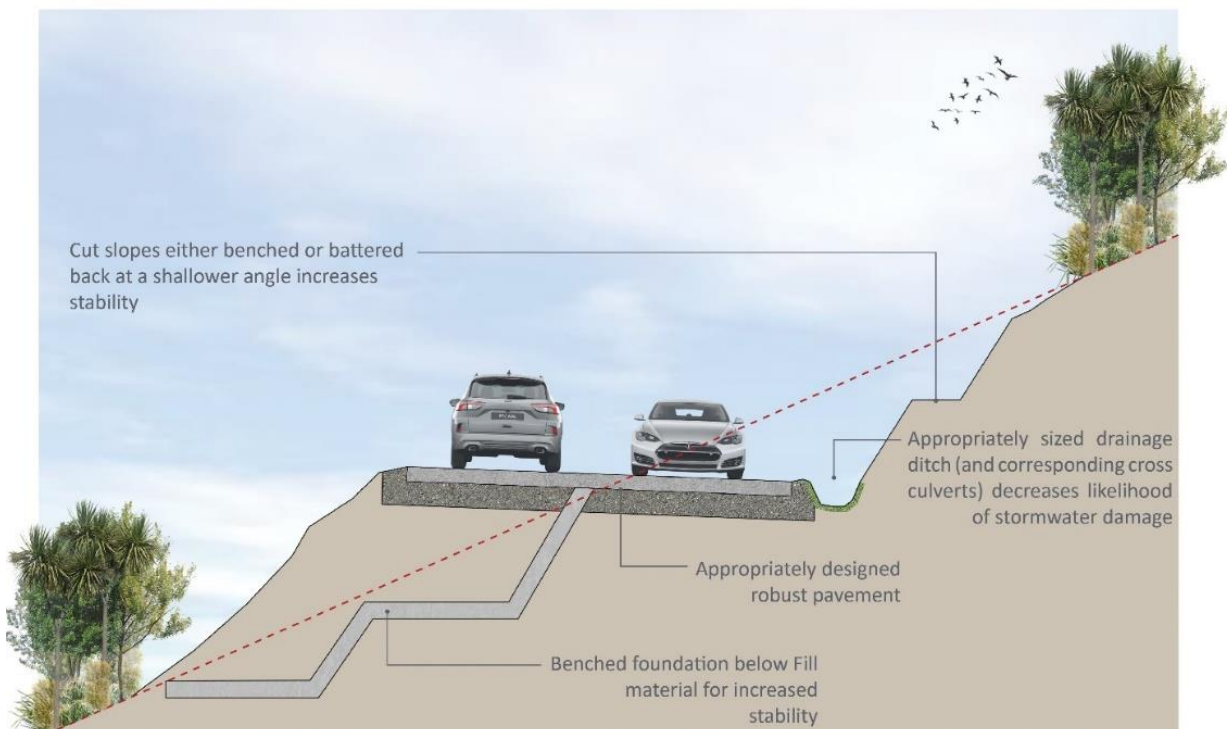


Figure 4-15: Modern road design features

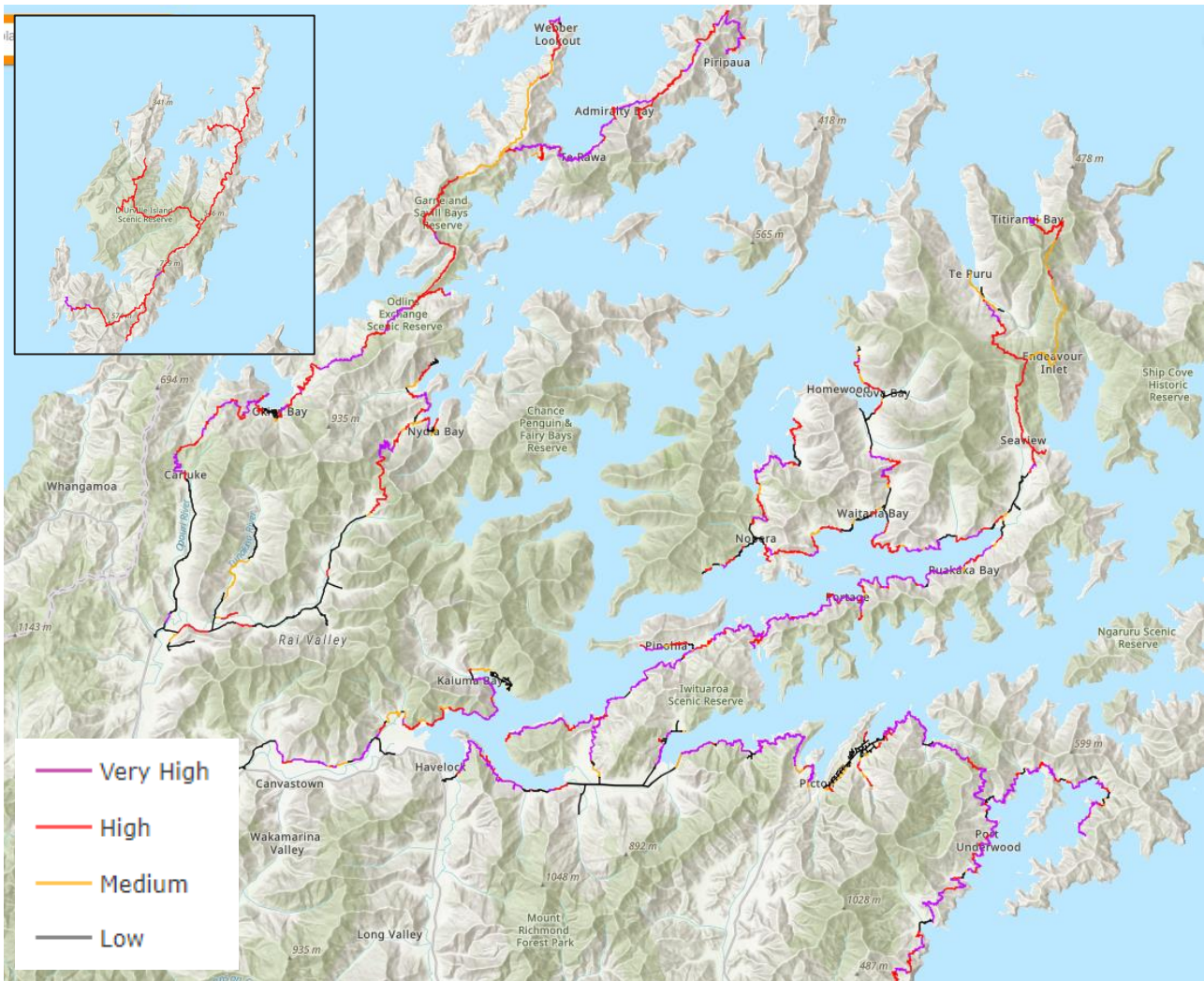


Figure 4-16: Map of susceptibility to human induced slope stability

4.4.3 Cause: Maintenance

Regular maintenance is important to ensure roads continue to provide access. In the case of the Sounds, the maintenance which would help to make these already vulnerable roads more resilient during storm events primarily relates to more regular culvert clearance and drainage work to ensure effective drainage during storm events. However, the drainage systems in place during the storm events were undersized by today’s standards⁵⁷ and unable to handle the rainfall the Sounds experienced. So even if all channels and culverts were completed cleared (unaffordable not achievable in the lead up to each event), it is likely that slips still would have occurred and washed-out roads.

The community provided strong messages that they believed more regular drainage maintenance would have ensured the roads would be more resilient during the storm events. Refer to Appendix E for a summary of comments from community engagement.

Figure 4-17 shows that over the past five years the maintenance spend per km of road has been greater for roads in the Sounds than the roads in the rest of Marlborough. In the 2020/21 financial year the spend per km in the Sounds was only 5% greater than the rest of Marlborough, but in 2017/18 it was 64% greater. Conversely in the three years preceding 2016/17 the maintenance spend per km outside the Sounds was between 20% and 70% greater than what was spent in the Sounds.

Its important to note that the cost of completing maintenance in the Sounds is likely more expensive than the rest of Marlborough due to the remoteness of the Sounds. However, the difference should not be as large as occurred for some years.

⁵⁷ Although undersized by today’s standards, the drainage systems were constructed to the standards and demands of the time

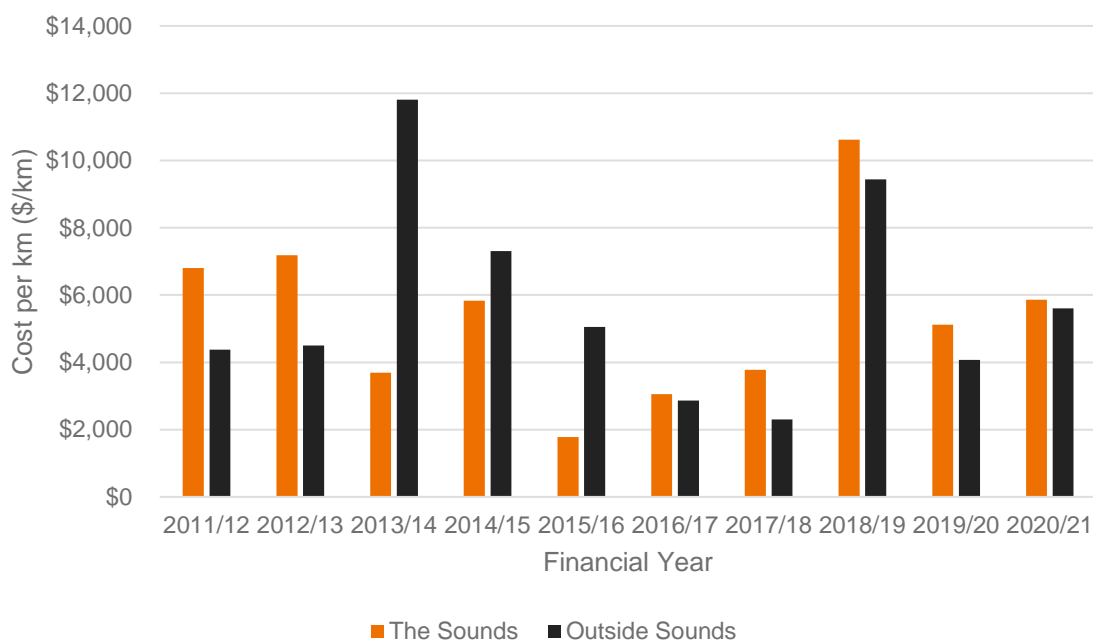


Figure 4-17: Maintenance spend per kilometre in the Sounds and outside the Sounds

4.4.4 Effect: 2021 and 2022 Weather Event Faults

The Sounds roading network experienced 915 faults during the 2021 weather event and 2,725 faults during the 2022 weather event. Table 4-9 and Table 4-10 summarises the type of faults experienced by each zone for each weather event. For maps and a more detailed breakdown of faults by road segment⁵⁸ and per kilometre of road refer to Appendix K .

Table 4-9: 2021 event faults by zone and fault type

	Te Aumiti / French Pass	Te Hoiere / Pelorus	Queen Charlotte	Kenepuru	Te Whanganui / Port Underwood	Total
Length (km)	204.1	31.2	42.1	154.6	58.7	490.5
Asset Damage	0	0	4	1	0	5
Culvert Issues	10	12	45	107	19	193
Pavement	0	0	64	0	0	64
Scour	8	11	20	15	9	63
Structural Issues	1	0	1	7	2	11
Surface Flooding	0	0	1	2	0	3
Tress/Debris	1	4	6	69	5	85
Over slips	7	35	78	169	43	332
Under slips	2	2	35	112	8	159
Total	29	64	254	482	86	915

⁵⁸ Refer to Section 8.2.1 for an explanation of how the roads in each zone were broken down into segments.

Table 4-10: 2022 event faults by zone and fault type

	Te Aumiti / French Pass	Te Hoiere / Pelorus	Queen Charlotte	Kenepuru	Te Whanganui / Port Underwood	Total
Length (km)	204.1	31.2	42.1	154.6	58.7	490.5
Asset Damage	0	1	1	15	1	18
Culvert Issues	137	24	46	301	57	565
Pavement	0	0	0	0	0	0
Scour	58	13	11	156	12	250
Structural Issues	6	1	2	4	2	15
Surface Flooding	8	0	0	0	0	8
Tress/Debris	26	6	26	52	51	161
Over slips	203	62	155	465	293	1,178
Under slips	91	2	62	323	52	530
Total	529	109	303	1,316	468	2,725

Key things to note:

- Both events:
 - The Kenepuru zone experienced the greatest number of faults in both weather events. Kenepuru had 53% of the total faults in 2021 and 48% of the total faults in 2022.
 - Over slips and under slips accounted for 54% of all faults in the 2021 event and 63% of faults in 2022. The next most common fault was culvert issues (21% in both 2021 and 2022).
- 2021:
 - The Queen Charlotte zone had the highest density of faults per kilometre of road with 6.03 faults recorded per kilometre, but only 28% of the total recorded faults. The Kenepuru area had the second highest fault density with 3.12 faults per kilometre, but over half of the total faults.
 - At a road segment level Kenepuru Road between the Moetapu Bay turn off and Mahau (K2) had the highest density of faults with 9.67 faults per kilometre. This was followed by the route between Havelock and Linkwater (QC1) at 7.42 faults per kilometre, and Kenepuru Road between Mahau and Portage (K3) at 6.77 faults per kilometre.
 - Refer to Appendix K for more information on fault densities for each road segment.
- 2022:
 - During the 2022 event Kenepuru had the highest density of faults with 8.51 faults per kilometre and accounted for just under half of the total faults recorded. Te Whanganui/Port Underwood was second with 7.97 faults per kilometre, with Queen Charlotte a close third with 7.20 faults per kilometre.
 - At a road segment level Kenepuru Road between Mahau and Portage (K3) had the highest density of faults with 22.04 faults per kilometre or road, followed by the section between Portage and the Heads (K4b) with 17.73 faults per kilometre.

4.4.5 Effect: Susceptibility to Landslips

As detailed in Section 4.4.1 and 4.4.2 large portions of the roads in the Sounds are highly or very highly susceptible to natural slope instability and human induced slope instability. These types of instability typically result in either over slips or under slips. As discussed in Section 4.4.4 approximately 60% of the recorded faults in both the 2021 and 2022 weather events were slips. There is a close correlation between the location of slips and unstable land as mapped in Figure 4-13.

This is compelling evidence of susceptibility to landslips for the roads identified, particularly sections of Croisilles-French Pass Road, Kenepuru Road, Queen Charlotte Drive and Port Underwood Road. Refer to Appendix K for maps of all fault data.

4.4.6 Consequence: Increased Spending

A comparison with MDC's peer groups (Table 4-11) showed that for ONRC Access roads, which is most roads in the Sounds, Marlborough had the highest spend on bridge, pavement and shoulder maintenance per lane kilometre (indicated by a red cell), and second highest spend on drainage and surfacing (indicated by an orange cell).

Table 4-11: Access Roads peer group comparison of spend per lane kilometre (\$/km)⁵⁹

District	Bridge Maintenance	Drainage	Pavement	Shoulder	Surfacing
Marlborough	135	719	986	177	10
Tasman	4	177	274	92	21
Whanganui	42	50	886	110	
Whangārei	3	834	261	52	2
Timaru		426	914		5

In February 2022 Council commissioned a report to determine Marlborough's costliest rural routes. The report determined that rural roads with a 10-year annual average spend of greater than \$100,000 represent 30% of the network by length but incur greater than 60% of the annual rural roads maintenance and emergency works cost across the whole network. Looking at just the Sounds, the most expensive roads in the Sounds account for 30% of the annual rural roads maintenance and emergency works cost across the whole network, despite only accounting for 18% of the rural road network length.

Figure 4-18 shows the rural roads with the greatest combined cost per kilometre per annum. Roads in the Sounds that are highlighted as expensive per kilometre of road length are:

- Te Aumiti/French Pass:
 - Ronga Road
 - Croisilles-French Pass Road
 - Opouri Road
- Te Hoiere/Pelorus: Kaiuma Bay Road
- Queen Charlotte: Queen Charlotte Drive
- Kenepuru:
 - Kenepuru Road (Linkwater-Heads)
 - Kenepuru Road (Heads-Raetihi)
 - Manaroa Road
 - Moetapu Bay Road
- Te Whanganui/Port Underwood: Port Underwood Road

Following the July 2021 event \$30M was spent on Kenepuru Road (Linkwater-Heads). This corresponds to an additional emergency spend of \$17,000/km/year, or an additional \$3M/year over a 10-year period. This was already the most expensive rural road section and third most expensive rural road per km prior to the 2021 event.

⁵⁹ Te Ringa Maimoa, 2020/21



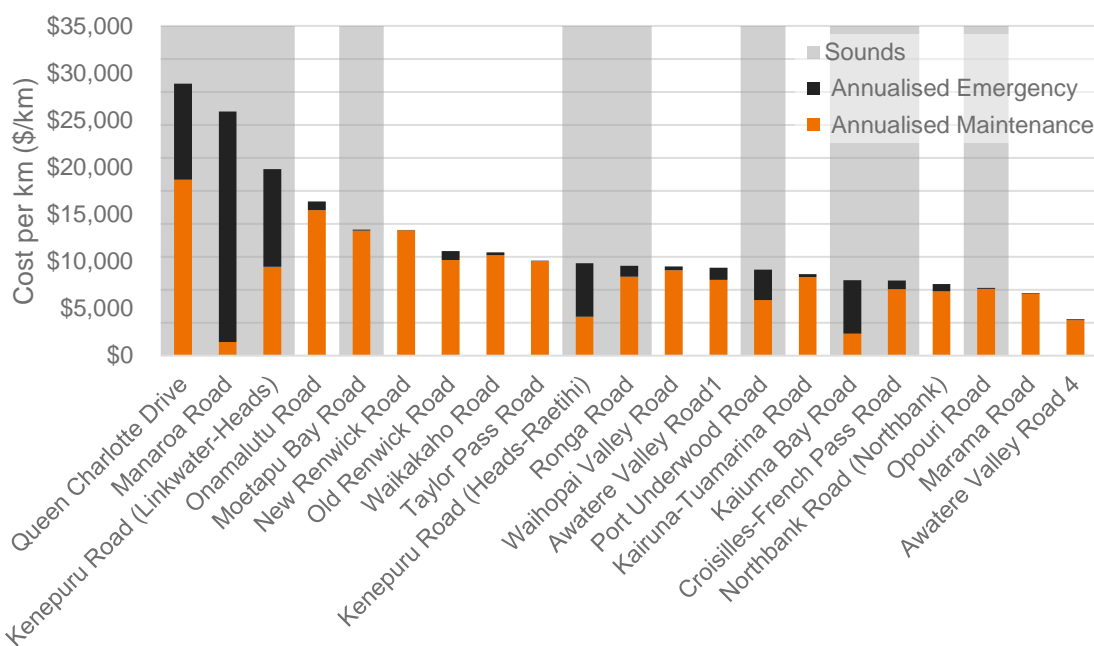


Figure 4-18: Most expensive rural road costs per kilometre

4.4.7 Consequence: Safety

The Waka Kotahi Crash Analysis System (CAS) tool recorded 93 crashes in the study area (excluding Picton) in the last full five-year period between 2017 – 2021, including available 2022 data. The crash analysis was completed on 13 December 2022.

Between 2017 and 2021 83 crashes were recorded: four fatal crashes, seven serious injury crashes, 20 minor injury crashes, and 52 non-injury crashes. To date in 2022 there has been one fatal crash, three serious injury crashes, one minor injury crash and six non-injury crashes. It is likely these numbers underestimate the total number of crashes, as it is likely that many will not be reported e.g. vehicle may be towed out of ditch by local resident and just keep going.

The locations of the death and serious injury (DSI) crashes between 2017 and the end of 2022 are shown in Figure 4-19. DSI crashes account for approximately 16% of all crashes in the study area within this period.

Key points are summarised below:

- Approximately 80% of crashes occurred in fine weather, and 71% of all crashes happened during the day.
- The most common crash type was of the ‘Bend – lost control/head on’ type, at over 84%. Further, 14 of the 15 DSIs resulted from this crash type.
- Fatal crashes:
 - Two of five fatal injuries occurred in the Te Aumiti/French Pass zone.
 - All five fatal crashes involved vehicle with only one occupant and were the result of a vehicle leaving the carriageway and falling down an embankment or gully. The fatal crash on Kenepuru Road occurred when a grass verge the vehicle had veered onto gave way beneath the weight of the heavy vehicle, causing the truck to slide down a steep bank.
 - Two trucks, a ute, an SUV and a tractor were the vehicles involved in the fatal crashes.
- None of the recorded crashes in this period involved pedestrians or cyclists.
- Five crashes involved drivers with overseas licences: one serious injury crash, two minor injury crashes, and two non-injury crashes.

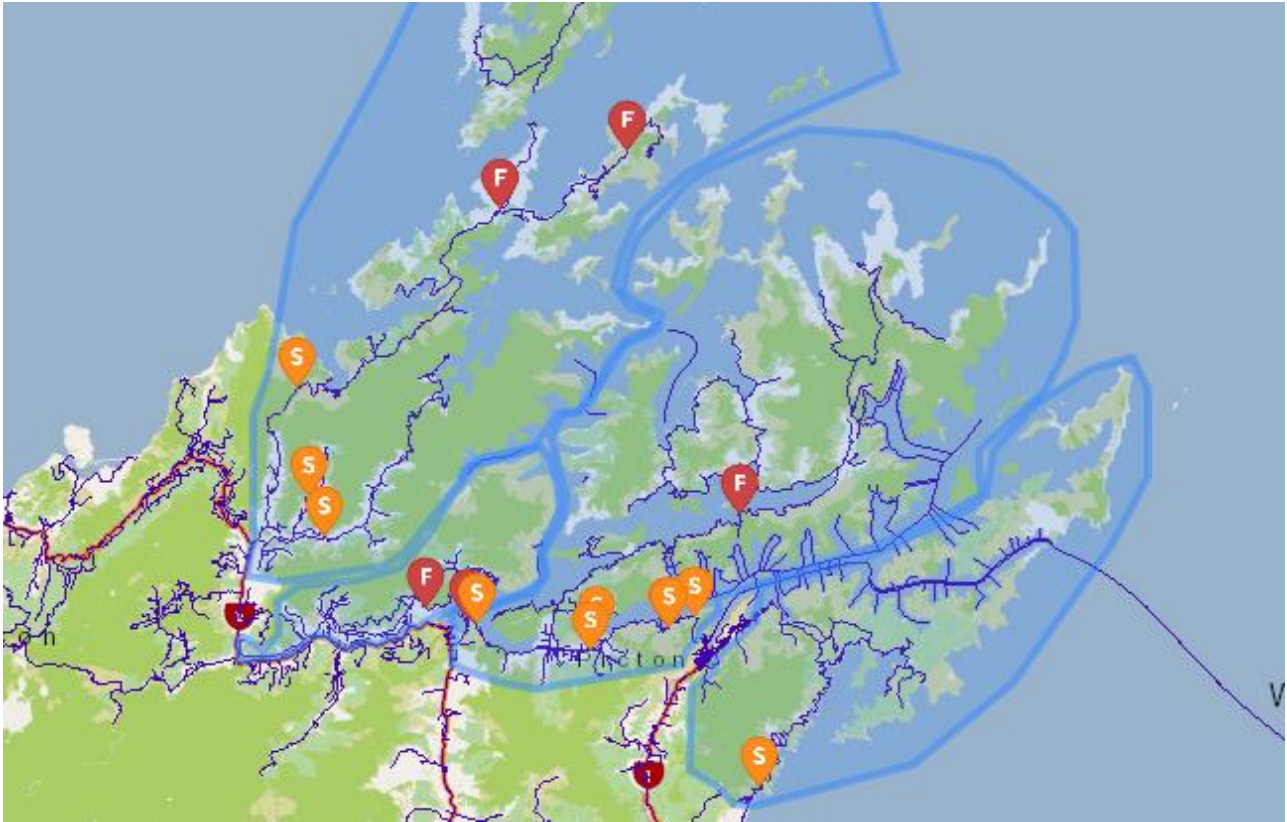


Figure 4-19: Death and serious injury crashes in the Marlborough Sounds

The Marlborough District is of 'medium concern' for driver distraction in comparison to other regions in the country, as outlined in the Communities at Risk Register 2022. This designation relates to communities with personal risk profiles greater than half a standard deviation from the mean, but below one. All other categories assessed by the register fall below this level of concern for Marlborough.

The following general comments have also been made by stakeholders when asked about the safety of the roads:

- **Safety issues:** driving off the edge, narrow, no edge barriers, conflicts between heavy vehicles and light vehicles, increasing number of narrow areas because of the storm events increasing safety risk, posted speed limit too high and people drive too fast.
- **Visitors:** tourists are not used to the roads; roads are not suitable for different types of tourist vehicles such as campervans and boat trailers.
- **Trucks:** heavy vehicles cross centrelines on blind corners, the trucks are not just farm servicing trucks but are also servicing other business sectors and development.

4.5 Problem Summary

A summary of the evidence collected for each problem is given in Table 4-12. The evidence shows approximately 2,000 residents and at least 150 businesses are affected, and that the effect of loss of access has been severe on these groups. This has been seen both in terms of mental health and disruption to normal practices – from going to school, to getting a prescription, to transporting stock to market. For many, daily life has become a challenge. After the 2022 storm event, road closure data shows that Kenepuru Road (Linkwater to Heads) was closed to all vehicles for two months and is still closed to heavy vehicles and non-residents today (over a year post event). Although alternatives have been provided by way of water taxis and barges, these reportedly take longer and cost more to use than driving.

The combination of unstable geology, steep topography, poor road construction and extreme rainfall events resulted in 1,892 slips after the 2022 storm event, primarily affecting Kenepuru Road, Croisilles-French Pass Road, Queen Charlotte Drive and Port Underwood Road. These are the main roads connecting people to goods and services, as well as the wider state highway network and markets beyond. They are also used to service important lifeline infrastructure such as the Cook Strait power cable, which supplies the North Island with electricity generated in the South Island.

Currently there is some resilience provided by water access. Historically water access was important, and there are barge sites in the Kenepuru zone at Fish Bay, Te Mara and Portage which have been used to provide access since the 2022 storm. There are also many public and private jetties and boat ramps, and some properties already rely on these for access. However, an estimated 75% of properties are not located within 50 m of a jetty and must drive to public sites.

The 2022 weather event is described in Tiro Rangi, the Waka Kotahi Climate Adaptation Plan 2022-24, under the heading 'we are already responding to climate change'. The plan notes the significant strain on local teams, communities, and suppliers. It is expected that climate hazards will continue to affect the Sounds into the future, as sea levels rise and intense rainfall events continue or worsen in frequency and duration.

Table 4-12: Problem evidence summary

Problem		Summary	
Problem 1: Disrupted Access	Cause	Sea level rise and land subsidence	<ul style="list-style-type: none"> Sea rising at a rate of ~2.7 mm/year (at Portage, under the 2-4.5 (medium confidence) RCP scenario) and land is sinking on average 1.6 mm/year (at Portage), giving an estimated sea level rise of 30cm by 2050 for Portage. Under the SSP5-8.5 scenario sea level could rise by up to 1m at Portage by 2100.
		Costal erosion and inundation	<ul style="list-style-type: none"> Areas under 3m elevation at high risk of inundation and erosion Areas between 3m and 5m elevation at medium risk of inundation and erosion Areas above 5m but within 100m of the coast may be at risk from future erosion
		Storm frequency and intensity change	<ul style="list-style-type: none"> Frequency: with future climate change (RCP4.5 2081-2100), damaging events will be approximately twice as frequent as historic patterns Intensity: August 2022 rainfall was three times the previous monthly maximum, and five times larger than the historic average. Intensities will increase with climate change. Under RCP4.5 2081-2100, the 1:100 AEP future event will be about as intense as the 1:200 AEP historic intensity.
	Effect	Increase in frequency and duration of road closures	<ul style="list-style-type: none"> Data gap prior to 2021 In December 2021 (5 months after storm event) 0.1 km of road was closed and 108 km of roads were under residents only access In December 2022 (4 months after storm event) 2.3 km of roads were closed and 65 km were under restricted access. Closures likely to become more frequent with climate change.
Consequence	Impacted access	<ul style="list-style-type: none"> There were months of roads closures following the 2021 and 2022 events. Kenepuru Road is still under restricted access and has been since the 2021 weather event. 	
Problem 2: Lack of Alternatives	Cause	People live here	<ul style="list-style-type: none"> 2,055 permanent residents Sounds population peaks in summer when bach owners are other tourists come and stay (approx. 5,000 additional residents)
		Businesses are located here	<ul style="list-style-type: none"> At least 150 businesses Known businesses in the Sounds include farming (sheep, cattle, deer), forestry, aquaculture (muscles, salmon, seaweed, etc), and many tourism offerings including accommodation, cafes and guided tours.
		No alternative overland routes	<ul style="list-style-type: none"> All roads in the Sounds are eventually dead ends, so if one part of a road is closed, everyone beyond that point loses access. The exception to this is Queen Charlotte Drive and Port Underwood Road. Queen Charlotte Drive is critically important for resilience of the state highway network as it provides an alternative route between Blenheim and Havelock in the event of a closure of SH6, and between Blenheim and Pickton in the event of a closure of SH1.
		Limited water routes	<ul style="list-style-type: none"> There are some existing water access points available, but they are more expensive and less convenient for locals, and some have tidal restraints. Approximately 75% of properties are more than 50m from a jetty, and 63% are more than 100m from a jetty The Sounds are generally considered too shallow for development of new water access points.

Problem		Summary	
Problem 2 cont.		Limited air routes	<ul style="list-style-type: none"> There is a reasonable collection of airstrips in the Sounds, however they are mostly privately owned and used for farming and agriculture. Air travel is not an affordable or realistic option for many residents.
	Effect	Risk to lifeline infrastructure	<ul style="list-style-type: none"> The Cook Strait electricity cable runs above ground along Port Underwood Road and Tumbledown Bay Road to Ōraumoā / Fighting Bay. It is the only power connection between the North and South Islands There is also a fibre optic communications cable that comes from Picton, along Port Underwood Road to Whatamango Bay and then along the ridgeline on private land to Ōraumoā/Fighting Bay. It assists in managing the national grid.
		Loss of access to community facilities	<ul style="list-style-type: none"> Health care can only be accessed in Havelock and Picton Secondary education can only be accessed in Rai Valley or Picton Supermarkets and food supply can only be accessed at Okiwi Bay, Havelock and Picton If any road is cut off, currently no easy alternative
	Consequence	Uncertainty	<ul style="list-style-type: none"> A common theme from the community engagement sessions was the impacts of the uncertainty around future access.
		Negative Health Impacts	<ul style="list-style-type: none"> Sounds Survey 2023 showed people's mental and physical health scores declined after the storms, compared to before, with mental health strongly affected, with scores declining 30%. Business owners in Kenepuru, Queen Charlotte Drive and Te Aumiti/French Pass were disproportionately affected. The Sheppard Agriculture survey found 69% of livestock farmers are more concerned with their mental wellbeing since the 2022 event. A common them from the community engagement sessions was the stress caused by the uncertainty around the future of the roads.
		Economic Impacts	<ul style="list-style-type: none"> Sounds Survey 2023 showed 18% of residents operating businesses in the sounds reported loss of income. The average loss was \$27,000 and the maximum was \$150,000. Business confidence dropped by 20-30%, with businesses in Kenepuru and Queen Charlotte Drive most negative, followed by those in Te Aumiti/French Pass. Anecdotal evidence of increased cost to get stock/product in and out of farms in Kenepuru.
Problem 3: Asset Vulnerability	Cause	Geology	<ul style="list-style-type: none"> Many sections of road are built on unstable land. Many would not be constructed today due to the number of underlying hazards. A long section of Kenepuru Road between Motapu Bay Road and Kenepuru Heads is on unstable land.
		Poor construction	<ul style="list-style-type: none"> The construction standard of many of the roads was not suitable for the underlying geology and topography.
		Infrequent maintenance	<ul style="list-style-type: none"> A recurring comment at all the community meetings was a perceived lack of road maintenance, particularly drainage maintenance. A comparison with MDC's peer group that for 'access' roads, which is most roads in the Sounds, Marlborough had the highest spend on bridge, pavement and shoulder maintenance per lane kilometre, and second highest spend on drainage and surfacing.
	Effect	Susceptible to landslips	<ul style="list-style-type: none"> Typically, the over slips and under slips from the 2021 and 2022 weather events occurred in areas of unstable land. Kenepuru Road, Croisilles-French Pass Road, Queen Charlotte Drive and Port Underwood Road experienced the highest concentration of slips after the 2022 event. There were 1892 slips affecting roads after the 2022 event.

Problem			Summary
Problem 3 cont.	Consequence	Safety	<ul style="list-style-type: none"> There have been four fatal crashes and seven serious injury crashes in the Sounds between 2017 and 2021. In 2022 (until early December) there was one fatal crash and three serious injury crashes. 66% of all crashes were loss of control off road crashes, and all fatal crashes were of this movement type The road environment (narrow and winding alignment, non-existent or narrow shoulders, high-moderate to high severity roadside hazards) increases the severity of any crashes that do occur.
		Increased maintenance costs	<ul style="list-style-type: none"> Prior to 2021/22 financial year 11 roads in the Sounds accounted for 30% of the total spending on rural roads despite only covering 18% of the rural road network.

4.6 Investment Objectives and Benefits of Assessment

4.6.1 Investment Objectives

Three investment objectives have been identified for the project, as shown in the Investment Logic Map below. The investment objectives clarify the future access needs. They summarise the desired outcomes of any investment, articulating what is needed to address the gap between existing and future needs. The agreed Business Case **Outcome Statement** is 'Provide access for the wellbeing of Marlborough Sounds Communities, through a safe and resilient transport system'.

The evidence presented clearly supports the three problem statements.

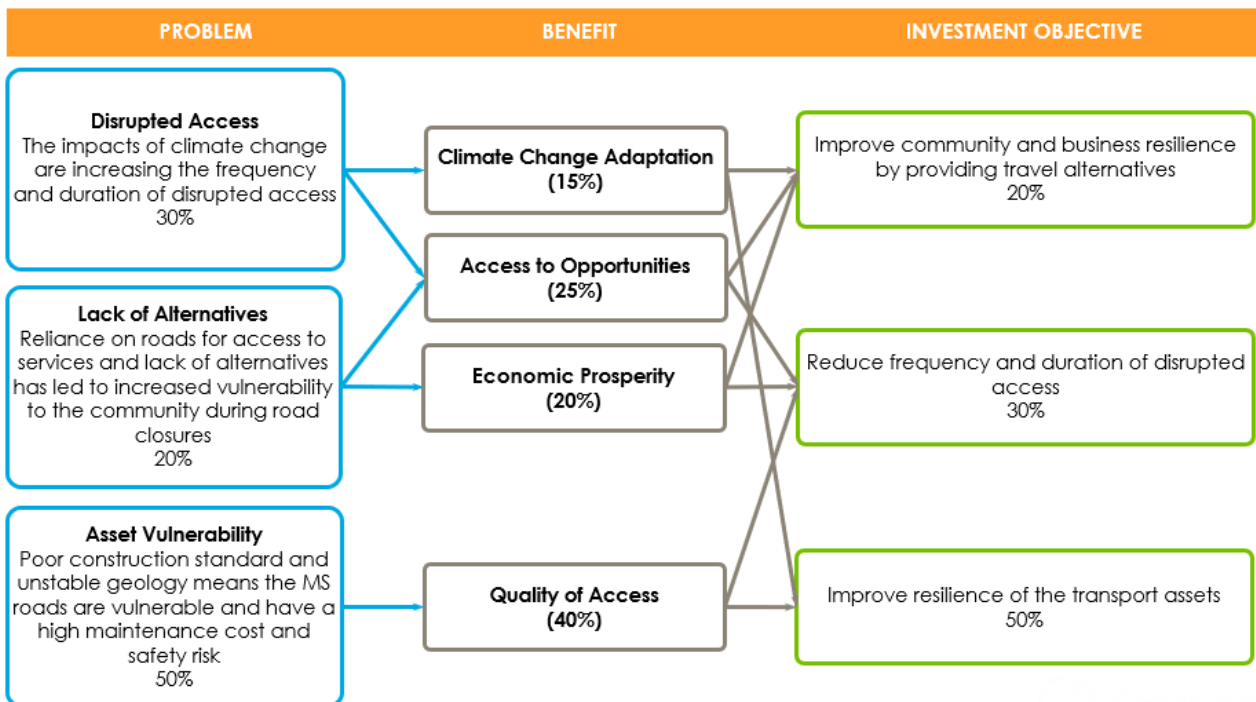


Figure 4-20: Investment logic map

4.6.2 Benefits

A benefits framework has been developed following discussion of project benefits with investors at the Investment Logic Mapping workshop. Key performance indicators (KPIs) were identified for each project benefit. The KPIs are based on the Waka Kotahi Investment Prioritisation Method GPS alignment criteria, the Benefits Framework, and ONRC performance measures. These KPIs will allow the success of any implementation programme to be measured. Figure 4-21 shows the linkages between the investment objectives, benefits, and KPIs. Table 4-13 provides more information on each measure, and Table 4-14 provides the baseline information for each measure.

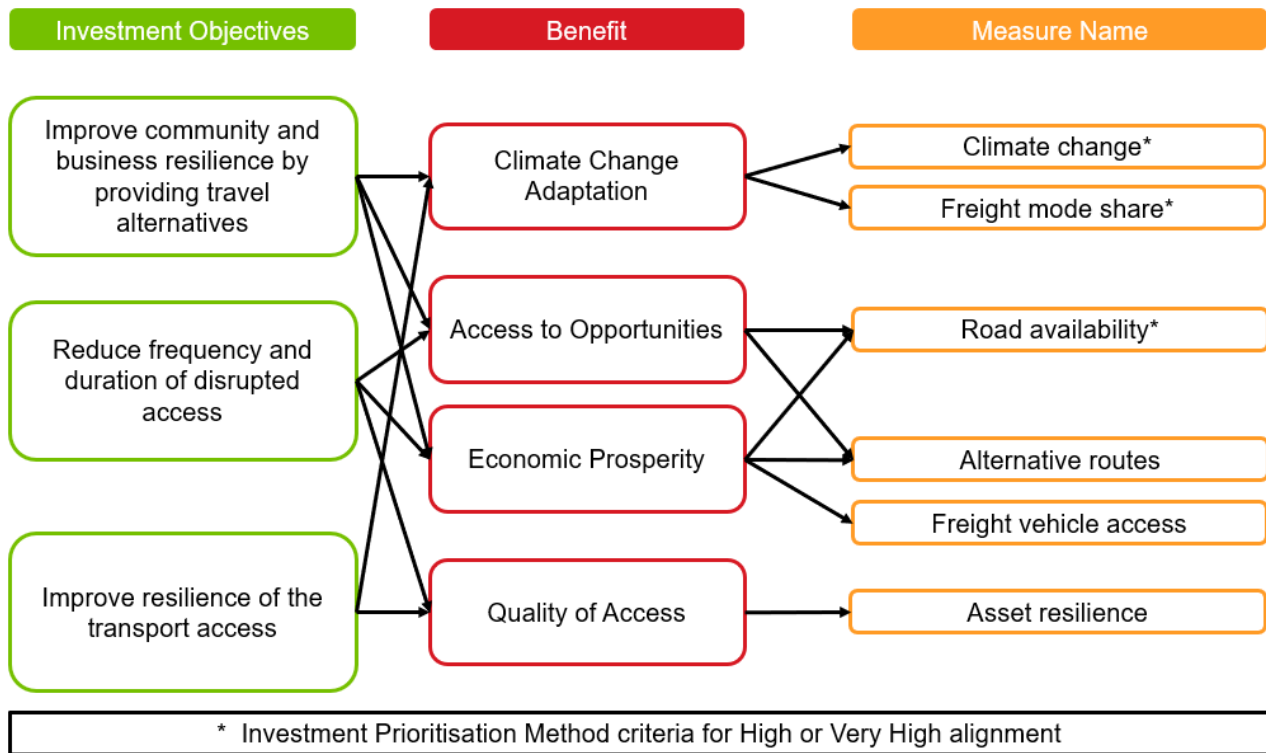


Figure 4-21: Linkage between Investment Objectives, Benefits, and measures

Table 4-13: Benefit measures

Name	Source	Description
Climate change	Investment Prioritisation Method ⁶⁰ (IPM): high alignment criteria for <i>Climate Change</i> GPS factor	Addressing a known climate change adaptation issue that is forecast to occur by 2040
Freight mode share	IPM: very high alignment criteria for <i>improving freight connections and climate change</i> GPS factor	Volume of road freight AADT on corridor moved to alternative modes.
Road availability: Maximum duration of closures	IPM: very high alignment criteria for <i>improving freight connections and climate change</i> GPS factor	The maximum duration of all unplanned road closures/service disruptions experienced in a year, expressed in hours
Road availability: Average duration of closures	IPM: very high alignment criteria for <i>improving freight connections</i> GPS factor	The average duration of all unplanned road closures/service disruptions greater than 2 hours experienced in a year, expressed in hours
Alternative routes	Benefits Framework: Benefit 4.1.1	Percentage length of high-risk (HR) ⁶¹ , high impact (HI) ⁶² road routes with a viable alternative ⁶³
Freight vehicle access	ONRC Accessibility Customer Outcome 1	Percentage length of network that is not available to HCV and 50MAX vehicles
Asset resilience	Adapted from Benefits Framework: Benefit 4.1.2	The number of stormwater related ⁶⁴ faults recorded following a weather event of a similar impact as 2022.

⁶⁰ Refer to Section 5 for Information on the Investment Prioritisation Method

⁶¹ High-risk routes are those that may be disrupted or impacted by significant events

⁶² High-impact routes are those that are of high importance for social and economic activities.

⁶³ Viable alternative routes are those that can carry the same or similar traffic types and levels. For this PBC detours are accepted as viable if:

- They add less two hours of driving compared with the original route, OR
- There is a scheduled marine service that can be accessed

This is modified from the Benefits Framework guidance to help provide differentiation between options.

⁶⁴ Culvert issues, scour, and under slips

Table 4-14: Baseline benefit data

Measure Name	Information Source	Te Aumiti/French Pass	Te Hoiere/Pelorus	Queen Charlotte	Kenepuru	Te Whanganui/Port Underwood
Climate Change		No, a known climate change issue (increased storminess, particularly increased duration and intensity of rainfall) is not being addressed.				
Freight Mode Share (road vs marine)	2023 heavy vehicle ADT estimates	Ronga Road: 54	Kaiuma Bay Road: 58	Grove Track: 104	Linkwater to Portage: 20	Oyster Bay to Waikawa: 22
	Marine	There is no information available on the volume of freight moved via marine modes of transport.				
Maximum duration of closure	Council 2022 event database	Route: Tollgate Bridge to Tennyson Inlet Not Assessed: NA Closed: 19/08/2022 to 3/10/2022 (46 days) Restricted Access: 4/10/2022 to 1/12/2022 (59 days) Service Disruption: 2,520 hours (105 days)	Route: Kaiuma Bay Road Not Assessed ⁶⁵ : 19/08/2022 to 15/09/2022 (28 days) Closed: NA Restricted Access: NA Service Disruption: 672 hours (28 days)	Route: Anakiwa Road Not Assessed: NA Closed: 19/08/2022 to 3/10/2022 (46 days) Restricted Access: 4/10/2022 to 9/11/2022 (37 days) Service Disruption: 1,992 hours (83 days)	Route: Linkwater to Portage Not Assessed: NA Closed: 19/08/2022 to 20/10/2022 (63 days) Restricted Access: 21/10/2023 to present ⁶⁶ (295 days) Service Disruption: 8,592 hours (358 days)	Route: Fighting Bay to Road end Not Assessed: NA Closed: 19/08/2023 to 18/12/2022 (122 days) Restricted Access: NA Service Disruption: 2,928 hours (122 days)
Average duration of closure	Council 2022 event database	Not Assessed: 24 days Closed: 36 days Restricted Access: 39 days Average Service Disruption: 1,437 hours (68 days)	Not Assessed: 28 days Closed: NA Restricted Access: NA Average Service Disruption: 672 hours (28 days)	Not Assessed: NA Closed: 48 days Restricted Access: 27 days Average Service Disruption: 1,440 hours (60 days)	Not Assessed: 24 days Closed: 38 days Restricted Access: 183 days ⁶⁷ Average Service Disruption: 5,560 hours (232 days)	Not Assessed: NA Closed: 87 days Restricted Access: 15 days Average Service Disruption: 2,076 hours (87 days)

⁶⁵ During this time the roads had not yet been assessed and any use was at drivers own risk

⁶⁶ 11/08/2023 at the time of writing. The restrictions on Kenepuru Road between Linkwater and the Heads are expected to be in place until repair work is complete which is contingent on this business case being approved, and funding released.

⁶⁷ As at time of writing, 11/08/2023



Measure Name	Information Source	Te Aumiti/French Pass	Te Hoiere/Pelorus	Queen Charlotte	Kenepuru	Te Whanganui/Port Underwood
Alternative routes⁶⁸	Multiple	<p>HR, HI route: Rai Valley to Elaine Bay (1 hour drive)</p> <p>Alternate Route: Boat from Elaine Bay to Havelock (2 hours), drive to Rai Valley (25 minutes)</p> <ul style="list-style-type: none"> Boat from Ōkiwi Bay to Nelson (2 hours), drive to Rai Valley (1 hour) <p>Viable: No. There are no scheduled marine services between Elaine Bay and Havelock, or Ōkiwi and Nelson.</p> <p>Percentage: 0%</p>	<p>HR, HI route: NA</p> <p>Alternative route: NA</p> <p>Viable: NA</p> <p>Percentage: NA</p>	<p>HR, HI route: Havelock to Picton (50 minute drive)</p> <p>Alternative route: SH1 and SH6 (45 minute drive)</p> <p>Viable: Yes, state highways are capable of taking all traffic types and the travel time is similar</p> <p>Percentage: 100%</p>	<p>HR, HI route: Havelock to Portage (1 hour drive)</p> <p>Alternative route: Boat from Havelock to Portage (1 hour 15 minutes)</p> <p>Viable: No. The total journey time is comparable to driving, but the scheduled marine service only operates three times per week.</p> <p>Percentage: 0%</p>	<p>HR, HI route: Waikawa to Ōraumoā/Fighting Bay entrance (1 hour drive)</p> <p>Alternative route:</p> <ul style="list-style-type: none"> Waikawa to Oyster Bay via Rārangī (1 hour 30 min drive) Oyster Bay to Hakahaka Bay (40 minutes by boat) <p>Viable: Partially. Route to Oyster Bay is viable, but the marine route from Oyster Bay to Ōraumoā/Fighting Bay is not as there are no marine services.</p> <p>Percentage: 50%</p>
Freight Vehicle Access	As at February 2023 ⁶⁹	<p>Class 1 HCV: 0%</p> <p>50Max: 10%</p>	<p>Class 1 HCV: 0%</p> <p>50Max: 0%</p>	<p>Class 1 HCV: 0%</p> <p>50Max: 49%</p>	<p>Class 1 HCV: 38%</p> <p>50Max: 38%</p>	<p>Class 1 HCV: 0%</p> <p>50Max: 6%</p>
Asset Resilience / Risk	2022 event faults database	<p>Culvert: 137</p> <p>Scour: 58</p> <p>Under slips: 91</p> <p>Total: 286</p>	<p>Culvert: 24</p> <p>Scour: 13</p> <p>Under slips: 2</p> <p>Total: 39</p>	<p>Culvert: 46</p> <p>Scour: 11</p> <p>Under slips: 62</p> <p>Total: 119</p>	<p>Culvert: 301</p> <p>Scour: 156</p> <p>Under slips: 323</p> <p>Total: 780</p>	<p>Culvert: 57</p> <p>Scour: 12</p> <p>Under slips: 52</p> <p>Total: 121</p>

⁶⁸ All drive times sourced from Google maps. Marine travel times assumed and average boat speed of 30 km/h, plus an extra 10 minutes at the start and end of every journey to account for the five knot speed limit within 200 m of shore or a marina. Loading and loading time has not been included.

⁶⁹ Prior to the weather events 0% of Kenepuru was unavailable to Class 1 HCV, and 0% was unavailable to 50Max vehicles. There has been no change for the other zones.

4.7 Alignment to Existing Strategies, Policies and Plans

It is important that the proposed outcomes for the business case contributes to, and is consistent (or at least not inconsistent) with the aims and objectives of relevant national and regional strategies and policies. Table 4-15 summarises each document and describes how the proposed outcomes for this business case align. The assessment demonstrates consistency and strong alignment with strategies, as all have a focus on ensuring access and resilience.

Table 4-15: Strategic alignment

Document	Alignment
NATIONAL STRATEGIES, POLICIES AND PLANS	
<p>Ministry for the Environment National Adaptation Plan</p> <p>The National Adaptation Plan sets out what the Government will do to enable better risk-informed decisions, drive climate-resilient development in the right locations, help communities assess adaptation options (including managed retreat) and embed climate resilience in all the Government's work. The long-term adaptation goals identified by the plan are to reduce vulnerability, enhance our ability to adapt, and strengthen our resilience.</p>	Alignment is VERY STRONG as the outcomes seek to address identified climate adaptation issues.
<p>Tiro Rangi - Waka Kotahi Adaptation Plan 2022-24</p> <p>Tiro Rangi is the long-term plan for adapting the land transport system to our changing climate. This involves planning and adapting to the effects of climate change to avoid ongoing disruptions and costly emergency responses. The goal is 'by 2050 our land transport system to be resilient in a changing climate to enable a system that improves wellbeing and liveability'. There are four levels of response:</p> <ol style="list-style-type: none"> 1. Avoid: avoid development in an area exposed to multiple future climate hazards 2. Protect: use grey and green engineering solutions to protect infrastructure 3. Accommodate: minimise disruption through alternative routes and drainage design that allows better flood management 4. Retreat: relocate infrastructure away from hazards. Retreat may be necessary where protection and accommodation are not viable. 	Alignment is VERY STRONG . The Marlborough Future Access PBC contributes to the overall goal of Tiro Rangi by seeking to adapt access to the Sounds so that it is resilient to climate change. Options will be structured using the four levels of adaptation response.
<p>Government Policy Statement on Land Transport 2021</p> <p>This document outlines the Government's priorities for land transport, providing direction and guidance to those who are planning, assessing, and making decisions on transport investment for the next 10 years. It identifies four investment priorities:</p> <ul style="list-style-type: none"> • Developing a low carbon transport system that supports emission reductions, while improving safety and inclusive access, and alignment with the National Adaptation Plan to create a network that is resilient to climate change effects. • Improving Freight Connections for economic development. • Developing a transport system where no-one is killed or seriously injured. • Providing people with better transport options to access opportunities. 	Alignment is strongest with climate change (through adaptation). There is also alignment with freight connections and safety. Overall alignment rating is STRONG (although ratings vary across priorities)
<p>Draft Government Policy Statement on Land Transport 2024-27</p> <p>The draft GPS for 2024 was released in August 2023. It identifies six strategic priorities:</p> <ul style="list-style-type: none"> • Maintaining and operating the system • Increasing resilience • Reducing emissions • Safety • Sustainable urban and regional development • Integrated freight system 	Alignment is VERY STRONG with the increasing resilience priority, and maintaining and operating the system priority. There is also alignment with safety, and integrated freight systems.

Document	Alignment
<p>Arataki (2023) – Waka Kotahi’s 30-year plan</p> <p>This is Waka Kotahi’s 30-year Plan to deliver on the government’s short term priorities and long term outcomes for the land transport system. Outcomes align with the MoT Transport Outcomes Framework. The overall desired outcome is for a transport system that improves wellbeing and liveability, with five outcome areas - inclusive access, economic prosperity, resilience and security, healthy and safe people and environmental sustainability.</p> <p>The plan recognises that future changes, including the increasing cost of infrastructure due to resource scarcity, network complexity and impacts of climate change. It anticipates that severe weather events will occur more often, and the transport sector will need to work with communities and infrastructure providers to understand the options for managing climate change impacts. This mean looking at a different mix of transport options, for example more water-based travel as network backup to minimize downtime and support system resilience.</p> <p>The Regional Summary for Top of the South identifies the growing risk of damage to road networks because of increased rain and storm intensity, coastal and soil erosion, sea level risk, flooding, slips and storm surges.</p>	<p>Alignment is strong with the climate change driver for future change, and with the resilience future outcome. The closest alignment is with the focus for the Top of the South on confirming how key resilience risks will be addressed over time, and work with communities to identify plans for when to defend, accommodate, or retreat.</p> <p>Overall alignment rating is STRONG</p>
<p>Waka Kotahi NZ Transport Agency Road to Zero 2020 – 2030</p> <p>The vision of Road to Zero is “a New Zealand where no one is killed or seriously injured in road crashes”. The Strategy focusing on actions in five key areas: infrastructure improvements and speed management; vehicle safety; work-related road safety; road user choices; and system management.</p>	<p>Alignment is MODERATE. This project is aligned to the Road to Zero vision, given that improvements to the corridor would likely also improve the overall safety.</p>
<p>REGIONAL PLANS</p>	
<p>Regional Land Transport Plan 2021-2031</p> <p>The six strategic objectives of Te Taihū Regional Land Transport Plan (RLTP) are: mode choice; safety; network management; economic prosperity; resilience; and environmental outcomes.</p> <p>There is no funding allocated for this work in the RLTP as this is an emergency response project.</p>	<p>Alignment is STRONG. This project is well aligned with the RLTP strategic objectives, primarily aligning with the resilience objective, but having significant alignment with environmental outcomes and economic prosperity.</p>
<p>Marlborough Rooding Asset Management Plan (2018-21)</p> <p>The Plan provides a strategic approach to managing the district’s roading assets to help contribute to community outcomes. While outside the indicated timeframe, this is still the current version on the website. The plan seeks the following outcomes:</p> <ul style="list-style-type: none"> • Reduction of deaths and serious injuries • Integrated, reliable and fit for purpose transport choices • Achieve appropriate customer levels of service • Increase GDP and Tourism 	<p>Alignment is STRONG. This project aligns with achieving the appropriate customer levels of service. It has more moderate links to the GDP and tourism outcomes and safety outcomes.</p>
<p>Marlborough Long Term Plan</p> <p>This plan notes that climate change is one of the key challenges facing infrastructure, and that the increasing frequency and intensity of natural events is impacting on our vulnerable local road network, resulting in more frequent emergency events, network deterioration and subsequent network disruption. The long-term plans also notes the importance of aquaculture, seafood, fishing and forestry to the local economy.</p> <p>There is no funding allocated for this work in the LTP as this is an emergency response project.</p>	<p>Alignment is STRONG. This project is directly aligned with one of the biggest challenges noted for the transport network in the LTP and access to the Sounds is a critical component for key economic drivers</p>
<p>Marlborough Climate Change Action Plan 2020</p> <p>The Action Plan outlines the steps that will be taken in the short and medium term to manage climate change. The Action Plan outlines four key goals:</p> <ol style="list-style-type: none"> 1. Reduce greenhouse gas emissions (including net carbon emissions). 2. Become more resilient to the impacts of climate change. 3. The Marlborough community is informed of climate change actions and options for response. 4. Council shows clear leadership on climate change issues. 	<p>Alignment is STRONG. The project is directly aligned with Goal 2 and will contribute to achieving the other three goals.</p>

Document	Alignment
<p>Marlborough Economic Wellbeing Strategy</p> <p>This strategy has a vision for a thriving economy balanced with a flourishing environment and vibrant communities. It presents three main goals:</p> <ul style="list-style-type: none"> Accelerated cross-collaboration between various industry sectors, businesses, and industry stakeholders to achieve efficiencies and increase productivity through technology and innovation. For Marlborough to be a recognised leader in Agritech solutions in Australasia – specifically in wine, viticulture, aquaculture and the Blue Economy. For Marlborough to develop and adopt an economic wellbeing framework in collaboration with businesses and industry sectors. 	<p>Alignment is MODERATE. The project enables access into areas with strong aquaculture and blue economy attributes and maintaining reliable access to these areas is essential to enabling this growth.</p>

4.8 Uncertainties and Constraints

Key economic, social, environmental, transport, stakeholder and other issues and constraints could influence the scope of the project outcomes and outputs. Table 4-16 outlines the uncertainties, assumptions and dependencies that the study may not be in a position to resolve but must work within the context of. Table 4-17 outlines limitations imposed on the investment proposal from the outset.

Table 4-16: Uncertainties, assumptions, and dependencies

Issue	Description	Mitigation
Uncertainties	Future storm or seismic events	Further damage may arise from future events. This may affect the preferred programme, which would need to be reviewed if further damage were to occur. Programmes will use data from recent events to inform development of resilient options for the future.
	Price volatility	Multiple factors have resulted in volatile prices in recent times that are impacting the cost of living, oil prices and supply chain security. This will be factored into the estimation of project delivery costs.
	Funding	Other agencies are being approached early in the business case process as there may be insufficient funding available from MDC and Waka Kotahi. In addition, the community might not want to fund the preferred programme.
	Future viability of economic and social activity	The viability of economic and social activity in the Sounds has been established through provision of access by road. If access is reduced, these activities may no longer be viable. The impact on these activities will be considered in the Economic Case and options assessment.
	Requirement to provide access to private property	The position on the requirement of road controlling authorities to provide access to private property in the face of future climate hazards is unclear, and liability has not been well tested. It may take some time for a national approach to be developed.
	Viability of property insurance schemes	Insurance companies may reduce or no longer provide cover for properties. This may reduce demand for roads. It may change the demographic of people moving to the area, with appeal for people who want to be independent and 'off grid'. The business case will clarify future access, and the programme assessment will include economic and social impacts.
	Election	The election in October 2023 means that there may be a change in government direction which could affect GPS funding priorities.
Assumptions	Government position	The position on 'retreat' and possible financial compensation for that is unknown.
	Recovery Plan	The business case will be used to guide the level of service that will be restored as part of the Recovery Plan.
	Future storms or seismic events	The business case assumes future events will happen and this will influence levels of service and the feasible preferred programme.
	Water infrastructure	It is assumed that marine assets and services will continue to be economically viable and available to provide access to the Sounds. Feasibility and costs associated with improving water access are uncertain. Water access will be investigated within the programme options but further investigation will be required for future business case stages.

Issue	Description	Mitigation
	Maintenance	It is assumed that maintenance will be undertaken for the Preferred Programme, and this will be included in the programme costs.
	Level of service	It may not be possible to meet the community's level of service expectations for road access, within available funding streams.
	It is safe to continue living in the Sounds	It is assumed that global stability and associated safety issues related to living in the Sounds will be considered by the Council in future planning.
	Utilities	Utilities affected by the storm events will be reinstated outside this process. Options to enable servicing via different forms of access will be included.
Dependencies	Marlborough Roads Recovery Plan	The completion of the Recovery Plan is dependent on the completion of the business case and subsequent funding.
	Marlborough District Plan	There are numerous vacant sections in the study area that could potentially be developed under the current District Plan. It is likely that the District Plan may need to be reviewed as a result of this PBC, to revisit MDC's plans for future development, land use, land use management practices, and population growth, in light of future access.

Table 4-17: Constraints

Constraint	Description
Lack of established guidance	Guidelines and policies that assist in the process of accommodating climate forced adaptation are still being developed. This means that the business case must instead rely on a balance of best practice, local knowledge, engineering judgement and 'what feels right'. There are no previous studies to lean on or learn from.
First PBC of this nature in NZ	In the Sounds, transport networks are a lifeline, and other lifelines are dependent on this access. This is the first PBC of this nature in NZ, and it will be difficult to compare this process and conclusions to other areas in similar situations.
Timeframe	The business case has been proceeding at pace in order to provide certainty to the community. However, this comes at a cost in terms of time available for community involvement.
Total project cost	Investment partners have finite funding availability. The total project cost should be realistic.
Community	Capacity of the community to pay for the preferred programme.
Rural population	Dispersed, isolated, rural population makes protecting access more difficult to achieve.

5 Investment Prioritisation

An assessment of the GPS alignment, scheduling and efficiency factors has been completed for the investment, in accordance with the Transport Agency Investment Prioritisation Method (IPM) for the NLTP 2021-24.

The anticipated profile is VH/H/VH. This means the programme is Priority 1 out of 12. The rationale for these ratings is explained further below.

5.1 GPS Alignment

Overall, the GPS Alignment is **Very High** – refer to Table 5-1. The project aligns with all the Government Policy Statement for Land Transport Groupings, as shown. Alignment is Very High for Improving Freight Connections, because implementing the preferred programme will reduce the duration of unplanned road closures of more than two hours which affect freight.

Table 5-1: GPS Alignment

Grouping	Alignment	Criteria	Assessment
Improving Freight Connections Project Benefit: Economic prosperity	Very high	>31% reduction in duration of unplanned road closures/service disruptions of >2hrs	Some sections of road have been closed or had restricted access for several months following storm damage. This has affected the movement of stock and forestry products to markets, with water transport being utilised instead, subsidised through the Mayoral Relief Fund. This has required significant changes to practice and there have been economic ramifications for businesses affected.
Improving Freight Connections and Climate Change Project Benefit: Economic prosperity	Very high	>6% change in road freight mode share to rail or coastal shipping measured as percentage change in volume of road freight AADT on corridor moved to alternative modes. Compared to pre 2021 event.	The Sounds has an existing network of marine infrastructure that could be used to facilitate a change from road freight to marine freight for some journeys. Marine freight was already used by some living in the Outer Sounds and had to be used by business owners following the storm events as discussed above. Improvements to the existing infrastructure, services, and price could make this a more attractive option going forward.
Climate Change Project Benefit: Climate change adaptation	High	Addressing a known climate change adaptation issue that is forecast to occur by 2040	The problems relate to a known climate change adaptation issue that is occurring now for roads providing access to the Marlborough Sounds. This access vulnerability to increases in peak rainfall duration and intensity will get progressively worse as the climate continues to warm.

5.2 Scheduling

The scheduling factor has two criteria: interdependency and criticality. The highest rating is used to determine the priority. Criticality is concerned with the urgency for delivery of the programme, and the importance of the programme to ensuring the transport network is resilient. Interdependency is concerned with activities that are part of a wider programme or package or needed to increase the resilience and connectedness of the transport network.

Criticality Rating = High. The programme meets the ‘high’ requirements for both timing and resilience. Delivery of the programme is urgent and needs to begin in 2021-24. For resilience, unplanned loss of service (more than 2 hours) results in most users needing to use alternative routes or modes which take more than 2 hours extra travel time.

Interdependency Rating = Low. The programme is a standalone programme. Non-delivery will not affect part of a separate programme or package.

5.3 Efficiency

The efficiency rating reflects the benefit-cost ratio (BCR). The BCR for this project has not been calculated at this stage. The Waka Kotahi Indicative Efficiency Rating Tool has been used to give a high-level estimate of the benefits and costs. The tool suggests an efficiency rating of **Very High**. Refer to Appendix L for the tool inputs and its results.



Part B(i) – The Economic Case: Developing the Programmes

6 Do Nothing

There is no Do Nothing for this business case. The 2021 event resulted in 915 faults across the Sounds. However, before all the faults had been repaired, the 2022 events occurred, resulting in an additional 2,725 faults across the Sounds. Work completed and outstanding as of 30 June 2023 is shown in Figure 6-1. To Do Nothing would be to leave the 1,535 outstanding faults without repair, which would be contrary to the purpose of the LTMA and LGA.

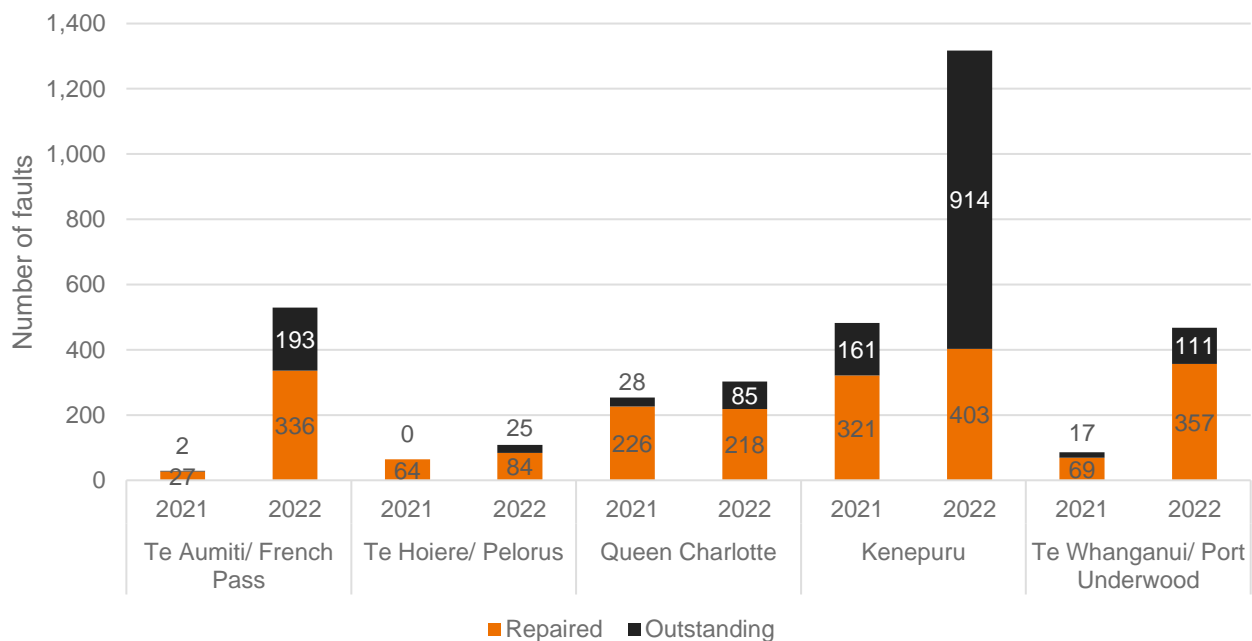


Figure 6-1: Repaired and outstanding faults from the 2021 and 2022 weather events

However, the standard to which the repair works should be completed has not been confirmed. This is one aspect of the purpose of this business case. No minimum level of investment has been agreed to by MDC or Waka Kotahi, for repairing the roads damaged by storm events.

7 Do Minimum

7.1 Description

The Do Minimum represents the minimum level of expenditure required to provide a minimum level of service. It was agreed, in discussion with Marlborough Roads representatives, that the minimum level of service is maintaining the status quo. This means that roads and marine infrastructure are maintained largely in current condition (as of February 2023).

The Do Minimum reflects that there is no committed funding for any improvements. As a result, some roads continue to have restricted access⁷⁰ than was available before the July 2021 event.

The Do Minimum has no allowance for:

- Capital improvements - permanent solutions/longer term repairs
- Marine improvements
- Marine services including MDC barge subsidy – this is assumed to stop when the recovery cost claim stops.

7.2 Components

The Do Minimum has three road components:

- Critical repairs completed from 2022 storm event prior to the business case starting
 - These critical repairs were required to provide basic road access for the community, and marine access for freight where road access could not be provided for heavy vehicles.
 - It has not previously been required to complete a business case for repairs and this work had already been completed when the business case began. Any work that was not completed when the business case started was put on hold, pending the outcome of the business case.
- Ongoing maintenance to preserve minimum level of service.
 - Assumes that transport networks continue to be vulnerable to underlying ground conditions and resilience to storm events is low.
 - Includes ongoing traffic management and annual maintenance cost.
 - No renewal costs are included.
- Allowance for emergency works to preserve minimum level of service, following disruptive events eg storms.
 - The allowance that has been included in the Do Minimum is based on the expectation that one storm with the impact of the 2022 event occurs in the next 50 years and is the cost for temporary repairs that allow the road to be re-opened.
 - Noting actual emergency works funding will be dependent on the frequency of storm or other disruptive events and will vary depending on the spatial nature of these events, including how many roads are affected.

The Do Minimum assumes that existing marine infrastructure will continue to be maintained, or not, as they have been previously. The Do Minimum also assumes that the current transport services will continue. For information on the existing marine infrastructure and scheduled marine transport services, refer to Section 2.5.5.1.

7.3 Resilience Risk and Access

The resilience risk under the Do Minimum remains very high. There is no proactive adaptation plan to accommodate increasing frequency and/or intensity of storm events. Instead, Marlborough Roads takes a reactive approach, responding as and when needed to keep road access open.

When a triggering event occurs, the Do Minimum approach is to re-open the road by clearing any slips, usually through bulldozing or clearing the material out of the way. It is assumed that motor vehicle access continues but is increasingly restricted to single lane road widths, with give ways and passing places, with traffic management.

The frequency and duration of disrupted access is likely to be similar to, or worse than, that experienced after the 2022 storm event, as storm events become more frequent⁷¹ as a result of the changing climate, and the roads continue to fail. Marine alternatives exist in some areas which help to ensure emergency access but remain poorly developed and do not provide a real alternative on a day to day basis. Over time, people struggle more and more to have access to essential

⁷⁰ Restricted access means one lane sections, or where there are vehicle weight, type or speed restrictions.

⁷¹ Refer to Section 4.2.3 for more information and references.



goods and services, and businesses face challenges reaching markets, as road closures become more frequent and tend to be longer in duration.

Current access restrictions remain, and more will be added following each event. Current restrictions include:

- **Te Aumiti/French Pass:** No vehicle restrictions
- **Te Hoiere/Pelorus:** No vehicle restrictions
- **Queen Charlotte:** No new vehicle restrictions. The pre weather event vehicle length restriction of 12.6 m between Picton and Linkwater remains.
- **Kenepuru:**
 - A 30 km/h temporary speed limit is in place between Moetapu Bay and Kenepuru Heads
 - Kenepuru Road, and its sideroads, between Linkwater and Kenepuru Heads is restricted to:
 - residents and emergency services access only
 - light vehicles only (3.5 tonnes or less)
 - combined length of not greater than 8 m
- **Te Whanganui/Port Underwood:** No vehicle restrictions.

7.4 Maps

Maps illustrating the Do Minimum for each zone can be found in Appendix M

8 Programme Options Identification

8.1 Programme Development Process

Figure 8-1 provides an overview of the programme development process. It demonstrates that programmes were developed using a combination of two different inputs – natural hazard susceptibility at a segment level, and route segment characteristics in terms of land use, users and traffic volume and type, and two alternative approaches – road management strategies, which were determined using the ‘Protect, Accommodate, Retreat, Avoid’ (PARA) framework, and marine interventions, which included infrastructure and services. All four elements are described in more detail in the following sections.

Programmes were developed by selecting different combinations of road management and marine interventions, which responded to the underlying hazard risk as well as the route segment characteristics. Programmes were grouped by zone, with a total of 28 programmes across the Sounds (four to five programmes plus the Do Minimum for each of the five zones).

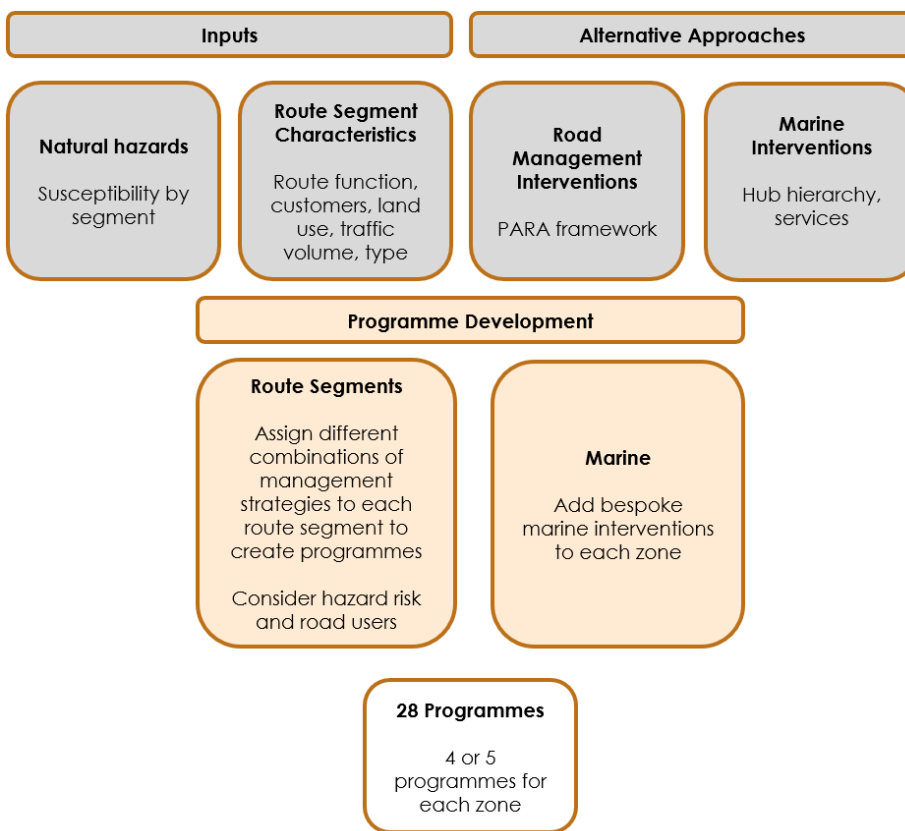


Figure 8-1: Programme Development Process Overview

8.2 Inputs

8.2.1 Route Segmentation

As the study area is large, the Sounds were divided into five ‘zones’, and within each zone, roads, or combinations of roads, were spilt into separate segments to facilitate optioneering. Segments were based on key origins and destinations, traffic volumes and underlying hazards. A map of the route segments and numbers is provided in Appendix N.

Table 8-1 shows each route segment, key road name(s), length, surface type, ONRC and ONF classifications⁷², AADT and percentage of heavy vehicles (HCV). A high percentage of heavy traffic on a road indicates economic activity, and therefore an important part of the network. This information was considered as an input, alongside detailed local knowledge held by members of the project team, which related in this context to land use – the locations of primary industries, settlements and holiday houses.

⁷² Refer to Section 2.5.2 for more information on ONRC and ONF

Table 8-1: Road segments and characteristics

Zone	Segment		Key Road(s)	Length (km)			One Network Road Classification	One Network Framework	2023 est. ADT	%HCV
				Sealed	Gravel	Total				
Te Aumiti / French Pass	FP1	Rai Valley to Ōkiwi Bay	Ronga Road, Croisilles Road	25.3	0.8	26.2	Secondary Collector	Rural Connectors	387	14%
	FP2	Ōkiwi Bay to Elaine Bay	Croisilles-French Pass Road, Elaine Bay Road	17.3	0.0	17.3	Access	Rural Roads	208	4%
	FP3	Elaine Bay turn off to Port Ligar turn off	Croisilles-French Pass Road	7.0	5.7	12.7	Access	Rural Roads	208	4%
	FP4	Port Ligar turn off to Te Aumiti/French Pass	Croisilles-French Pass Road	3.2	7.6	10.8	Access	Rural Roads	208	4%
	FP5	Port Ligar turn off to Bulwer	Te Towaka-Port Ligar Road	0.6	29.5	30.1	Access	Rural Roads	69	10%
	FP6	Rangitoto ki te Tonga / D'Urville Island	All	0.0	57.1	57.1	Low Volume	Rural Roads	10	17%
	FP7	Rai Valley to Tollgate Bridge	Opouri Road	19.1	9.6	28.8	Access	Rural Roads	350	15%
	FP8	Tollgate Bridge to Duncan and Penzance Bays	Tennyson Inlet Road, Duncan Bay Road, Archers Road	21.0	0.1	21.1	Access	Rural Roads	130	16%
Te Hoiere / Pelorus	P1	Daltons to Brooklyn Bay	Kaiuma Bay Road, Te Hoiere Road	2.7	11.6	14.3	Access	Rural Roads	166	35%
	P2	Brooklyn Bay to Kaiuma Bay	Kaiuma Bay Road	3.0	13.9	16.9	Low Volume	Rural Roads	166	35%
Queen Charlotte	QC1	Havelock to Linkwater	Mahakipawa Hill, Grove Track	13.5	9.6	15.1	Primary Collector	Rural Connectors	1,261	8%
	QC2	Linkwater to Picton	Grove Track, Queen Charlotte Drive	21.3	0.0	21.3	Primary Collector	Rural Connectors	911	31%
	QC3	Anakiwa	Anakiwa Road	5.4	0.2	5.7	Secondary Collector	Rural Connectors	502	17%
Kenepuru	K1	Linkwater to Moetapu turn off	Kenepuru Road (Linkwater-Heads)	4.8	0.0	4.8	Secondary Collector	Rural Connectors	340	6%
	K2	Moetapu turn off to Mahau Sound	Kenepuru Road (Linkwater-Heads), Mahau Road	8.5	3.6	12.0	Secondary Collector	Rural Connectors	340	6%
	K3	Mahau turn off to Portage	Kenepuru Road (Linkwater-Heads)	16.9	1.7	18.6	Secondary Collector	Rural Connectors	340	6%

Zone	Segment		Key Road(s)	Length (km)			One Network Road Classification	One Network Framework	2023 est. ADT	%HCV
				Sealed	Gravel	Total				
Kenepuru cont.	K4a	Portage to Torea Bay	Torea Road	1.7	0.0	1.7	Access	Rural Roads	58	0%
	K4b	Portage to Kenepuru Head	Kenepuru Road (Linkwater-Heads)	14.1	0.0	14.1	Access	Rural Roads	340	6%
	K5	Kenepuru Head to Waitaria Bay	Kenepuru Road (Heads-Raetihi)	12.9	0.0	12.9	Access	Rural Roads	71	24%
	K6a	Waitaria Bay to Raetihi	Kenepuru Road (Heads-Raetihi)	6.2	10.4	16.6	Access	Rural Roads	71	24%
	K6b	Nopera to Crail Bay	Crail Bay Road, Elie Bay Road, Hopai Road	0.0	13.2	13.2	Low Volume	Rural Roads	37	12%
	K7	Waitaria to Clova Bay	Clova Bay Road, Totaranui Road	1.6	13.5	15.1	Low Volume	Rural Roads	40	20%
	K8	Kenepuru Head north	Titirangi Road, Anakoha Road	0.8	37.2	38.0	Access	Rural Roads	104	16%
	K9	Moetapu Bay	Moetapu Bay Road	6.7	1.0	7.6	Access	Rural Roads	175	5%
	Te Whanganui / Port Underwood	PU1	Waikawa to Hakahaka Bay	Port Underwood Road	14.9	0.0	14.9	Access	Rural Roads	492
PU2		Hakahaka Bay to Rārangi	Port Underwood Road	8.7	17.8	26.5	Access	Rural Roads	492	8%
PU3		Hakahaka Bay to Oraumoa/Fighting Bay entrance	Tumbledown Bay Road	4.1	9.2	13.3	Access/ Low Volume	Rural Roads	115	16%
PU4		Oraumoa/Fighting Bay entrance to road end	Tumbledown Bay Road	0.0	4.0	4.0	Low Volume	Rural Roads	29	17%

8.2.2 Natural Hazards

A preliminary natural hazard susceptibility assessment⁷³ was completed, to understand the impacts and implications of geology and topography on the likely future land stability. The methodology included a desktop natural hazard literature review of technical reports, maps, LiDAR terrain information, and historical aerial photography. A project GIS webmap was prepared, which also included faults recorded after the 2021 and 2022 storm events. Seven types of natural hazard were identified:

- **Natural slope instability:** underlying geology (deeply weathered semi-schist with limited topsoil) is such that the land is naturally unstable under certain conditions, eg when there is high soil moisture, steep slope angle, weathering of bedrock, shallow depth to bedrock, presence of vegetation – which can either provide a benefit through anchoring and/or a burden due to added weight. The resulting slope failures when conditions are met (usually through a trigger event such as storm) occur as part of natural processes, in the absence of human impact on the landscape.
- **Human induced slope instability:** where terrain has been modified by human activities, such as road building, this can result in unstable slopes. Vegetation removal can be a contributing factor, as can inadequate design and/or poor road construction techniques – a common feature of roads across the Sounds. Instability can be associated with main roads and smaller access tracks on farms or forestry blocks. Drainage patterns are also changed as a result of road construction, and there is a tendency to focus water discharge, exacerbating instability issues. The slips that occur include over slips, under slops, upslope failures and failure of retaining systems e.g. walls. These events would not occur without human intervention in the landscape.
- **Debris flows:** slope instabilities confined to natural waterways e.g. valleys, streams, channels. Resulting hazards are usually constrained to locations where these waterways cross the road corridor. Debris flows are water laden masses of soil and debris that move at speeds of up to 70km/h in a fluid like manner, carrying large boulders and destroying downslope roads and infrastructure.
- **Liquefaction:** strong seismic shaking results in loss of strength in the soil and surface cracking, dislocation, ground distortion, slumping, large settlements and lateral spreading.
- **Flood inundation:** rainfall related flooding of roads, which can make roads unsafe for driving, and lead to waterlogging which results in direct or indirect damage to the road.
- **Coastal inundation and erosion:** tide levels, sea level risk, storm surge and wave run up can all lead to flooding and erosion of low-lying land, including roads.
- **Tsunami:** sizeable waves resulting from seismic or other activity, leading to flooding, erosion and destruction.

In order to complete the susceptibility assessment, assumptions were made based on probability of triggering events (storm events, coastal events, and seismic hazard).

Hazard susceptibility maps were developed and road network exposure assessed using a four-level natural hazard susceptibility classification where feasible (very high, high, medium, low). The results were verified by comparing the defined hazard susceptibility classification against historic network fault data. Input was also provided by Marlborough Roads personnel, who shared knowledge of the network gained over the last 25 years.

Table 8-2 provides an overview of percentage of each segment which has high or very high susceptibility to each of the seven hazards considered. For full table including susceptibility index and 2021/2022 fault data, see Appendix O .

Table 8-2: Percentage length of road segments susceptible to natural hazards

Zone and segment		Natural Slope Instability		Human Induced Sloped Instability		Liquefaction	Flood Inundation		Coastal	Tsunami	Debris Flow (# per km)	
		VH ⁷⁴	H ⁷⁵	VH	H		M ⁷⁶	VH			H	H
Te Aumiti / French Pass	1	2%	1%	28%	27%	21%	0%	11%	3%	6%	1.5	1.9
	2	6%	3%	39%	60%	3%	0%	1%	0%	4%	1.4	1.5
	3	0%	0%	4%	73%	0%	0%	0%	0%	0%	1.2	0.2
	4	0%	34%	10%	29%	2%	0%	0%	2%	2%	0.1	0.4
	5	6%	7%	57%	40%	3%	0%	0%	0%	1%	2.4	1.2

⁷³ Stantec, Marlborough Sounds Future Access Study Preliminary Natural Hazard Susceptibility, Implications and Interventions (2023)

⁷⁴ Very high susceptibility

⁷⁵ High susceptibility

⁷⁶ Medium susceptibility



Zone and segment		Natural Slope Instability		Human Induced Sloped Instability		Liquefaction	Flood Inundation		Coastal	Tsunami	Debris Flow (# per km)	
		VH ⁷⁴	H ⁷⁵	VH	H	M ⁷⁶	VH	H	H	M	VH	H
Te Aumiti / French Pass	6	0%	3%	6%	94%	0%	0%	0%	0%	0%	0.6	0.7
	7	2%	0%	0%	15%	38%	0%	35%	0%	0%	0.8	1.4
	8	0%	5%	28%	46%	22%	0%	1%	1%	1%	2.1	1.2
Te Hoiere / Pelorus	1	0%	0%	43%	6%	68%	0%	45%	8%	12%	1.4	1.7
	2	7%	0%	28%	25%	38%	0%	4%	4%	31%	3.4	1.0
Queen Charlotte	1	11%	0%	48%	16%	40%	0%	8%	10%	19%	1.5	1.7
	2	0%	10%	62%	3%	35%	0%	6%	3%	5%	0.8	2.2
	3	4%	5%	30%	7%	73%	0%	5%	26%	44%	0.7	2.6
Kenepuru	1	14%	0%	66%	3%	25%	0%	0%	0%	0%	1.3	2.9
	2	29%	0%	70%	15%	5%	0%	0%	1%	10%	2.5	1.3
	3	52%	0%	74%	24%	4%	0%	0%	0%	4%	2.1	1.9
	4	54%	1%	64%	22%	11%	0%	7%	2%	9%	2.2	2.1
	5	17%	0%	34%	42%	31%	0%	0%	9%	50%	1.8	2.6
	6	14%	0%	23%	47%	36%	0%	0%	18%	31%	1.1	1.7
	7	5%	2%	17%	35%	62%	0%	2%	6%	15%	2.1	1.9
	8	18%	0%	10%	47%	21%	0%	9%	1%	3%	2.2	1.5
	9	60%	12%	71%	29%	0%	0%	0%	0%	1%	3.7	2.0
Te Whanganui / Port Underwood	1	0%	0%	85%	12%	3%	1%	1%	1%	0%	1.6	1.6
	2	0%	0%	60%	27%	14%	0%	3%	3%	11%	0.6	1.8
	3	0%	0%	62%	18%	22%	0%	1%	6%	11%	1.0	2.0
	4	0%	0%	71%	15%	20%	0%	0%	4%	10%	3.0	1.7

Table 8-2 shows:

- Kenepuru zone has greatest lengths of roads with high to very high natural slope instability. Three Kenepuru zone segments have notably higher proportions of very high natural slope instability compared to anywhere else in the Sounds (>50% of length): K3, K4 and K9. K2 also has a significant length of road (29%) with high to very high natural slope instability.
- All road segments except two (FP4, K12) have significant (>50% length) proportions that have either high or very high human induced slope instability, particularly: FP5, QC1, QC2, K2, K3, K4, K9, PU1, PU4.
- Liquefaction risk: Waikawa Marina, Havelock Marina, Okiwi Bay foreshore, French Pass wharf, all bridges.
- Highest flood risk, and a number of bridges at risk: FP1, P1, QC1, K4.

This hazard susceptibility information was used to develop the programmes in the following main ways:

- Segments with high hazard susceptibility due to a lack of natural slope stability - it was assumed that slips would continue to happen due to storm or other trigger events. It would therefore be difficult or impossible to strengthen the roads adequately to reduce this risk. For these segments, the approach was to accommodate the risk by building back with targeted resilience improvements but assume that over time there would be an increase in unsealed, one-way sections, and vehicle length and or weight restrictions. As the road was expected to continue to experience slips and loss of access, marine alternatives would be strengthened to ensure alternative access could be provided going forward. Examples are FP4, K1-6, 8 and 9.
- Segments with lower hazard susceptibility due to a lack of natural slope stability – it was assumed that these roads could potentially be protected from further hazard through intervention to address underlying issues.



- Segments with higher hazard susceptibility due to human induced instability – it was assumed that these roads could be protected from future hazard risk, if this was justified. Engineering interventions such as stormwater improvements, retaining walls and road reconstruction would be likely to reduce hazard risk, as long as the natural slope instability risk was low. These interventions would add resilience to the asset and to access. In these locations less investment would be needed in marine alternatives.
- Significant marine infrastructure is low lying, and the underlying land at risk of liquefaction in a seismic event, as well as flooding. All programmes therefore included added protection for marine infrastructure, to ensure this is resilient into the future.

8.3 Strategic Response

The 'alternatives' in this business case related to different combinations of intervention in the road network and in the marine network. The options are explained below.

8.3.1 Road Network Management Strategic Response

Four road management approaches were developed, aligned with the Protect Accommodate Retreat Avoid (PARA) framework from the National Adaptation Plan. The approaches respond in different ways to the hazard risk, with a build back stronger approach (protect) to a marine access option (retreat) where roads are not fixed unless required for access to a marine hub (hub and spoke model). Refer to Appendix P for more information about how the approaches were aligned with the Resilience Response Framework.

The four main segment level approaches are:

- **Approach A Build Back Stronger (Protect):** This approach reflects the Reduce (improve) response from the Resilience Framework. The risk is reduced through investment that improves the resilience of the asset, reducing future risk. For this approach the road segment is strengthened to provide additional resilience, with the role of marine transport primarily for emergency response. Whole route stormwater infrastructure upgrades are completed. Works are triaged and completed to repair existing geotechnical faults and preventative maintenance carried out at high and medium risk sites to reduce likelihood of significant failures in the future and enable more efficient recovery following events. Damaged roading assets are more fit for future climate (eg more frequent and larger culverts), with higher annual maintenance costs to allow for preventative maintenance works.
 - **Variation Ai:** No additional vehicle restrictions expected, and surface type and lane width as current. This approach is for roads which perform a critical or highly important role in the network; and where susceptibility to natural land instability is lower ie the underlying geology is reasonably sound.
 - **Variation Aii:** Additional vehicle restrictions are likely in the future, as well as more one lane and unsealed sections. This approach is used for roads which are not quite as important in the network; and where natural land instability risk is higher.
- **Approach B Targeted Improvements (Accommodate):** This approach also reflects the Reduce (improve) response from the Resilience Framework, but there is less reduction in risk, and a lower level of resilience improvement. This is achieved through targeted upgrades to stormwater infrastructure on the road segment, and existing failures are addressed. Triage of existing geotechnical failures, and repairs completed at the essential, high-risk sites, focussing on reducing risk of significant and lengthy road closures. Marine infrastructure is limited but, in some locations, can provide access when road unavailable.
 - **Variation Bi:** No additional vehicle restrictions expected, and surface type and lane width as current. This approach is for roads in the B category which perform a more important role in the network; and where susceptibility to natural land instability is lower ie the underlying geology is reasonably sound.
 - **Variation Bii:** Additional vehicle restrictions are likely in the future, as well as more one lane and unsealed sections. This approach is used for roads which not quite as important in the network; and where natural land instability risk is higher.
- **Approach C Essential Repairs (Accommodate/Retreat):** This approach reflects the Reduce (maintain) approach from the Resilience Framework. Essential roads repaired, and marine transport made more available and more resilient. Frequent failure of roads is likely to continue to occur in future, and the duration of recovery could be lengthy. Marine options provide access when the road fails.
- **Approach D Marine Access (Retreat):** This approach reflects the Prevent/Remove/Avoid response from the Resilience Framework. Roads are repaired where affordable, but sometimes connections will not be restored. In this case roads will primarily provide access to marine hubs (spoke and hub model), and marine transport will be the primary transport mode for access into and out of the area.

A summary of the approaches and impact on customer experience is provided in Table 8-3.



Table 8-3: Road segment approach summary

Strategic Response		Capital Works				Resilience Risk ⁷⁷	Cost
Approach	Vehicle restrictions ⁷⁸	Lane width	Surface type	Stormwater	Geotechnical		
Ai Build back stronger (protect)	No additional restrictions	As existing	As existing	Whole route upgrades	Targeted: existing failures and improvements	Road strengthened; risk most reduced (30%)	\$\$\$\$
Aii Build back stronger (protect)	Additional restrictions	More one lane sections	More unsealed sections	Whole route upgrades	Targeted: existing failures and improvements	Road strengthened; risk most reduced (30%)	\$\$\$\$
Bi Targeted improvements (accommodate)	No additional restrictions	As existing	As existing	Targeted: existing failures and improvements	Essential: address existing failures	Road somewhat strengthened; risk somewhat reduced (15%)	\$\$\$
Bii Targeted improvements (accommodate)	Additional restrictions	More one lane sections	More unsealed sections	Targeted: existing failures and improvements	Essential: address existing failures	Road somewhat strengthened; risk somewhat reduced (15%)	\$\$
C Essential repairs (accommodate/retreat)	Additional restrictions	More one lane sections	More unsealed sections	Essential: address existing failures	Essential: address existing failures	Road useable; risk only minimally reduced (5%)	\$
D Marine access (retreat)	Additional restrictions	More one lane sections	More unsealed sections	Essential: address existing failures	None	Alternatives strengthened; risk same (0%)	\$\$

8.3.2 Marine Network

In order to understand the potential for marine to provide an alternative to roading, a draft marine network was developed. The network was developed based on existing marine infrastructure and services, which could both be further developed if required. Potential development was based on the likely demand for marine services, and consideration of resilience risk for the roads and the extent to which this could be addressed through engineering works. The existing marine network is shown in Figure 2-16 (Section 2.5.5.1), and the proposed marine network in Figure 8-2.

Most marine hub sites which have potential to be used (or used more) for this purpose already have some marine infrastructure, such as a jetty or ramp. It is noted that siltation is already an issue and this limits the feasibility of some potential marine sites, and/or requires very long jetties to enable deeper water to be accessed. Additional dredging is likely to be required to maintain the proposed marine network.

While possible marine transport services were investigated, it is believed these would be privately operated so this has not been included in any costings. More work is needed in the next stages to confirm the details of any marine transport services.

Primary, arterial, and local marine hubs were identified, as defined in Table 8-4.

⁷⁷ Reduced risk is for human induced susceptibility
⁷⁸ Pre 2021 event as a baseline



Table 8-4: Indicative concept for marine hubs

Facility	Example	Indicative concept
Primary Marine Hub	Picton, Havelock	Function: primary hubs for transfer of significant volumes of goods and passengers. Significant landside and marine infrastructure.
Arterial Marine Hub	Portage	Function: important hubs with good facilities able to support multiple transfers and primary/most frequent marine services. Landside: Terminal building with passenger waiting area, dry storage facility, toilets, etc, around the size of a small community hall. Parking for at least 12 cars, loading/unloading area for freight (tennis court sized), lighting, and a livestock yard within certain distance if required. Marine: A small marina of 12 or more moorings, including jetty, with floating component. Concrete launch ramp approximately 4 m wide, potentially on reclaimed land 20 – 30 m offshore. Likely to require localised dredging.
Local Marine Hub	Bulwer Bay	Function: hubs providing local connection between arterial marine hub and origin/destination of goods and passengers, reducing distance travelled by road. Landside: Bus shelter type structure, lighting, parking for six cars. Marine: Approximately six moorings. Jetty, with floating component, likely to be 20 – 30 m from the shore. Concrete launch ramp approximately 4 m wide. Potential to require some localised dredging.
Emergency Ramp	Fish Bay	Function: emergency back up in case of a road outage, providing access to marine hub network, and goods, services and markets. Landside: no facilities Marine: ramp made from well graded gravel, potentially lined with rock riprap on sides. Likely to be 20-30m from shore, about 4 m wide, with sloped sides.

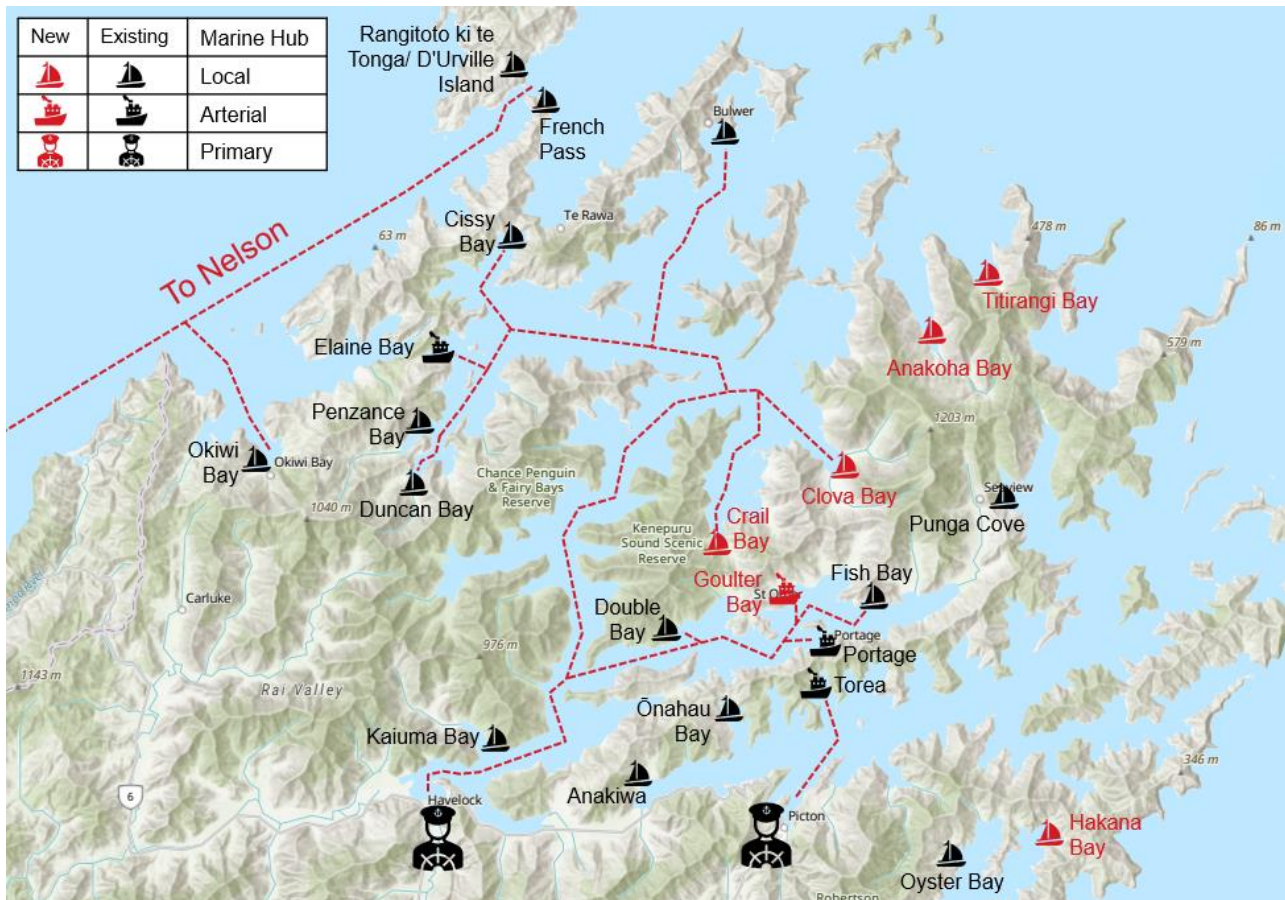


Figure 8-2: Proposed additional marine infrastructure and new or increased scheduled services

The high-level network map demonstrates that for Kenepuru and Te Aumiti/French Pass, a marine network is feasible and represents excellent adaptive capacity for these areas. For Te Whanganui/Port Underwood, Te Hoiere/Pelorus, and Queen Charlotte there is potential to connect to a wider marine network, but within these zones there are only one or



two suitable marine sites, and it is likely that these will be primarily for emergency response, at least in the short-medium term.

Marine infrastructure was added to the programmes for each zone, based on the high-level network map and hubs identified. The proposed levels of interventions for marine infrastructure were:

- **Approach X:** maintain and protect existing infrastructure (resilience)
- **Approach Y:** Protect and upgrade facilities
 - **Variation Yi:** Protect and upgrade facilities for passengers
 - **Variation Yii:** Protect and upgrade facilities for freight
 - **Variation Yiii:** Protect and upgrade facilities for all users.
- **Approach Z:** New infrastructure
 - **Variation Zi:** new emergency ramp
 - **Variation Zii:** new local marine hub
 - **Variation Ziii:** New arterial marine hub.

Bespoke marine services for freight and passengers were developed at a high level, by zone. It was not possible to determine with confidence what the frequency of such services would be, but some indicative levels were included for consultation and feedback, and so the community could understand what was envisaged.

8.4 Assignment Process and Excluded Options

The business case and geotechnical specialists considered each segment individually to determine which approaches were applicable to each segment. Approaches were excluded based on land use, road user, traffic volumes, hazard risk, and scope for access to a potential marine hub. Table 8-5 to Table 8-9 in the following sections show the approaches excluded by segment, with reasoning. Refer to Appendix N for the zone segment maps.

8.4.1 Te Aumiti/French Pass

Te Aumiti/French Pass has reasonable capacity for a marine network centred around connections to primary hubs at Havelock and Picton (and Nelson), via an arterial hub at Elaine Bay, and local hubs at Ōkiwi Bay, Duncan Bay, Tennyson Inlet, Cissy Bay and Port Ligar.

In terms of hazards, the underlying slope stability across most segments is reasonable, with the exception of Segment FP4, which has high susceptibility to natural slope stability hazard, meaning it will be difficult to provide enhanced resilience. All segments, except Segment FP7, have a high percentage of length which has high or very high susceptibility to human induced instability, which can be addressed through engineering works to provide a more resilient road.

Table 8-5: Roading approaches excluded or carried through for Te Aumiti/French Pass

Segment	Ai	Aii	Bi	Bii	C	D	Reasons for exclusion
FP1	✓	✗	✓	✗	✗	✗	ONRC Secondary Collector route providing only road access to whole Te Aumiti/French Pass area and D'Urville Island. Freight volumes 14% (54 trucks per day). Provides road access to and from marine hub at Ōkiwi Bay. Additional restrictions (Aii) not feasible due to economic importance and network connectivity role. Marine access not feasible as no coastline.
FP2	✓	✓	✓	✗	✓	✗	ONRC Access Road providing only road connection to Ōkiwi Bay from French Pass/D'Urville Island area. 90% of road has very high or high susceptibility to human induced slope instability hazard, so solutions to reduce the risk can be successful. Marine alternatives challenging and unlikely to be feasible. C is a last resort.
FP3	✗	✗	✓	✓	✗	✓	ONRC Access Road which runs along the ridge, so there are no marine options unless moving to a retreat - hub and spoke model, in which case it would be possible to develop this mode. Lower traffic volumes and natural slope instability across segment 4 mean A approaches not justified. High percentage of road susceptible to human induced slope instability hazard, which can be addressed through engineering solutions.
FP4	✗	✗	✓	✓	✗	✓	

Segment	Ai	Aii	Bi	Bii	C	D	Reasons for exclusion
FP5	x	x	x	✓	✓	✓	ONRC Access and Low Volume roads. Both have low traffic volumes. Some forestry/agriculture users, sufficient volume to justify B approach with restrictions (69 vehicles per day including 12 heavy vehicles), but not A. Marine options are available.
FP6	x	x	x	✓	✓	✓	
FP7	x	x	✓	✓	✓	x	ONRC Access with no coastline, so marine options not feasible. High flood risk on 35% of road length. 350 vehicles per day including 60 heavy vehicles, mostly forestry. A approaches not justified as this route is not as strategically important as FP1 and others.
FP8	x	x	x	✓	✓	✓	ONRC Access Road serving forestry blocks and holiday homes. Volumes not sufficient to justify A approaches. Approximately 80% of road length has high or very high susceptibility to human induced slope instability hazard, so solutions to reduce the risk can be successful. Marine options are also available.

8.4.2 Te Hoiere/Pelorus, Queen Charlotte and Te Whanganui/Port Underwood

Although separate zones, these areas are similar in that the scope to develop a marine network is limited. Each zone has potential to connect to a wider network:

- Te Hoiere/Pelorus – Kaiuma Bay
- Queen Charlotte – Grove Arm and Anakiwa
- Te Whanganui/Port Underwood – Oyster Bay and Hakana Bay

In terms of hazard risk, most segments across these zones have high or very high human induced instability, and the underlying geology is relatively stable. The exception is Queen Charlotte Drive, where approximately 10% of all three road segments is vulnerable to natural slope hazard.

Table 8-6: Roading approaches excluded or carried through for Te Hoiere/Pelorus

Segment	Ai	Aii	Bi	Bii	C	D	Reasons for exclusion
P1	x	x	✓	✓	✓	x	ONRC Access Road where A approaches are not justified due to low traffic volumes. The road does not play an overarching network connectivity role – although in theory it can act as an alternative to SH6, flooding is the main risk (45% of road has high or very high flood risk) and both roads are likely to be equally affected, so resilience added by this road is negligible. There is no coastline for marine access options.
P2	x	x	x	✓	✓	✓	A approaches and Bi not justified as this is a ONRC Low Volume Road with no overarching network connectivity role. Marine options are available.

Table 8-7: Roading approaches excluded or carried through for Queen Charlotte

Segment	Ai	Aii	Bi	Bii	C	D	Reasons for exclusion
QC1	✓	x	✓	✓	x	x	ONRC Primary Collector so additional vehicle restrictions via Aii are not realistic as the road is a regional connector providing a significant overarching network connectivity role. Marine options not feasible as no continuous coastline.
QC2	✓	✓	x	✓	x	x	ONRC Primary Collector but pre weather events vehicle length restriction of 12.6 m means Aii or Bii are possible for retreat options. C is not appropriate due to the ONRC of the road. Marine options not feasible as no continuous coastline.
QC3	x	x	✓	✓	✓	x	ONRC Secondary Collector with reasonable traffic volumes (502 AADT) and freight (17%). Road is less susceptible to underlying natural slope instability hazard, but significant stretches have high coastal hazard. A approaches excluded to provide differentiation to Queen Charlotte Drive and to provide alignment with other key side roads (i.e. Kenepuru Road).

Table 8-8: Roading approaches excluded or carried through for Te Whanganui/Port Underwood

Segment	Ai	Aii	Bi	Bii	C	D	Reasons for exclusion
PU1	✓	✗	✓	✗	✗	✗	Vehicle restrictions not feasible as route is ONRC Secondary Collector and used to access key marine hub for the area at Oyster Bay Wharf. Provides back up access for Strait Cable maintenance, and local power and communications networks if Segment PU2 fails. Road is reasonably high standard already. Distances not feasible for marine alternative.
PU2	✓	✗	✓	✓	✓	✗	ONRC Access Road, which need to be accessible for utility trucks to maintain the Strait Cable (Segment PU1 as back up). Marine access not feasible.
PU3	✓	✗	✓	✓	✓	✗	Both segments are ONRC Access Roads, which need to be accessible for utility trucks to maintain the Strait Cable. Marine access not feasible.
PU4	✗	✓	✗	✓	✓	✓	ONRC Low Volume Access Road which serves a small number of private dwellings, many of which have marine access. Significant investment in this route not justified.

8.4.3 Kenepuru

Kenepuru has good resilience potential through development of a marine network. Marine hubs exist across Kenepuru, with potential for arterial hubs at Torea and Portage, which if connected by an upgraded Torea Road (segment 6a) would provide access to both Havelock via Kenepuru Sound, and Picton via Queen Charlotte Sound. A new arterial hub could be developed near Goulter Bay to provide additional resilience and options for barging of freight. The arterial hubs would be supported by local hubs at Double Bay, Fish Bay and Punga Cove. New local hubs could be developed as/when required, at Crail Bay, Clova Bay, Anakoha Bay and Titirangi Bay.

This is a very positive situation for Kenepuru, because there are considerable challenges across much of the road network with many road segments having a high or very high susceptibility across much of their length to underlying natural slope hazard. This means that regardless of any geotechnical or stormwater engineering improvements, the roads will continue to fail following trigger events such as storms. A high level of investment in the road network to try and improve resilience is not justified. For most segments this means that the A approaches have been excluded, except for 6a, which connects arterial marine hubs at Portage and Torea Bay.

Table 8-9: Roading approaches excluded or carried through for Kenepuru

Segment	Ai	Aii	Bi	Bii	C	D	Reasons for exclusion
K1	✗	✗	✓	✓	✓	✗	ONRC Secondary Collector, which is the only road providing access to the entire Kenepuru peninsula. A approaches excluded because the roads that this connects to (Segments 2-4 and 9) have high or very high susceptibility to natural slope stability hazard, which means these roads will always be prone to slips and closures. Full marine option not feasible as no coastline, but possible for marine freight via Portage, so vehicle restrictions feasible.
K2	✗	✗	✓	✓	✗	✓	Strategically important ONRC Secondary Collector, but issues apply as explained above. C excluded as B is minimum suitable for this road unless moving to a full marine option (D).
K3	✗	✗	✓	✓	✗	✓	Strategically important ONRC Secondary Collector, but issues apply as explained above. C excluded as B is minimum suitable for this road unless moving to a full marine option (D).
K4a	✓	✗	✗	✗	✗	✗	ONRC Access Road which provides strategically important connection between arterial marine hubs at Portage and Torea Bay – ensuring marine access to both Picton and Havelock.
K4b	✗	✗	✓	✓	✓	✓	ONRC Access Road with underlying natural slope stability hazard as described above.
K5	✗	✗	✓	✓	✗	✓	ONRC Access roads but both play strategic role in providing access to marine hubs at Fish Bay and Goulter Bay for properties served by Segments 7 and 8. Also important as provides access to Kenepuru heads for lifeline power and communications. C excluded as B is minimum suitable for this road unless moving to a full marine option (D).
K6a	✗	✗	✓	✓	✗	✓	

Segment	Ai	Aii	Bi	Bii	C	D	Reasons for exclusion
K6b	x	x	✓	✓	✓	✓	ONRC Access and Low Volume Roads – A approaches excluded as described above.
K7	x	x	✓	✓	✓	✓	
K8	x	x	✓	✓	✓	✓	
K9	x	x	✓	✓	✓	✓	

8.5 Programme Development

8.5.1 Programme Overview

Four or five programmes were developed for each zone, by bringing together different combinations of road network management options for each road segment and then considering supporting marine infrastructure and services that could be feasible and support access across each zone. Although some road network management options had been excluded, as described in Section 8.4, there were still a significant number of possible permutations and combinations that could be produced. To limit the number of programmes, an approach was taken whereby Programme 1 focussed on protecting and making road access more resilient, and Programme 5 tended to be more focussed on investment in marine access and retreat from roads, if marine access was a possibility. Programmes 2-4 represented a progression from road focus to marine focus.

Programme summaries:

- **Programme 1: Road Focus:** Most road segments within the zone strengthened to provide a resilient road network where roads can withstand trigger events in future and disruptions and unplanned closures are minimised, noting this may not be possible for all zones where underlying geohazard risk is high and cannot be addressed (susceptible to natural slope instability). Marine access is primarily for emergency response.
- **Programme 2: Road Access:** Important roads within the zone are strengthened to withstand events and provide resilience - for example roads which perform an important network function (eg the only road into the zone). Where marine access is available, this starts to provide an alternative if roads are closed during or following an event.
- **Programme 3: Balanced:** Essential roads within the zone are strengthened to withstand events and provide resilience, where this is possible. Other roads are repaired to a basic level. Where marine alternatives are possible, these start to represent a real alternative, particularly where roads have high exposure to geohazard risk.
- **Programme 4: Marine Access:** Essential roads within the zone are repaired to a basic level. Where marine alternatives are possible, these become a significant of the travel network, and are made more available and more resilient.
- **Programme 5: Marine Focus:** Roads are repaired where affordable, but road access primarily provides the route to the marine hub, where this exists. Marine transport is the primary transport mode/method for access into and out of the zone, if this is feasible.

This simple high-level approach was underpinned by local knowledge, susceptibility for geohazards, road function and use, and scope for marine access. This meant that a Road Focus programme for one zone (such as Queen Charlotte) could involve considerable investment in road strengthening due to the importance of the roads and the lower susceptibility to geohazards. In contrast, the Road Focus programme for a separate zone (such as Kenepuru) would not see such investment in road strengthening, as there is an underlying susceptibility to geohazards which mean roads will continue to fail regardless of investment, and also marine can provide an alternative.

Table 8-10, Figure 8-3 and Figure 8-4 provide examples of Programme Development for Te Hoiere/Pelorus. Programme tables showing the allocation of road option by segment and marine option by zone are provided in Appendix Q . Appendix Q also provides maps and high-level descriptions for each of the programmes.

Note for Te Hoiere/Pelorus, Balanced and Marine Access Programmes are the same, as the segment level options for road investment were limited, as were the marine options for Segment 1.

Table 8-10: Te Hoiere/Pelorus Programme Development

Network Feature		1. Road Focus	2. Road Access	3. Balanced	4. Marine Access	5. Marine Focus	Comments
Road	P1	Bi	Bii	Bii	Bii	C	ONRC Access Road where A approaches are not justified due to low traffic volumes. Highest level of investment in roads is Bi, transitioning to Bii. There is no coastline, so the area will always rely on roads, and the lowest level of repair is C.
	P2	Bii	Bii	C	C	D	A approaches and Bi not justified as this is a ONRC Low Volume Road with no overarching network connectivity role. Marine options are available.
Marine	Kaiuma Bay	X	X	Yiii	Yiii	Yiii	Kaiuma Bay becomes more important as the road access declines in Programmes 3-5. In Programmes 1 and 2 it is protected from potential geohazards, in Programme 3-5 it is upgraded for all users and performs an important access role.

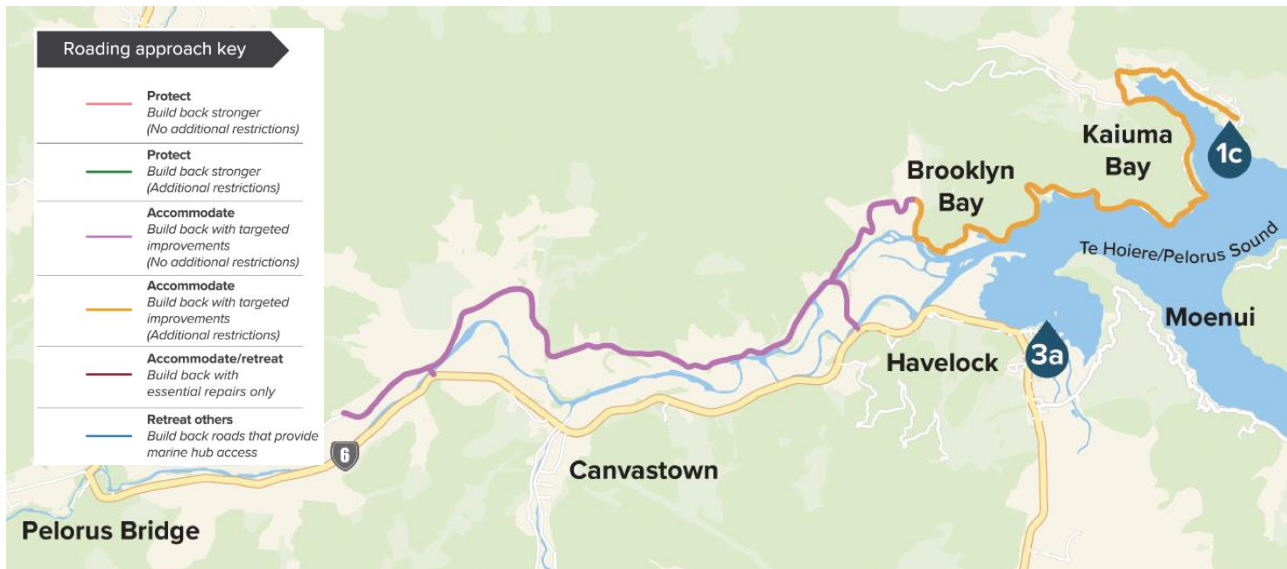


Figure 8-3: Te Hoiere/Pelorus Road Focus option map



Figure 8-4: Te Hoiere/Pelorus Marine Focus option map

8.5.2 Common Interventions

A number of interventions that applied to the whole Sounds were raised at the stakeholder workshop, during consultation and/or by the Council or the project team. These will be added to MDC's BAU work programme and progressed outside of the PBC, with the exception of the Marine Study, Resilience (drainage) Study, and Plan Change, where costs have been included in the Preferred Programme.

- Protect
 - Investigate options to minimise the impact of tree felling by forestry companies
 - Consider planning and consenting changes for earthworks within an offset of road corridors
 - Understand the extent and scale of existing risks by undertaking further studies
 - Plan and deliver a robust maintenance programme.
- Accommodate
 - Emergency Response Planning -Trigger Action Response Plan (TARP) for operation of marine facilities post hazard event and for rapid repair of lifeline assets (ie emergency marine ramps).
 - Increase community resilience by providing support in developing community recovery plans.
- Avoid
 - Avoid building new assets in the potential flow paths of debris flows.
 - Put restrictions on construction within:
 - areas at risk of slope instability, flooding, coastal and tsunami hazards and
 - areas accessed by roads which are at risk of slope instability, flooding, coastal and tsunami hazards.
 - Ensure new earthworks are engineered to avoid creating new human induced instabilities.

9 Programme Assessment

9.1 Multi Criteria Analysis

9.1.1 Assessment Criteria

A multi-criteria analysis (MCA) was used to assess the long list of programmes. Criteria were discussed and agreed with Council and Waka Kotahi representatives at a meeting on 21 February 2023. The assessment criteria and descriptions are summarised in Table 9-1.

Table 9-1: Criteria groupings and descriptions

Theme	Criteria	Description	
Investment Objectives	1	Improve community and business resilience by providing travel alternatives	Does the programme provide alternative routes/modes if road access is closed? Is access futureproofed as the climate changes? Does it help to adapt to climate change?
	2	Reduce frequency and duration of disrupted access	Does the programme alter the occurrence of unplanned road closures, or reduce the duration of unplanned road closures? What will the impact be if the frequency of events changes in the future, as the climate continues to change?
	3	Improve resilience of the transport assets	Does the programme improve the resilience of transport assets to future extreme intensity and duration rainfall events? Does it help to adapt to climate change?
Potential Achievability	4	Technical Difficulty	How difficult will the programme be to design and construct? Are there any material supply constraints that will impact this? What are the technical risks involved in implementing the option? Include consideration of challenges for water access.
Opportunities and Impacts	5	Social and Community Impacts	What social impacts are associated with this programme? For example, human health (safety), feelings of community, access to emergency services, impacts on community in relation to jobs, recreation, services and severance, impacts on farming and business operations.
	6	Environment Effects	What environmental effects are associated with this programme? Environmental effects could include those related to terrestrial and marine ecology, stormwater, water quality, noise and vibration, visual impact, urban design, natural hazards, biodiversity, resource efficiency and air quality.
	7	Climate Change Mitigation	What effect will the programme have on long-term carbon emissions e.g. through enabled, embodied and construction carbon.
	8	Supplier capacity and capability	Is there sufficient capacity amongst suppliers, including designers for more complex solutions? Are there any resource constraints?

The following assessment criteria were considered and discussed with the project team and Waka Kotahi advisors. The following was agreed:

- **Impacts on Te Ao Māori:** Following conversations with the Te Tau Ihu GM – CE collective, it was advised that iwi consultation and input on implementation of the preferred programme would take place in the next phase of work.
- **Affordability and Value for Money:** Costs and benefits would be assessed in parallel to the MCA and considered in the Appraisal Summary Table (AST) alongside the MCA in the final decision making.

The following assessment criteria were considered and discussed with the project team and Waka Kotahi advisors. It was agreed that they would be excluded with reasoning as follows:

- **Climate change adaptation:** This criterion was excluded as it was considered to be double counting Investment Objective 1 and 3.
- **Scheduling/programming:** This will be considered as part of the Management Case
- **Cumulative Impacts:** Cumulative costs and benefits are in the Economic Impact Assessment.



- **Property Impacts:** Impact of options on property owners is in the Economic Impact Assessment. Property acquisition to date has been a small proportion of the cost of the recovery programme. This will only need to be considered at the next stage.

9.1.2 Scoring

A 7-point scoring system was used as recommended in the Waka Kotahi MCA Guidance. It is explained in Table 9-2.

Table 9-2: Multi criteria analysis scoring scale

Magnitude	Definition	Score
Large Positive	Major positive impacts resulting in substantial and long-term improvements or enhancements of the existing environment.	+3
Moderate Positive	Moderate positive impact, possibly of short, medium or long-term duration. Positive outcome may be in terms of new opportunities and outcomes of enhancement or improvement.	+2
Slight Positive	Minimal positive impact, possibly only lasting over the short term. May be confined to a limited area.	+1
Neutral	No discernible or predicted positive or negative impact.	0
Slight Negative	Minimal negative impact, possibly only lasting over the short term, and definitely able to be managed or mitigated. May be confined to a limited area.	-1
Moderate Negative	Moderate negative impact, possibly of short, medium or long-term duration. Impacts highly likely to respond to management actions.	-2
Large Negative	Major negative impacts with serious, long term and possibly irreversible effect leading to serious damage, degradation or deterioration of the physical, economic, cultural or social environment. Required major rescope of concept, design, location and justification, or requires major commitment to extensive management strategies to mitigate the effect.	-3

9.1.3 Assessment Process and Moderation

Following the development of the long list of programmes and agreement on the assessment criteria, subject matter experts (SMEs) from Stantec, Marlborough District Council and Marlborough Roads were identified. The SMEs undertook independent scoring for criteria that reflected their technical expertise.

A memo and a summary of technical information was provided to assessors and a briefing session was held on 23 March 2023 to explain the programmes, assessment task, outputs required and to help ensure that people were assessing programme options consistently (refer to Appendix R). Stantec provided one-to-one support to individual SMEs who were seeking clarification or confirming assumptions and reasoning to arrive at a final set of scores, as required throughout the assessment period.

To ensure that there was differentiation between programme options, scoring was undertaken for each programme option, including the Do Minimum.

SMEs presented their scores for moderation with the project team at a session on 31 March 2023.

There was significant discussion and moderation for all scores. Appendix R is the MCA Report, which includes the workshop discussion, key discussion points for scoring and the workshop presentation in the report attachments.

The Social and Community criteria was scored separately to provide a 'community focus' score and a 'business focus' score, to reflect the different effects of the programmes on sub-sectors of the community. These separate scores were combined to provide a 'final' score. It was agreed that the effect on different sub-sectors of the community would be tested further through sensitivity testing.

As a result of the workshop some of the initial scores were changed. SMEs provided their final scores on 4 April 2023, following the moderation session. The moderated scores were accepted and included in the MCA.

9.1.4 Weightings

Weightings recognise that some criteria are considered more important than others. The baseline weightings for the Investment Objectives were drawn from the ILM, whilst weightings for other criteria were assigned based on the key drivers for the project and risks. The weightings were agreed with the client and Waka Kotahi representatives and are shown in Table 9-3.

Table 9-3: Base weighting

Theme		Criteria			Base Weighting
Investment Objectives	40%	1	Improve community and business resilience by providing travel alternatives	20%	8.0%
		2	Reduce frequency and duration of disrupted access	30%	12.0%
		3	Improve resilience of the transport assets	50%	20.0%
Potential Achievability	30%	4	Technical Difficulty	100%	30.0%
Opportunities and Impacts	30%	5	Social and Community Impacts	45%	13.5%
		6	Environment Effects	30%	9.0%
		7	Climate Change Mitigation	15%	4.5%
		8	Supplier capacity and capability	10%	3.0%

9.1.5 Sensitivity Analysis

The aim of sensitivity analysis is to test how sensitive the outcomes of the MCA were to the different criteria. The following weighting themes were tested:

- Investment Objective Focus
- Equal Weighting
- Investment Objectives and Achievability Focus
- Social and Community Focus
- Investment Objective and Social and Community Focus.

A breakdown of how each criteria contributed to the overall score for each sensitivity test is provided in Table 9-4.

Table 9-4: Sensitivity testing weighting scenarios

Sensitivity Scenarios	1. Travel Alternatives	2. Disrupted Access	3. Resilience of Assets	4. Technical Difficulty	5. Social and Community	6. Environmental Effects	7. Climate Change Mitigation	8. Supplier Capacity and Capability
Base weightings	8.0%	12.0%	20.0%	30.0%	13.5%	9.0%	4.5%	3.0%
Investment objectives	20.0%	30.0%	50.0%	-	-	-	-	-
Equal weightings	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%
Investment objectives and achievability	12.0%	18.0%	30.0%	40%	-	-	-	-
Social and community	-	-	-	-	100.0%	-	-	-
Investment objectives and social and community	12.0%	18.0%	30.0%	-	40.0%	-	-	-

9.1.6 Multi Criteria Analysis Results

Table 9-5 presents the scores agreed at the technical moderation workshop and ranking of each programme.

For context to understand the following table the programmes were structured in general as follows:

- A total of 28 programmes were evaluated.
- The Balanced and Marine Access programmes are the same for Te Hoiere/Pelorus,
- The Road Focus and Road Access programmes are the same for Queen Charlotte.

The scoring showed a clear trend towards the Road Focus and Road Access Programmes for the Te Hoiere/Pelorus, Queen Charlotte and Te Whanganui/Port Underwood zones, and for the Balanced and Marine Access Programmes for

Te Aumiti/French Pass and Kenepuru, which have more scope for marine transport. However, for Te Aumiti/French Pass, these programmes score negatively against Investment Objective 2, reduce frequency and duration of disrupted access, which does not represent a good outcome from the investment.

Table 9-5 also shows that the Do-Minimum for all zones results in very low resilience for the roading assets, and more frequent/longer periods of disrupted access.

9.1.7 Sensitivity Tests

The ranking of various programmes, depending on the sensitivity test that was applied, is presented in Table 9-6.

For Te Hoiere/Pelorus, Queen Charlotte and Te Whanganui/Port Underwood zones, sensitivity testing made no material difference to the rankings. The 'average ranking' shows the Road Focus and Road Access Programmes ranked highest.

For the Te Aumiti/French Pass and Kenepuru zones, the Balanced programme has the highest average ranking. But there was some variability across the tests performed, depending on what was considered important.

The top performing programmes for each zone based on the MCA results are listed below:

- **Te Aumiti/French Pass:** Balanced was the best performer, with Road Focus ranked second overall
- **Te Hoiere/Pelorus:** Road Focus was the best performer, with Road Access ranked second overall
- **Queen Charlotte:** Road Focus/Road Access was the best performer, with Balanced ranked second overall
- **Kenepuru:** Balanced was the best performer, with Marine Access and Marine Focus ranked second overall
- **Te Whanganui/Port Underwood:** Road Focus was the best performer, with Road Access ranked second overall.

The MCA does not support:

- **Do Minimum:** which was predominantly ranked last or second to last across all zones.
- **Marine Focus:** which was ranked last or second last across all zones except for the Kenepuru zone, where it could be considered.

Table 9-5: Multi Criteria Analysis Results

Programme		Investment Objectives			Achievability	Opportunities and Impacts				Weighted Score	Score Rank
		Travel Alternatives (8%)	Reduced Disruption (12%)	Resilience (20%)	Technical Difficulty (30%)	Social and Community (13.5%)	Environment (9%)	Climate Change (4.5%)	Supplier Capacity and Capability (3%)		
Te Aumiti/French Pass	Do Minimum	-1	-2	-2	3	-3	-2	-1	3	-0.360	6
	Road Focus	0	2	1	-1	2	1	-3	1	0.395	4
	Road Access	1	0	1	1	1	1	-3	1	0.700	3
	Balanced	2	-1	2	1	1	1	-2	0	0.875	1
	Marine Access	2	-2	3	1	0	1	-1	0	0.865	2
	Marine Focus	3	-2	2	-1	-2	1	-1	-1	-0.155	5
Te Hoiere/Pelorus	Do Minimum	1	-1	-1	3	-1	-2	0	3	0.435	4
	Road Focus	1	2	2	0	2	1	-1	2	1.095	1
	Road Access	1	1	1	1	1	1	-1	2	0.940	2
	Balanced	2	1	0	0	1	1	-1	2	0.520	3
	Marine Access										
	Marine Focus	2	-1	-1	1	-1	-1	0	2	-0.025	5
Queen Charlotte	Do Minimum	1	-2	-2	3	-3	-2	0	3	-0.155	3
	Road Focus	1	1	2	-2	3	1	-3	1	0.390	1
	Road Access										
	Balanced	1	-1	1	-1	2	1	-2	1	0.160	2
	Marine Access	2	-2	0	-1	1	1	-2	0	-0.245	4
	Marine Focus	2	-3	-1	-2	1	0	-1	-1	-0.940	5
Kenepuru	Do Minimum	1	-3	-3	3	-3	-2	-1	3	-0.520	4
	Road Focus	1	0	-2	-3	2	1	-3	-2	-1.055	6
	Road Access	2	-1	-1	-2	1	1	-2	-1	-0.655	5
	Balanced	2	2	0	-1	0	1	-2	-1	0.070	1
	Marine Access	3	1	1	-2	-2	2	-1	-2	-0.235	2
	Marine Focus	3	0	3	-3	-2	1	-1	-3	-0.375	3



Programme		Investment Objectives			Achievability	Opportunities and Impacts				Weighted Score	Score Rank
		Travel Alternatives (8%)	Reduced Disruption (12%)	Resilience (20%)	Technical Difficulty (30%)	Social and Community (13.5%)	Environment (9%)	Climate Change (4.5%)	Supplier Capacity and Capability (3%)		
Te Whanganui/Port Underwood	Do Minimum	0	-2	-1	3	-2	-2	-1	3	0.055	5
	Road Focus	0	2	2	1	2	1	-2	2	1.270	1
	Road Access	0	1	1	2	1	1	-2	2	1.115	2
	Balanced	1	0	0	2	1	2	-1	2	1.010	3
	Marine Access	2	-1	-1	2	-1	-2	-1	2	0.140	4
	Marine Focus	2	-2	-2	2	-1	-1	-1	2	-0.090	6

Table 9-6: Ranked sensitivity analysis results

Programme		Base Weightings			Investment Objectives (IO)	Equal Weightings			IO and Achievability	Social and Community (S&C)			Investment Objectives and Social and Community			Average Rank	
		S&C: Base-line	S&C: Community	S&C: Business		S&C: Base-line	S&C: Community	S&C: Business		S&C: Base-line	S&C: Community	S&C: Business	S&C: Base-line	S&C: Community	S&C: Business		
Te Aumiti/French Pass	Do Minimum	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6.0
	Road Focus	4	4	4	2	3	3	2	4	1	1	1	1	1	1	1	2.3
	Road Access	3	3	3	5	3	3	2	3	2	2	2	3	3	3	3	2.9
	Balanced	1	1	1	2	1	1	1	2	2	2	2	2	2	2	2	1.6
	Marine Access	2	2	2	1	1	1	2	1	4	4	4	4	4	4	4	2.6
	Marine Focus	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5	4.9
Te Hoiere/Pelorus	Do Minimum	4	4	4	5	4	4	4	3	4	4	4	5	5	4	4	4.1
	Road Focus	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0
	Road Access	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0
	Balanced	3	3	3	3	3	3	3	4	2	2	2	3	3	3	3	2.9
	Marine Access																
	Marine Focus	5	5	5	4	5	5	5	5	4	4	5	4	4	5	5	4.6

Programme		Base Weightings			Investment Objectives (IO)	Equal Weightings			IO and Achievability	Social and Community (S&C)			Investment Objectives and Social and Community			Average Rank
		S&C: Base-line	S&C: Community	S&C: Business		S&C: Base-line	S&C: Community	S&C: Business		S&C: Base-line	S&C: Community	S&C: Business	S&C: Base-line	S&C: Community	S&C: Business	
Queen Charlotte	Do Minimum	3	3	3	5	4	4	4	1	5	5	5	5	5	5	3.6
	Road Focus	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1.1
	Road Access															
	Balanced	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2.1
	Marine Access	4	4	4	3	3	3	3	4	3	3	3	3	3	3	3.3
	Marine Focus	5	5	5	4	5	5	5	5	3	3	3	4	4	4	4.3
Kenepuru	Do Minimum	4	5	4	6	5	5	4	4	6	6	4	6	6	6	5.1
	Road Focus	6	6	6	5	6	6	6	6	1	1	4	3	5	5	4.7
	Road Access	5	4	5	4	4	3	5	5	2	1	4	4	2	4	3.7
	Balanced	1	1	1	3	1	1	2	1	3	3	1	1	1	3	1.6
	Marine Access	2	2	2	2	2	2	1	3	4	4	1	5	4	2	2.6
	Marine Focus	3	3	3	1	3	3	3	2	4	5	1	2	3	1	2.6
Te Whanganui/Port Underwood	Do Minimum	5	6	5	5	6	6	6	5	6	6	6	6	6	6	5.7
	Road Focus	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0
	Road Access	2	2	2	2	3	3	2	2	2	2	2	2	2	2	2.1
	Balanced	3	3	3	3	2	2	2	3	2	2	3	3	3	3	2.6
	Marine Access	4	4	4	4	4	4	4	4	4	2	4	4	4	4	3.9
	Marine Focus	6	5	6	6	5	5	5	6	4	2	4	5	5	5	4.9

9.2 Initial Cost Estimate

An initial programme level engineering cost estimate was completed for each programme. The programme level cost estimates allow for all fees, overheads, and construction costs, but do not include specific allowance for client costs, consenting and property costs. They also provided for an overall 30% contingency allowance. The cost estimates for each programme are shown in Table 9-7. Values have been rounded to the nearest \$5M for those over \$10M, and nearest \$1M for those under \$10M. Table 9-7 shows that:

- Road Focus has the highest capital cost for each zone⁷⁹
- As programmes focus less on roads and more on marine capital costs reduce across all zones.
- The Do Minimum programme has the least capital costs for all zones.
- The Kenepuru zone has the highest capital costs across all zones
- Te Hoiere/Pelorus has the lowest capital cost across all zones

Table 9-7: Initial capital cost estimates for each programme⁸⁰

Programme	Te Aumiti / French Pass	Te Hoiere / Pelorus	Queen Charlotte	Kenepuru	Te Whanganui / Port Underwood
Do Minimum	\$4M	\$1M	\$2M	\$10M	\$3M
Road Focus	\$75M	\$6M	\$30M	\$150M	\$40M
Road Access	\$45M	\$4M		\$80M	\$20M
Balanced	\$30M	\$2M	\$15M	\$60M	\$15M
Marine Access	\$20M		\$10M	\$50M	\$10M
Marine Focus	\$20M	\$2M	\$10M	\$40M	\$7M

The initial cost estimates were used by MDC decision makers alongside a range of other metrics to assist in the identification of the Emerging Preferred Option for consultation. The estimates were used to understand the possible cost of each programme relative to one another, rather than providing an expectation that the absolute values of the estimates would be the cost of implementation.

9.3 Benefit Cost Ratios

Table 9-8 shows the initial estimated transport efficiency benefit cost ratios (BCRs) for each programme, and Table 9-9 shows the initial wider economic impact (WEI) factors for each programme. The WEI factors were calculated using a non-MBCM⁸¹ compliant methodology that was developed for the project using a bespoke methodology based on a community survey in January 2022. This approach was agreed by Waka Kotahi as a relevant and useful method to inform MDC considerations on economic impacts from the Community. The BCRs and WEI factors were only used for comparative purposes to assist in decision making on relative merits of the respective programmes. MBCM compliant BCRs were developed later and are presented in Section 13.

The assessment drew on 919 survey responses where respondents answered questions about the impacts of the 2021 and 2022 storm events on travel (travel times, travel costs) and wider economic impacts (business turnover, income, house price changes, other costs). The survey allowed the economists to understand the value that the community places on the road, including how it is used and its role in supporting residents and businesses.

The transport efficiency BCRs and WEI factors were calculated by considering respondents' estimates about changes in travel time since the storm events. The results show that:

- **French Pass/Te Aumiti:**
 - The Do Minimum gives the lowest BCR and WEI factor, and the BCR is less than one.
 - The BCRs are all less than one.
 - Road Access gives the highest WEI factor
- **Te Hoiere/Pelorus:**
 - The Do Minimum gives the lowest BCR and WEI factor, and the BCR is less than one.

⁷⁹ Marine Focused programmes have the highest additional maintenance and operating costs

⁸⁰ Initial estimates are the same for Balanced/ Marine Access for Te Hoiere/ Pelorus and Road Focus/ Road Access for Queen Charlotte as these are the same programmes. Refer to Section 8.5 for more detail.

⁸¹ Monetised benefits and costs manual, Waka Kotahi

- Only the Balanced/Marine Access programme gives a BCR of greater than one.
- Balanced/Marine Access gives the highest BCR and WEI factor
- **Queen Charlotte:**
 - The Do Minimum and Marine Focus gives the lowest BCR and the BCR is less than one.
 - The Do Minimum gives the lowest WEI
 - The Balanced approach gives the highest BCR and WEI factor.
- **Kenepuru:**
 - Marine Focus gives the lowest BCR and WEI factor.
 - Only the Road Access and Balanced programmes give BCRs of greater than one
 - Balanced gives the highest BCR and WEI factor
- **Te Whanganui/Port Underwood:**
 - The Do Minimum gives the lowest BCR and WEI factor.
 - The BCRs are all less than one
 - Marine Access has the highest BCR, and Marine Focus and Marine Access have the highest equal WEI factor

Table 9-8: Initial transport efficiency benefit cost ratios

Programme	Te Aumiti / French Pass	Te Hoiere / Pelorus	Queen Charlotte	Kenepuru	Te Whanganui / Port Underwood
Do Minimum	0.29	0.39	0.68	0.57	0.22
Road Focus	0.57	0.51	1.68	0.86	0.37
Road Access	0.76	0.63		1.07	0.49
Balanced	0.83	1.14	3.01	1.12	0.51
Marine Access	0.61		1.97	0.59	0.73
Marine Focus	0.49	0.82	0.68	0.53	0.72

Table 9-9: Initial wider economic impact factors

Programme	Te Aumiti / French Pass	Te Hoiere / Pelorus	Queen Charlotte	Kenepuru	Te Whanganui / Port Underwood
Do Minimum	2.33	7.43	6.57	5.57	1.54
Road Focus	4.06	9.01	16.36	7.72	2.60
Road Access	5.46	10.91		9.56	3.34
Balanced	5.35	22.91	27.47	10.20	3.41
Marine Access	4.10		16.27	5.81	4.95
Marine Focus	3.44	17.94	16.29	5.56	4.95

9.4 Economic Impact

The economic impact for each programme was assessed using the present value of the WEI for each programme. It was assumed that the Road Focus programme for each zone would enable each area to return to its pre 2021 weather event level of economic activity. The present value of the WEI was converted to a percentage and assigned a likelihood on returning the zone to its previous level of economic activity using the terminology in the Waka Kotahi Risk Management Practice Guide threat likelihoods⁸². Table 9-10 shows the apparent likelihood of each programme returning the zone to its previous level of economic activity.

⁸² Rare ≤ 5%, 5% < Unlikely ≤ 30%, 30% < Possible ≤ 55%, 55% < Likely ≤ 85%, 85% < Almost Certain

Table 9-10: Likelihood of returning to previous level of economic activity

Programme	Te Aumiti / French Pass	Te Hoiere / Pelorus	Queen Charlotte	Kenepuru	Te Whanganui / Port Underwood
Do Minimum	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Road Focus	Almost certain	Almost certain	Almost certain	Almost certain	Almost certain
Road Access	Almost certain	Almost certain		Likely	Likely
Balanced	Likely	Almost certain	Likely	Likely	Likely
Marine Access	Likely		Possible	Possible	Likely
Marine Focus	Possible	Likely	Possible	Possible	Possible

10 Emerging Preferred Programme

10.1 Programme Evaluations

10.1.1 Overview of Process

The identification of an Emerging Preferred Option may consider aspects not considered in the MCA, such as political considerations, funding constraints or other risks.

The decision on the Emerging Preferred Option was confirmed at a meeting with senior MDC and Marlborough Roads representatives. The MCA was not the primary driver of selecting a preferred option, it was an important input.

The considerations were:

- Does the programme contribute positively to the investment objectives?
 - MCA results for the Investment objectives used to assess.
- How does the programme rank overall against the MCA criteria?
 - MCA scoring used to assess.
- What level of economic activity does it restore?
 - Initial cost estimates
 - Initial BCRs
 - Initial WEI factors
 - Economic impact assessment
- How efficient is it from a transport perspective?
 - i.e.. road more efficient than boat, the initial transport economics were used to assess.
- Are there any other overriding factors that need to be considered?
 - e.g. key inter regional link like Queen Charlotte Drive and inter island transmission and communications link as in Te Whanganui/Port Underwood

Then on balance, a decision was made regarding the Emerging Preferred Programme Option (EPP, the works needed now) and the HAP (minimum level of service required should a significant event(s) occur closing roads for very long periods or permanently) for each zone, as shown in Figure 10-1. Refer to Section 10.3 for more detail regarding the HAP. Identifying the HAP allowed a conversation to be started with the community about future access.

An explanation by zone is in the following sections.

	Road Focus	Road Access	Balanced	Marine Access	Marine Focus
Rai Valley to Te Aumiti / French Pass		●		▲	
Te Hoiere/Pelorus	●			▲	
Queen Charlotte	●			▲	
Kenepuru			●		▲
Te Whanganui/ Port Underwood		●		▲	

● Emerging preferred ▲ Adaptation pathway

Figure 10-1: Comparison of emerging preferred options and hazard adaptation pathways

10.1.2 Te Aumiti/French Pass

Table 10-1 shows a summary of the MCA results, benefits, cost estimate and economic impact for Te Aumiti/French Pass.



Table 10-1: Summary of evaluation method results for Te Aumiti/French Pass

Considerations	Do Minimum	Road Focus	Road Access	Balanced	Marine Access	Marine Focus
Weighted MCA Score	-0.36	0.40	0.70	0.88	0.87	-0.16
Transport Efficiency BCR	0.30	0.57	0.76	0.83	0.61	0.49
WEI Factor	2.33	4.06	5.46	5.35	4.1	3.44
Initial Cost Estimate	\$4.1M	\$75.4M	\$43.1M	\$27.0M	\$22.0M	\$20.2M
Likelihood of restoring previous economic activity	Unlikely	Almost Certain	Almost Certain	Likely	Likely	Possible

These results were considered by the Council, and it was confirmed that the Emerging Preferred Programme for Te Aumiti/French Pass was the Road Access Programme, and the Hazard Adaptation Pathway was the Marine Access Programme. A summary of rationale is provided in Table 10-2.

Table 10-2: Summary of decision rationale for Te Aumiti/French Pass

Considerations	Performance of Emerging Preferred Programme: Road Access
Investment Objectives	Some improvement to transport alternatives and resilience, provides similar level of disruption into the future as is experienced now. Best balance overall for level of disruption and provision of travel alternatives. Other programmes either have more disruption, or do not provide alternatives.
Multi Criteria Analysis	Rated positively for technical achievability, social and community impact, environmental effects and market capacity to deliver. Rated negatively for climate change mitigation. Overall rated third, however, first and second rated options did not deliver positive outcomes on all investment objectives, with disrupted access likely to become more frequent and less likely to meet local business needs.
Cost estimate	Was second-highest cost estimate of the proposed options. Lower cost options were Balanced, Marine Access and Marine Focus, which did not do as well in achieving investment objectives, particularly reducing frequency of disrupted access, and were not as readily deliverable by local market capacity. The higher cost option (Road Focus) was demanding to achieve technically.
Transport efficiency	The low volume of traffic on this network means no options receive a positive transport benefit cost ratio from a transport investment efficiency perspective. The preferred option was the second highest-rated options for this criterion.
Economic impact	The estimated likelihood of restoring pre-storm economic activity is almost certain. The primary reason for continuing to invest to this level is the importance of this area from an economic perspective in the Sounds, relative to the level of investment needed to achieve this outcome.
Conclusion	Restoring road access is justified, as are targeted improvements in resilience, particularly at the southern end of the study area around SH6 to Elaine Bay, because of the volume of aquaculture moved through Elaine Bay. However, adaptive capacity is high due to access to marine transport, and this is likely to become increasingly important over time in the outer reaches beyond Elaine Bay due to the susceptibility of the road corridor in this area.

10.1.3 Te Hoiere/Pelorus

Table 10-3 shows a summary of the MCA results, benefits, cost estimate and economic impact for Te Hoiere/Pelorus.

Table 10-3: Summary of evaluation method results for Te Hoiere/Pelorus

Considerations	Do Minimum	Road Focus	Road Access	Balanced/Marine Access	Marine Focus
Weighted MCA Score	0.435	1.095	0.94	0.52	-0.025
Transport Efficiency BCR	0.39	0.51	0.63	1.14	0.82
WEI Factor	7.43	9.01	10.91	22.91	17.94
Initial Cost Estimate	\$0.8M	\$6.1M	\$4.2M	\$2.2M	\$1.8M
Likelihood of restoring previous economic activity	Unlikely	Almost Certain	Almost Certain	Almost Certain	Likely

These results were considered by the Council, and it was confirmed that the Emerging Preferred Programme for Te Hoiere/Pelorus was the Road Focus Programme, and the Hazard Adaptation Pathway was the Marine Access Programme. A summary of rationale is provided in Table 10-4.



Table 10-4: Summary of decision rationale for Te Hoiere/Pelorus

Considerations	Performance of Emerging Preferred Programme: Road Focus
Investment Objectives	Contributes the most benefit against each of the investment objectives: reduced disruption, improved alternatives and improved resilience.
MCA	Rated positively for social and community impacts, environmental effects and capacity of market to deliver. Was considered technically achievable. Rated negatively for climate change mitigation. Was the highest-ranked option overall in qualitative assessment.
Cost estimate	Was the highest cost estimate, however, the overall cost is not high and there are opportunities for cost savings and rationalisation in delivery. If these cost savings are not realised, a lower level of service or reduced number of improvements may need to be considered through implementation.
Transport efficiency	The low volume of traffic on this network means most options receive a negative transport BCR from a transport investment efficiency perspective, including this option.
Economic impact	The estimated likelihood of restoring pre-storm economic activity is almost certain for this option. A primary reason to invest in this level of service is the economic activity at the western end of Kaiuma Bay Road. Long-term alternative access for eastern communities can be supported by marine infrastructure because of proximity to Havelock.
Conclusion	Restoring road access is justified as are targeted improvements in resilience, particularly at the western end of the study area, due to dairy and logging activity. However, marine access could become increasingly important over time at the eastern end of the study area due to the susceptibility of the road corridor coastal inundation, which will only increase as the impacts of climate change become more frequent.

10.1.4 Queen Charlotte

Table 10-5 shows a summary of the MCA results, benefits, cost estimate and economic impact for Queen Charlotte.

Table 10-5: Summary of evaluation method results for Queen Charlotte

Considerations	Do Minimum	Road Focus/Road Access	Balanced	Marine Access	Marine Focus
Weighted MCA Score	-0.155	0.39	0.16	-0.245	-0.94
Transport Efficiency BCR	0.68	1.68	3.01	1.97	0.68
WEI Factor	6.57	16.36	27.47	16.27	16.29
Initial Cost Estimate	\$1.9M	\$32.2M	\$12.2M	\$9.2M	\$7.9M
Likelihood of restoring previous economic activity	Unlikely	Almost Certain	Likely	Possible	Possible

These results were considered by the Council, and it was confirmed that the Emerging Preferred Programme for Queen Charlotte was the Road Focus Programme, and the Hazard Adaptation Pathway was the Marine Access Programme. A summary of rationale is provided in Table 10-6.

Table 10-6: Summary of decision rationale for Queen Charlotte

Considerations	Performance of Emerging Preferred Programme: Road Focus/Road Access
Investment Objectives	Contributes the most benefit against each of the investment objectives: reduced disruption, improved alternatives and most improved resilience.
MCA	Rated most positively for social and community impacts. The option is also rated positively for environmental effects and capacity of market to deliver. Rated negatively for climate change mitigation. Was the highest-ranked option overall in qualitative assessment.
Cost estimate	Was the highest cost option. Opportunities for cost savings while still delivering resilience outcomes need to be explored through implementation, which may mean a reduced level of service, such as reduced lane widths, is delivered in some areas over time.
Transport efficiency	The higher volume of traffic for this area means there is an opportunity for a positive return on investment from a transport investment efficiency perspective for this option.
Economic impact	The estimated likelihood of restoring pre-storm economic activity is almost certain for this option. A primary reason to invest in this level of service is the regional importance of this route as an alternative for SH 1 or SH6 outages. It is also a key link for the Kenepuru community to the rest of Marlborough.

Considerations	Performance of Emerging Preferred Programme: Road Focus/Road Access
Conclusion	While there are marine transport alternatives for the eastern end of the study area, the regional importance of the link between Picton and Havelock means a focus on restoring a reasonable and more resilient level of service is important.

10.1.5 Kenepuru

Table 10-7 shows a summary of the MCA results, benefits, cost estimate and economic impact for Kenepuru.

Table 10-7: Summary of evaluation method results for Kenepuru

Considerations	Do Minimum	Road Focus	Road Access	Balanced	Marine Access	Marine Focus
Weighted MCA Score	-0.52	-1.06	-0.67	0.07	-0.24	-0.38
Transport Efficiency BCR	0.57	0.86	1.07	1.12	0.59	0.53
WEI Factor	5.57	7.72	9.56	10.2	5.81	5.56
Initial Cost Estimate	\$8.6M	\$145.2M	\$81.9M	\$57.6M	\$46.5M	\$41.6M
Likelihood of restoring previous economic activity	Unlikely	Almost Certain	Likely	Likely	Possible	Possible

These results were considered by the Council, and it was confirmed that the Emerging Preferred Programme for Kenepuru was the Balanced Programme, and the Hazard Adaptation Pathway was the Marine Focus Programme. A summary of rationale is provided in Table 10-8.

Table 10-8: Summary of decision rationale for Kenepuru

Considerations	Performance of Emerging Preferred Programme: Balanced
Investment Objectives	Improves travel alternatives and is the best option to reduce future disruption for similar events, but resilience of the route is similar to what is in place now.
MCA	It rates positively for community impacts and environmental effects, and it delivers a serviceable road network and improvements to marine infrastructure. However, although not unique to this option, it is challenging technically, potentially adversely impacts future local commercial outcomes, does not mitigate climate change and there is a risk it will challenge the local market capacity to deliver
Initial Cost estimate	Was the third-lowest cost of the six options for Kenepuru. It is nearly a third of the highest cost option but is still a substantial cost. It is still the most expensive of the emerging preferred options.
Transport efficiency	The volume of traffic on this network means there is an opportunity for a positive return on investment from a transport investment efficiency perspective for this option.
Economic impact	Restoring pre-storm economic activity longer term is considered likely for this option. The primary reason for investing in this level of service is the size of the community and diversity of activity. However, the road network is highly vulnerable and costly to repair.
Conclusion	Restoring some form of road access is warranted, and there is merit in some improvements such as to stormwater and maintenance. However, over time the area will become more dependent on the need for a robust adaptation plan and marine infrastructure to be in place because of the likelihood of future severe disruption due to a wide range of possible/probable events.

10.1.6 Te Whanganui/Port Underwood

Table 10-9 shows a summary of the MCA results, benefits, cost estimate and economic impact for Te Whanganui/Port Underwood.

Table 10-9: Summary of evaluation method results for Te Whanganui/Port Underwood

Considerations	Do Minimum	Road Focus	Road Access	Balanced	Marine Access	Marine Focus
Weighted MCA Score	0.06	1.27	1.12	1.01	0.14	-0.09
Transport Efficiency BCR	0.22	0.37	0.49	0.51	0.73	0.72
WEI Factor	1.54	2.6	3.34	3.41	4.95	4.95

Considerations	Do Minimum	Road Focus	Road Access	Balanced	Marine Access	Marine Focus
Initial Cost Estimate	\$3.2M	\$41.4M	\$21.4M	\$17.0M	\$7.2M	\$6.7M
Likelihood of restoring previous economic activity	Unlikely	Almost Certain	Likely	Likely	Likely	Possible

These results were considered by the Council, and it was confirmed that the Emerging Preferred Programme for Te Whanganui/Port Underwood was the Road Access Programme, and the Hazard Adaptation Pathway was the Marine Access Programme. A summary of rationale is provided in Table 10-10.

Table 10-10: Summary of decision rationale for Te Whanganui/Port Underwood

Considerations	Performance of Emerging Preferred Programme: Road Access
Investment Objectives	Maintains existing travel alternatives. Marine alternatives are of limited benefit relative to road. Some reduction in disruption to access and improved resilience of transport assets.
MCA	Rated positively for technical achievability, social and community impacts, environmental effects and capacity of market to deliver. Rated negatively for climate change mitigation. This option was the second-highest ranked option overall in qualitative assessment.
Initial cost estimate	Was the second-highest cost estimate of the proposed options. Road focus rated higher qualitatively but was roughly twice the cost.
Transport efficiency	The low volume of traffic on this network means no options receive a positive transport benefit cost ratio from a transport investment efficiency perspective.
Economic impact	The estimated likelihood of restoring pre-storm economic activity is almost certain. However, a primary reason for continuing to invest is because of the maintenance access for the national linkage between the South and North islands of transmission and communications infrastructure.
Conclusion	Restoring full levels of service do not appear justified if costs are high, however, road access is preferred to marine access particularly to support access for maintenance of interisland transmission and communications infrastructure. Compromises can be made on road width and type (sealed, unsealed) in areas over time to save money, and improved resilience is justified with improved stormwater, and regular maintenance of fit-for-purpose roadway levels of service.

10.2 Emerging Preferred Programme Summary

In summary, the EPP for four of the five zones is the road focused or road access programme. This means the bulk of the investment would be on roading infrastructure, but there would still be improvements made to the marine infrastructure. The resilience of nearly all roads would be improved, but in some cases, there would be trade-offs with road width and surfacing type to achieve the improved resilience. There would also be investment in upgrading and protecting the existing marine infrastructure in Picton, Havelock and Elaine Bay, as well as local marine hubs at Tennyson Inlet, Cissy Bay, and Waihinu Bay.

The EPP for Kenepuru is the balanced programme. This is largely because the underlying geological instability found along the majority of Kenepuru Road between Linkwater and the Heads means it would be unaffordable to implement any long-lasting repairs along this section of road. There would be targeted improvements for Kenepuru roads, but there would be trade-offs to achieve this and it is likely there would be vehicle weight and length restrictions for sections of road. The roads would not be restricted to residents only.

There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary marine hubs); Torea and Portage (arterial marine hubs); and Double Bay, Fish Bay and Punga Cove. A new arterial marine hub will be developed near Goulter Bay.

Marine passenger services between Havelock and Kenepuru Sound would be introduced at approximately three times per week, while passenger services in the Queen Charlotte Sound would be as existing. A twice-weekly freight service between Picton and Torea would be introduced, as would a scheduled freight service between Havelock and Kenepuru Sound. Routes and frequencies would be subject to consultation. Subsidies for any public transport are currently unknown.

10.3 Hazard Adaptation Pathways Summary

The EPP represents the appropriate approach to the current resilience risk in the Sounds. However, over time, events such as storms, earthquakes and sea level rise are likely to occur which will make it progressively difficult to maintain a resilient road network.

The HAP represents the lowest level of service Council is willing to provide, while still delivering safe transport solutions and access in and out of the Sounds. For Kenepuru the lowest level of service is the Marine Focus Programme, for the other four zones it is the Marine Access Programme.



Adaptation is a journey – a series of steps. The EPP can be considered the starting point of that journey, and the HAP the end point. Any significant event that causes substantial damage to the transport network will start the adaptation process. The event would be a trigger for Council to assess the Road Management Strategy for that road segment and decide whether it is realistic to continue with the agreed strategy, or transition to a different strategy for that segment.

Figure 10-2 provides an overview adaptation map. The transition from the EPP to HAP is unlikely to be linear and each road segment will follow its own path based on its importance and the impact of each event. The detail by zone and road segment is provided in Table 10-11.

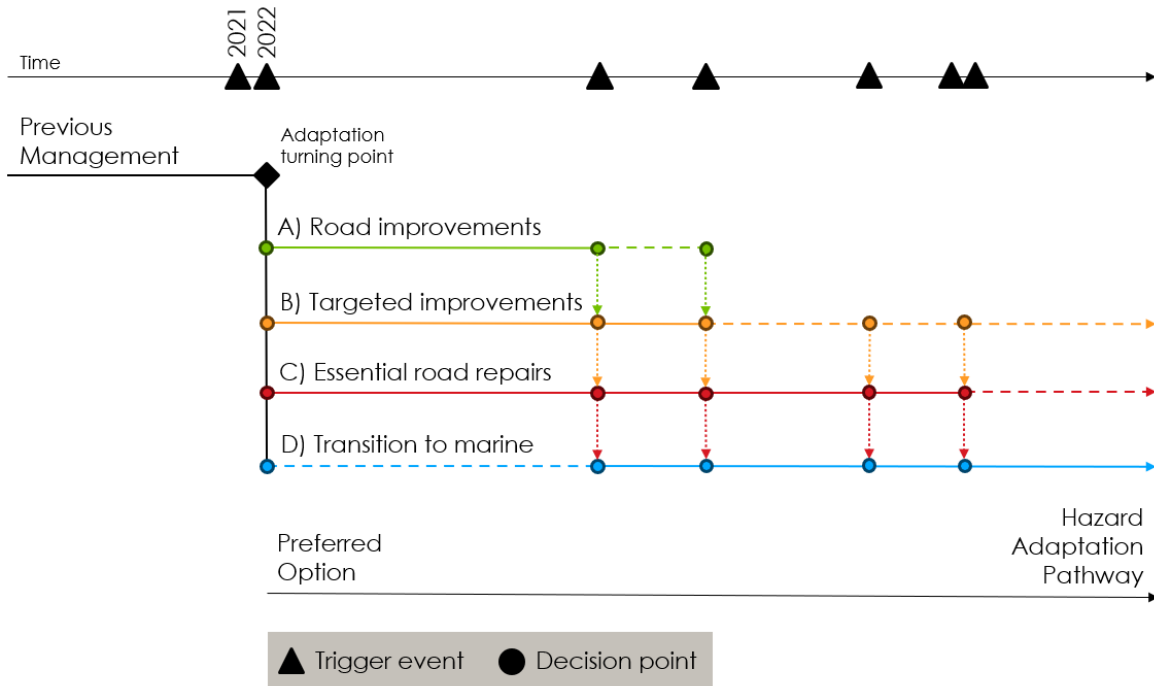


Figure 10-2: Possible adaptation route map for the Sounds

Table 10-11: Road management strategy by zone and segment for the EPP and the HAP

Zone	Segment	Emerging Preferred Programme (Today)	Hazard Adaptation Pathway (Future)
Te Aumiti / French Pass	1	Ai	Bi
	2	Aii	Bi
	3	Bii	Bii
	4	Bii	Bii
	5	C	D
	6	C	D
	7	Bii	Bii
	8	Bii	C
Te Hoiere / Pelorus	1	Bi	Bii
	2	Bii	C
Queen Charlotte	1	Ai	Bi
	2	Ai	Bii
	3	Bii	C
Kenepuru	1	Bii	C
	2	Bii	D
	3	Bii	D
	4a	Ai	Ai
	4b	C	D

Zone	Segment	Emerging Preferred Programme (Today)	Hazard Adaptation Pathway (Future)
Kenepuru cont.	5	Bii	D
	6a	Bii	D
	6b	Bii	D
	7	Bii	D
	8	Bii	D
	9	C	D
Te Whanganui / Port Underwood	1	Ai	Bi
	2	Bi	C
	3	Bi	Bii
	4	Bii	D

10.4 Iwi

There was no structured engagement with Iwi regarding the Emerging Preferred Option. MDC has been updating the iwi GMs regularly at the iwi GMs Forum. In addition, whole of Governance Project Advisory Group Meetings have occurred regularly and two representatives of Te Tau Ihu have been in attendance. However, it is understood that iwi want to input separately, and this will occur post-PBC.

10.5 Engagement

10.5.1 Summary

As mentioned in Section 3.3 and Section 3.4 a number of engagement opportunities were provided to allow the community and stakeholders to provide feedback on the emerging preferred options and hazard adaptation pathways. Table 10-12 summaries the significant volume of engagement activity from the community.

An Engagement Summary Report is provided in Appendix S .

Table 10-12: Summary of engagement completed for the emerging preferred options

Forum	Summary
Stakeholder workshop	On 20 June 2023 a stakeholder workshop was held in Blenheim. Approximately 50 people attended. Refer to Appendix C.2 for a summary of the workshop's outcomes.
Community Drop In Sessions	Between 20 and 28 June 2023 seven drop-in sessions were held across the Sounds, Blenheim, Picton, and Nelson. An online zoom session was also held for anyone who could not attend any of the in-person drop-ins. The purpose of the drop-in sessions was to allow the community to ask questions of, and provide feedback on, the emerging preferred options and hazard adaptation pathways for each area. Approximately 500 people attended in person, with about 50 people attending the online Zoom session. Refer to Appendix E for a summary of the events.
Survey	Between the 16 June and 11 July 2023 an online survey was run to gauge community support for the emerging preferred options and hazard adaptation pathways. Over 1,700 responses were received. Refer to Appendix G for a summary of the survey results.
Written Submission	An additional 43 written submissions were received.

10.5.2 Survey Results

The key findings from the survey are summarised in Table 10-13, and shown in Figure 10-3 to Figure 10-5. For the full results, refer to Appendix G .

Table 10-13: Key engagement findings for each zone

Zone	Findings
Te Aumiti / French Pass	<ul style="list-style-type: none"> • 229 responses were received. • Road Access was the most popular respondent preferred option at 40%. This was closely followed by Road Focus at 37%. • There is relatively strong support for the emerging preferred option, Road Access with 69% of respondents 'supportive' or 'somewhat supportive' of this option. • Support of the hazard adaptation pathway, Marine Access, was less clear. 43% of respondents were 'supportive' or 'somewhat supportive', while 40% were 'unsupportive' or 'somewhat unsupportive.'
Te Hoiere / Pelorus	<ul style="list-style-type: none"> • 84 responses were received. • Road Access was the most popular respondent preferred option at 33%. This was closely followed by Road Focus at 21%. • 47% of respondents were 'supportive' or 'somewhat supportive' of the proposed emerging preferred option, Road Focus. • Support of the hazard adaptation pathway, Marine Access, was less clear. 38% of respondents were 'supportive' or 'somewhat supportive', while 40% were 'unsupportive' or 'somewhat unsupportive.'
Queen Charlotte	<ul style="list-style-type: none"> • 197 responses were received. • Road Focus/Road Access was the most popular respondent preferred option at 72%. This was followed by Balanced at 14%. • This was the most supported emerging preferred option with 77% of respondents 'supportive' or 'somewhat supportive' of the emerging preferred option, Road Focus/Road Access. • This zone also had the most supported hazard adaptation pathway with 47% of respondents 'supportive' or 'somewhat supportive' of the hazard adaptation pathway, Marine Access.
Kenepuru	<ul style="list-style-type: none"> • 361 responses were received. • Road Access was the most popular respondent preferred option at 43%. This was followed by Road Focus at 29%. • This was the least supported emerging preferred option with 48% of respondents 'unsupportive' or 'somewhat unsupportive' of the proposed emerging preferred option, Balanced. • There were many requests for a Road Access approach across Kenepuru, and/or to increase the segment response from essential repairs to targeted improvements for Portage to the Heads and Moetapu Bay Road. • This was also the least supported hazard adaptation pathway with 53% of respondents 'unsupportive' or 'somewhat unsupportive' of the hazard adaptation pathway, Marine Focus.
Te Whanganui / Port Underwood	<ul style="list-style-type: none"> • 95 responses were received. • Road Access was the most popular respondent preferred option at 32%. This was closely followed by Road Access at 28%. • There is relatively strong support for the emerging preferred option, Road Access with 63% of respondents 'supportive' or 'somewhat supportive' of this option. • Support of the hazard adaptation pathway, Marine Access, was less clear. 39% of respondents were 'supportive' or 'somewhat supportive', while 43% were 'unsupportive' or 'somewhat unsupportive.'

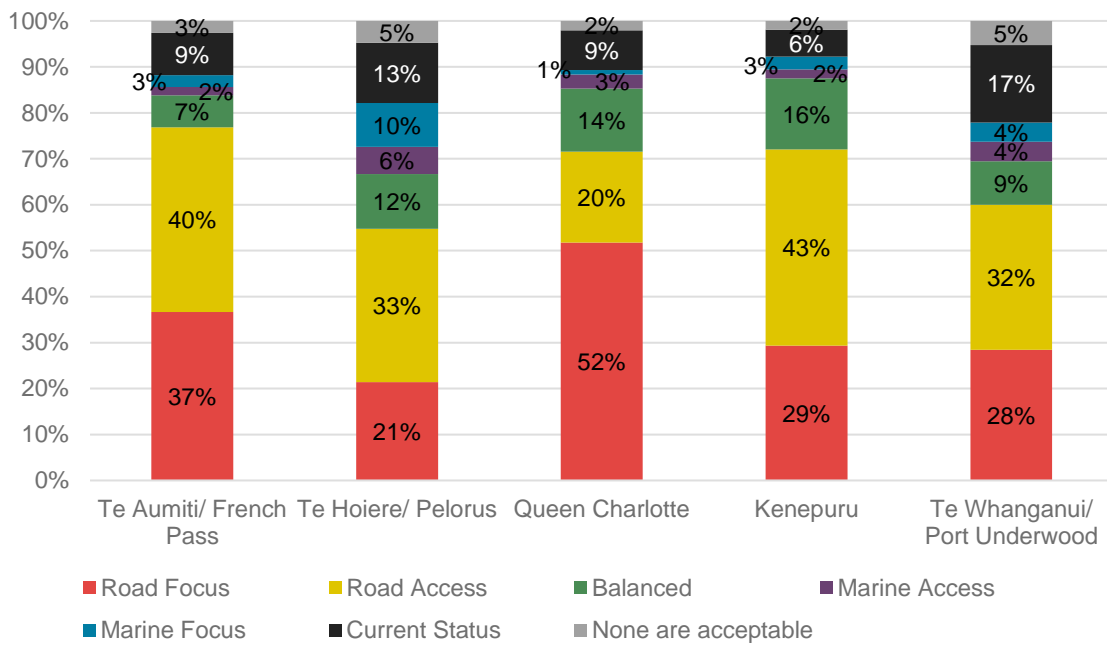


Figure 10-3: Respondents preferred option by zone

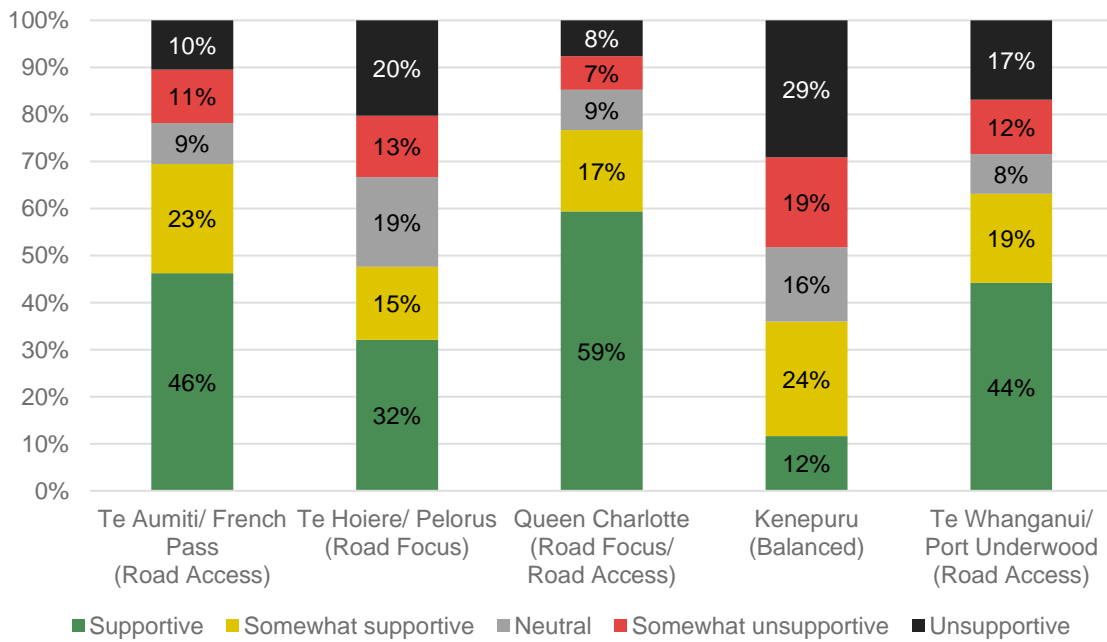


Figure 10-4: Respondents support for the emerging preferred options

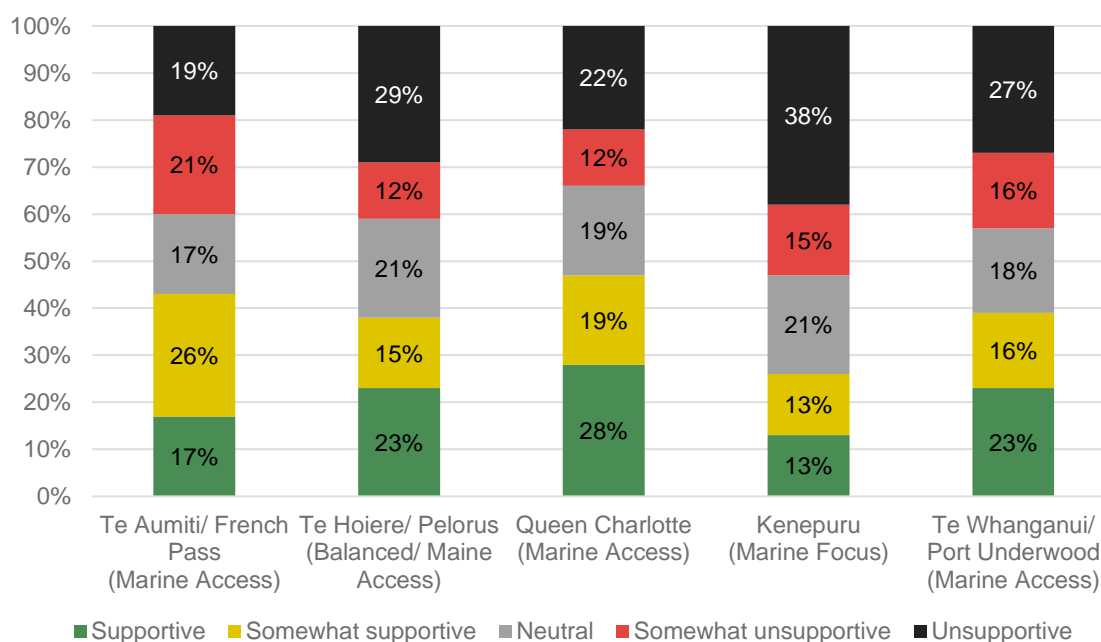


Figure 10-5: Respondents support for the hazard adaptation pathways

10.6 Revised Programme Benefits Assessment

10.6.1 Overview

In parallel with consultation, a revised Present Value Cost and benefits analysis was completed for all programmes, consistent with the MBCM for a 40-year analysis period.

The purpose of this assessment was to understand if the Emerging Preferred Option was preferred from an economic perspective based on the revised economic methodology and updated cost estimates (refer Section 12 below).

The revised programme assessment considered the following cost and benefit streams:

- Capital costs relating to repairs and improvements.
- On-going maintenance.
- Disruption event cost savings from improved resilience compared to the Do Minimum.
- Travel time and vehicle operating via costs resulting from the lifting of speed restrictions.
- Travel time savings resulting from reduced closure duration and impacts following a disruption event as a result of improved resilience.

A range of sensitivity tests were undertaken as part of the assessment; however, the results were found to be the most sensitive to assumptions made around scaling factors for Do Minimum event costs. As outlined in Appendix V and Section 13 below, it is assumed that without further repairs, any future events are likely to do more damage than has been experienced to date (baseline). This is because previous damage will not have been fully repaired and will reactivate, plus additional areas will be damaged. A comparison of 2021 and 2022 event costs showed that this factor was 2x (or 200%). A multiplication factor of 1.5x (or 150%) for small and large events has been conservatively adopted with sensitivity testing on other factors.

A summary of the results is presented below by area with further details on the methodology and assumptions underpinning the assessment outlined in Appendix V

10.6.2 Te Aumiti/French Pass

Table 10-14 shows a summary of the updated whole of life cost, benefits and BCR for Te Aumiti/French Pass for each of the programmes for a range of sensitivity tests.

The Emerging Preferred Option is Road Access, with a BCR ranging from 0.4 to 1.3. The least PV cost and highest BCR is the Marine Focus programme, followed by Marine Access or Road Focus, depending on the sensitivity test. At this stage the Road Access programme was preferred based on other factors including affordability of the Road Focus programme and the public consultation showing that the Marine programmes were a higher step change in provision that the public were willing to take. The Marine Access programme was therefore adopted as the Hazard Adaptation Pathway (HAP).

These results for the Emerging Preferred Option were carried forward to be considered further in the refinement stage, to understand whether optimisation could provide a better economic outcome for Te Aumiti/French Pass (refer to Section 11)

Table 10-14: Te Aumiti/French Pass NPV (\$M), Benefits (\$M) and BCRs

Do Minimum Event Factor (small event/large event)	Road Focus			Road Access			Balanced			Marine Access			Marine Focus		
	NPV	Benefits	BCR	NPV	Benefits	BCR	NPV	Benefits	BCR	NPV	Benefits	BCR	NPV	Benefits	BCR
150%/200%	\$12	\$25	2.0	\$19	\$25	1.3	\$17	\$24	1.4	\$14	\$24	1.7	\$3	\$22	6.9
150%/150%	\$25	\$18	0.7	\$31	\$18	0.6	\$29	\$17	0.6	\$26	\$17	0.6	\$16	\$15	1.0
125%/125%	\$32	\$14	0.4	\$39	\$14	0.4	\$37	\$13	0.4	\$34	\$13	0.4	\$23	\$11	0.5

10.6.3 Te Hoiere/Pelorus

Table 10-15 shows a summary of the updated whole of list cost, benefits and BCR for Te Hoiere/Pelorus for each of the programmes for a range of sensitivity tests.

The Emerging Preferred Option is Road Focus, with a BCR less than 0.2. None of the programmes provide a positive return on investment, but the relative costs are also significantly lower than other areas. There is minimal difference between the programmes, and the Road Focus approach was adopted to better support industry (forestry, dairy) and community development. Investment in Te Hoiere/Pelorus will therefore be justified as part of the wider programme for the Sounds, rather than in isolation.

Table 10-15: Te Hoiere/Pelorus NPV (\$M), Benefits (\$M) and BCRs

Do Minimum Event Factor (small event/large event)	Road Focus			Road Access			Balanced/Marine Access			Marine Focus		
	NPV	Benefits	BCR	NPV	Benefits	BCR	NPV	Benefits	BCR	NPV	Benefits	BCR
150%/200%	\$2.1	\$0.4	0.2	\$0.8	\$0.4	0.4	\$3.1	\$0.3	0.1	\$2.3	\$0.3	0.1
150%/150%	\$3.1	\$0.2	0.1	\$1.8	\$0.2	0.1	\$4.1	\$0.2	0.0	\$3.3	\$0.1	0.0
125%/125%	\$4.0	\$0.2	0.0	\$2.7	\$0.2	0.1	\$5.0	\$0.1	0.0	\$4.3	\$0.1	0.0

10.6.4 Queen Charlotte

Table 10-16 shows a summary of the updated whole of life cost, benefits and BCR for Queen Charlotte for each of the programmes for a range of sensitivity tests.

The Emerging Preferred Option is Road Focus/Road Access, with a BCR ranging from 7.1 to a PV cost saving. Road Focus/Road Access is the best performing programme with a high BCR and PV cost savings under the different sensitivity tests. Marine Access was chosen as the HAP.

Table 10-16: Queen Charlotte NPV (\$M), Benefits (\$M) and BCRs

Do Minimum Event Factor (small event/large event)	Road Focus/Road Access			Balanced			Marine Access			Marine Focus		
	NPV	Benefits	BCR	NPV	Benefits	BCR	NPV	Benefits	BCR	NPV	Benefits	BCR
150%/200%	-\$21	\$20	-PV	-\$21	\$20	-PV	-\$18	\$19	-PV	-\$20	\$19	-PV
150%/150%	-\$8	\$17	-PV	-\$8	\$17	-PV	-\$5	\$16	-PV	-\$7	\$16	-PV
125%/125%	\$2	\$15	7.1	\$2	\$15	8.9	\$4	\$14	3.3	\$3	\$14	4.8

10.6.5 Kenepuru

Table 10-17 shows a summary of the updated whole of life cost, benefits and BCR for Kenepuru for each of the programmes for a range of sensitivity tests.

The Emerging Preferred Option is Balanced, with a BCR ranging from 0.8 to PV cost saving. The Balanced programme is the best performing non-marine programme. The Marine Access and Marine Focus have positive BCRs and higher PV cost savings; however, consultation showed that these programmes were a higher step change in provision than the public were willing to accept. The Marine Access was therefore adopted as the HAP.

Table 10-17: Kenepuru NPV (\$M), Benefits (\$M) and BCRs

Do Minimum Event Factor (small event/large event)	Road Focus			Road Access			Balanced			Marine Access			Marine Focus		
	NPV	Benefits	BCR	NPV	Benefits	BCR	NPV	Benefits	BCR	NPV	Benefits	BCR	NPV	Benefits	BCR
150%/200%	\$22	\$60	2.7	\$5	\$60	11.7	-\$2	\$60	-PV	-\$32	\$58	-PV	-\$32	\$58	-PV
150%/150%	\$55	\$55	1.0	\$38	\$55	1.5	\$31	\$55	1.8	\$1	\$53	>10	\$1	\$52	>10
125%/125%	\$85	\$52	0.6	\$68	\$52	0.8	\$62	\$52	0.8	\$32	\$50	1.6	\$31	\$50	1.6

10.6.6 Te Whanganui/Port Underwood

Table 10-18 shows a summary of the updated whole of list cost, benefits and BCR for Te Whanganui/Port Underwood for each of the programmes for a range of sensitivity tests.

The Emerging Preferred Option is Road Access with the Marine Access as the Hazard Adaptation Pathway, with a BCR ranging from 0.5 to PV cost saving. The Road Access is the best performing programme with PV cost savings under two of the three sensitivity tests.

Table 10-18: Te Whanganui/Port Underwood NPV (\$M), Benefits (\$M) and BCRs

Do Minimum Event Factor (small event/large event)	Road Focus			Road Access			Balanced			Marine Access			Marine Focus		
	NPV	Benefits	BCR	NPV	Benefits	BCR	NPV	Benefits	BCR	NPV	Benefits	BCR	NPV	Benefits	BCR
150%/200%	-\$5	\$7	-PV	-\$6	\$7	-PV	-\$6	\$6	-PV	-\$6	\$6	-PV	-\$6	\$6	-PV
150%/150%	\$1	\$5	4.2	-\$0	\$4	-PV	-\$0	\$4	-PV	-\$0	\$3	-PV	-\$0	\$3	-PV
125%/125%	\$7	\$3	0.5	\$5	\$3	0.5	\$5	\$3	0.5	\$6	\$2	0.4	\$6	\$2	0.4

10.6.7 Emerging Preferred Programme

The overall results for the emerging preferred programme as a package across the Sounds is summarised in Table 10-19. The results demonstrate that the overall programme BCR is 1.6, resulting in a 'Low' efficiency rating with a BCR between 1 and 3.

Key sensitivity tests show that the BCR could range between 0.7 (based on conservative assumptions around future events being only 25% worse than the do-min) to a present value cost saving⁸³ of \$7M against the Do Minimum (when future small events are 50% worse and larger events are 100% worse than the baseline).

Discussion on how the updated analysis contributed to the preferred programme revision is contained in Section 11.

⁸³ A present value cost saving means that regardless of the benefits, the programme approach provides a cost saving compared to the Do Minimum.

Table 10-19: Emerging Preferred Programme NPV (\$M), Benefits (\$M) and BCRs

Zone	150%/200%			150%/150%			125%/125%		
	NPV	Benefits	BCR	NPV	Benefits	BCR	NPV	Benefits	BCR
Te Aumiti/French Pass (Road Access)	\$19	\$25	1.3	\$31	\$18	0.6	\$39	\$14	0.4
Te Hoiere/Pelorus (Road Focus)	\$2	\$0	0.2	\$3	\$0	0.1	\$4	\$0	0.0
Queen Charlotte (Road Focus / Road Access)	-\$21	\$20	-PV	-\$8	\$17	-PV	\$2	\$15	7.1
Kenepuru (Balanced)	-\$2	\$60	-PV	\$31	\$55	1.8	\$62	\$52	0.8
Te Whanganui/Port Underwood (Road Access)	-\$6	\$7	-PV	\$0	\$4	-PV	\$5	\$3	0.5
Total	-\$7	\$112	-PV	\$57	\$94	1.6	\$112	\$83	0.7

Part B(ii) – Economic Case: Preferred Programme

11 Preferred Programme

The consultation feedback was considered alongside the Benefits Assessment (Section 10.6) and the original MCA at a meeting between Council and Waka Kotahi in August 2023. Table 11-1 highlights the proposed changes that were considered and the final decisions and comments that were made regarding each proposed change to the emerging preferred programmes.

An appraisal summary table (AST) has been completed for the preferred programme for each zone. Refer to Appendix T for more information.

Table 11-1: Proposed changes to the preferred programmes

Zone	Emerging Preferred Option	Proposed Changes	Preferred Option - decisions and comments
Te Aumiti / French Pass	Road Access	No changes to the overall approach proposed.	Emerging Preferred Option to become preferred option. It was noted that the roading repair and improvement costs seemed high, and that the Benefits Assessment identified other programmes could be more favourable from an economic perspective. Further work was done to review costs and staging of marine interventions (Section 12 and 13) to confirm the costs and benefits and ensure value for money from the investment.
Te Hoiere / Pelorus	Road Focus	Moving to the Road Access approach instead of Road Focus	Emerging Preferred Option to become preferred option. Improvements along Kaiuma Bay Road to be reduced and timing of improvements to be moved to the end of the timeframe.
Queen Charlotte	Road Focus / Road Access	No changes proposed.	Emerging Preferred Option to become preferred option with no changes made.
Kenepuru	Balanced	Moving to the Road Access approach instead of Balanced	It was decided not to change the entire programme to Road Access. Emerging Preferred Option to become the preferred option, but with the following adjustments as detailed below.
		K4b (Portage to the Heads) to have the Bii approach instead of C	Essential repairs (C) to remain the key approach for this segment. There may be opportunity to implement some targeted improvements (B) but they will be to a lower cost and standard than implemented elsewhere.
		K9 (Moetapu Bay Road) to have the Bii approach instead of C	As above. Key comments received were on ensuring Driftwood Corner and Elephant Point were repaired. These faults will be addressed under the essential repairs (C) approach.
		Moetapu Bay to be added as a marine hub	As the jetty is privately owned, its addition to the preferred option and HAP will be based on further discussion and work on the marine options. Council could potentially take on the maintenance costs for the jetty.
		Te Mahia to be added as a marine hub	Yes. The jetty here is already owned and maintained by Council.

Zone	Emerging Preferred Option	Proposed Changes	Preferred Option - decisions and comments
Te Whanganui / Port Underwood	Road Access	No changes to the overall approach proposed.	Emerging Preferred Option to become preferred option. Under slips will be repaired by retreating the road inland instead of retaining walls where there is room to do so. It was mentioned that the roading repair and improvement costs seemed high. These will be reviewed.

The staging of the marine works was also considered following stakeholder and community feedback. The final implementation plan for the marine works is as follows:

- Stage 1 (Year 0 to 3): feasibility studies and plan changes
- Stage 2 (Year 4 to 5): minor improvements of primary hubs, and construction of new arterial hub in Kenepuru
- Stage 3 (Year 6 to 10): planning primary hub resilience upgrades and arterial hub improvements
- Stage 4 (Year 11 to 15): resilience upgrades of primary hubs, and arterial hub improvements
- Stage 5 (Year 16+): local hub improvements.

12 Cost Estimate for Preferred Programme

An updated cost estimate was prepared alongside a concurrent independent peer review of the initial programme level cost estimates. This resulted in an overall increase in costs as shown in Table 12-1

The following changes were made:

- Significant increase in marine infrastructure costs, which mainly impacted Te Aumiti/French Pass and Kenepuru, where marine is an important near future element of the transport system. There was particular variance in the marine estimates reflecting the high degree of uncertainty regarding the costs and feasibility of providing improved marine infrastructure.
- Changes to contingency to better reflect uncertainty in programme level estimates, specifically:
 - Contingency increased from 30% to 50% for all road and marine improvements
 - Contingency increased from 30% to 50% for Kenepuru road repairs.
- Costs added for three major studies which are needed to determine the exact scope, feasibility and priority of road and marine improvements. The Sounds wide studies were not included in the initial cost estimate, but the need for these became better understood as the business case progressed and following community feedback.
- Costs added for repair of storm damage to side roads. There are more side roads in the Kenepuru zone compared to the other zones, so there has been a greater impact on the updated cost for this zone. The basis of the updated cost estimate is that side roads will be covered by Approach C - Essential Repairs only.
- Cost refinement to better reflect level of service expectations arising from community engagement such as for Kenepuru Road between Portage and the Heads.
- Cost refinement following more detailed validation of the proposed repair strategies, particularly site validation (drive over) for Te Aumiti/French Pass and additional site level desktop validation of Te Whanganui/Port Underwood.

The cost estimates are project estimates, including fees and contingencies. Property costs, Client pre-implementation and implementation managed costs and consenting costs are excluded.

Table 12-1: Programme level initial and final cost estimates for the preferred programme

Zone	Initial Cost Estimate	Final Cost Estimate
The Sounds wide studies	-	\$10M
Te Aumiti/French Pass: Road Access	\$45M	\$50M
Te Hoiere/Pelorus: Road Focus	\$5M	\$6M
Queen Charlotte: Road Focus/Road Access	\$30M	\$26M
Kenepuru: Balanced	\$60M	\$124M
Te Whanganui/Port Underwood: Road Access	\$20M	\$19M
TOTAL	\$160M	\$234M

A summary of the P50 estimates are provided in Table 12-2. The figures include contingencies.

Table 12-2: P50 estimates for the preferred programme

Zone	Road Repairs	Road Improvements	Marine Improvements	Total
Sounds wide studies	-	\$3M	\$7M	\$10M
Te Aumiti/French Pass	\$26M	\$15M	\$9M	\$50M
Te Hoiere/Pelorus	\$2M	\$4M	-	\$6M
Queen Charlotte	\$14M	\$6M	\$6M	\$26M
Kenepuru	\$94M	\$12M	\$18M	\$124M
Te Whanganui/Port Underwood	\$11M	\$8M	-	\$19M
Total	\$146M	\$48M	\$40M	\$234M

For a breakdown of these estimates per road segment and marine hub location refer to Appendix U



13 Economic Analysis of the Preferred Programme

The economic analysis of the Preferred Programme has been carried out in accordance with the latest Waka Kotahi MBCM full procedures with the overall approach to disruption costs and benefits agreed with Waka Kotahi investment advisors.

This section provides a summary of the overall methodology, key assumptions, outcomes from the cost benefit analysis and the results from a range of sensitivity testing.

Further details of the methodology and assumptions underpinning the assessment are outlined in Appendix V

13.1 Do Minimum

The Do Minimum is outlined in Section 7 above. For the purposes of economic evaluation it is assumed that:

- There will be no further investment/capital works.
- There are speed restrictions in place on sections of the Kenepuru road network with temporary signals spread across Te Aumiti/French Pass and Queen Charlotte, refer Section 7 above.
- The costs of future events will increase (Refer 13.3 below)
- Existing annual road maintenance will continue at \$4.4M
- Existing annual marine maintenance will continue at \$60,000 p.a., spread across the areas with the exception of Te Hoiere/Pelorus.

13.2 Preferred Programme

The Preferred Programme is summarised in Section 11 with costs of the Preferred Programme outlined in Section 12.

The key change compared to the analysis presented in Section 10.6 is that the refined Preferred Programme includes refinements to the marine interventions, intervention cost and timing, which occurred post cost estimate peer review.

The economic analysis has adopted the cashflow presented in the Financial Case, refer Section 16:

- Repairs will be spread over three years and complete by year 4.
- Improvements will be spread over 20 years, starting in year 1.
- Marine interventions and associated marine maintenance is spread over 24 years, starting in year 1.

The preferred programme results in a range of benefits relating to:

- Disruption event cost savings from improved resilience compared to the Do Minimum.
- Travel time and vehicle operating via costs relating to the lifting of speed restrictions in the Do Minimum.
- Travel time savings resulting from reduced closure duration and impacts following a disruption event as a result of improved resilience.

These costs and benefits are outlined below.

13.3 Assessment of Transport Costs and Benefits

The economic analysis has considered the following quantifiable costs:

- Direct costs
 - Repair/reinstatement from Disruption Events
- Road user costs
 - Travel Time Costs
 - Vehicle Operating Costs
 - Travel Time Costs from Disruption Events

Other benefit streams not considered at the PBC stage include:

- Vehicle operating costs for disruption events, due to the difficulties in estimating marine VOC based on the MBCM.

- Marine benefits have not been assessed due to the uncertainty around specific interventions. This can be explored during future SSBC phases. Indirectly, the marine costs included as part of the programme allow for the viability of marine as an alternate route.
- Road safety benefits have also not been explored due to the relatively low volumes and types of interventions included in the preferred programme. These can be explored further in any future improvements SSBCs.
- Road freight impacts due to restrictions, due to the difficulties in estimating the freight barging costs. These impacts can be explored further as part of future SSBC phases.

Exclusion of these benefits at the PBC phase is considered to be conservative.

13.3.1 Resilience – Estimated Cost of future Disruption Events

A key part of the assessment is the estimation of the potential damage risk from future events. An assessment was undertaken in line with Waka Kotahi Research Report 670 to estimate the annual event costs from different event probabilities, based on RAMM emergency cost data for frequent events, actual costs from the 21/22 baseline event and other estimates based on flooding and geotechnical expert inputs. This is summarised in the Table 13-1.

Table 13-1: Baseline event risks and probabilities

ARI ⁸⁴ in years	AEP ⁸⁵	ARI Ranges	AEP Differences	Rainfall	Damage Impacts (%)	Source
1 in 5 years	20.0%	up to 5 ARI	80%	-	N/A	RAMM – emergency costs
1 in 10 years	10.0%	5 to 10 ARI	10%	75% of benchmark	50%	Estimated on 1/40 and expert judgement
1 in 40 years	2.5%	10 to 40 ARI	7.5%	100% of benchmark	100%	Actual 21/22 event repair and response costs (~45M)
1 in 50 years	2.0%	40 to 50 ARI	0.5%	105% of benchmark	110%	Estimated on 1/40 and expert judgement
1 in 100 years	0.0%	50 to 100 ARI	1.99%	117% of benchmark	150%	Estimated on 1/40 and expert judgement

The baseline annual average event risk cost was estimated separately for each area within the Sounds and was found to range from \$150,000 p.a. for Te Hoiere/Pelorus to \$4.8M p.a. for Kenepuru.

Do Minimum Costs

For the Do-Minimum, it is assumed that without further repairs, any future events are likely to do more damage than what has occurred to date (baseline). This is because previous damage will not have been fully repaired and will reactivate, plus additional areas will be damaged.

The actual costs data recorded in the 2021 versus 2022 events corroborated this:

- The number of repairs needed increased by three times,
- The overall cost of response to open roads increased by more than three times,
- The increase of cost of existing damage examples factor ranging between 1.1 to 4.8, with an average of over 2.

Based on these observations, do-minimum multiplication factors of 1.5x (or 150%) for small and for large events were conservatively adopted. Sensitivity testing on other multiplication factors of 125%, 150% and 200% has also been considered.

Preferred Programme

The preferred programme is based on a range of segment level strategies that differ from segment to segment and by area. The segment strategies, outlined in Section 8.5, range from Ai (Build back stronger) to D (Retreat).

Each of these segment strategies had an effectiveness factor assigned based on geotechnical and flooding expert input on the potential changes to the key underlying resilience risk across the Sounds – human induced slope instability.

⁸⁴ Annual recurrence interval

⁸⁵ Annual exceedance probability



The effectiveness factors were then applied to reducing the event cost as a result of improved resilience. The factors are summarised in Table 13-2 for year 20, with Figure 13-1 showing the change over time. For example, a segment with a Bi strategy would see a 30% reduction in event cost by year 20.

There are three types of improvements included in the programme – roading repairs, roading improvements and marine improvements. The effectiveness relates to the roading repairs and improvements only. Marine costs are therefore included in the capital costs, but do not directly result in any event cost savings.

Once the repairs are complete by year 4, event costs will revert from the ‘Do Minimum’ costs to the lower ‘Baseline’ costs. It is also assumed that any repairs will be undertaken to a higher standard, resulting in resilience improvements, and therefore would account for 20% of the segment level strategy effectiveness.

The improvements account for the remainder of the effectiveness and gradually build over the 20-year programme. Beyond the 20-year improvement programme, as events occur and repairs are made, further improvements in effectiveness are anticipated up to the residual risk cap set by Ai strategy (i.e. there is a limit to the impact that resilience improvements can have). For the lower intervention strategies, this residual risk cap may not be reached during the analysis period.

A range of sensitivity testing on the event cost risk assumptions has been undertaken and summarised in Section 13.5 below.

Table 13-2: An overview of strategy effectiveness

Strategy	Effectiveness (Year 20)			Split of Effectiveness	
	Base	Low Sensitivity	High Sensitivity	Repairs (% of base)	Improvements (% of base)
Ai	50%	40%	70%	20%	80%
Aii	50%	40%	70%	20%	80%
Bi	30%	25%	45%	20%	80%
Bii	30%	25%	45%	20%	80%
C	10%	0%	20%	20%	80%
D	0%	0%	0%	0%	0%

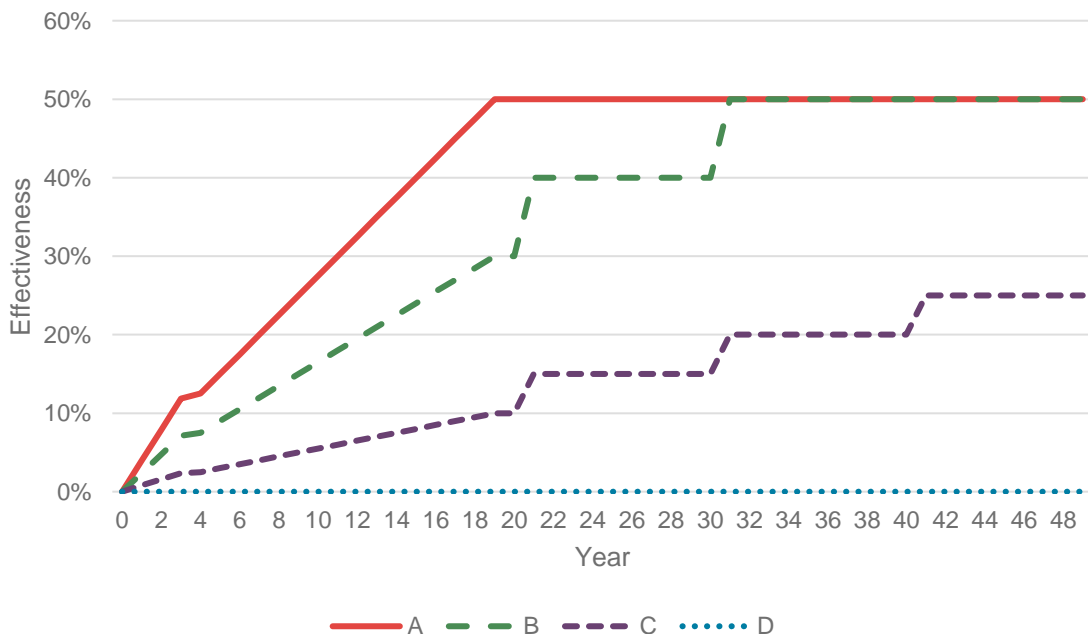


Figure 13-1: Accumulated total effectiveness over time

13.3.2 Travel Time Costs and Vehicle Operating Costs

Conventional travel time and vehicle operating costs relating to the restrictions in the Do Minimum have been assessed for each area at a segment level.

Existing volumes have been adopted from RAMM based on 2022/2023 ADT estimates while 'baseline' speeds have been determined from Waka Kotahi's MegaMaps tool. The Do Minimum speeds have been assumed to be 30 km/h for segments within Kenepuru with speed restrictions (Refer Section 7) while temporary signals are assumed to have a 30 second impact for affected segments (eight sites spread across Te Aumiti/French Pass and Queen Charlotte).

Travel time benefits relate to the segment travel times with the Do Minimum restrictions compared to the 'baseline' travel times, based on a Rural Other value of time of \$48.61 per hour.

Similarly, vehicle operating costs relate to the difference in speeds and speed change cycles (e.g. temporary signals) between the 'baseline' and Do Minimum restrictions. Base running costs and additional vehicle operating costs due to speed change cycles have been based on the Rural Other values in line with the MBCM.

It is assumed that following the repairs, these restrictions will be lifted, allowing the speeds to return to the 'baseline' levels, resulting in travel time and vehicle operating cost savings. Any further improvements would not impact these conventional benefits, and therefore there is assumed to be minimal difference between the programmes in terms of conventional travel time and vehicle operating savings.

Travel time and vehicle operating costs are assumed to grow at a nominal 1% over the analysis period. As there are no permanent count sites within the Sounds, comparison of historic traffic counts to obtain a reliable estimate over a long period is not possible; however, comparison of 2015/16 counts to 2022/23 does show growth of varying levels across the Sounds.

13.3.3 Road user costs from Disruption Events

In addition to conventional travel time and VOC outlined above, there are further probability-based road user benefits relating to reduced impacts from a future event (e.g. reduced road closure duration due to improved resilience). The overall disruption cost would be a function of the incremental road user cost (e.g. additional cost of a detour) and the probability of such an event.

Average Annual Closure Duration

Detailed closure information at a segment level for each area was available for the benchmark 1/40 event from 21/22. The average closure duration at an area level varied from 28 days for Te Hoiere/Pelorus to 89 days for Te Whanganui/Port Underwood. However, prior to 21/22, there was no formal incident/event database (e.g. such as Traffic Road Event Information System (TREIS) for the State Highway network).

As a result, estimation of future average annual closure duration was undertaken using the same probability based annualisation process as for the Event Costs (refer Section 13.3.1). This was based on Research Report 670 and used data at a segment level using the 21/22 closure data for the 1/40 event and an assumed 2-hour annual closure. It was assumed that the percentages for damage used in the disruption cost assessment would also apply to the closure duration – e.g. a 1/100-year event would have 150% of the damage and closure duration as the benchmark 1/40 event (refer Table 13-1).

This process resulted in baseline average annual closure durations ranging from 4 days (Te Aumiti/French Pass, Te Hoiere/Pelorus) to 10 days (Te Whanganui/Port Underwood). It is important to note that the overall disruption cost is a function of the probability and the detour cost; therefore, a high closure duration for segment with a viable alternate route may not result in significant road user costs.

As for the disruption event costs, in the Do Minimum, without repairs, the future event duration would be higher by a factor of 1.5x (or 150%).

Road User Costs

Road user costs relating to disrupted trips have been split into diverted trips, waiting trips, cancelled trips or those or trips which would be unaffected. For the Sounds, due to the length of likely closures and the lack of viable roading alternate routes 'waiting trips' have been adopted as 0% of ADT.

The remaining trips assumed the following split:

- **Diverted trips:** 37.5% of ADT (sensitivity at 25% and 60%)
- **Cancelled trips:** 37.5% of ADT (Sensitivity at 25% and 30%)
- **Unaffected trips:** 25% of ADT (sensitivity at 50% and 10%).

Diverted trips were costed based on the incremental travel time of the detour route (either by marine or by road) compared to the existing trip. The majority of the segments within the sounds do not have a viable roading alternate route (with the exception of Queen Charlotte and some parts of Te Whanganui/Port Underwood and Te Hoiere/Pelorus). This means that in a disruptive event, access would need to be via marine services/boat. An estimate of marine detour travel time was based on the travel time from the segment midpoint to the closest marine hub and then travelling by boat at 30 km/h to the closest key destination with State Highway access (e.g. destinations of Nelson, Havelock, Picton etc). A marine travel time penalty of two was applied to the travel time to account for the reduced attractiveness, frequency limitations and other restrictions (e.g. infrastructure, loading/unloading). This is considered to be conservative and likely to underestimate the true cost of marine as a detour, primarily due to the service limitations limited viability (e.g.

frequency) and sensitivity testing with factors of one and four was therefore undertaken to gauge the impact of this assumption (Refer Section 13.5).

While some trips can be cancelled with minimal cost, others can be delayed but not cancelled. Where trips are cancelled, these do have a cost. Research Report 670 identifies that cancelled trips can be assumed to have a cost equal to the rule of half – an average between no cost and the minimum diversion cost. A further proportion of trips could be unaffected – these could be short local trips or trips that already used marine services and therefore would have no to minimal incremental cost in an event.

The total diversion cost was estimated as a sum of the trip types above, based on the Rural Other value of time and the segment ADT. This is then multiplied by the annual average closure duration by segment.

Benefits of the preferred programme relate to the intervention strategies effectiveness (refer Section 13.3.1 above) reducing the duration of future closures. It is assumed that repairs are complete by year 4, the average closure duration will revert from the 'Do Minimum' costs to the lower 'Baseline' duration. It is also assumed that any repairs will be undertaken to a higher standard, resulting in resilience improvements, and therefore would account for 20% of the segment level strategy effectiveness. The improvements account for the remainder of the effectiveness and gradually build over the 20-year programme.

13.4 Cost Benefit Analysis

Table 13-3 provides a summary of the cost benefit analysis and BCR for the preferred programme based on a 40-year evaluation period with a 4% discount rate and the expected cost estimate (P50) for the base and two key sensitivity tests. In Table 13-3 green cells indicate BCRs greater than one or PV cost savings, and red cells indicate BCR less than one.

Overall, the programme BCR is 1.8 resulting in a 'Low' efficiency rating with a BCR between 1 and 3. Under the base scenario, the only areas with a BCR less than one are Te Hoiere/Pelorus (0.1) and Te Aumiti/French Pass (0.7).

The BCR of the Preferred Programme has increased from the previous stage due to the review and reduction in marine intervention costs coupled with updated phasing of marine interventions to occur over a longer time period.

Key sensitivity tests show the Preferred Programme BCR ranges from 0.8 to a PV cost saving of \$12M (a present value cost saving means that regardless of the benefits, the programme approach provides a cost saving compared to the Do Minimum). A full suite of sensitivity tests are outlined in Section 13.5 below.

Table 13-3: Refined Preferred Programme NPV (\$M), NPV Benefits (\$M) and BCR

Zone	150%/200%			150%/150% (Base)			125%/125%		
	NPV	Benefits	BCR	NPV	Benefits	BCR	NPV	Benefits	BCR
Te Aumiti/French Pass (Road Access)	\$11	\$25	2.2	\$24	\$18	0.7	\$31	\$14	0.4
Te Hoiere/Pelorus (Road Focus)	\$2	\$0	0.2	\$3	\$0	0.1	\$4	\$0	0.0
Queen Charlotte (Road Focus / Road Access)	-\$18	\$20	-PV	-\$5	\$17	-PV	\$4	\$15	3.4
Kenepuru (Balanced)	-\$2	\$60	-PV	\$30	\$55	1.8	\$61	\$52	0.9
Te Whanganui/Port Underwood (Road Access)	-\$4	\$7	-PV	\$2	\$4	2.7	\$7	\$3	0.4
Total	-\$12	\$112	-PV	\$53	\$94	1.8	\$107	\$83	0.8

13.5 Sensitivity Testing

Sensitivity analysis plays an important role in understanding the impact of key assumptions on the overall case for investment. It involves defining a range of potential values for an uncertain variable in the evaluation and reviewing the variation in the evaluation as the variable changes within the range.

Table 13-4 summarises the results of the tests have been undertaken, by varying the factors which are the most influential to the overall BCR, focusing on cost, programme and benefit variables. Red shading indicates BCR less than one, light green a BCR of between one and three, and dark green a BCR of greater than three.

Table 13-4: Refined Preferred Programme sensitivity analysis

Variable	Sensitivity	Item	PV Cost	BCR
Cost Variability	Low	100% Contingency (Repairs and Improvements) – P95	\$126M	0.7
	Base	50% Contingency Improvements 30% Contingency Repairs – P50	\$53M	1.8
	High	30% Contingency (Repairs and Improvements)	\$34M	2.7
Do Minimum Event Factor (Impacts damage and closure duration)	Low	125% small events, 125% large events	\$107M	0.8
	Base	150% small events, 150% large events	\$53M	1.8
	High	150% small events, 200% large events	-\$12M	N/A as PV Cost Saving
Discount Rate	Low	6%	\$82M	0.8
	Base	4%	\$53M	1.8
	High	3%	\$30M	3.8
Climate Change Growth (Impacts future event cost and closures)	Low	1%	\$75M	1.2
	Base	2%	\$53M	1.8
	High	3%	\$31M	3.2
Segment Strategy Effectiveness (Resilience Improvement %)	Low	-20% from base segment strategy (e.g. Ai 30% by year 20)	\$63M	1.4
	Base	Base segment strategy % (e.g. Ai 50% by year 20)	\$53M	1.8
	High	+20% to the base segment strategy (e.g. Ai 70% by year 20)	\$28M	3.5
Repairs and Improvements	Low	30% effectiveness from Repairs, 70% from Improvements	\$51M	1.8
	Base	20% effectiveness from Repairs, 80% Improvements	\$53M	1.8
	High	10% effectiveness from Repairs, 90% Improvements	\$55M	1.7
Marine Costs	Low	NA	NA	NA
	Base	Include Marine Costs	\$53M	1.8
	High	Exclude Marine Costs	\$7M	12.8
Travel Time and VOC Do Minimum restrictions	Low	NA	NA	NA
	Base	Do Minimum current restrictions only (e.g. 30 km/h along parts of Kenepuru)	\$53M	1.8
	High	Do Minimum includes further 30 km/h restrictions across the Sounds	\$53M	8.4
Traffic Growth Rate	Low	0%	\$49M	1.7
	Base	1%	\$53M	1.8
	High	2%	\$57M	1.8
Disruption Diversion Assumptions	Low	25% trips diverted, 25% cancelled, 50% trips unaffected	\$53M	1.5
	Base	37.5% trips diverted and cancelled, 25% trips unaffected	\$53M	1.8
	High	60% trips diverted, 30% trips cancelled, 10% trips unaffected	\$53M	2.0

Variable	Sensitivity	Item	PV Cost	BCR
Marine Travel Time Penalty (to account for frequency and other limitations)	Low	No penalty – factor of 1	\$53M	1.4
	Base	Penalty factor of 2	\$53M	1.8
	High	Penalty factor of 4	\$53M	2.4

The sensitivity analysis identified the following:

- Overall, the Preferred Programme has a BCR which is robust in the ‘Low BCR 1-2.9’ range across the majority of sensitivity tests.
- The exceptions include the 95th percentile cost (BCR 0.7), which assumes that events under the Do Minimum would only be 25% worse than the baseline (BCR 0.8) and a higher 6% discount rate (BCR 0.8).
- Sensitivity tests that would result in the programme BCR resulting in having a “Medium BCR 3-5.9” or higher include:
 - Excluding marine intervention costs increases the BCR to 12.8. This is because while costs for the marine interventions have been included, no benefits have been estimated at the PBC phase.
 - If further speed restrictions were in place across the Sounds as a result of the Do Minimum approach being adopted the BCR would increase to 8.4.
 - If 3% p.a. climate change growth is assumed the BCR increases to 3.2.
 - Strategy effectiveness – if a higher potential resilience improvement percentage is assumed (the strategy is more effective), the BCR increases to 3.5.

13.6 Summary

The Preferred Programme has been assessed to have a base BCR of 1.8 based on the expected cost estimate and the consideration of a range of costs and benefits relating to conventional travel time and vehicle operating costs through to resilience-based disruption costs. Under the base scenario, the Preferred Programmes for Queen Charlotte, Kenepuru and Te Whanganui/Port Underwood areas all result in BCRs above 1 or present value cost savings. The Te Aumiti/French Pass and Te Hoiere/Pelorus zones have area level BCRs less than 1.0; however, these areas are balanced by considering the Preferred Programme as a package of investment across the Sounds.

Table 13-5: Preferred Programme Summary BCR

Zone	Do Minimum Factor: 150%/150% (Base)		
	NPV Cost	NPV Benefit	BCR
Te Aumiti/French Pass (Road Access)	\$24	\$18	0.7
Te Hoiere/Pelorus (Road Focus)	\$3	\$0	0.1
Queen Charlotte (Road Focus/Road Access)	-\$5	\$17	-PV
Kenepuru (Balanced)	\$30	\$55	1.8
Te Whanganui/Port Underwood (Road Access)	\$2	\$4	2.7
Total	\$53	\$94	1.8

Sensitivity analysis plays an important role in understanding the impact of key assumptions on the overall case for investment, particularly during the development of a PBC. A suite of sensitivity testing shows that the BCR is robust in the ‘Low BCR 1-2.9’ range. The exceptions include the 95th percentile cost (BCR 0.7), assuming events under the Do Minimum would only be 25% worse than the baseline (BCR 0.8) and a higher 6% discount rate (BCR 0.8). Sensitivity tests that would result in the programme BCR having a “Medium BCR 3-5.9” or higher rating involve excluding marine investment (BCR 12.8), including higher climate change growth, further speed restrictions in the Do Minimum or higher strategy effectiveness values.

14 Programme Outcomes

An assessment of the Preferred Programme against the Benefits/Outcomes is provided in Table 14-1.

Table 14-1: Programme Outcomes

Benefit / Outcome	Contribution of Preferred Programme
Climate Change Adaptation	<p>Addresses a known climate change issue by</p> <ul style="list-style-type: none"> • Improving marine alternatives to road by: <ul style="list-style-type: none"> ○ completing resilience works on two primary hubs (Havelock and Picton) ○ upgrading three arterial hubs (Elaine Bay, Portage and Torea Bay) ○ constructing one new arterial hub (Goulter Bay) ○ improving nine local marine hubs • Improving road network resilience on 77% of roads to reduce susceptibility to human induced instability by 30% and 50% • Reducing carbon emissions from freight transport by progressively transitioning freight within Kenepuru from road to marine.
Access to Opportunities and Economic Prosperity	<p>Support economic prosperity and access to opportunities by reducing average duration of road closures across the Sounds by</p> <ul style="list-style-type: none"> • 6% by 2027 through repair work at priority sites • 26% by 2034 through road improvement work • 32% by 2044 through road improvement work <p>Support economic prosperity across the Sounds by</p> <ul style="list-style-type: none"> • Decreasing travel times by 15% through the removal of 30km/hr restrictions in parts of Kenepuru • Reducing vehicle operating costs through the removal of temporary speed restrictions (including signals) • Providing an alternative Kenepuru Road, which will continue to be vulnerable due to underlying geology, by providing enhanced marine access • Protecting primary marine hubs at Picton and Havelock for emergency response and for future marine networks.
Quality of Access	<p>Improve quality of access across the Sounds by</p> <ul style="list-style-type: none"> • Addressing 232 simple, 1,128 minor, 175 complex site repairs to provide a safe and fit for purpose road network. • Adding resilience to the road network by completing a programme of drainage improvements across the Sounds, which will result in approximately 31% less drainage related faults⁸⁶ • Addressing 232 simple, 1,128 minor, 175 complex site repairs to provide a safe and fit for purpose road network. • Providing more consistent and reliable access • Providing more viable and resilient marine alternatives • Providing more consistent, reliable access • Providing better marine alternatives and completing emergency response planning

⁸⁶ Culvert issues, scour, and under slips



15 Reconfirm Investment Profile

The investment priority for the preferred programme is **2 of 12**. Table 15-1 outlines the ratings for each investment factor and the rationale behind the ratings. Refer to Section 5 for initial assessment.

Table 15-1: Investment priority ratings

Factor	Rating	Comments
GPS Alignment	Very High	No change from initial rating. The anticipated average reduction in the duration of closures across the Sounds is as follows: <ul style="list-style-type: none"> • Year 20: 32% reduction in closure duration • Year 42: 47% reduction in closure duration Very High alignment against the <i>Improving Freight Connections</i> priority.
Scheduling	High (criticality)	No change from initial rating. Refer to Section 5 for more detail.
Efficiency	Low (1.8)	Refer to Section 13 for more detail

Part C – Readiness and Assurance

16 Financial Case

The purpose of this section is to set out the programme costs and funding requirements for the programme streams. It considers affordability and identifies potential supplementary funding sources for further investigation. Financial cost estimates will be updated throughout the lifetime of the programme as the impacts on the organisation are known with greater accuracy, with more detailed analysis of the financial case taking place post-PBC, for each stream.

16.1 Indicative Cost

A high-level indicative cost to the nearest \$1,000 for the activities in the Preferred Programme by zone is shown in Table 16-1. These are final PBC level cost estimates, following changes arising from a cost peer review by an Independent Estimator. All costs have been estimated in accordance with Waka Kotahi SM014.

A contingency of 50% is included for all Road and Marine Improvements (including studies), and for Road Repairs in Kenepuru. There is a higher degree of uncertainty relating to costs for Kenepuru because of the unstable geology in the area, which means it can be challenging to estimate costs. There is more confidence in cost estimates for Road Repairs in Te Aumiti/French Pass, Te Hoiere/Pelorus, Queen Charlotte and Te Whanganui/Port Underwood, and MDC have agreed to a 30% contingency for those items.

Table 16-1: Indicative capital cost breakdown of the preferred programme⁸⁷

Zone	Road Repairs	Road Improvements	Marine Improvements	Total
All Sounds Studies	-	\$3,000,000	\$6,750,000	\$9,750,000
Te Aumiti/French Pass (Road Access)	\$26,369,000	\$14,423,000	\$9,000,000	\$49,792,000
Te Hoiere/Pelorus (Road Focus)	\$2,034,000	\$3,492,000	-	\$5,526,000
Queen Charlotte (Road Focus)	\$13,937,000	\$6,315,000	\$6,000,000	\$26,252,000
Kenepuru (Balanced)	\$93,541,000	\$12,066,000	\$18,000,000	\$123,607,000
Te Whanganui/Port Underwood (Road Access)	\$10,529,000	\$8,262,000	-	\$18,791,000
TOTAL	\$146,410,000	\$47,558,000	\$39,750,000	\$233,718,000

The anticipated annual road maintenance cost is \$4,463,000. This is the historic maintenance spend (based on MDC advice and RAMM outputs) for the Sounds and is split across the five zones as follows:

- Te Aumiti/French Pass: \$1,304,000
- Te Hoiere/Pelorus: \$232,000
- Queen Charlotte: \$780,000
- Kenepuru: \$1,586,000
- Te Whanganui/Port Underwood: \$562,000.

The new marine maintenance costs are shown in Figure 16-1. These values exclude the existing \$60,000 per annum that Council advises they already spend on maintenance of marine infrastructure across the Sounds. They also exclude existing maintenance costs incurred by Port Marlborough in the management of Elaine Bay, Havelock and Picton.

⁸⁷ Contingency included

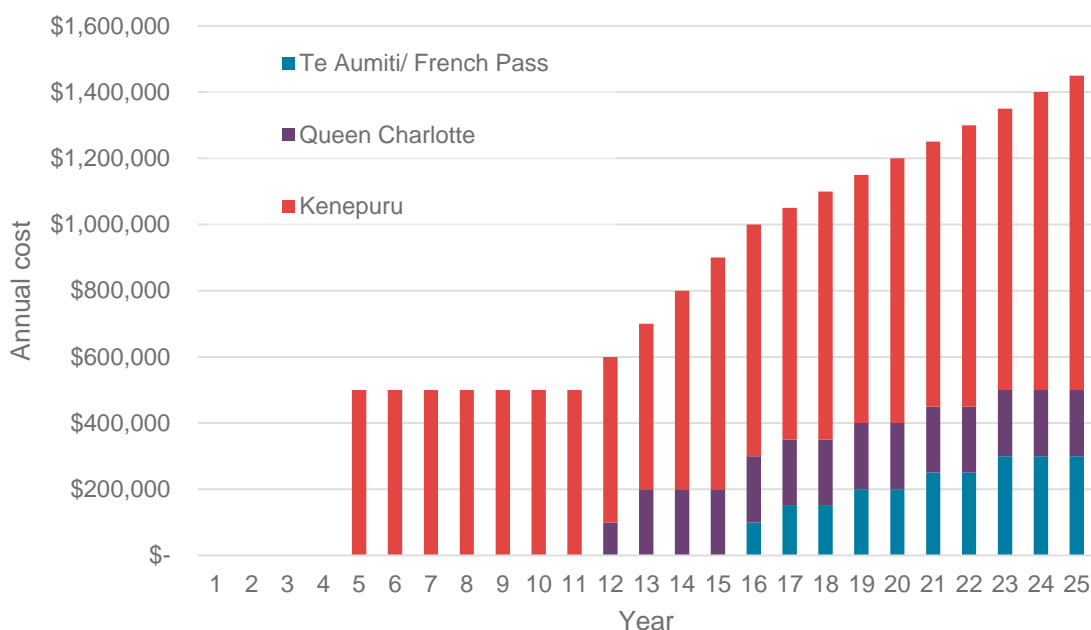


Figure 16-1: Indicative additional annual marine maintenance of the preferred programme

Further scope detail and cost breakdown is provided in Appendix U .

16.2 Project Funding Milestones

In order to confirm funding arrangements, the following milestones have been identified in Table 16-2. These stages must be completed before works can commence.

For a more comprehensive list of milestones refer to Section 18.2.

Table 16-2: Project milestones for funding

No.	Action	Purpose	Date
1	MDC consider PBC	Endorse business case and process for consultation and RLTP	By end 2023
2	Waka Kotahi Board consider PBC	Provide FAR indication and endorsement	By end 2023
3	MDC consult with community	Through LTP or SCP	Early-mid 2024
4	MDC decision on funding	Funding included in LTP	June 2024
5	MDC include in RLTP	Funding included in NLTF	June 2024

16.3 Funding Risks

The main risks and uncertainties that could cause changes to costs are:

- New events:
 - Additional storm or other natural events cause more damage to the transport network
- Site specific investigations identify:
 - Significant changes in scope to the assumed repairs and improvements programme
 - Cultural, archaeological, community, property and/or environmental constraints
- Central Government:
 - Prioritises funding support elsewhere
 - Policy changes and supports a different strategic response compared to what is proposed in the business case
- Market costs increase:
 - Inflation leading to cost escalation

- Demand for suppliers means programme is competing with other projects for resources

For information on the funding related risks refer to Section 18.4.

16.4 Funding Sources

16.4.1 Overview

Currently no funding has been allocated for the project in the LTP or RLTP. Emergency response has been paid for by Waka Kotahi at 95% FAR.

Potential funding streams for the Preferred Programme is shown in Table 16-3. NTLF and local share are the most likely fundings streams. A series of Crown Funded budgets have been announced but there is uncertainty around how these will be allocated, and it is not likely that this will be known until post-election 2023. It is recommended that MDC investigate these potential funding streams further, and ensure the project is included as a line item in the RLTP.

The Transport Resilience Fund (TRF) has been highlighted by Waka Kotahi as a potential source of funding for Road Improvements. However, at this stage it is assumed all funding will be from the NTLF with local share from rates.

Table 16-3 Potential Funding Streams

Potential funding stream	Comments	Programme Stream
Local share - MDC Rates Funding	Potential for funding through a targeted rate for those living in the Sounds and benefiting from the investment, or for a general rate across the Marlborough District.	Whole Programme.
National Land Transport Fund (NLTF)	Hypothecated fund from fuel taxes and road user charges, for activities in the NLTP. Co-investment in works on MDC roads are at the agreed Financial Assistance Rate (FAR), depending on the activity.	Road repairs and improvements. Maintenance of infrastructure that supports new marine PT services where part of updated RPTP.
Direct Budget Bid	MDC could pursue buy in from Government, either for the full Programme, or part of it, through a direct budget bid.	Whole Programme
Transport Resilience Fund (TRF)	Targeted Crown Fund created to support local councils to develop and fund resilience upgrades on local roads. The fund will provide \$20M a year over 7 years. An initiative is eligible for funding if it is a resilience upgrade on a local road. It may be able to be used for some high-risk lower cost sites (without the current \$2M cap). To be considered for funding, projects will probably need to be included as line items in an RLTP.	Road repairs and improvements.
Regional Strategic Partnership Fund	MBIE Kanoa Regional Development Unit manages this \$200M fund to support regions to make steps towards achieving their potential, through partnering with regions to develop projects that support improved economic outcomes.	Works which support economic growth e.g. primary industries in the Sounds.
International Visitor Levy	Since 2019, most international visitors are charged the International Visitor Conservation and Tourism Levy (IVL) of \$35. The IVL is managed by MBIE, and invested in projects that will help to create productive, sustainable and inclusive tourism growth. From the Preferred Programme, a strong case may be made for funding of works to improve the resilience of Queen Charlotte Drive which is used by many visitors to access the Queen Charlotte Track Great Walk.	Road repairs and improvements on Queen Charlotte Drive.
Transpower	Some roads in the Te Whanganui/Port Underwood area were reportedly constructed by Transpower when the Cook Strait cables were installed. The roads were then vested in Council, and initial signals are that it is unlikely further funds would be invested. However, MDC may choose to explore this further.	Road repairs and improvements in Te Whanganui/Port Underwood area.
Climate Emergency Response Fund (CERF)	Targeted Crown Fund with initial \$4.8B for climate spending in 2021, proportional to proceeds of Emissions Trading Scheme. Current information suggests a good alignment with the Preferred Programme: 'an initiative is eligible for funding if it directly reduces vulnerability or exposure to the impacts of	Whole Programme.

Potential funding stream	Comments	Programme Stream
	climate change'. Delegation is held by some Ministers to approve funding from the CERF, however it is not clear at this stage how these funds will be allocated. May be allocated through a specific Waka Kotahi Programme, with EOI and application process.	
Provincial Growth Fund	Targeted Crown Fund listed in the draft GPS 2024-27 and previously operational from 2018. Originally for seed funding for regional projects that could demonstrate economic growth e.g. through job creation. Status currently uncertain.	Whole Programme.

MDC will continue to explore the potential for funding through the NLTP and targeted Crown Funds, particularly the CERF and Regional Resilience Funds, where there appears to be particularly close alignment with the project outcomes. It is recommended that MDC seek a sponsor within Central Government who can advocate for funding for the Sounds.

16.4.2 Waka Kotahi Funding

The activities within the Preferred Programme are classed as either Road Repairs, Road Improvements, Marine Improvements, or Maintenance and Operations. Table 16-4 shows each workstream, the 2021-24 NLTP activity classes and work categories which apply, the normal Financial Assistance Rate (FAR) and the FAR assumed for this PBC and identifies the next steps.

Table 16-4: Normal FAR for MDC Activities

PBC Activity	Funding Category	Assumed FAR ⁸⁸	Next Steps
Road maintenance and operations	Network and Asset Management WC 151 Local road maintenance	51%	MR and NOC to review maintenance management plan with NOC and develop action plan to improve network resilience through better targeted maintenance activity. MDC to consult on increase to maintenance budget through LTP.
Road repairs	WC 141 Emergency Works	71% (Works costing up to 10% of annual maintenance programme funded at 51%; works costing over 10% funded at 71%-95%)	Funding application from MDC to Waka Kotahi in accordance with the agreed strategy defined by the PBC, listing all faults, and demonstrating proposed repairs are fit for purpose and will reinstate the appropriate level of service. Note the PBC strategy has diminishing level of service at road ends where uneconomic transport infrastructure policy may apply. Emergency Works Tranche X received 95% FAR. However, the Waka Kotahi Board need to confirm on a case by case basis. 71% is assumed for this PBC in line with normal policy, noting it could be higher or lower than this depending on Board decision.
Road Improvements			
Resilience (Drainage) Study	WC 151 Network and Asset Management	51%	Complete study to identify drainage improvement priorities at segment level and engage with iwi, community, stakeholders
Stakeholder narratives – key sites of interest	WC 324 Road Improvements	51%	There is an opportunity to develop iwi narratives as part of Road Improvements project, but this is not included in the Preferred Programme, and no funding is included.

⁸⁸ normal FAR in brackets if different

PBC Activity	Funding Category	Assumed FAR ⁸⁸	Next Steps
Road Improvements – construction	Local Road Improvements WC 341 Low-Cost Low Risk OR WC 357 Resilience	51%	The Resilience Study will identify packages of work expected to be prioritised over the next 20 years and included in RLTP. The most suitable work category can be identified for each package: <ul style="list-style-type: none"> • Low-cost low risk if under the budget threshold. • If over threshold, Point of Entry to determine business case level, depending on risk and scale. • If BCR<1, uneconomic transport infrastructure policy.
Marine Improvements			
Marine Study	NA	0%	Complete study to establish an area level strategy or plan and engage iwi and community.
Plan Change	NA	0%	Plan change to improve land use management and improve ease of private construction of marine infrastructure e.g. jetties, wharves and moorings.
Public Transport	WC 512 Public transport services - ferry WC 562 Public transport infrastructure - ferry	0% (51%)	Determined by marine investigation/feasibility study.
Freight Transport	NA	0%	Determined by marine investigation/feasibility study.

As noted, Waka Kotahi have indicated the FAR for the Road Repairs (Emergency Works) will need to be considered by the Board when it formally receives the PBC. At that time, an indication of likely FAR will be provided. This will provide sufficient assurance for MDC to consult with the community through the LTP (or SCP).

16.5 Cost by Funding Source

Figure 16-2 and Figure 16-3 show the total capital and operational funding requirements for the preferred programme for each line item for the 25-year period. Refer to Appendix W for more detail about the funding requirements including the split between funding sources (rates vs NLTF). This assumes that funding is only available through the NLTF. If supplementary sources can be identified, these will reduce the totals assumed in the tables in Appendix W

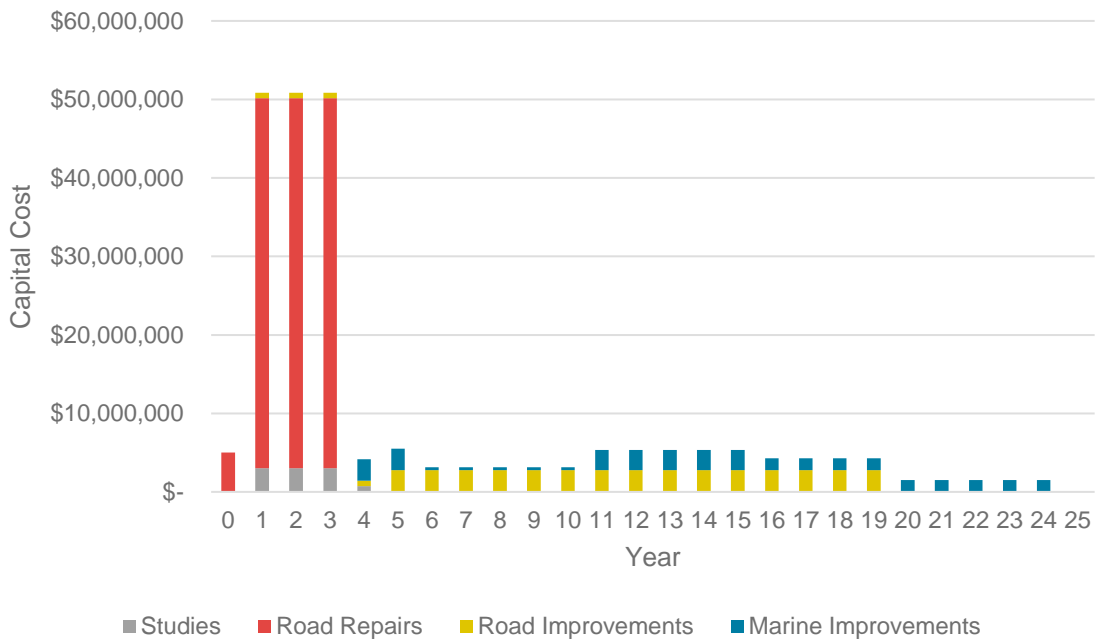


Figure 16-2: Capital costs by item and year

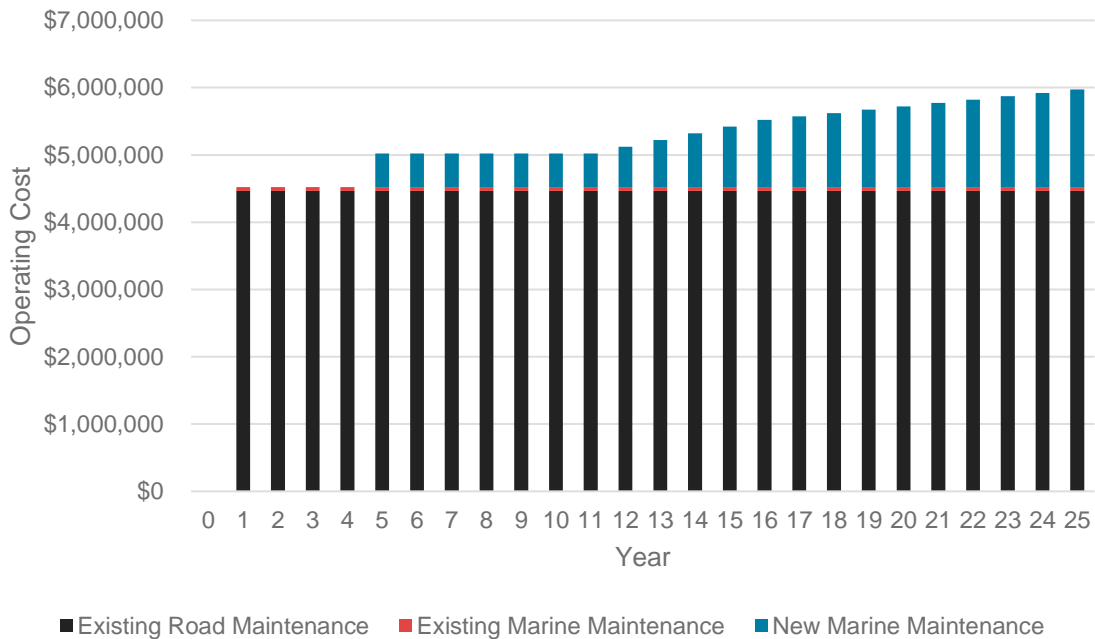


Figure 16-3: Operating costs by item and year

16.6 Overall Affordability

The estimated cost of the Preferred Programme is \$234M, and the BCR is 1.8 (refer to Section 13). The funding immediately sought from the PBC is not the full \$234M, rather \$146M for immediate road repairs and \$10M for further investigations into roading improvements (\$3M) and marine improvements (\$7M).

MDC will include relevant budget lines in the LTP to provide funding for the items. These funding streams will be confirmed at the end of June 2024, when Council will adopt the final LTP, following consultation, hearings and deliberations. The programme will be included in the RLTP.

MDC will seek funding from other potential sources, as identified in Table 16-3.

The Programme will seek funding through the NLTF. There is always pressure on the NLTF from projects across the country, however as the project is Priority 2 of 12, it will be in a very good position to attract funding.

17 Commercial Case

17.1 Procurement Strategy

A decision around procurement arrangements for the Preferred Programme will be made post PBC, through discussion and agreement between Waka Kotahi and MDC.

A workshop was held with MDC and Waka Kotahi as part of the PBC process to identify the possible procurement strategies for each part of the Preferred Programme and discuss and record the advantages and disadvantages of each. This assessment is presented in Section 17.1.1 to Section 17.1.4.

An updated procurement strategy will be submitted alongside the funding application for Repairs, to demonstrate a value for money approach to delivery.

There is a risk that existing market capacity will be affected by the Cyclone Gabrielle recovery underway on the North Island.

17.1.1 Programme Management of Repairs

The largest component of the programme is repairs. In the MDC transport activity procurement strategy (June 2022) a repair programme of this scale requires a PMO to be set up within the NOC to manage delivery. A range of possible procurement strategies for the programme management of repairs are shown in Table 17-1, with advantages and disadvantages highlighted. A decision will need to be made by MDC and Waka Kotahi on the form and procurement of the PMO services.

Table 17-1: Possible procurement strategies for the programme management delivery model

Option	Advantages	Disadvantages	Comments
Variation to NOC⁸⁹: Project Management Office (PMO)	<p>Simple contractually as there is an existing contractor and resourcing should be straightforward.</p> <p>Existing institutional knowledge so the project will be able to quickly move into delivery.</p> <p>No additional procurement cost.</p> <p>Better supply chain management of materials</p>	<p>Waka Kotahi procurement consider this to be a conflict of interest where the NOC can procure itself to do work.</p> <p>MDC/Waka Kotahi will be paying for the NOC to manage other contractors.</p> <p>There is no incentive to deliver work cheaply or efficiently.</p> <p>It could be difficult to separate the costs of NOC business as usual from the recovery programme – risk of costs being allocated to the wrong contract, or for paying for repairs under this contract when it should be part of the NOC lump sum.</p>	<p>Conflict of interest could be managed with a strong scope of works.</p> <p>Independent onsite assurance would be required to ensure costs allocated to the right contract and reduce risk of paying for repairs under this contract when it should be part of the NOC lump sum.</p> <p>Regardless of amount of onsite assurance provided a degree of trust between parties is needed.</p>
Marlborough Roads set up PMO	<p>Clearly separate from the NOC so is more transparent.</p> <p>Client can control the level of resourcing.</p> <p>Much reduced chance of risk of costs being allocated to the wrong contract, or for paying for repairs under this contract when it should be part of the NOC lump sum, but these scenarios are still possible.</p>	<p>Marlborough Roads would need dedicated resources for this approach.</p> <p>Marlborough Roads systems are not set up for managing large programmes. They would need to establish new systems and support, could lead to possible delays</p> <p>Will not be able to do same level of supply chain management as NOC PMO.</p>	<p>Marlborough Roads is taking on more risk and opportunity.</p> <p>Could bring in a dedicated health and safety person.</p>

⁸⁹ This is how the recovery has been managed so far.

Option	Advantages	Disadvantages	Comments
Independent PMO	<p>Clearly separate from the NOC so is more transparent.</p> <p>Even lower risk of costs being allocated to the wrong contract, or for paying for repairs under this contract when it should be part of the NOC lump sum, but these scenarios are still possible.</p> <p>Potential for market competitive pricing when forming the PMO and for construction work afterwards.</p> <p>Potential for performance linked payments.</p> <p>Risk can be transferred by Marlborough Roads to the PMO.</p>	<p>Marlborough Roads would need to engage expertise to procure it. This would take at least six months.</p> <p>Performance and price will rely on how well the scope is defined.</p> <p>Likely more expensive than Marlborough Roads PMO.</p> <p>Won't be able to do same level of supply chain management as NOC PMO.</p>	<p>At arm's length from political the process</p> <p>There will be a fixed fee</p>

17.1.2 Road

Road works can be split into repairs, improvements, and maintenance. The possible procurement strategies and the advantages and disadvantages of each strategy for these works are detailed in Table 17-2 to Table 17-4.

It is expected that procurement of roading improvements works will be completed through normal MDC procurement processes as outlined by their Transport Activity Procurement Strategy.

Potential procurement methods are outlined in Table 17-2 below where the PMO procures repairs from the market. This may be through a supply panel arrangement or direct to market dependent upon the MDC and Waka Kotahi approved procurement methods within the PMO procurement strategy.

Procurement approaches by MDC or Marlborough Roads for other road improvements and maintenance activity are highlighted in Table 17-3 and Table 17-4. Decisions on these procurement methods are to be made closer to the time of delivery dependent on a number of factors including scale, value for money, risk, available funding, market capacity.

Table 17-2: Possible procurement strategies for road repairs

Option	Advantages	Disadvantages
Traditional	<p>Can use a range of procurement methods (negotiation through to lowest price confirming).</p> <p>Price tension in both pre-implementation, and implementation.</p>	<p>Uncertainty around ground conditions.</p> <p>Higher risk of cost increase for construction.</p>
Design and Construct	<p>Can use a range of procurement methods (negotiation through to lowest price confirming).</p>	<p>Scope needs to be very well defined, but most repairs are very hard to define.</p> <p>More difficult if greater uncertainty around ground conditions.</p> <p>Higher risk of cost increase through variations.</p>
Early Contractor Involvement	<p>Gives more price certainty and lower risk of variations.</p> <p>Contractor is focusing on risk early on.</p>	<p>Not always the cheapest option as there is no competitive tension.</p>
Alliance	<p>Incentive to deliver within an agreed cost.</p> <p>Aligns with methodology elsewhere for recovery.</p>	<p>May be more expensive.</p> <p>Results in a long lead time due to the set-up requirements.</p> <p>Requires more client input.</p> <p>No local in-house alliance experience.</p> <p>A small-scale alliance might have trouble attracting resources.</p>

Table 17-3: Possible procurement strategies for road improvements

Option	Advantages	Disadvantages
Traditional	Consistency of approach for design Better control of quality of outcome Price tension	Requires more client-side management. Will require more time than some other approaches.
Design and Construct	Can be delivered quicker. May be cheaper than other options.	Requires more client-side management. Will require more time than some other approaches.
Contractor Led	Reduced design cost Will require less time than other approaches.	Marlborough Roads is taking on more risk. Higher likelihood that contractor delivers a short-term solution over a long-term solution.

Table 17-4: Possible procurement strategies for road maintenance

Option	Advantages	Disadvantages
NOC	In house knowledge Cost certainty for Marlborough Roads (lump sum)	Current performance has not met the need Performance measures may not be right (there is potential to renegotiate these). There is lack of transparency due to self-auditing.
Traditional Maintenance Contract	More control by Marlborough Roads Can downscale to match need, so is more deliverable by local contractors.	Requires more client/consultant management. Relies on Marlborough Roads to have expertise in house
Hybrid Maintenance Contract	Separates maintenance management responsibility from delivery, so there is more Marlborough Roads control of maintenance outcomes. Still has performance-price tension.	Can be expensive Has more systems so is less easy for a local contractor to deliver.

17.1.3 Marine Improvements

Completion of the Marine Study will provide greater clarity around the scope of the marine improvements, priorities for investment and packaging of works. It is likely that improvements to marine infrastructure will be procured in accordance with MDC procurement strategy, but that specialist contractors will be required to complete the works.

17.1.4 Other

In addition, the following pieces of work will be procured in accordance with MDC procurement strategy;

- Engagement and communication plan to communicate the key messages and next steps
- Marine Study – including consenting strategy for implementation.
- Resilience (drainage) Study
- Plan Change (both marine and land use)

18 Management Case

The purpose of the management case is to describe the arrangements that will be put in place for the successful delivery of the programme and its constituent projects, both to ensure successful delivery and to manage programme risks.

18.1 Marlborough Transport Network Management

Waka Kotahi is contracted to MDC to provide asset management services for all of MDC's transport activity. The Waka Kotahi brand for the delivery of this contract is Marlborough Roads. MDC pay an annual fee to Waka Kotahi (as Marlborough Roads) for these services. All works on the transport network are contracted by Waka Kotahi as the Principal. MDC funds the local road costs. MDC claims the FAR subsidy from Waka Kotahi as a funding agency and rates for the local share.

In this business case it is assumed that the 'Marlborough Roads' arrangement outlined above continues.

18.2 Outline Programme Plan

Delivery of the Preferred Programme will as shown in Table 18-1 and as follows:

- Studies – short term (1-4 years)
- Repairs – short term (1-3 years)
- Improvements – medium term (1-10 years)
- Marine Improvements – medium to long term (10-20 years).

Table 18-1: Anticipated delivery outline for the preferred programme

Activity	Years one to four	Years five to 10	Years 10 to 30
Road Repairs	Complete road repairs	-	-
Road Improvements	Resilience (drainage) study and pre-implementation	Pre-implementation and implementation	Pre-implementation and implementation
Marine Improvements	Marine study Plan changes	Pre-implementation Implementation of essential items	Implementation of Long-Term Plan
Maintenance	Maintenance planning Implementation	Implementation	Implementation
Area wide studies	Plan Change Marine Study Resilience (drainage) Study		

Table 18-2 shows the key programme dates for the Preferred Programme. This includes initial steps to confirm funding, followed by procurement and implementation of works.

Table 18-2: Key milestones

Milestone	Date	Owner
1 MDC continue to liaise with iwi	Ongoing	MDC
2 MDC continue to explore supplementary revenue streams, particularly for marine	Ongoing	MDC
3 Council consider and endorse business case, include in draft RLTP and LTP	By end 2023	MDC
4 Waka Kotahi Board approves business case in principle, and provides indicative FAR	By end 2023	Waka Kotahi

Milestone		Date	Owner
5	Delivery of eight priority Road Repairs ⁹⁰ (advanced funding application for \$5M)	Late 2023	Marlborough Roads
6	Confirm programme management arrangements and organise/establish/procure resources as/if required, including PMO	By end 2023	MDC and Waka Kotahi
7	Special Consultative Procedure or Long-Term Plan to consult on preferred option and financial impact	Early 2024	MDC
8	Funding confirmed in NLTP and LTP	June 2024	MDC and Waka Kotahi
9	Submit funding application and procurement strategy for repairs	July 2024	Marlborough Roads for MDC
10	Amend maintenance schedule and commence delivery	Underway	Marlborough Roads
11	Commence non-infrastructure elements of programme – Marine Study, Resilience (Drainage) Study, Plan Change(s) ⁹¹	July 2024	MDC and Marlborough Roads
12	Pre-implementation, procurement and delivery of remaining Road Repairs	Late 2024 to 2027	Marlborough Roads
13	Pre-implementation, procurement and delivery of remaining Road Improvements	2028 to 2034	Marlborough Roads
14	Pre-implementation, procurement and delivery of Marine Improvements	Ongoing from 2028	Marlborough Roads and/or Port Marlborough (Elaine Bay, Havelock, Picton)

18.3 Benefits Realisation Management

Table 18-3 provides the framework for benefit management. Most benefits will require Marlborough Roads or the new PMO to start collecting data. Refer to Section 4.6.2 for more information on benefits.

Table 18-3: Benefit management

Benefit	Description	Baseline	Responsibilities
Climate Change	Addressing a known climate change adaptation issue that is forecast to occur by 2040	No, the Do Minimum/existing situation does not address a known adaptation issue.	MDC
Freight Mode Share	Volume of road freight AADT on corridor moved to alternative modes.	Te Aumiti/French Pass: 54 Te Hoiere/Pelorus: 58 Queen Charlotte: 104 Kenepuru: 20 Te Whanganui/Port Underwood: 22	Classified vehicle count data will be available from MDC/Marlborough Roads. Develop framework to measure marine freight volumes.

⁹⁰ The eight priority sites are:

- **Te Hoiere/ Pelorus:** Daltons Bridge underslip
- **Queen Charlotte:** Anakiwa Road underslip
- **Kenepuru:**
 - Ankerbloms Road overslip/ underslip
 - Portage underslip
 - Water Tank underslip
 - Driftwood Corner underslip
 - Elephant Point overslip
- **Te Whanganui/ Port Underwood:**
 - Port Underwood Road underslip

⁹¹ Land use changes, increasing ease of constructing private marine infrastructure (jetties, wharfs, moorings, etc)



Benefit	Description	Baseline	Responsibilities
Maximum duration of unplanned road closures	The maximum duration of all unplanned road closures/service disruptions experienced in a year, expressed in hours	Te Aumiti/French Pass: 105 days Te Hoiere/Pelorus: 28 days Queen Charlotte: 83 days Kenepuru: 358 days Te Whanganui/Port Underwood: 122 days	Marlborough Roads/PMO (to be established) to continue collecting duration of closure data for all roads across the Sounds.
Average duration of unplanned road closures	The average duration of all unplanned road closures/service disruptions greater than 2 hours experienced in a year, expressed in hours	Te Aumiti/French Pass: 68 days Te Hoiere/Pelorus: 28 days Queen Charlotte: 60 days Kenepuru: 232 days Te Whanganui/Port Underwood: 87 days	Marlborough Roads/PMO (to be established) to continue collecting duration of closure data for all roads across the Sounds.
Alternative Routes	Percentage length of HR, HI road routes with a viable alternative.	Te Aumiti/French Pass: 0% Te Hoiere/Pelorus: NA Queen Charlotte: 100% Kenepuru: 0% Te Whanganui/Port Underwood: 50%	Marlborough Roads/PMO (to be established)
Freight Vehicle Access	Percentage length of network that is not available to HCV and 50MAX vehicles	Te Aumiti/French Pass: • Class 1 HCV: 0% • 50MAX: 10% Te Hoiere/Pelorus: • Class 1 HCV: 0% • 50MAX: 0% Queen Charlotte: • Class 1 HCV: 0% • 50MAX: 49% Kenepuru: • Class 1 HCV: 38% • 50MAX: 38% Te Whanganui/Port Underwood: • Class 1 HCV: 0% • 50MAX: 6%	Data will be available from MDC/Marlborough Roads
Asset Resilience	The number of stormwater related faults recorded following a weather event of a similar impact as 2022.	Te Aumiti/French Pass: 286 Te Hoiere/Pelorus: 39 Queen Charlotte: 119 Kenepuru: 780 Te Whanganui/Port Underwood: 121	Marlborough Roads/PMO (to be established) to continue collecting fault data for all roads across the Sounds following significant weather events.

18.4 Risk Management

A Risk Workshop was held with representatives from Waka Kotahi and MDC. Following the workshop, risks were rationalised and compiled in a risk register (Appendix X). A rating score was identified for each risk using the Z/44 Risk management guide. The critical risks identified through this process, risk owner and mitigation are shown in Table 18-4.

Risk management will continue to be an active and important part of the project post-PBC, and this risk register will be used by MDC and Marlborough Roads to guide thinking during project planning and implementation stages. At this stage the risk owner is MDC. Risks will be regularly and frequently reviewed, and the register updated through the course of the programme.

Table 18-4: Critical risks

Description		Cause	Consequence	Mitigation
Category: Stakeholders and Funding				
1	Iwi rights and interests not adequately included or addressed.	Level of Iwi involvement in programme development and delivery.	May not support preferred programme, risk of challenges in consenting and delivering leading to delays and adding costs, outcomes not achieved.	Ongoing collaboration post PBC is required with iwi to continue input on the business case and programme of works as it emerges.
1	Heritage interests not adequately included.	Heritage NZ have not been significantly involved in PBC.	May not support preferred programme, risk of challenges in consenting and delivering leading to delays and adding costs; outcomes not achieved.	Ongoing collaboration post PBC is required with Heritage NZ and other stakeholders to continue input on the business case and programme of works as it emerges.
3	MDC cannot afford to fund preferred programme without significant help from central government	Small ratepayer base, costly programme. There is uncertainty about ability to access other (new) funding streams.	May not be able to afford to deliver the preferred programme. May need to deliver less, affecting project outcomes.	Pursue full range of potential supplementary revenue streams listed in Financial Case. Seek sponsor in Government. Manage community expectations.
4	The project will need to compete against other MDC priorities for limited funding	Preferred programme may not be affordable, or a priority compared to other Council projects.	May not be able to afford to deliver the preferred programme. May need to deliver less, affecting project outcomes.	Pursue full range of potential supplementary revenue streams listed in Financial Case.
5	Reduced funding nationally	The FAR may be reduced.	May not be able to afford to deliver the preferred programme. May need to deliver less, affecting project outcomes.	Pursue full range of potential supplementary revenue streams listed in Financial Case. Seek sponsor in Government. Manage community expectations.
Category: Delivery				
10	May not be able to secure a contractor, or contractor may be lower capability	Lack of capacity within contractor/consultant market as many working on NI due to Cyclone Gabrielle response, huge demand currently and lack of resources.	Costs may increase meaning less can be delivered, poorer outcomes, and may slow delivery, or lower quality contractors with flow on effects	Early engagement with potential contractors.
15	May be challenging to get consents for marine infrastructure	There may be opposition to marine infrastructure on environmental grounds.	Process might add delay or marine programme may be unachievable, affecting project outcomes.	Ongoing dialogue with iwi, stakeholders and community to ensure good level of understanding and buy in. Manage community expectations. Consenting issues to be considered as part of the marine study.
Category: Environmental				
27	Increased need for dredging	Marine based infrastructure may lead to increased siltation and more boats.	Increased sedimentation, and pollution.	Include mitigations within Marine Study scope.

19 Next Steps

The PBC has identified a Preferred Programme for road repairs, road improvements and marine improvements across the Sounds, at a total cost of \$234M over 10 years. This includes the following contingencies:

- 30% on road repairs for Te Aumiti/French Pass, Te Hoiere/Pelorus, Queen Charlotte and Te Whanganui/Port Underwood
- 50% on road repairs for Kenepuru
- 50% on all road and marine improvements.

The next steps are shown in Table 19-1. These focus on activities that can commence as part of MDC's BAU, along with steps to urgently secure funding and establish a PMO to progress actions including securing funding.

Table 19-1 Next Steps

Workstream	Action	Timeframe	Partner Responsible
Engage with iwi partners	Ensure iwi involvement in studies, pre-implementation and implementation. Initially, engage with each of the individual iwi to gather their interests and determine how they would like to be engaged moving forward.	Underway	MDC
Engage with Heritage NZ	Ensure Heritage NZ involvement in studies, pre-implementation and implementation.	Underway	MDC
Emergency Planning	Collaborate with the community to develop community response plans for future emergency events.	Underway	MDC
Develop Funding Plan	Aggressively pursue supplementary funding sources	Underway	MDC
	Endorse business case and consider FAR	By end 2023	Waka Kotahi
	Consult through LTP to confirm rates funding	Early-mid 2024	MDC
	Include line items in draft RLTP	Late 2023	MDC
Programme Management	Establish PMO to develop funding plan and procurement	By end 2023	Marlborough Roads
Maintenance	Review existing maintenance schedules and implement changes.	Underway	Marlborough Roads
Road Repairs	Delivery of eight priority Road Repairs	Late 2023	Marlborough Roads
	Develop and submit funding application for road repairs, including design philosophy based on the Preferred Programme Strategy, and confirm the Procurement Strategy.	Mid 2024	PMO and MDC
Road and Marine Improvements	Procure Marine Study and Resilience (drainage) study to confirm the detail of the preferred option including feasibility, costs and priorities.	Mid 2024	Marlborough Roads
District Plan	Commence Plan Change to allow people to adapt more quickly to reduced road service through simpler/easier process for constructing private marine infrastructure.	Mid 2024	MDC
	Review District Plan provisions relating to the Sounds to determine appropriate protections, including managing overland flow paths that impact the road network.	Mid 2024	MDC

An aerial photograph showing a road construction site in a dense forest. A large, irregularly shaped area of cleared land, showing brown soil and some grey rocks, is the central focus. This cleared area is bordered by a grey asphalt road on the left and top. Several orange traffic cones and workers in high-visibility vests are visible on the road. The surrounding forest is lush and green, with various types of trees and ferns. The word "Appendices" is overlaid in white text in the center of the image.

Appendices

Appendix A Dwelling Occupancy

A.1 Dwelling owner by postal address as per Council's rating database

Zone	Marlborough District	Nelson / Tasman	Other South Island	North Island	Overseas/ Unknown	Total	Percentage outside Marlborough
Te Aumiti / French Pass	265	312	76	66	8	727	64%
Te Hoiere / Pelorus	59	22	19	8	2	110	46%
Queen Charlotte	335	40	142	35	11	563	40%
Kenepuru	490	96	414	204	37	1,241	61%
Te Whanganui / Port Underwood	215	9	94	87	11	416	48%
Total	1,364	479	745	400	63	3,057	55%

A.2 2013 Census dwelling occupancy by zone

Zone	2013 Census Dwelling Data					Properties with Dwellings as per rating database
	Occupied	Residents Away	Empty	Total	Percentage Empty	
Te Aumiti / French Pass	252	24	564	849	66%	727
Te Hoiere / Pelorus	69	3	30	102	29%	110
Queen Charlotte	324	24	300	648	46%	563
Kenepuru	318	30	912	1,269	72%	1,241
Te Whanganui / Port Underwood	150	12	333	501	63%	416
Total	1,113	93	2,139	3,369	63%	3,057



A.3 2013 Census dwelling occupancy by zone and Statistical Area 1

Area	Occupied	Residents Away	Empty Dwelling	Total	Percentage Empty
Te Aumiti/French Pass	252	24	564	849	66%
7023222	42	C	C	48	C
Okiwi Bay (SA1 7023225)	54	3	132	192	71%
7023228	93	9	228	330	72%
7023233	90	0	138	234	69%
Rangitoto ki te Tonga/D'Urville Island (SA1 7023234)	18	3	39	60	67%
Stephens Island/Takapourewa (SA1 7023236)	C	C	C	C	C
Te Hoiere/Pelorus (SA1 7023224)	69	3	30	102	29%
Queen Charlotte	324	24	300	648	46%
7023239	30	0	6	36	17%
7023241	84	6	66	156	42%
Linkwater to Picton (SA1 7023243)	93	3	87	183	48%
Anakiwa (SA1 7023245)	87	12	69	168	41%
Ngakutu Bay (SA1 7023247)	30	3	72	105	69%
Kenepuru	318	30	912	1,269	72%
Moetapu Bay (SA1 7023242)	60	12	135	198	62%
Mahau to Kenepuru Heads (SA1 7023250)	129	9	558	690	80%
Beyond Kenepuru Heads (SA1 7023252)	129	9	249	381	63%
Te Whanganui/Port Underwood	150	12	333	501	63%
7023249	18	C	C	18	C
7023251	48	6	30	87	34%
7023253	42	3	18	63	29%
7023254	30	3	186	219	85%
Arapaoa Island (SA1 7023255)	12	0	99	114	87%
Total	1,113	93	2,139	3,369	63%



Appendix B Existing Marine Infrastructure

Zone	Location	Owner/Licensee Name	Jetty	Ramp	Barge
Te Aumiti / French Pass	Elaine Bay	Elaine Bay Community Association	1	1	
		Port Marlborough	2		
	Ōkiwi Bay	Okiwi Bay Ratepayers Association		+1	
	Nydia Bay	Nydia Bay Community Association	1		
	Duncan Bay	Tennyson Inlet Boat Club	2	1	
	Penzance Bay	Department Of Conservation	+1	1	
	Cissy Bay	Cissy Bay Community Association		1	
	Elmslie Bay	Marlborough District Council	+++1	1	1
Kapowai Bay (D'Urville Island)	Marlborough District Council	+++1		1	
Te Hoiere / Pelorus	Kaiuma Bay	Sounds Lifestyle Investments Limited	1	1	
Queen Charlotte	Havelock	Port Marlborough	Havelock Marina		
	Anakiwa/Thompson Bay/Tirimoana	Marlborough District Council	1	2	
		Outward Bound Trust of NZ	++1		
	The Grove/Okiwa Bay	Marlborough District Council	+1		
	Momorangi Bay	Marlborough District Council	++1		
		Department of Conservation		1	
	Ngakuta Bay	Ngakuta Boating Club	++1	1	
Picton	Port Marlborough	Picton Marina			
Kenepuru	Moetapu Bay	Moetapu Bay Community Jetty Incorporated	1		
	Te Mahia Bay	Marlborough District Council	+++1		
	Tara Bay	Tara Bay Community Jetty	1		
	Portage	Portage Boat Harbour Limited and Marlborough District Council	+++1		
		Kenepuru and Central Sounds Residents Association		1	
		Marlborough District Council			1
	Fish Bay	Marlborough District Council			1
	Waitaria Bay	Marlborough District Council	+++1		
	Double Bay	Avalon Properties Limited			1
Torea Bay	Marlborough District Council	+++1		1	
Kenepuru cont.	Onahau Bay/Waterfall Bay)	Marlborough District Council	+++1		
Te Whanganui / Port Underwood	Oyster Bay	Port Marlborough	1		
		Marlborough District Council		1	



Classification level under the MDC Wharves and Jetties Policy is as follows:

Classification	Symbol	Definition	Ownership Structure
Strategic	+++	A strategic wharf/jetty facility is a necessary and strategic link in the district transport network. They are key facilities in Marlborough’s tourism industry and are heavily used by commercial operators. Strategic jetties may also be important to the community as cultural and/or historical sites.	It is vital that Council ensures that these are adequately maintained and are safe and fit for purpose. It is necessary that Council retains ownership and responsibility for funding capital improvements.
Community/ Amenity	++	A community/amenity wharf or jetty in this category still has a role in the context of the transport network but much less so than the “strategic” jetties. Use is more recreational than commercial. The facility is highly valued and used by both the community at large and the local community and residents as a point of access and/or as an amenity for recreational purposes.	<p>Community groups (residents’ associations etc) manage these facilities with input and some assistance from Council.</p> <p>The local communities own these facilities and are responsible for the finances and for the implementation of any capital improvements and for the ongoing maintenance and safety of the facility.</p> <p>A financial contribution to these activities from the Council would be made.</p> <p>Council would require a formal relationship to be established with the community group responsible for the jetty, via a Memorandum of Understanding.</p>
Local / Amenity	+	Local/amenity jetties are seen to have no substantive connection with or importance to the district transport network and are significantly of less interest to the community at large for either access or amenity purposes. The facility is highly valued and used by the local community. Jetties in this category are to all intents and purposes serving a local interest only. That is not to say that there will not be casual use from time to time from visitors or recreational users as is the case for many of the private jetties spread throughout the Sounds.	The local community group assume ownership and responsibility for the facility into the future. This includes being responsible for the financial requirements of capital improvement and ongoing maintenance. In the event that the local community could not manage those obligations the structure would be disestablished.



Appendix C Stakeholder Engagement

C.1 Issues and Options Workshop (January 2023)

C.1.1 Presentation Slides





Marlborough Sounds Future Access

Workshop 1: 24 January 2023

A close-up photograph of a person's hands weaving a basket. The hands are positioned in the center-right of the frame, with the left hand holding a green reed strip and the right hand weaving it into a complex, diamond-patterned structure. The background is a blurred view of the basket's interior, showing the intricate weaving pattern. The lighting is dramatic, with strong highlights on the hands and the reeds, and deep shadows in the surrounding areas. The overall mood is focused and traditional.

**Karakia
timatanga**



Agenda

- Welcome and Overview
- Strategic Case Context
- Access Issues
- Problem Evidence Summary
- Break**
- Issue identification break out
- Break**
- Possible solutions break out
- Next Steps
- Close

Introductions and Overview

- Stakeholder introductions
- Project overview
 - Governance Advisory Group
 - Scope
 - Key milestones
 - Business case process
 - Workshop purpose



Project Governance Advisory Group

- Marlborough District Council
- Marlborough Roads
- Mana whenua and tangata whenua representative(s)
- Te Kotahi o Te Te Tauihu Charitable Trust
- Port Marlborough
- Waka Kotahi NZ Transport Agency
- Department of Internal Affairs
- National Emergency Management Agency
- Department of Conservation
- Regional Public Service Lead - Te Tau Ihu

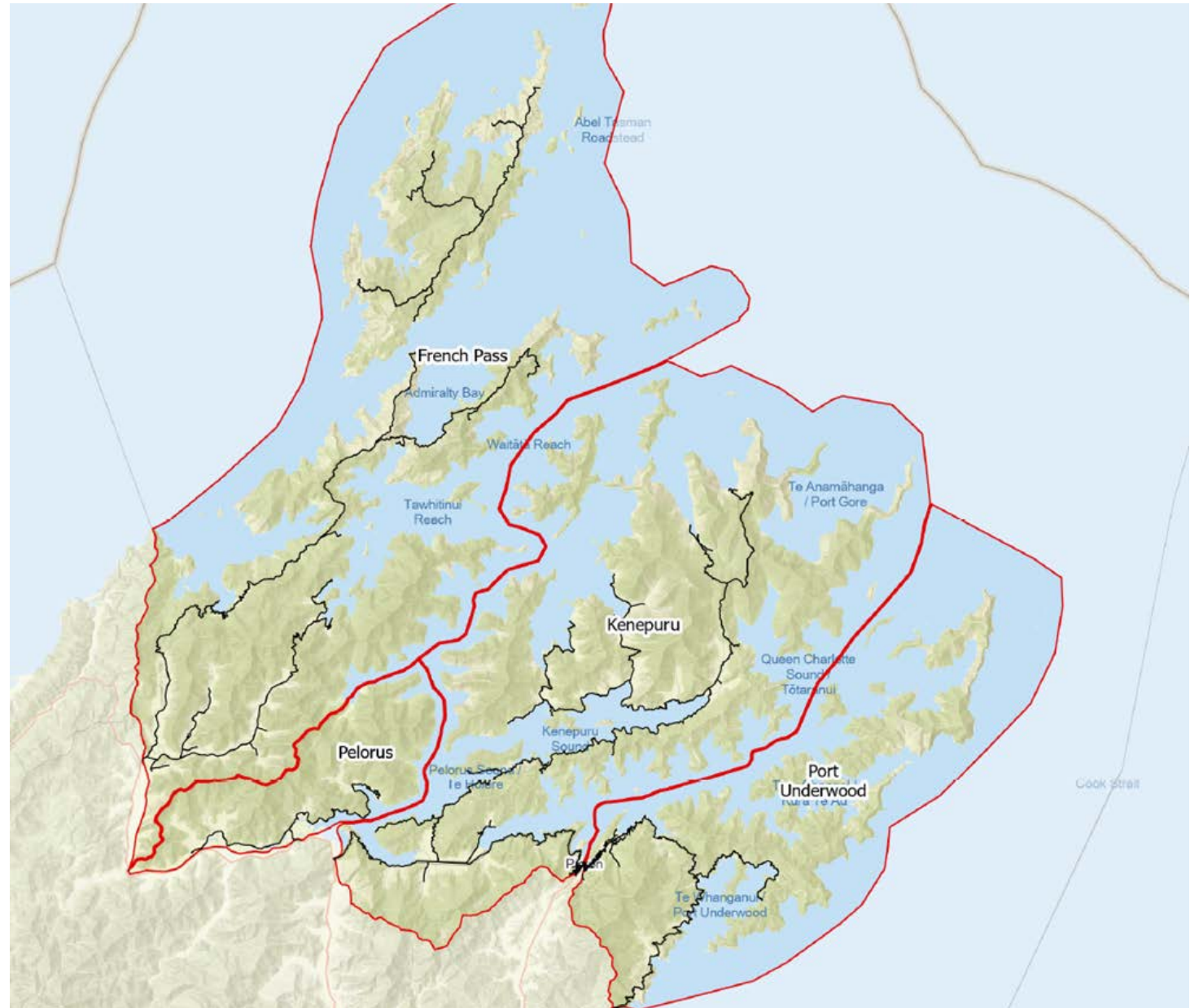


Kenepuru



Study Scope

- French Pass
- Pelorus
- Kenepuru
- Port Underwood





Key Milestones

Milestone	Target Date
Consult with community	January 2023
Investigate options	February 2023
Consult with funders	March/ April 2023
Consult with community	May 2023
Identify preferred option and next steps	June 2023
Funding decision	TBC
Inform community of funding decision	TBC

Business Case Process

- What is the problem?
- Why do we need to solve it? Why now?
- What are the options to solve the problem?
- Evaluate and decide what is the preferred option
- Plan the next steps including:
 - Who will fund it?
 - When will it be delivered?
 - How will it be delivered?





Surveys

- Will inform the business case and final project
- Residents and business survey



Queen Charlotte Drive

Workshop Purpose

- Bring key stakeholders together
- Build common understanding of scope and study outcomes
- Study team to present their understanding of the problem
- Stakeholders to provide feedback to the study team of key issues
- Stakeholders to identify options they think need to be considered
- Discuss next steps



An aerial photograph showing a coastline with turquoise water on the left, a steep, eroded hillside in the center, and a paved road on the right. The hillside is covered with green vegetation and has some exposed brown soil. The road has orange traffic cones along its edge. The text 'Marlborough Sounds Context' is overlaid in white on the water and hillside.

Marlborough Sounds Context

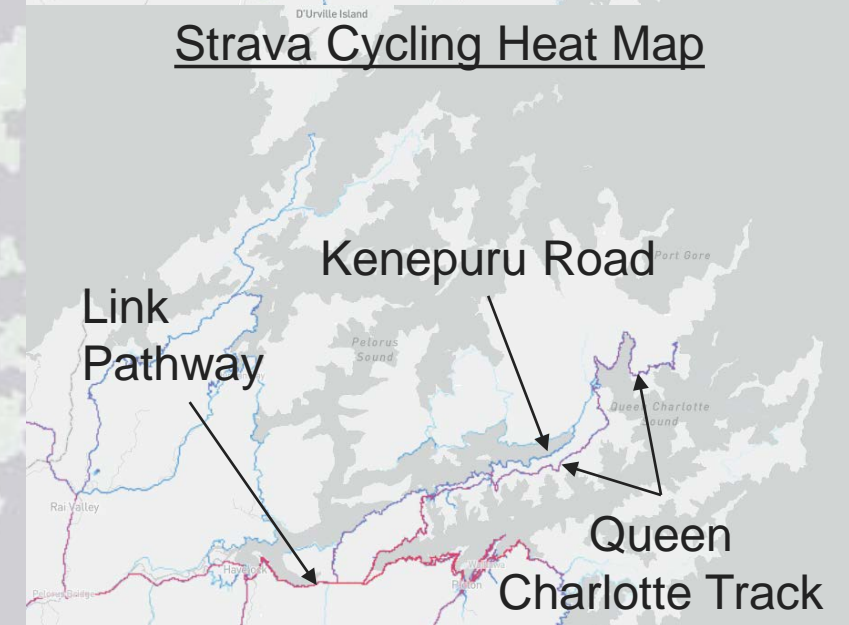
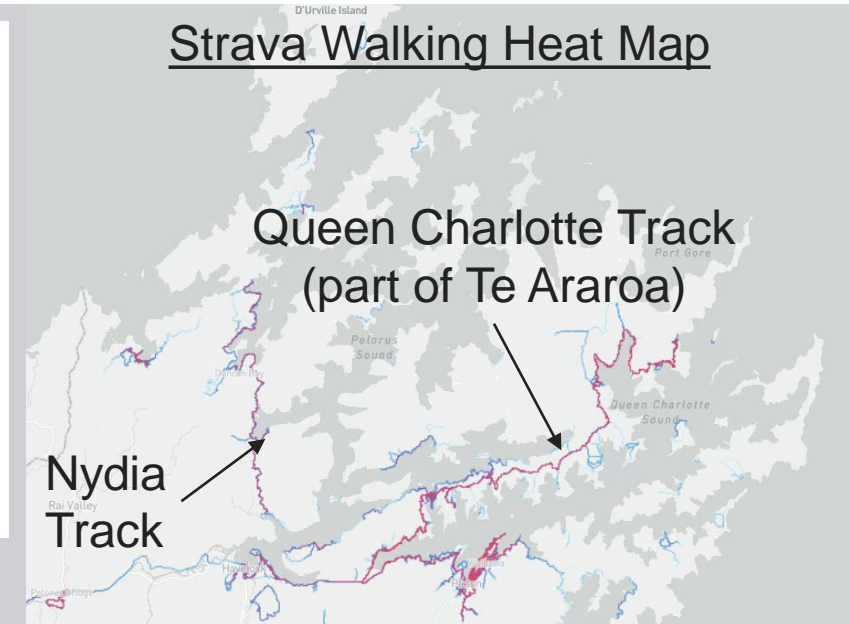
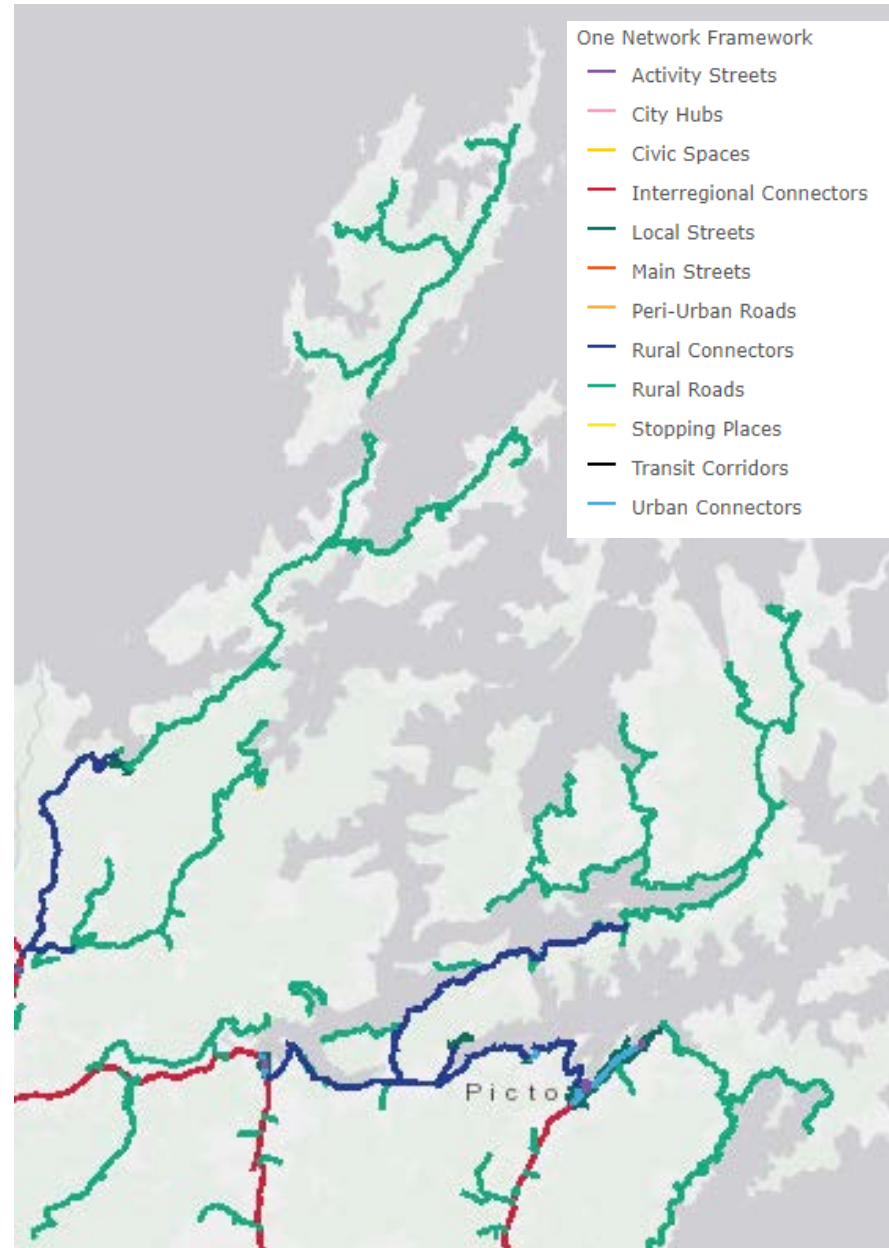
Transport

Roads

- 259 km sealed
- 266 km unsealed
- Speed limit: ~100km/h
- Operating speed: between 30 – 50km/h
- 10 – 380 vpd (9-12% heavy)
- Significant increase in traffic volumes over summer

Walking and Cycling

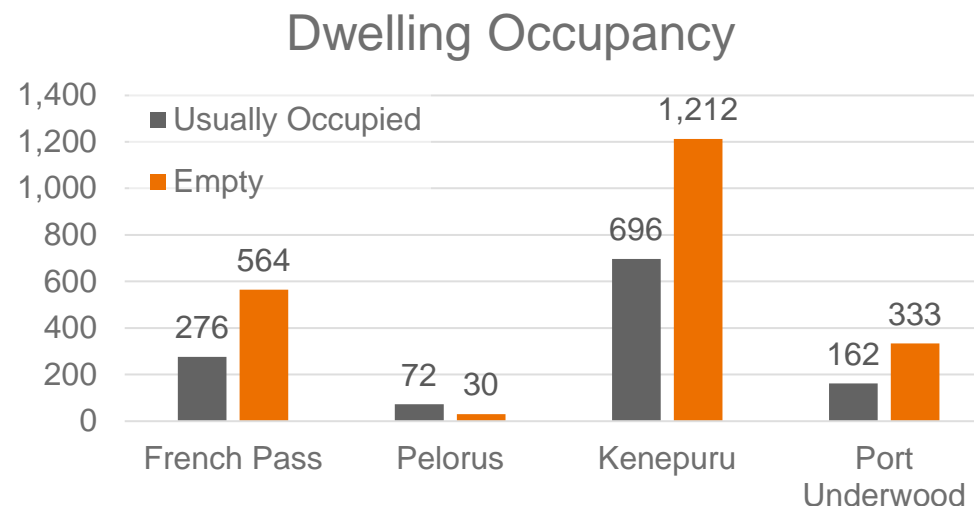
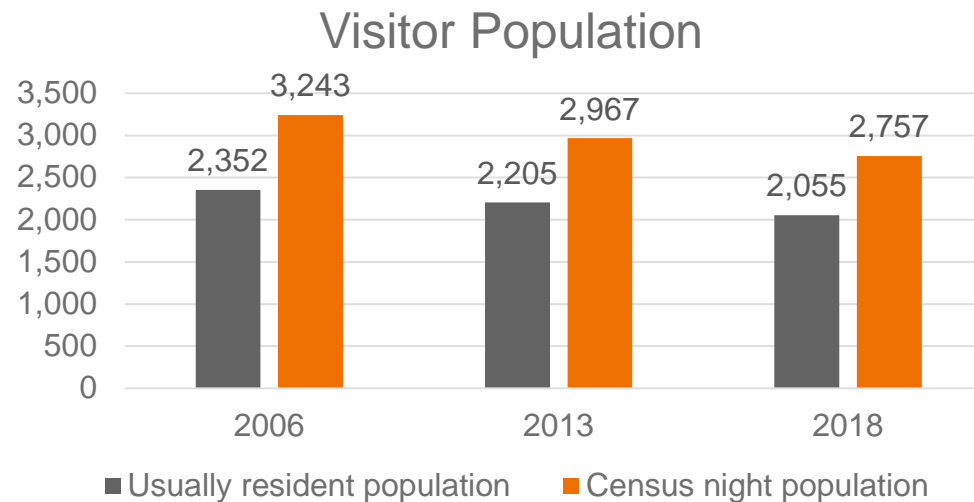
- Many popular recreational tracks



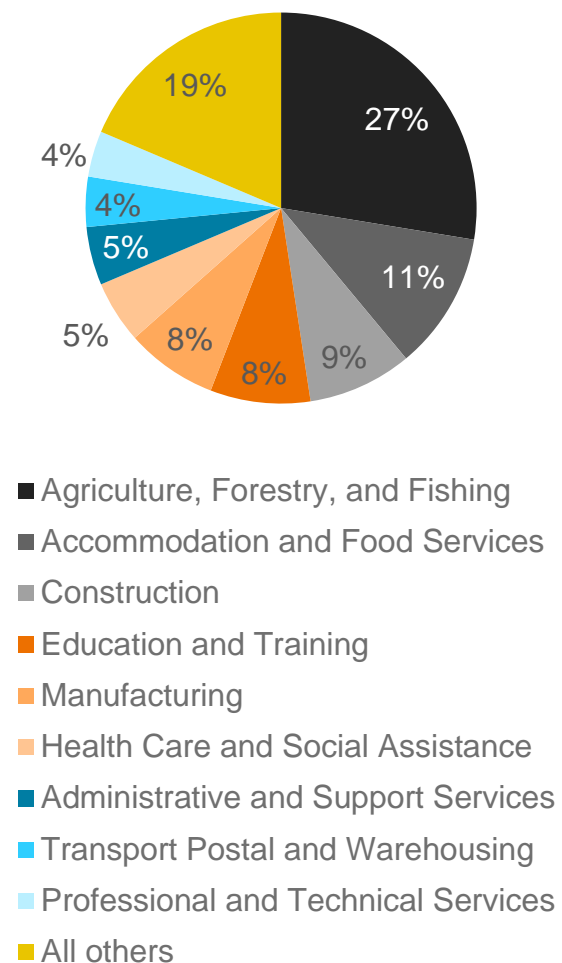


Social and Economic Context

- Population: 2,055
- Shrinking 15-64 age group
- 63% of dwellings are usually empty
- Biggest employers:
 - Agriculture, forestry and fishing (240)
 - Accommodation and food services (99)
 - Construction (75)



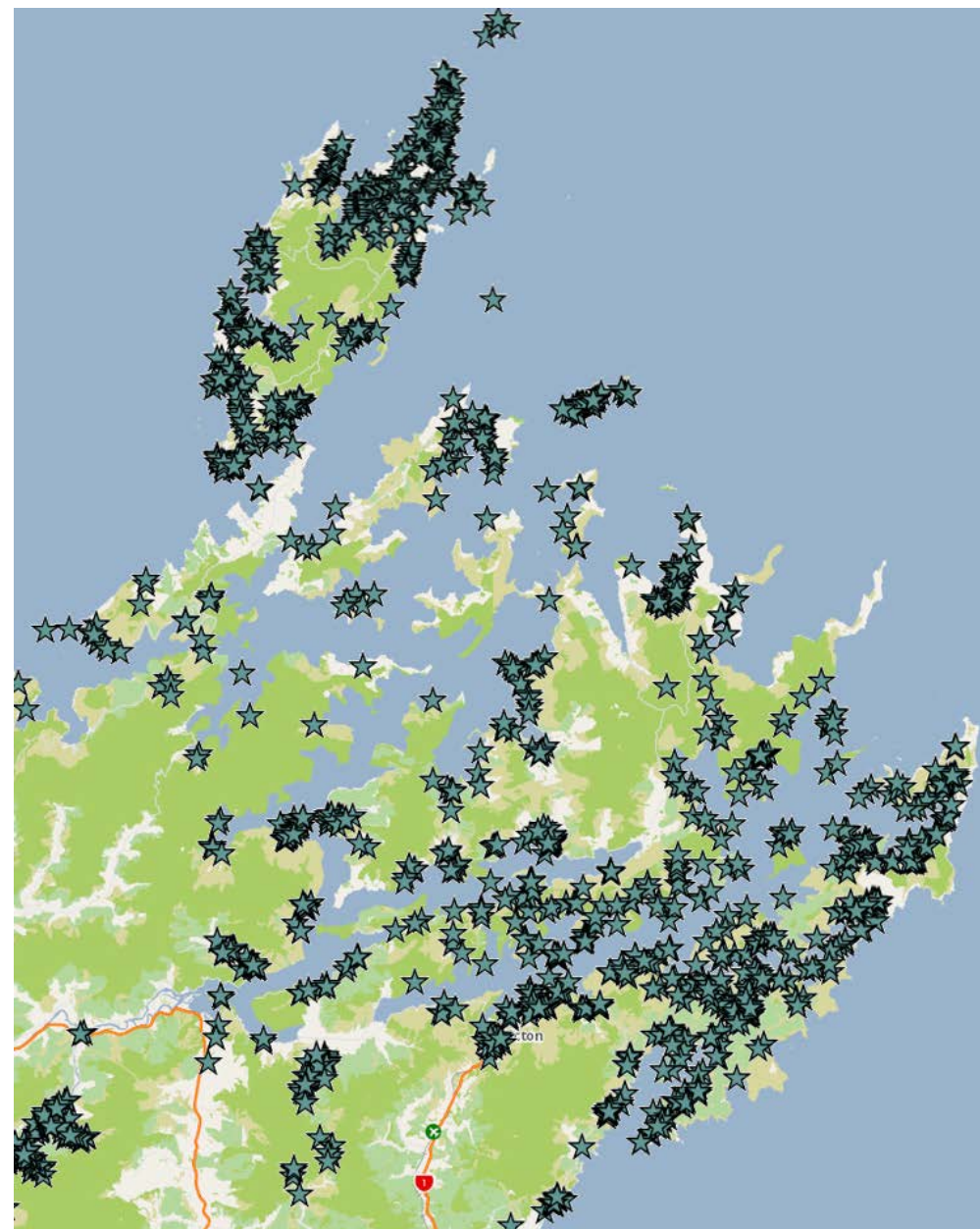
Employment Industries



Cultural and Historical Context

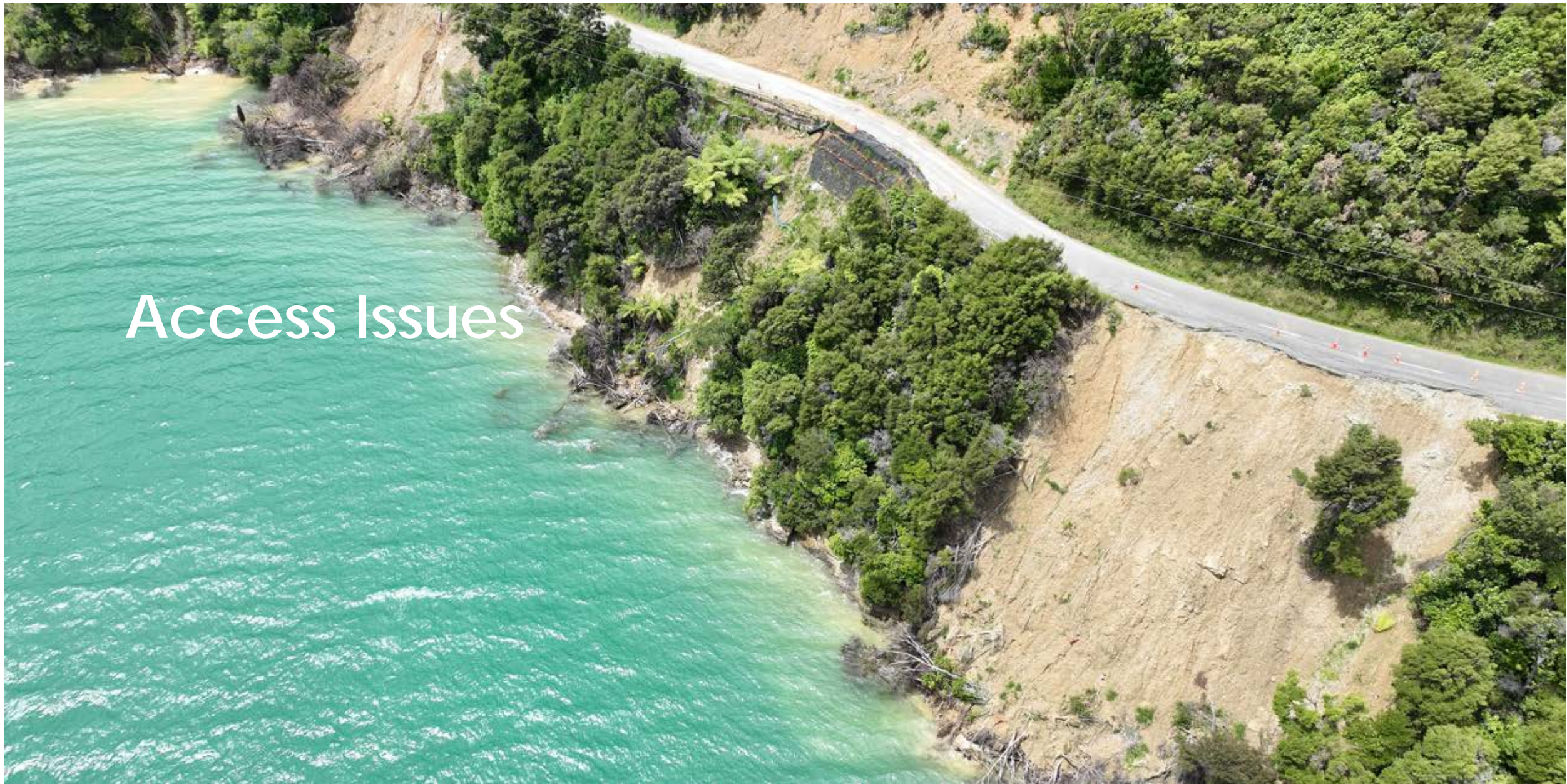
Hundreds of recorded archaeological sites
Proposed Environmental Management
Plan:

- 8 sites with significance to Marlborough's Tangata Whenua Iwi
- 3 Category A heritage resources
- 13 Category B heritage resources





Access Issues



Business Case Purpose

Provide access for the wellbeing of Marlborough Sounds communities *with a safe and resilient transport system*

Comments

- Agree this represents the aspiration for this project
- Any decisions will affect wellbeing
- Reflects feeling of community
- Don't want to see this a pure financial case





Issues

- 2021 thought could restore road network
- Subsequent event within 12 months increased magnitude of damage before could recover
- Soils are poor
- Roads not built to proper standards when initially built
- Use and increasing use by heavy vehicles creating more damage
- Always expensive to maintain
- These two events far worse than previously experienced
- Almost as expensive as NCTIR (Kaikoura EQ recovery project) but only servicing 1,000 properties
- Can we affordably sustain them in Climate change more frequent intense events
- What needs to be done to make them more resilient, affordable to District and government
- Are levels of service affordable and fit for purpose
- People rely on roads as if they are in town, and expectation is that they can run down to 1 days supply, expectation road will always be open, local businesses have done the same
- Emergency access for the community following events
- Large number of visitors can be impacted if event occurs while they are there
- Main North South power cables, Port Underwood Road was to service this, and cable is buried in this road and overhead, National Grid
- Fibre optic cables Fighting Bay managed by Transpower (buried in Port Underwood, Tumbledown) interisland, cable protection zone across Cook Strait, National Grid



Issues (cont.)

- Kenepuru Road is main route for power cables, and needed for servicing, services around 1,500 properties Kenepuru Community
- Businesses rely on the roads to be kept open, higher cost for them to use alternative modes for access, particularly aquaculture (Elaine Bay example), impacts major employers
- Need fire trucks able to get in to fight fires, need roads
- Remote workers unable to access airport when needing to travel to work
- Don't have clear picture of what an acceptable level of service is going forward
- Community has expectation that doesn't fit with Council's Roding Asset Management Plan and One Network Road Classification for this road
- Expectation doesn't match available funds
- Amount of rates probably only half what road maintenance costs are excluding damage from exceptional events
- Increased frequency of emergency events and higher maintenance costs make it a bigger issue now
- Kenepuru geotechnically unstable, people don't understand this
- Roads were sealed for amenity value, drainage was never addressed, standard was poor, causing a lot of problems now
- Don't know volume of people, permanent versus temporary residents
- Don't know who has alternative access, for example in boats



Issues (cont.)

- Community isn't expecting gold plated, would be happy providing there is some sort of road, expectations may be different for different parts of the community such as farmers versus residents
- Biggest social issue, can't live lives impromptu now, biggest impact is having to plan
- Every time it rains, very worried about what impact is, creating a lot of stress for the community, lack of certainty
- Issues with coastal access: barge, jetties, etc., limited capacity if needed
- Issues with access to coastal facilities, not everyone can get to coast if there is no road access, might need access through private properties
- Not enough providers / operators such as water taxis if demand increase
- Much of sounds are too shallow to develop new water access points
- QCD is a primary collector and is alternative route for SH6 and SH1 of this is out, Kenepuru, dairy farms etc....
- Safety issues with road network: driving off the edge, narrow, no edge barriers, conflicts between heavy vehicles and light vehicles, increasing number of narrow areas as a result of the storm events increasing safety risk
- Visitors aren't used to roads, roads aren't suitable for different types of vehicles such as campervans, boat trailers, etc..
- Heavy vehicles cross centrelines on blind corners, not just farm servicing trucks but other businesses and development



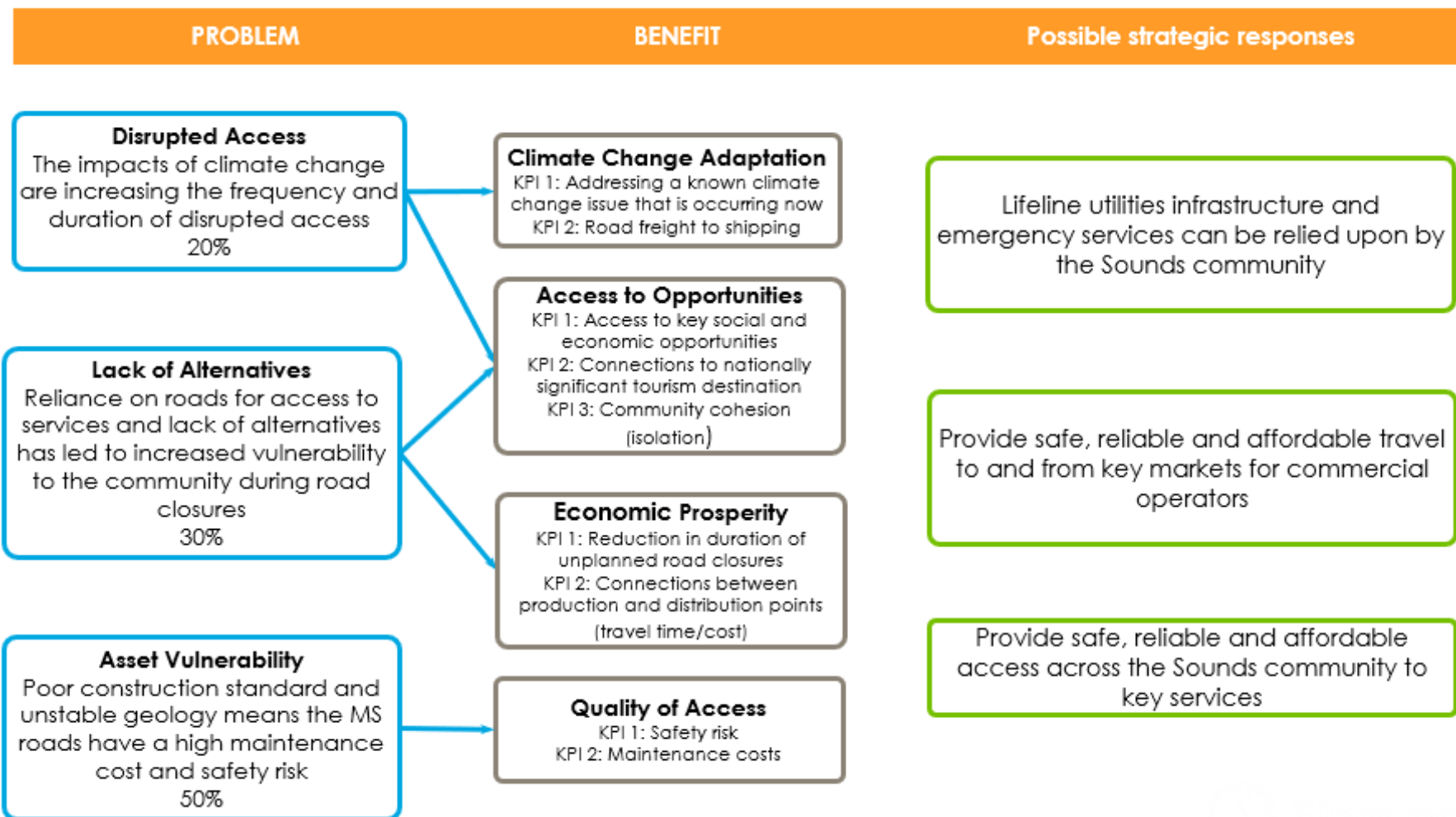
Problem theme, cause and consequence

- Climate Change – frequency of storm events
- Unstable soils and underlying geology
- Poor road construction standard (especially heavy traffic)
- Water access not set up (road reliance)
- Small number of properties (high cost to maintain road)
- Varying LoS expectations across community / sectors on access
- Deteriorating road condition
- High cost to fix road
- Ratepayers base small compared to cost
- National risk to power and fibre optic cables
- Environmental / prevailing and changing conditions (Geology and climate change)
- Road standard and level of service
- Alternative access modes
- Lifelines utilities vulnerability



Marlborough Sounds Future Access Final Investment Logic Map

Outcome Statement: Provide access for the wellbeing of Marlborough Sounds Communities, through a safe and resilient transport system



An aerial photograph showing a coastal road. The road is paved and curves along a steep, eroded hillside. The hillside is covered in dense green vegetation, but a large section of the road is blocked by a landslide of brown earth and debris. The water in the foreground is a vibrant turquoise color. The text 'Strategic Case Overview: Problems' is overlaid in white on the left side of the image.

Strategic Case Overview: Problems

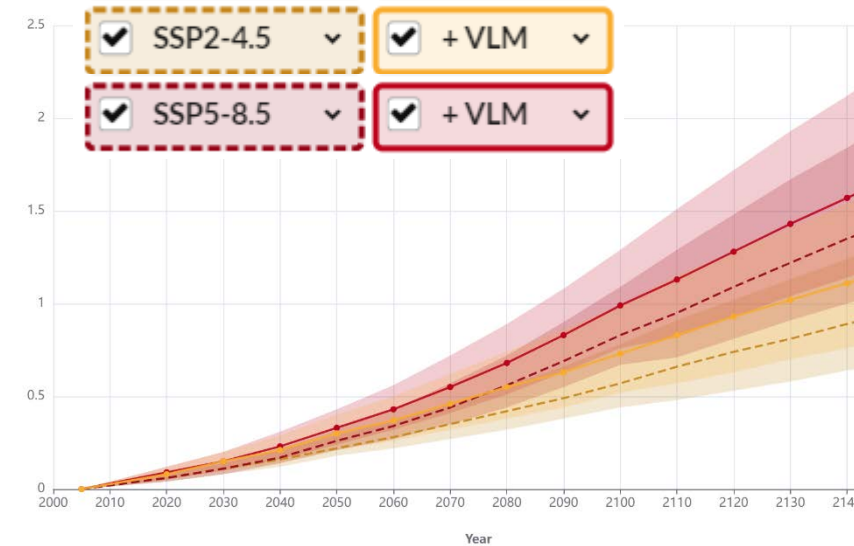
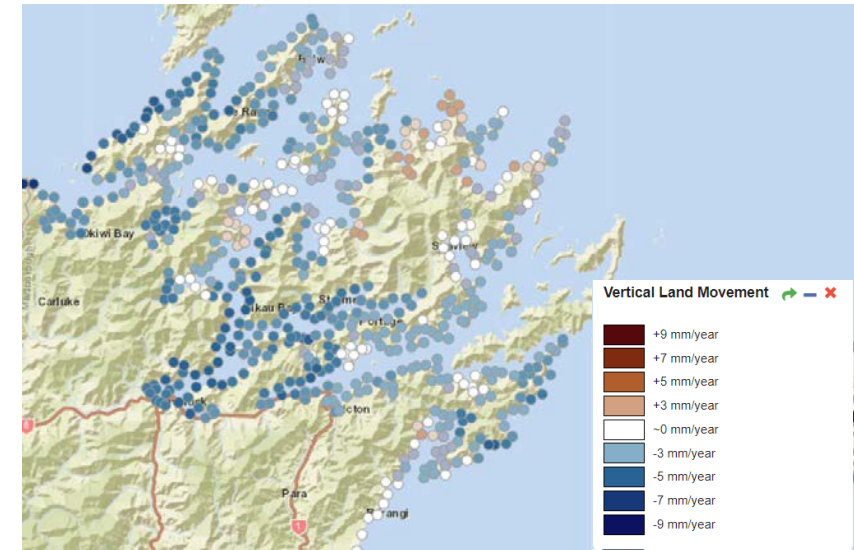
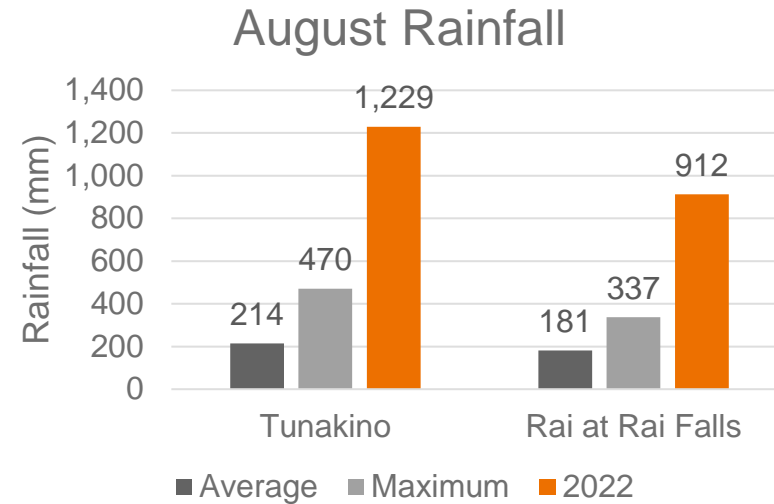
Problem 1: Disrupted Access

The impacts of climate change are increasing the frequency and duration of disrupted access

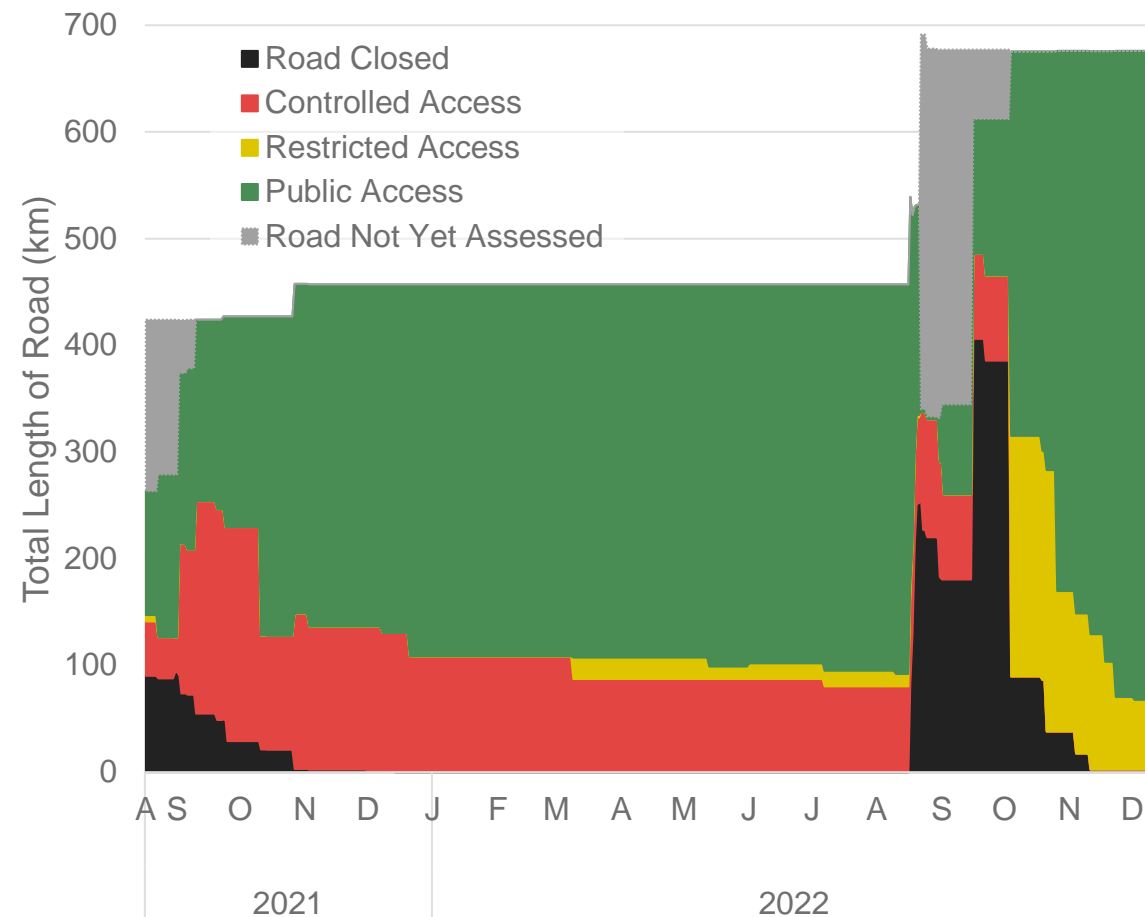
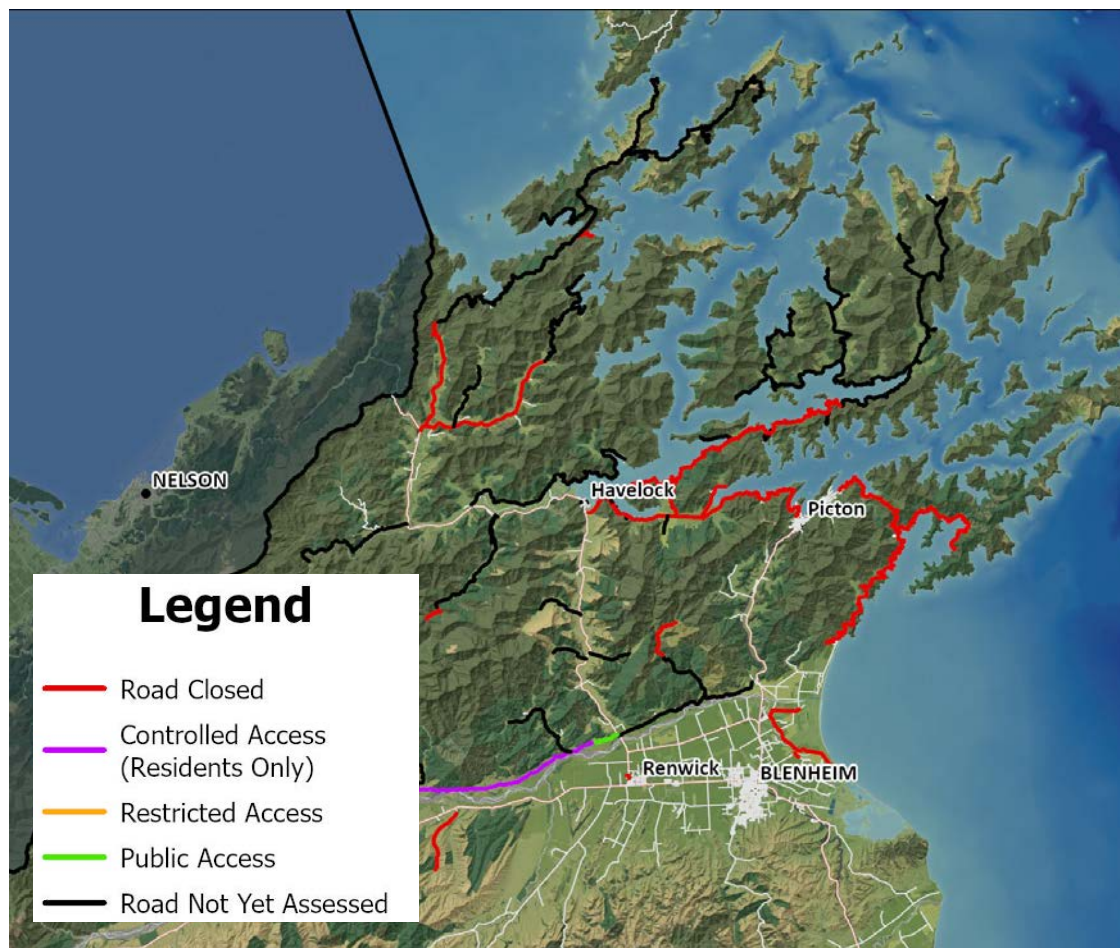


P1: Causes

- Storm frequency and intensity changes
- Vertical land movement
- Sea level rise
- Coastal erosion
- Slips and dropouts



P1: Effect and Consequence





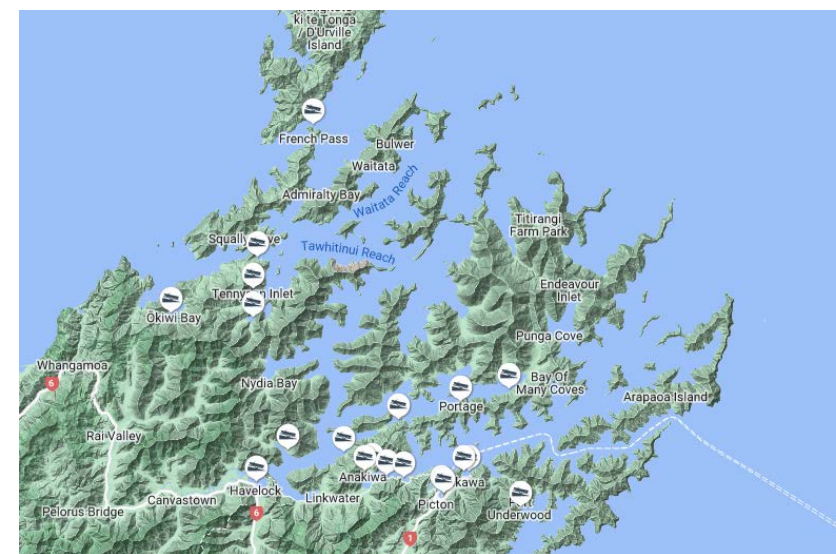
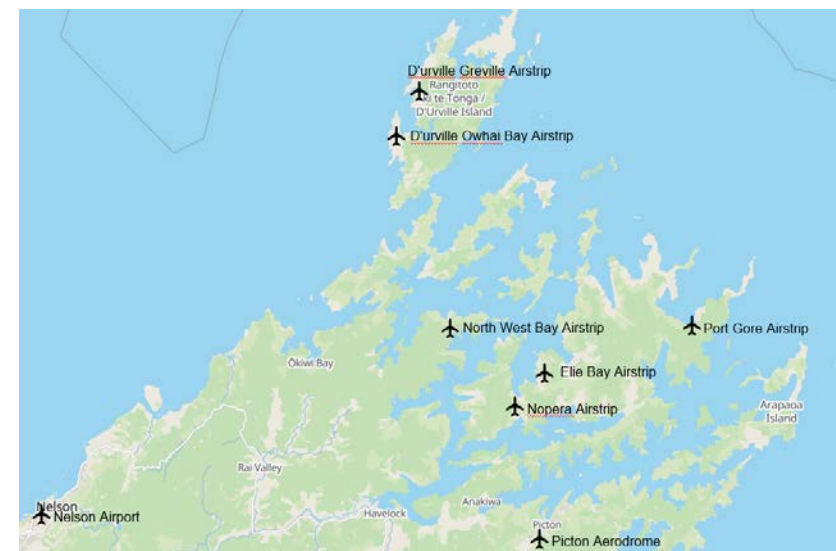
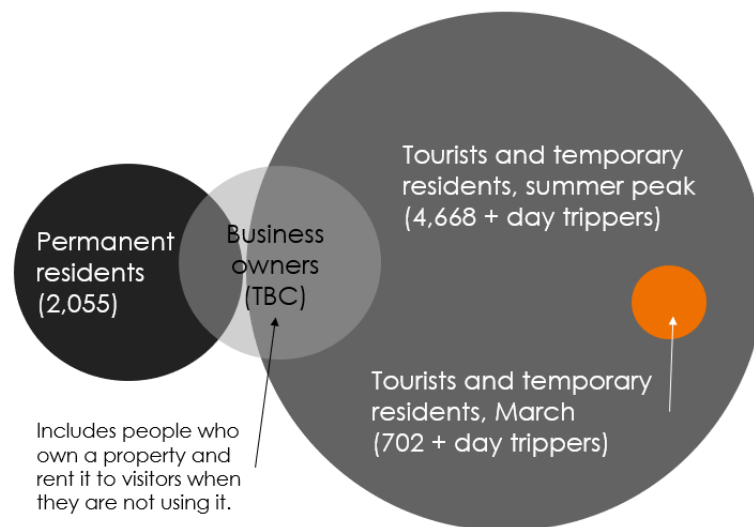
Problem 2: No Alternate Routes

Reliance on roads for access to services and lack of alternatives has led to increased vulnerability to the community during road closures.



P2: Cause

- Permanent and temporary residents live here
 - Generations of visiting/ownership
- Businesses are established here
 - Range of accommodation
- No alternative overland routes
- Air and water poorly developed

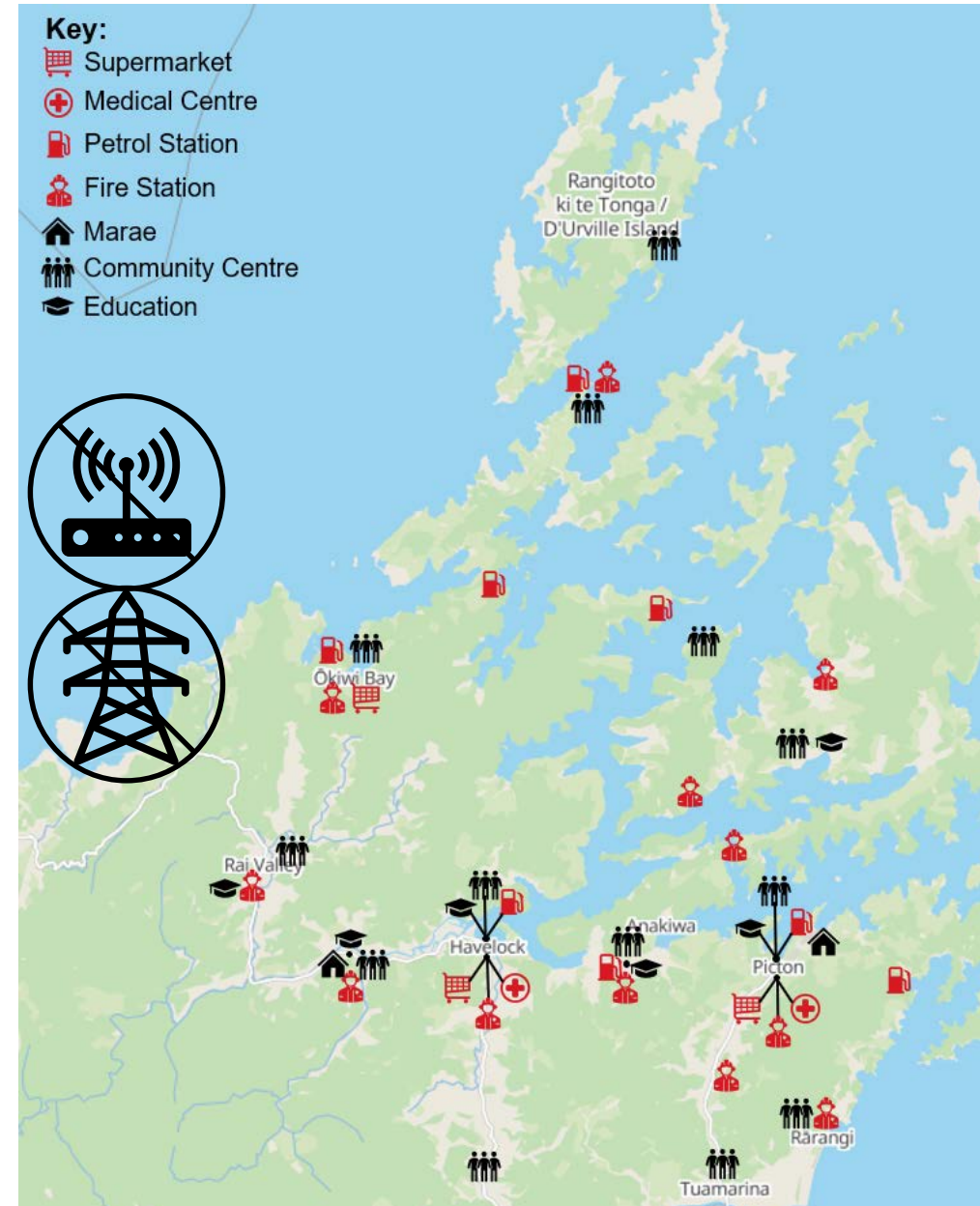


P2: Effect

Loss of access to services and markets

Loss of lifelines during events

- Interisland utilities
 - Main North South power cables (serviced by Port Underwood Road)
 - Fibre optic cables (buried in Port Underwood, Tumbledown)
- Kenepuru Road is main route for local power cables, and needed for servicing (services around 1,500 properties in Kenepuru Community)
- Emergency Services access affected when roads closed





P2: Consequence

Uncertainty:

- Every time it rains, people are very worried about what the impact might be,
- Significant social issue, the luxury of being impromptu has been take away .

Health Impacts

- “Feeling overwhelmed as often simple tasks pose a lot of logistical difficulties”

- “way more stressful as everything is difficult and complicated”
- 69% replied they are more concerned with their mental wellbeing since this weather event

Economic Impacts

- Current alternate modes higher cost
- Reduction in holiday rental occupancy

	French Pass	Pelorus	<u>Kenepuru</u>	Port Underwood	Total
Population	459	183	1,170	243	2,055
Under 15 years	57	39	102	21	219
15 – 64 years	258	111	648	141	1,158
65 years and older	144	108	420	81	678
Median Age (years)	53.2	47.4	58.1	56.8	57.6
Median Personal Income	\$22,900	\$34,200	\$26,300	\$33,400	\$26,700
Dwellings (2013 data)	849	102	1,917	501	3,369
Occupied	252	69	642	150	1,113
Empty	564	30	1,212	333	2,139
Percentage empty	66%	29%	63%	66%	63%



Problem 3: Asset Vulnerability

Poor construction standard and unstable geology means the Marlborough Sounds roads have a high maintenance cost and safety risk



Bill Partridge drives
Gillbert Wells' bulldozer



Croisilles-French Pass Road



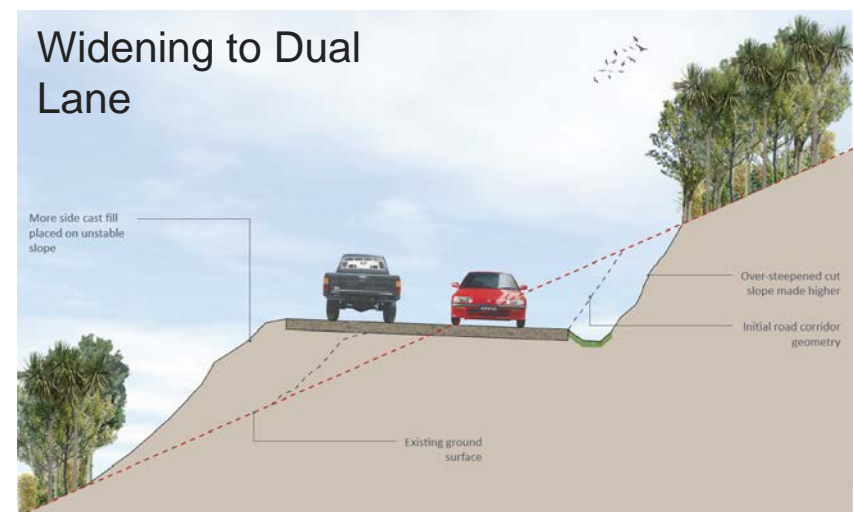
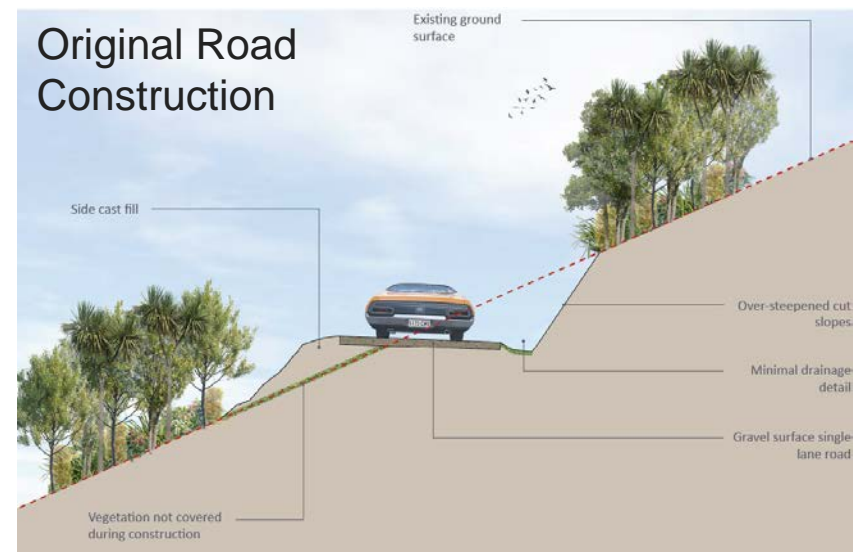
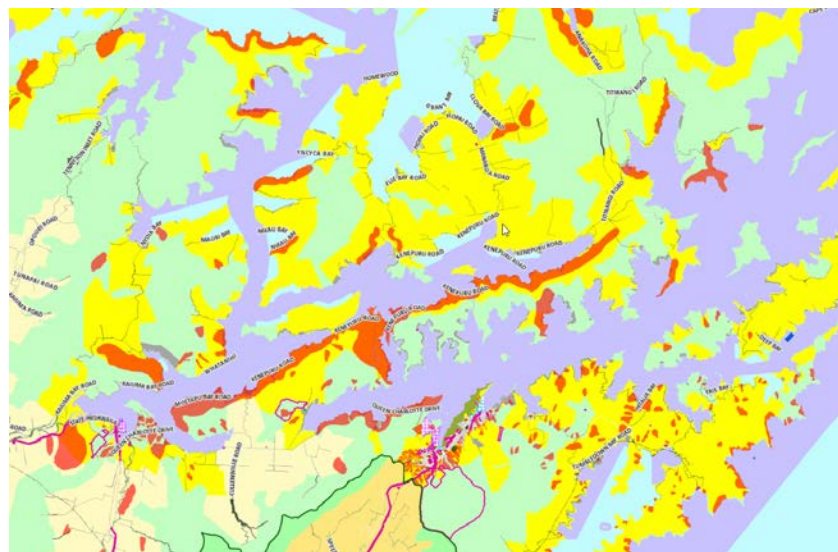
Safety risk



P3: Cause

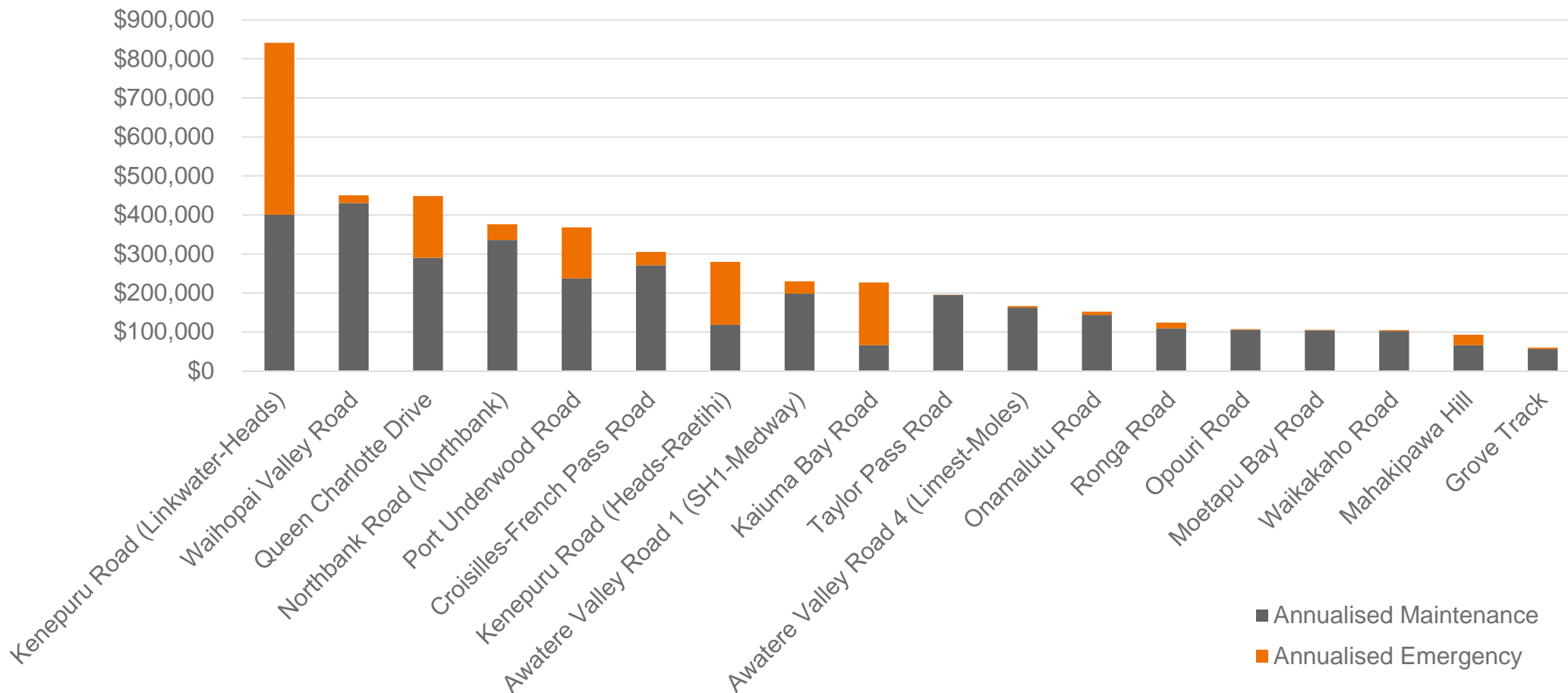
Geology/ Land stability

Construction standard





P3: Consequences (spending)



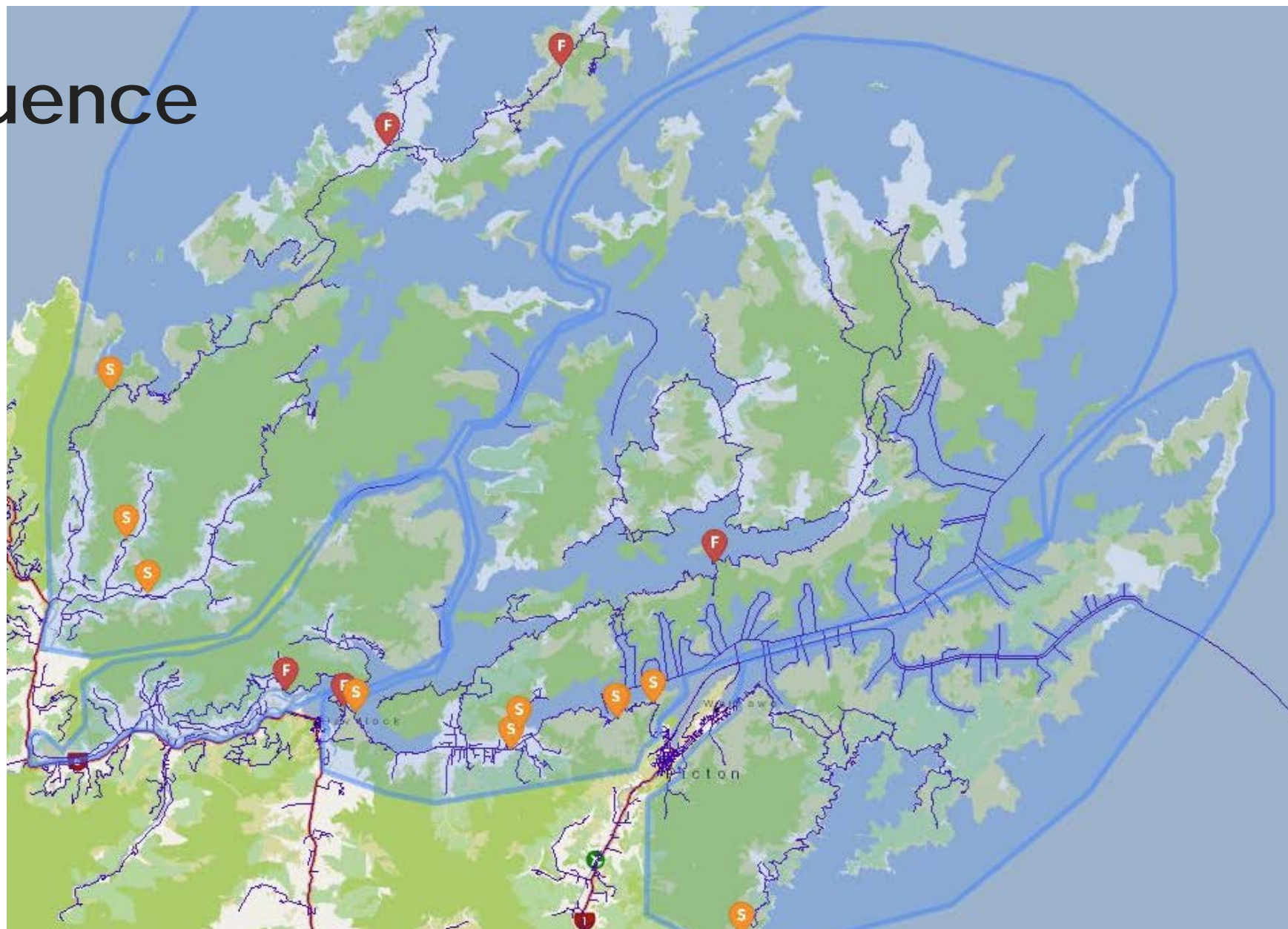
P3: Consequence (Safety)

Causes:

66% loss of control off road

5 years:

- 5 fatal crashes
- 10 serious injury crashes
- 21 minor injury crashes
- 57 non-injury crashes

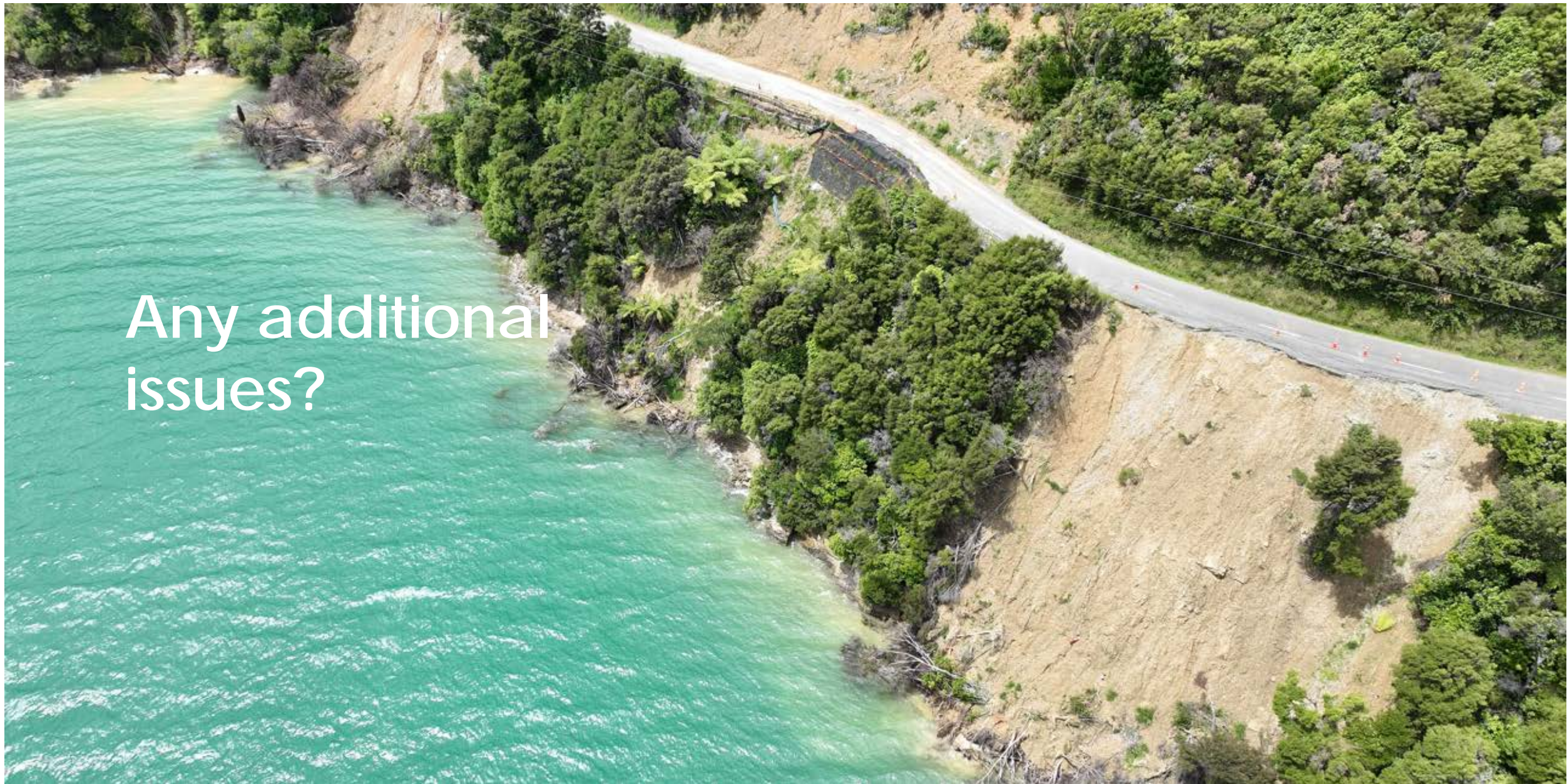


An aerial photograph showing a coastal road. The road is paved and curves along a steep, eroded hillside. The hillside is covered in dense green vegetation, but a large section of the road has been blocked by a landslide of brown earth and debris. The water in the bay is a vibrant turquoise color. The text 'Health Break Be back in 10 minutes' is overlaid in white on the left side of the image.

Health Break
Be back in 10 minutes



Any additional
issues?



Additional Issues and Evidence

- Are there additional issues you want to raise?
- Are there area specific issues we have missed?
- Do you know of additional information we can use to support the business case?

There will be 15 minutes at the end to visit other tables and contribute.

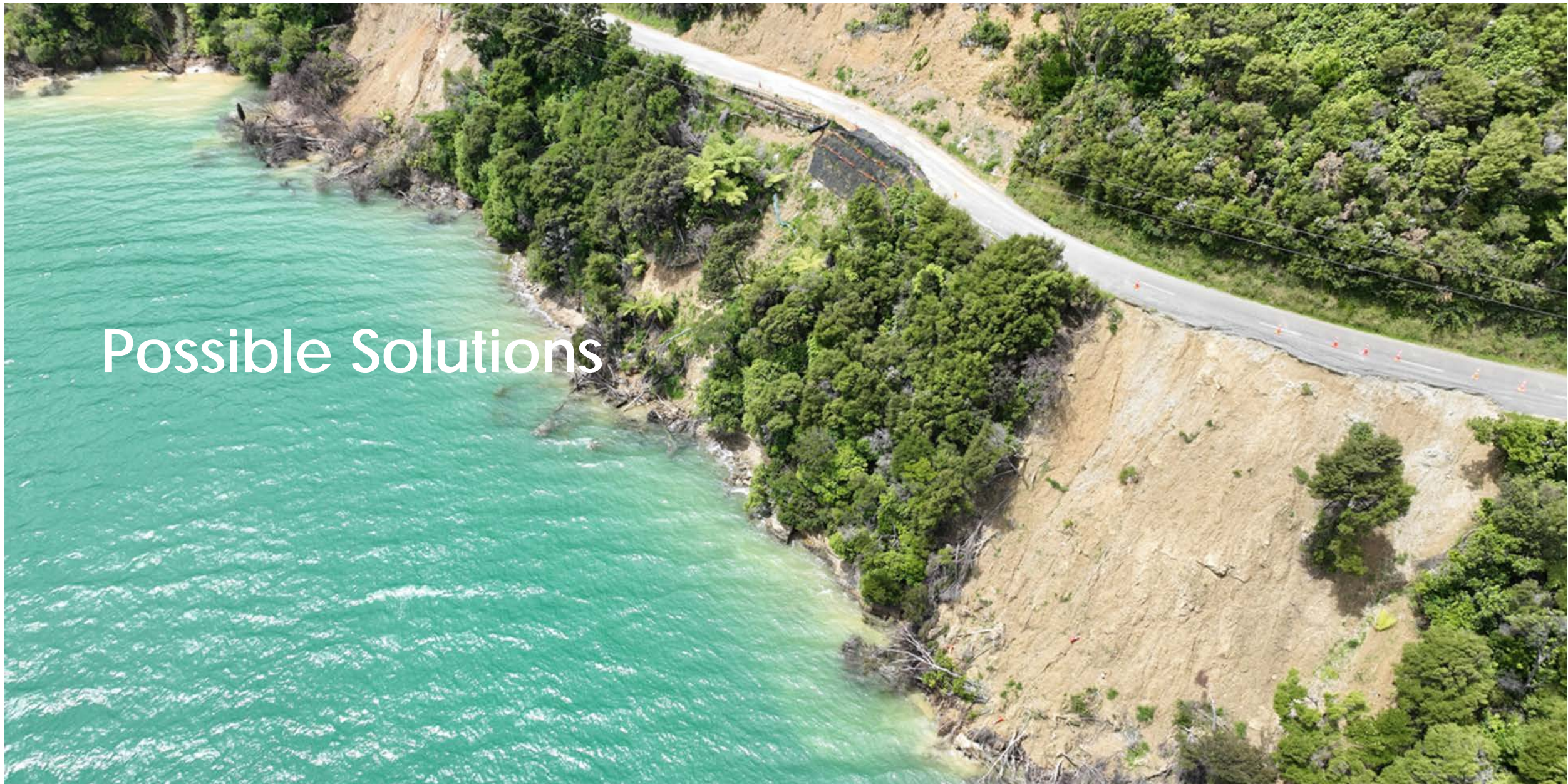


An aerial photograph showing a coastal road. The road is paved and curves along a steep, eroded hillside. The hillside is covered in dense green forest, but a large section of the road is blocked by a landslide of brown earth and debris. The water in the bay is a vibrant turquoise color. The text 'Health Break Be back in 10 minutes' is overlaid in white on the left side of the image.

Health Break
Be back in 10 minutes

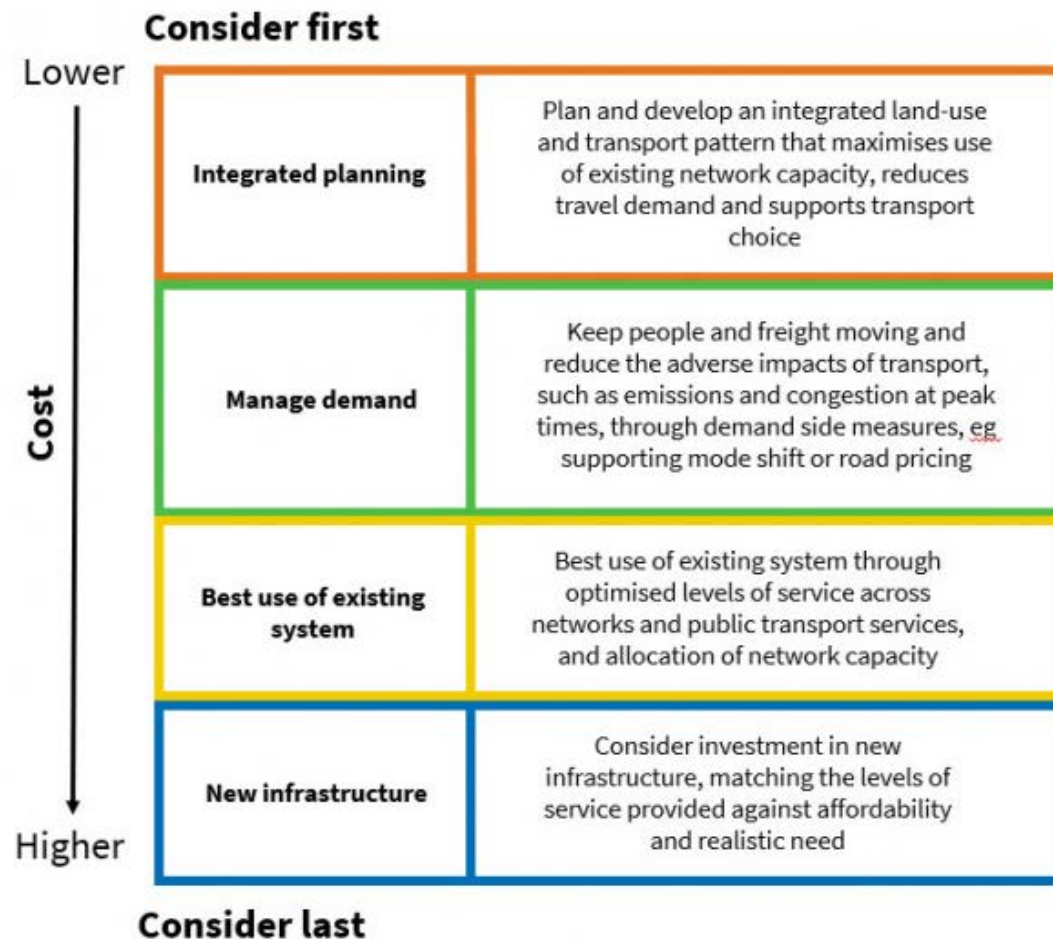


Possible Solutions

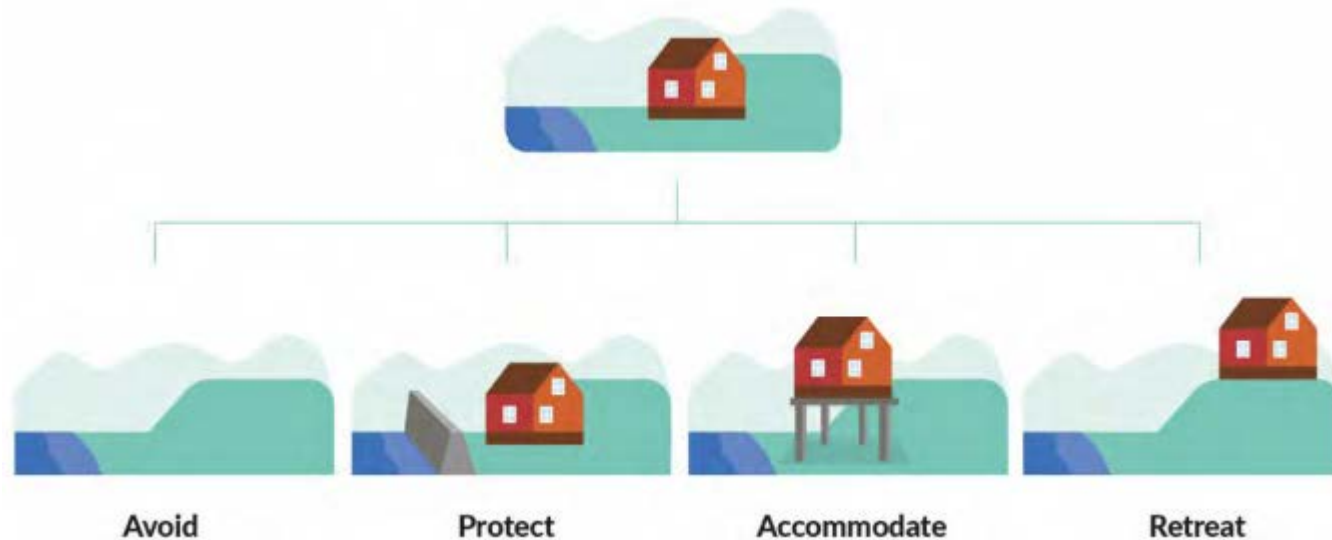




Things to consider: Waka Kotahi Investment Hierarchy



Things to consider: Adaptation Principles and Adaptation Options



Principles for adaptation action

1. Be proactive

Anticipate change and take practical steps to adapt.

2. Think long term

Take an intergenerational perspective that spans political, planning and financial cycles, to plan for a changing climate.

3. Maximise co-benefits

Choose adaptation actions that achieve complementary goals while avoiding maladaptation.

4. Promote equity

Prioritise helping the people, places and infrastructure that are most vulnerable to climate impacts, while building adaptive capacity for all.

5. Collaborate

Adapt in partnership with iwi, hapū, Māori and all New Zealanders – ara whakamua (the path forward).

6. Adjust as we go

Design actions and decisions to be revisited and adjusted as circumstances change.

7. Mainstream adaptation

Embed climate resilience as a core consideration in all decision-making.

8. Make well-informed decisions

Use the best available evidence, including science, data, local knowledge and mātauranga Māori.

9. Work with nature

Policies, planning and regulation should protect, enhance and restore nature, and any impacts on nature should be mitigated as much as possible.

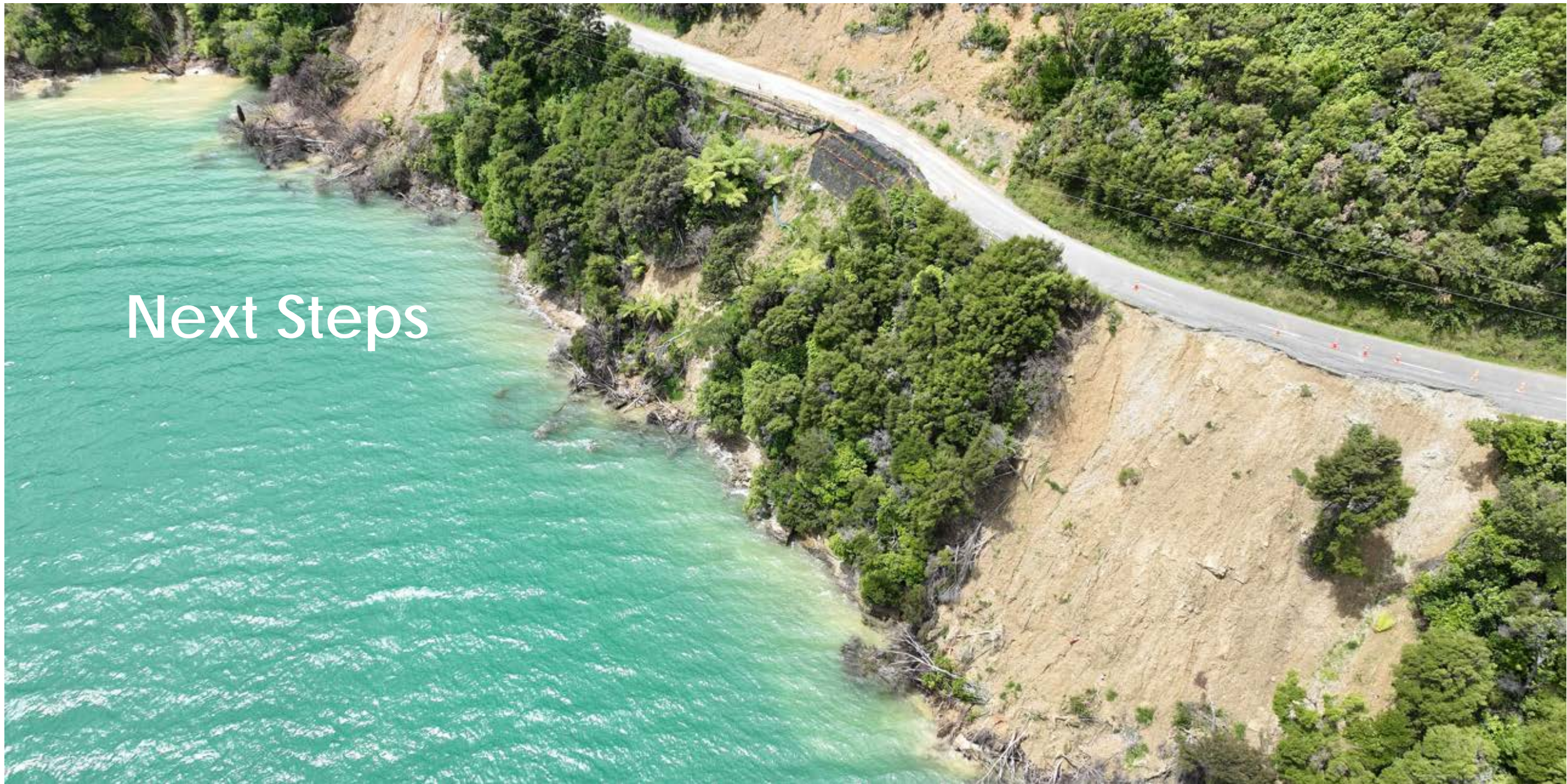
10. Adapt locally

Enable communities to prepare for the unique risks and opportunities they face, and tailor interventions to the local situation.





Next Steps





Key Milestones/ Next Steps

Milestone	Target Date
Consult with community	January 2023
Investigate options	February 2023
Consult with funders	March/ April 2023
Consult with community	May 2023
Identify preferred option and next steps	June 2023
Funding decision	TBC
Inform community of funding decision	TBC

How you can be involved

- Survey: Launched 31 January 2023
- Feedback forms
- Community engagement sessions (next week)
- Project website:
<https://www.marlborough.govt.nz/services/roads-and-transport/marlborough-sounds-future-access-study>
- Project email:
soundsfutureaccess@marlborough.govt.nz





Questions?



A close-up photograph of a person's hands weaving a basket. The hands are positioned in the center-right of the frame, with the left hand holding a green reed strip and the right hand weaving it into a complex, diamond-patterned structure. The background is a blurred view of the already woven portion of the basket, showing the intricate texture of the reeds. The lighting is soft and focused on the hands and the reeds, creating a sense of depth and detail. The overall color palette is dominated by the natural green of the reeds and the dark tones of the person's clothing.

Karakia
whakamutunga



Provide access for
the wellbeing of
Marlborough Sounds
communities

C.1.2 Workshop Minutes



Stakeholder Workshop minutes

Project/File: 310205564 – Marlborough Sounds Future Access

Date/Time: 24 January 2023 / 10:00am

Location: Havelock Town Hall

Attendees: **Marlborough District Council:** Barbara Faulis, Ben Minehan, Dean Heiford, Mark Wheeler, Nadine Taylor, Neil Henry, Raylene Innes, Steve Murrin,

Ngāti Kuia: Raymond Smith, Shannon Huntley

Waka Kotahi: Andrew Bawden, Andrew James

Emergency Services: Phil Black (Police), Steve Trigg (FENZ)

Ministry of Education: Jem Pupich, Trish Morgan

Community/ Residents Associations: Alistair Cameron (Kenepuru and Central Sounds (KCS)), Heather Mathers (KCS), Joe Roberts (Moetapu Bay), John Davison (Port Underwood), Linda Booth (Duncan Bay), Lynley Perkins (Pelorus), Trevor Offen (KCS), Richard Bake (Cissy Bay), Robbie Peat (Okiwi Bay),

Other Organisations: Anton Wilke (Destination Marlborough), Dan Quinn (Marlborough Lines), Dave Hayes (DoC), Eric Jorgensen (Ocean Bay Farms), Gareth Parkes (truck owner), Gavin Beattie (Port Marlborough), Geoff Shand (Chorus), Glenda Robb (Federated Farmers), Helen McLean (National Public Health), James Galloway (O'Donnel Park Barging), John Crisp (Transpower), Kim Waetherhead (Johnsons Barge Service Havelock), Linda Booth (Sounds Advisory Group), Steve Chandler (Forestry), Simon Langley (MPI), Steve McKeown (Port Marlborough), Lynley Offen (Pelorus Promotions Inc), Melinda Price (Rural Women NZ)

Stantec: Andrew Maughan, Avik Hader, Courtney McCrostie, Blake Brown

Absentees: Chris Hayles (FENZ), Nova Mercier (MPI), Trevor Hook (Te Mahia Bay Resort)

Distribution: Workshop Attendees

Attachments: 1. ILM Scope Questions
2. Issues Notes
3. Possible Solutions Notes
4. Workshop Slides

Item
<p>Welcome and Overview</p> <ul style="list-style-type: none"> • Introductions • Scope outline <ul style="list-style-type: none"> ○ Confirmed that all roads in each zone were being looked at, not just the ones mentioned on the slide • Key milestones • Business Case purpose • Workshop purpose

Item

Strategic Case Context

General agreement with evidence outlined in the transport, social, economic, cultural, and historic contexts.

Investment Logic Map (ILM)

Discussion around removing the word 'affordable' from the outcomes statement. For a full list of what was discussed please refer to the attached *Scope Questions* sheet.

Problem Evidence Summary

Problem 1: Disrupted Access

- General agreement with evidence presented

Problem 2: No Alternate Routes

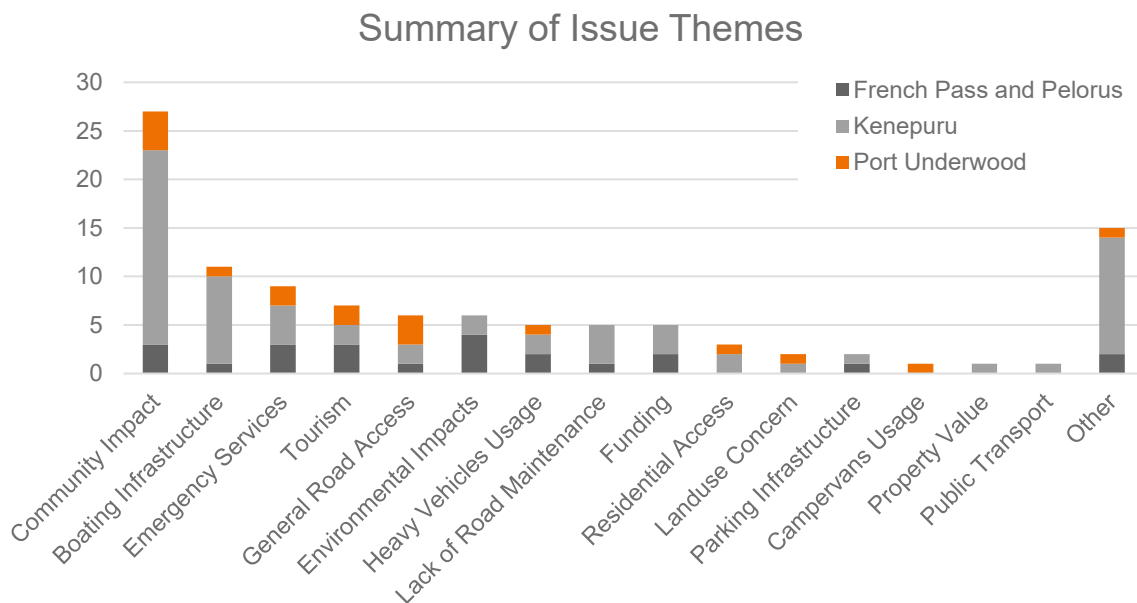
- General agreement with evidence presented
- Noted that the number of businesses mentioned was drastically undercounted

Problem 3: Asset Vulnerability

- General agreement with evidence presented
- Lack of drainage maintenance featured heavily in discussions
- Comment made that the slide 32 graph should be changed to show annual average spending per road km instead of average annual spending per road section.

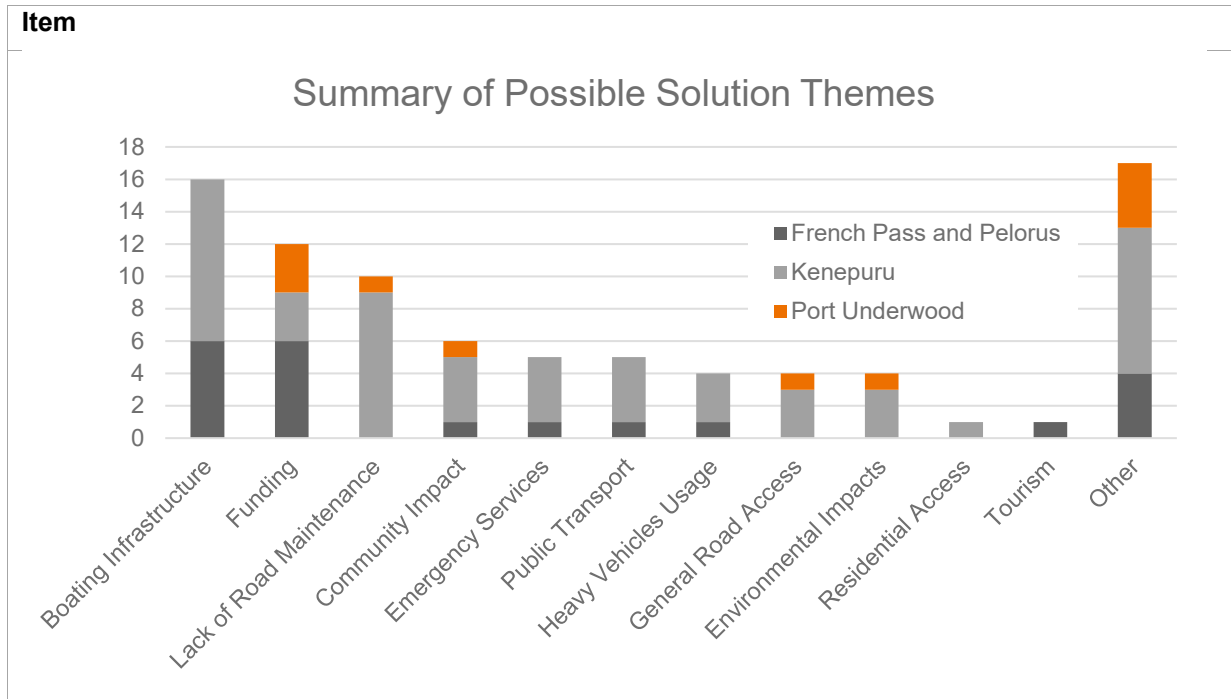
Issues Identification

The full list of identified issues are attached. A summary of the themes of the comments is shown below.



Possible Solutions

The full list of possible solutions are attached. A summary of the themes of the comments is below



The meeting adjourned at 1:00pm.

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Ngā mihi,

STANTEC NEW ZEALAND

Courtney McCrostie

Transportation Engineer

Phone: +64 4 381 5776

courtney.mccrostie@stantec.com

Attachment: Workshop Presentation, Scope Questions, Issues notes, Solutions notes

ATTACHMENT 1

1 Investment Logic Map

Original Outcome Statement: Provide affordable access for the wellbeing of Marlborough Sounds Communities, through a safe and resilient transport system

1.1 French Pass and Pelorus Table

- Affordability is an outcome.
- Does 'community' include visitors, non-resident owners – DoC estate, tourism.
 - The Sounds are nationally iconic
 - Communities of NZ
- Problem Three: Asset Vulnerability.
 - Lack of maintenance (drainage)
 - 80% issues on Ronga Road due to lack of drainage maintenance
 - Mowing and off cuts in drainage channels
 - Remoteness of the network
 - Quality of access: a lot of road is sealed – does it need to be?

1.2 Kenepuru Table

- Amend outcome statement – too much focus on affordability.
 - Practically viable vs affordable
 - Viability vs affordability
- Business Case Purpose.
 - Affordability → should this be in the same statement?
 - GDP benefit
 - Maintaining connectivity efficiency
- Some workshop participants voiced concern with the Outcome Statement/ ILM noting:
 - Should focus on transport efficacy
 - Should rank investment options primarily by how well they will serve the transport system

1.3 Port Underwood Table

- Nationally important infrastructure (power cables, telecommunication cables, microwave sites) missing from business case purpose.
- Disrupted access – access to opportunities. Nothing specific about education – add as a specific KPI

Other Discussion

1.4 French Pass and Pelorus Table

- Proj. Gov advisory.
 - Would MDC consider MPI?
 - How is MPI involved?
- Do we need to take a wider view?
 - Not just transport → enviro etc.
 - Long term (50, 100, 150 years from now)
- Look at alternative funding streams, not just Waka Kotahi?
- Need to focus on the impacts on people.
- Need clarity around roads included in the scope, presentation only mentions main road in – not any of the others.
- Areas of existing roads that aren't on legal roadways and are maintained by Council .
- Need a youth input for this process.

1.5 Kenenpuru Table

- Geographic areas: breakdown to more discrete / different communities.
- KPI Evidence:
 - Review of existing damage / stabilisation to curtail further interim damage
 - Need interim protection
- Info issues?
 - Kaikoura
 - \$30m

1.6 Port Underwood Table

- Adjacent catchment land use should be included – effects on neighbouring land use.

- Regulating environment has exacerbated storm damage to the roads. Leads on to more damage to public roads.
- Funding to provide immediate funding for repairs to reduce the future repair cost.
- Maintenance – needs to be realistic around future options. Upgrades to be future proof.
- Policies – take into account Marlborough Environmental Plan – anticipated environmental outcomes.
- Active travel – walking biking, safety, electric bikes.
- Protection of national assets, power fibre optics etc.
- Better communication systems for those working from home, health, education.
- Population is incorrect metric. Many road users not residents, such as forestry and aquaculture + many tourists / campers / boating.

ATTACHMENT 2

2 Issues/ Problems Notes

2.1 French Pass

- Tourism
- Impacts of logging trucks – poor original construction quality,
- Need to focus on the impact on people,
- Funding?

2.2 Pelorus

- Mental health of residents – ongoing care,
- Need to focus on the impact on people,
- Funding needs to be considered,
- Front wheel drive vehicles – towing boats + campervans damage the gravel road,
- Regular heavy vehicles using roads – forestry and aquaculture,
- Speed limit single lane access Opouri Saddle,
- Primary sector needs to be serviced by maintained roading network – should these sectors be levied?
- Ensure all roads are assessed in entirety,
- Speed limit single lane access Opouri Saddle,
- Less ability for police (emergency services) to attend – leads to loss of trust and confidence which leads to further issues,
- Back-up access points to main areas accessible by barge i.e. Okiwi – very shallow, additional all tide ramp here could be helpful
- If roads not reopening – is there consideration for non-public access (emergency services)
- Visitors / explorers: safety, business (tourism) viability / resilience,
- Culverts and Maintenance,
 - Opouri Saddle
 - Archers Road – Tennyson Inlet
 - Harvey Bay – Duncan Bay
- Kaiuma Bay Road at the top of Kaiuma Bay. Flooding rain events + high tides,

- Daltons Bridge (Kaiuma Bay Road end) wash out Dalton Bridge end vulnerability,
- Te Hoiere Road Flooding in weather event (between bridges),
- Alternative access issues in emergencies,
 - Eg: Okiwi Bay, Duncan Bay, French Pass, Kaiuma Bay
 - Suitable water access e.g. extend jetties in bay for all water areas/ tide levels
- Havelock Channel access: needs upgrading to ensure flood sediments are cleared allowing all tide access for commercial operations and safer boating access for locals,

2.3 Kenepuru

- Kenepuru
 - Roading access
 - tourism / hotels
 - Access → boat / road to Airbnb
 - Price point access issue
- Kids at school currently,
 - Linkwater = 63
 - Waitaria Bay = 29
- Truck
 - Empty on road (not loaded)
 - Out on barge (loaded)
 - Corners improved
 - Portage + Te Mahia
 - Road open for trucks for farmers
- Building community resilience with limited access,
- Maori landowners contact for feedback,
- 18 farmers using the Kenepuru Road. 30,000 stock units at a value of over 5 million. Problem of accommodating stock over night in Havelock from barge, and fertilisers difficulty in getting in.
- To invest or not? Long term security for businesses?
- We need a public, daily ferry service,
- Increase in rates if access by road is not returned,
- General Emergency Service access (Fire, Police, Ambulance, Electricity),
- More strategic barge sites, Fix Pudney's – make bigger, More jetties,

- Bulk fuel an issue, need for a bowser system for locals to buy fuel for household machinery, vehicles & boats
- Ewe costs 4 times the cost on barge compared with trucking them (comparing apples with oranges, potential to improve efficiencies by carting stock to barge site, lose stock on barge, and then trucks from Havelock onwards)
- the barge is not economic, not reliable and relies on one truck driver to reach the farms, and then return to the barge
- Baleage \$70 cartage on barge, usually \$30,
- Need more dry storage at Havelock to facilitate larger quantities of goods movement
- Evacuation of residents in isolated communities or limited access,
- Better info on value of business in Sounds,
- Use QCT as option,
- July 21 event – it's how this was managed by the programme director that was the problem. Which is now causing the issue the community faces,
- The Sounds are iconic – NZers expect to get there by road as cheaply as possible. Water transport is amazing but not available for everyone,
- Access to education: Waitaria Bay, Linkwater, Queen Charlotte Drive (Picton, Havelock) closed due to road issues,
- Havelock Channel – ensure its dredged and accessible,
- Tourism
 - Presently tourism providers loss of income
 - Wellbeing tourism for future
 - Tourism as employer
- Health access
 - Good communication systems needed
 - To get in for appointments
 - To get in for emergencies
- Looking to the future,
 - Environmentally
 - Charging stations
 - Think 50 / 100 years into the future
- Internet needs to be better,
 - Education
 - Health
 - Working from home

- Active travel/ biking/ walking.
 - Increasing
 - More environmental
 - Safety an issue
- Study objective should stop short of determining affordability & focus on transport efficacy: "Provide a safe, resilient transport system that maintains or enhances transport efficacy."
- Stakeholder costs.
 - Extra costs for farmers barging in goods (even with subsidy)!
 - Fuel, fert., stock
- They need the road to open to truck and trailer size. Impact of farms not being economic on barge – if they move out, schools goes, community goes. Some of these families have been there for generations.
- Resilience: We cannot predict the future conditions and unless you build a permanent structure from the Heads to Linkwater you cannot guarantee future proofing – quick fix is get going – when it fails fix it again – cost less, fast and gets people moving again!
- Locking people up and dictating when and how they can travel in and out of the Kenepuru while they repair the road. i.e., road closed from 7am – work doesn't start till 9am!
- Moetapu Bay Road.
 - School Children
 - School access
- Property maintenance: Septic tanks, Emergency services.
- Study needs to be based on costs that are based on actual spend, not estimated and need to be normalised for historical inefficiencies.
- Manner in which maintenance is undertaken, as well as lack of maintenance.
- Extra expenses for freight, goods, supplies, monitoring maintenance.
- The cost of getting in and out!
- Compounding effects of road closures affecting business viability, very stressful.
- Isolation
 - Mental health of residents and business owners
 - Isolation from friends, family, activities and events
 - "Alone in the world"
- The Sounds is for NZers, not just local community.
- Havelock – space at yards for stock.
- Freezing works - Ability to consistently get priority to bring stock out if road is not available.
- Maintaining adequate business connectivity.

- Visibility of Geotech finding and opportunities for peer reviews – timing.
- Mental Health & Wellbeing:
 - Of residents who have had x2 lots damage & told you pay for fixing & insurance pay you back (they may not have \$\$)
 - Insurance - will peeps be able to get this again?
 - Good support for recovery navigator (she can't always give answers)
 - People sunk \$\$ into retirement home, can they still get there etc?
 - Co-ordinate support for areas - remembering all areas of health - happy to support
 - Utilise primary health services - especially mental health & wellbeing via HIP (Health Improvement Practitioners)
 - Advocates to support people to get through bureaucracy
 - Good opportunity to encourage more care for our environments to decrease effects of weather events
- Water Taxi subsidies.
 - Still expensive
 - Tourism
 - Services
 - Groceries
 - Businesses
 - Residents
 - Peeps to holiday homes
- DoC costs on foreshore.
- Investment map KPI should have one for education. Example, school buses.
- Flexibility from people!
- Concern for farmers mental health and wellbeing.
 - The cost of living
 - Unexpected costs
 - Banks playing hard ball
 - Subsidies not enough
- Emergency resource access.
- Mental health of residents and flown on from limited access.
- Standard of the road was acceptable in the 60s 70s – currently the repairs are at our “known” acceptable standard. How do we know that things will not be different in future and the current future proofing will be any good or will we be looking back in 20 years laughing at what we considered an acceptable level of repair for future proof.

- Lack of water access infrastructure to provide alternative routes.
- Need to improve access to Havelock marina for commuting locals.
- Investigation needed into historical efficiencies of Kenepuru Road maintenance and construction.
- Coastguard out of Havelock to bolster access to Sounds.
- No roadman! No on call roadman ready to clear/ repair and gain access immediately. Need designated local central to all.
- It's how the repair work that is being carried out or the way it is being managed that is the problem.
- Cost of water access only will be more than road access. Not everyone has a boat or beach access.
- Landlocked properties – not access to beach or barge ramp without roads.
- \$30m recovery cost for Kenepuru Road grossly wrong. Actual works spend \$5m and only 4 sites to be completed.
- Communication
 - from residents and users
 - from businesses and farmers
- Responsibility needs to be taken for the way the recovery operation was run. The Kenepuru Ratepayers found it unbelievable.
- Independence. Not relying on water taxi/ punts. Difficulty of carting purchases and supplies in wet and windy conditions via wharf (twice). Weather dependent on water.
- Misconception that barge service wants road closed! We don't.
- Waitaria Bay Access – Barge ramp, staging/ storage area.
- Police - loss of trust & confidence of residents leads to less reported crime / less resolution which leads to further losses.
- Without road access very limited ability for police (emergency services) to provide adequate service support - lose trust & confidence of population.
- Moetapu Bay Road immediate works: Stabilisation of slips to prevent further damage over the coming winter.
- Williwars – rough sea, no access.
- Already at capacity in peak times: traffic, parking, trailer boats, barges, commercial.
- Capacity of existing marina/ port facilities to accommodate further volume.

2.4 Port Underwood

- Number of non-residents using the road (visitors, forestry).
- Environmental effects of the roading network (also think about this for solutions).

- Evacuation of residents in an emergency (if limited access, one way).
- Rarangi to Port Underwood and Tumbledown Bay Road. Access to power line tower for maintenance.
- Fighting Bay: HV power cable landing site, Assets of national significance.
- Road insufficient for heavy traffic such as log trucks with trailers. Also peak periods for tourism in summer – over 100 vehicles with caravans and trailers at Christmas in Robin Hood Bay.
- No alternate access on Port Underwood Road or Tumbledown Bay Road – no barge or water taxi service after the last storm event some residents trapped at home for 10 days.
- Access to gravel for road construction.
- Access to quarry rock for road construction.
- Road closures to allow forest companies to fell trees above and below road.
- Access to key infrastructure fibre cables for communications.
- Kahikatea: microwave site to North Island.
- Rahotia: Microwave site telecommunication site to North Island.
- If roads no re-opening is there consideration for non-public access (emergency services).
- Access to barge landing site in Picton for public – not through port operation .
- Separate cyclists from vulnerable roads if funds to ensure their safety is not available.
- Regulations need addressing to enable easier access to local metal sources.
- Build community resilience for limited access and isolation.
- Pines on the road verges are a significant problem. Most slips had a pine tree in them
- Most of the damage to the roads are caused by heavy vehicles and front-wheel drive cars, not by residents. Most residents use four-wheel drive cars.

ATTACHMENT 3

3 Possible Solutions Notes

3.1 French Pass

- Tourism: Take car on barge to end point then drive back in.
- Water taxi as public transport (needs to be affordable).
- Need to ensure all tide access to ports/ Havelock, Okiwi Bay etc.

3.2 Pelorus

- Govt funded Havelock Channel upgrades (ongoing and due to sedimentation).
- Hybrid transport options considered.
- Govt funded alternate public transport system on-water.
- Regular water taxi service – like Waiheke for residents, holiday makers, and tourists.
- Fuel depots, barge sites, community wharves, helicopter landing sites – emergency/ FENZ access.
- Access for emergency services, police GPS co-ordinates, fire, power.
- Transition forestry harvest to “skyline” harvest (see trial over Eatwell property + Bay in Pelorus) Darryn Newman operator.
- Government support to assist farmers to transition to barge (funding for loading yards) – Waitaria Bay is a worth while investment
- Bring back toll roads.
- Marlborough roading rate levy is a lot lower than its neighbouring councils – should this be looked at now?
- Raise maintenance bond for Resource Consents – retrospectively this should be looked at now!
- Govt funded assistance for floating jetties in Marlborough Sounds
- Dredging to maintain boat access as a backup.
- Alternate transport methods (barging? Storage of cars etc.)
- Cross subsidise tourism / locals.
- Reduction of size / height of vehicles allowed on certain roads?
- Targeted rates not practical.
- Mail boat run extension / support.
- Low carbon future options, sea rise protection.

3.3 Kenepuru

- Roadmen: bring back local road repair maintenance.
- Note, barging transport time from Fish Bay is the same / similar to driving time.
- Havelock Channel entrance dredging!
- Certain days for certain services e.g., stock trucks.
- Use local contractors: qualified local contractors located centrally.
- Don't have to be sealed road everywhere – just a safe, useable road.
- Local roadies used to provide regular, ongoing localised maintenance.
- Full mail boat service.
- Regular ferry/mail boat services to the Sounds public.
- Subsidise or make berths affordable.
- How/who get exemptions.
- One way option.
- High standard Wi-Fi.
- Extend existing community jetty for deeper, less tidal dependency.
- Narrow areas, provided they are geotechnically safe, could remain one lane and instal permanent signage.
- Repair the road but keep it simple, not like the '21 event. As of today the onsite organisation is sadly lacking.
- More strategic barge and jetty sites. Budget for ongoing maintenance.
- Regular maintenance done by local contractors.
- The way the road is fixed is not working *unless you build a man made structure from Heads to Linkwater you are not going to fix it. Go to quick-fix rail irons and boards and secure roads then keep them maintained.
- One off upgrade of all culverts and ditches and maintain road to level of service commensurate with base infrastructure .
- Focus on culverts and surface water control to 500 year flood standards.
- Immediate stabilisation of existing damage / slips to prevent more damage this winter.
- Transport cost benefit analysis for varying levels of reinstatement water vs road option combination.
- Be aware of tidal and weather limitations to all boating activities. Weather can be very variable and different in each are. Can be very dirty at times even close to Havelock.
- During works progress – extend the weight and length of vehicles currently able to travel K Road. 3.5 tonne and 8 metres too light and not enough.

- Dedicated ferry and barge site at Broughton Bay and maintain truck access to Broughton Bay – challenging due to shallow water at Broughton Bay
- More barge sites (Waitaria Bay), better access for farmers.
- Dedicated ferry based in Kenepuru for north side – south side community in event road closed and also for vehicles that cannot use the road due to restrictions.
- Installation of self-maintained micro generation.
- Remove power supply out to the Sounds from main arteries.
- Community resilience for power and emergency services.
- Community truck / livestock trailer to shift gear within Kenepuru.
- Council roads vs community roads.
 - Paid for by community that live there
 - Main road in by Council
- Havelock Facilities: Launching ramp, berths, parking.
- Improve services: Internal, Communication.
 - This could be a short term use for working from home and education while roads are out
- Fire services: actions to make community more resilient:
 - Community resilience plan in event of wildfire
 - Build community resilience, fire resistant etc
 - Ability to get people out
 - Support to and connection with community
- Outer sounds scheduled barge run for outer residents supporting road access.
- Waitaria Bay: Farming staging site / storage for livestock, farming supplies, etc.
- Emergency sites for evacuation.
- Additional barge ramps to support future roading.
- Waitaria Bay needs barge ramps and storage / access site.
- Barge subsidy based on access on roading ability of vehicle.
- Barge service / vehicle ferry for residents' transport / holiday visitors / tourists etc. Note, time taken driving is same to Fish Bay as if you took barge.
- Maintain and improve road, ultimately to fix to class one. Provide more facilities at Havelock including more room for livestock and fertilisers.
- Reinstate wharves and a barge ramp at Waitaria. Council funds a livestock truck to be based in Kenepuru to cart stock to barge.
- Power and phone cell tower site access.
 - What do they require?

- Any quirky sites?
- Coastguard / police vessel based in Havelock to be able to respond to emergencies / needs.
- Investigate more efficient maintenance systems and policies. E.g., portfolio of spoil sites, water carriage upgrade and regular policy of retreat for under slips etc.
- Improved water access infrastructure: Barge points, Jetties.
- Get road up to standard to carry empty truck and trollies unit, then come out on barge. Make it quicker and easier.
- Discuss targeted rate for certain roads.
- Guarantee of water taxi subsidies.
 - How long?
 - We need plan!

3.4 Port Underwood

- Culvert upsizing and maintenance.
- Ridgeline road under public works act.
- Spray young pine trees above road before they grow too big.
- Road closures to fell pine trees above Port underwood Road. Stop them falling onto road.
- User groups ongoing by road network to ID and implement opportunities and improvements.
- Back door barge site into Opuia for emergency access to power.
- Work with utility providers to design effective solutions.
- SLTF (Sustainable land transition fund) – review of land use.
- If roads are retired – forestry may help bach owners with barge point infrastructure investment.
- Publicly access water facilities to/from Picton.

C.2 Emerging Preferred Option Workshop (June 2023)

C.2.1 Presentation Slides





Marlborough Sounds Future Access Programme Business Case

Stakeholder Workshop, June 2023

Contents:

1. Background
2. Purpose of study
3. Engagement
4. Strategic context
5. Programme development
6. Preferred programme and adaptation plan
7. Strategic alignment
8. Multi-criteria analysis
9. Economic evaluation
10. Workshop exercise (and questions)
11. Hazard Adaptation Q&A
12. Next steps – and getting involved



Purpose

Brief stakeholders and take questions on the emerging preferred option and adaptation approach

Identify stakeholder preferences

Highlight other ways stakeholders can get involved



1. Background

Four Storm Events Over 13 months

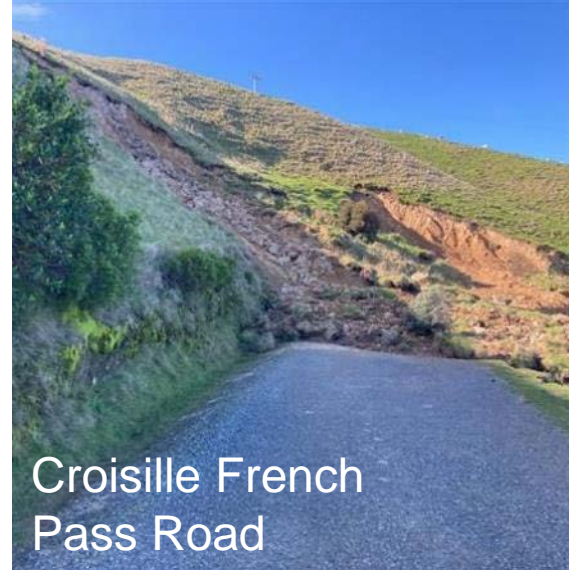
- July 2021, and February, July and August 2022
- 5,420 faults recorded
- \$85m funding received for July 2021 event (Phase 1)
- Road LoS prior to events: narrow one or two lane, rural, sealed and unsealed, low safety LoS

August 2022 event

- Over 3,000 faults recorded
- Wider spread of damage than experienced previously
- Communities cut off; stress and uncertainty; transport a problem
- Concerns expressed about the economic and social sustainability of the Sounds
- \$53m funding application (Phase 2) being considered by Waka Kotahi to complete repair works outside of the Sounds and essential repairs only within the Sounds

Today

- This PBC will identify a sustainable long-term solution for safe and resilient transport access to the Sounds
- Phase 1 and 2 funding will address 3,640 of identified faults (1,780 faults outstanding pending outcome of this PBC)



Croisille French
Pass Road



Port Underwood



Queen Charlotte Drive



Pelorus



5km out of Okiwi Bay



2. Purpose of Study

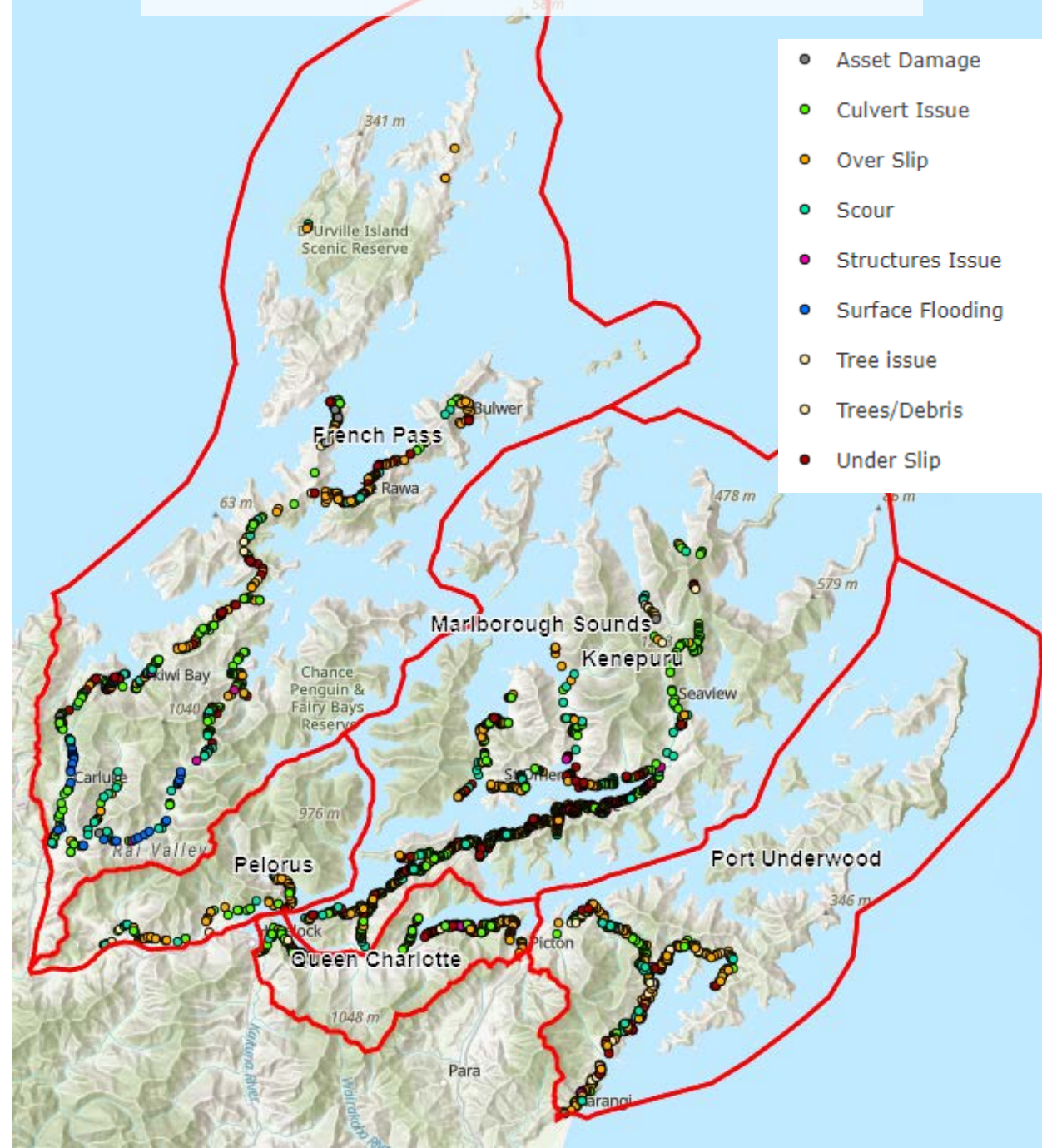
Why are we doing this study?

- Determine level of service for immediate recovery taking into account future adaptation
- Provide certainty about future access to the Marlborough Sounds
- Identify range of approaches, and recommend the most cost effective access solution for the Marlborough Sounds
- Confirm the approach for approximately 1,800 faults on the roading network that are outstanding, pending completion of the business case

Identified Problems

1. **Disrupted Access:** The impacts of climate change are increasing the frequency and duration of disrupted access
2. **Lack of Alternatives:** Reliance on roads for access to services and lack of alternatives has led to increased vulnerability to the community during road closures
3. **Asset Vulnerability:** Poor construction standard and unstable geology means the Marlborough Sounds roads have a high maintenance cost and safety risk

Zone Boundaries and 2022 fault locations





3. Engagement summary

Completed

Scope Survey

- 125 responses

Community engagement sessions

- Seven sessions, over five days
- Well over 500 people attended
- Collated community supplied evidence and suggested interventions

Targeted stakeholder engagement

- 21 targeted stakeholders engaged with

Economics Survey

- 919 responses
- Results informed the economic case
- Supported the strategic case

How we used your feedback

- Fed into development of the options
- Provided part of the evidence for the strategic case
- Informed the multi-criteria analysis
- Informed the economic case

IT'S BEEN REALLY USEFUL - THANK YOU

On going/ Still to come

Iwi

- There is ongoing engagement with iwi

Stakeholders

- First workshop held late January
- Workshop on emerging preferred option [TODAY]

Emerging preferred option community drop in sessions

- Nine sessions in late June, across the Sounds
- Online session

Survey on emerging preferred option

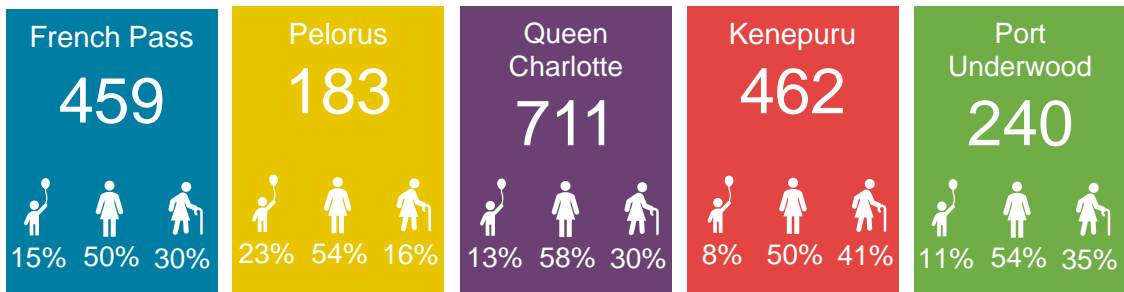
- Available from 20 June to 11 July (4 weeks)
- Will provide feedback and refine emerging preferred option





4. Strategic Context

Usually Resident Population (2018)



Business

Top 3 industries operating in the Sounds

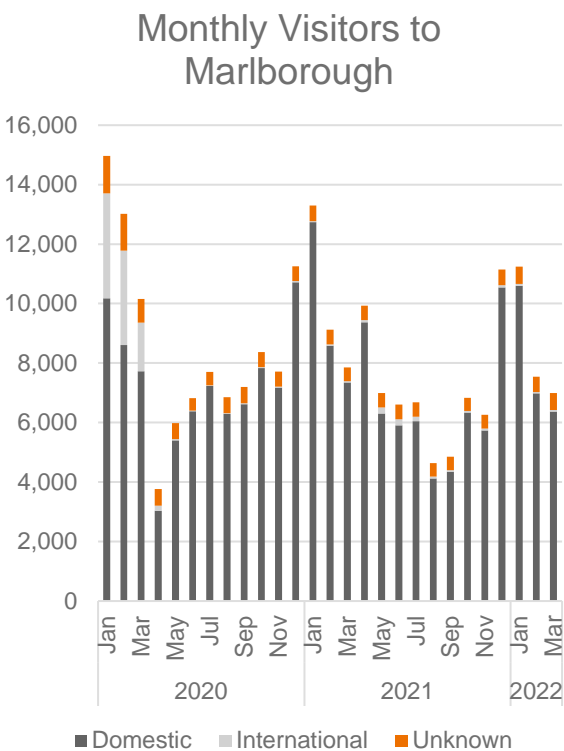
1. Agriculture, Forestry & Fishing: 31%
2. Accommodation and Food Services: 29%
3. Construction: 9%

Median personal income

87%

of national average

Visitor Population



Existing Transport Options

Zone	Total dwellings	No road access	Percentage no road access
FP	733	100	14%
P	111	56	50%
QC	562	0	0%
K	1,250	570	46%
PU	410	200	49%
Total	3,066	926	30%

Land
525 km road

- 49% sealed
- 51% unsealed

Water
2 ports
6 barge sites
17 boat ramps
32 public jetties

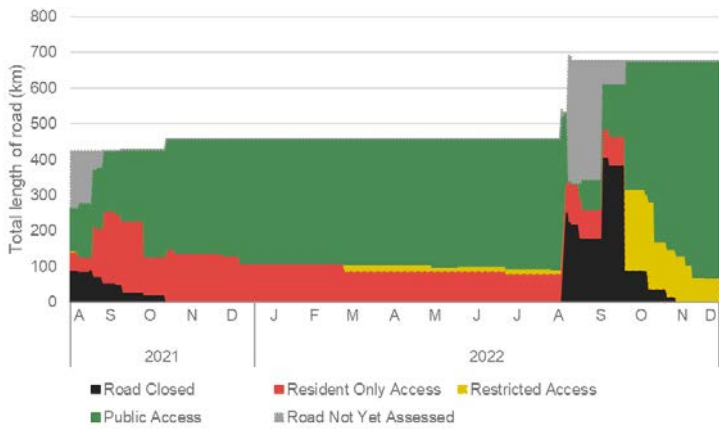
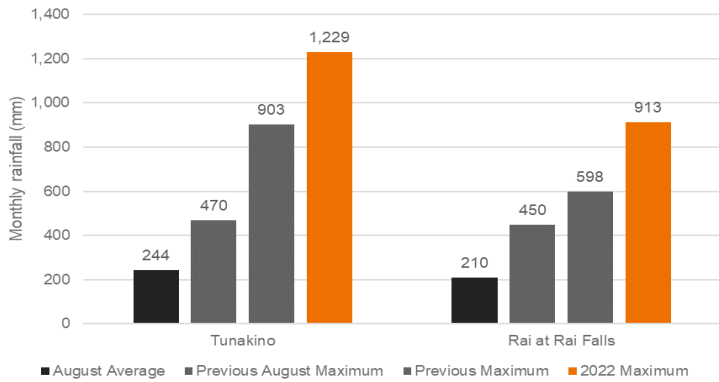
Travel to work	FP	P	QC	K	PU	Sounds	NZ
Work from home	45%	41%	32%	45%	33%	39%	12%
Drove	46%	47%	59%	36%	60%	50%	73%
Active Transport	9%	6%	8%	12%	5%	8%	7%
Other	0%	6%	1%	6%	2%	3%	8%



4. Strategic Context

SOUNDS FUTURE ACCESS PROGRAMME BUSINESS CASE

Problem 1: Disrupted Access



Max duration roads closed

French Pass:	64 days
Pelorus:	28 days
Queen Charlotte:	63 days
Kenepuru:	63 days
Port Underwood:	122 days

Problem 2: Lack of Alternatives

- 2,145 usually resident
- Up to ~4,000 visitors at peak
- At least 150 business

83%
of Sounds roads have no alternate route

Loss of access to:

Lifeline infrastructure

Community facilities

30%
in mental health following the storms

25%
in business confidence

Problem 3: Asset Vulnerability

13%
roads highly/very highly susceptible to natural slope instability

73%
roads highly/very highly susceptible to slope instability following man-made adaptations

Slips accounted for

63%
of total recorded faults



11
of the 18 most expensive rural roads are in the Sounds

Rural roads in the Sounds spend

10 x more on emergency works
than rest of Marlborough



5. Programme Option Development

Road Segment Approach			Capital Works		
Approach	Vehicle Restrictions	Lane Width	Surface Type	Stormwater	Geotech
Build back stronger (protect)	No additional restrictions	As existing	As existing	Whole route upgrades	Targeted: existing failures and improvements
Build back stronger (protect)	Additional restrictions	More one lane sections	More unsealed sections	Whole route upgrades	Targeted: existing failures and improvements
Targeted improvements (accommodate)	No additional restrictions	As existing	As existing	Targeted upgrades	Essential: address existing failures
Targeted improvements (accommodate)	Additional restrictions	More one lane sections	More unsealed sections	Targeted upgrades	Essential: address existing failures
Essential repairs (accommodate/retreat)	Additional restrictions	More one lane sections	More unsealed sections	Essential: address existing failures	Essential: address existing failures
Marine Access (retreat)	Additional restrictions	More one lane sections	More unsealed sections	Essential: address existing failures	None

Marine Infrastructure Indicative Concept	
Emergency Ramp	<ul style="list-style-type: none"> Made from well graded gravel Potentially lined with rock riprap on both sides Likely to be 20-30m from shoreline About 4m wide with sloped sides Fish Bay ramp as example
Local Hub	<ul style="list-style-type: none"> Jetty with floating component Likely to be 20-30m from shoreline Concrete launching ramp (~4m wide) Potentially some localised dredging Parking for approx. 6 cars Bus shelter type structure Lighting Approx. 6 moorings Bulwer Bay as example
Arterial Hub	<ul style="list-style-type: none"> Jetty with floating component Likely to be 20-30m from shoreline Concrete launching ramp (~4m wide), potentially on reclaimed land Likely some localised dredging Parking for > 12 cars Potentially small marina or > 12 moorings Tennis court sized area for freight laydown Terminal structure, including passenger waiting area, dry storage facility, toilets, etc (around size of community hall) Lighting Livestock yard within a certain distance if required Portage as example
Primary Hub	<ul style="list-style-type: none"> Significant marine hub infrastructure like Port of Nelson, Picton and Havelock

Interventions in every programme:

- Investigate options to minimise impact of tree felling by forestry companies
- Consider planning/consenting changes for earthworks
- Restrict construction in at risk areas (debris flow paths, slope instability, etc)
- Emergency Response Planning for marine facilities post hazard event
- Develop community recovery plans
- Understand extent and scale of risks by undertaking further studies.
- Plan and undertake a robust maintenance programme



6. Emerging Preferred Programme and Hazard Adaptation Plan

- Programme options have been developed consistent with the National Adaptation Plan and PARA framework
- The emerging preferred programme includes a mix of repairs, improved resilience to roads and improvements to water transport as alternatives
- Improved resilience includes targeted strengthening of some areas and improved stormwater
- The programme also trades off customer levels of service in different areas related to road surfacing, lane widths and types of vehicle accommodated into the future
- The adaptation plan provides a much lower level of service for roads but a higher level of service for marine infrastructure
- Funding from government will impact affordability of different options for the Community
- The business case will be sufficient for the WK Board to make a decision on funding repairs as soon as possible following its completion



	Road Focus	Road Access	Balanced	Marine Access	Marine Focus
Rai Valley to Te Aumiti / French Pass		●		▲	
Te Hoiere/Pelorus	●			▲	
Queen Charlotte	●			▲	
Kenepuru			●		▲
Te Whanganui/ Port Underwood		●		▲	

● Emerging preferred ▲ Adaptation plan



6. Adaptation Plan and Future Trigger Events

- Uncertainty when next event will occur, scale of event and extent of damage
- Trigger event may have an impact on the future recovery of an area, or the whole Sounds

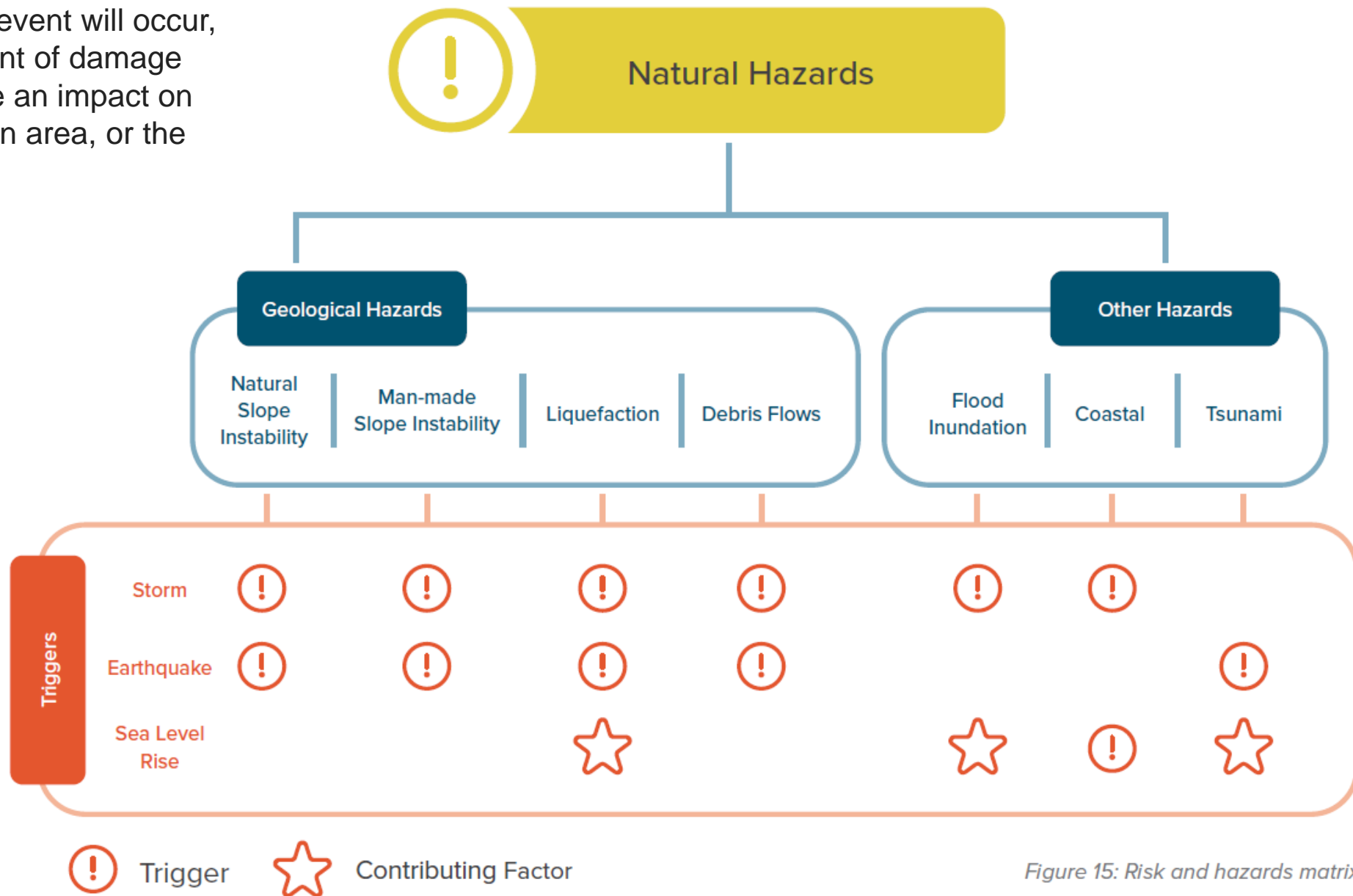
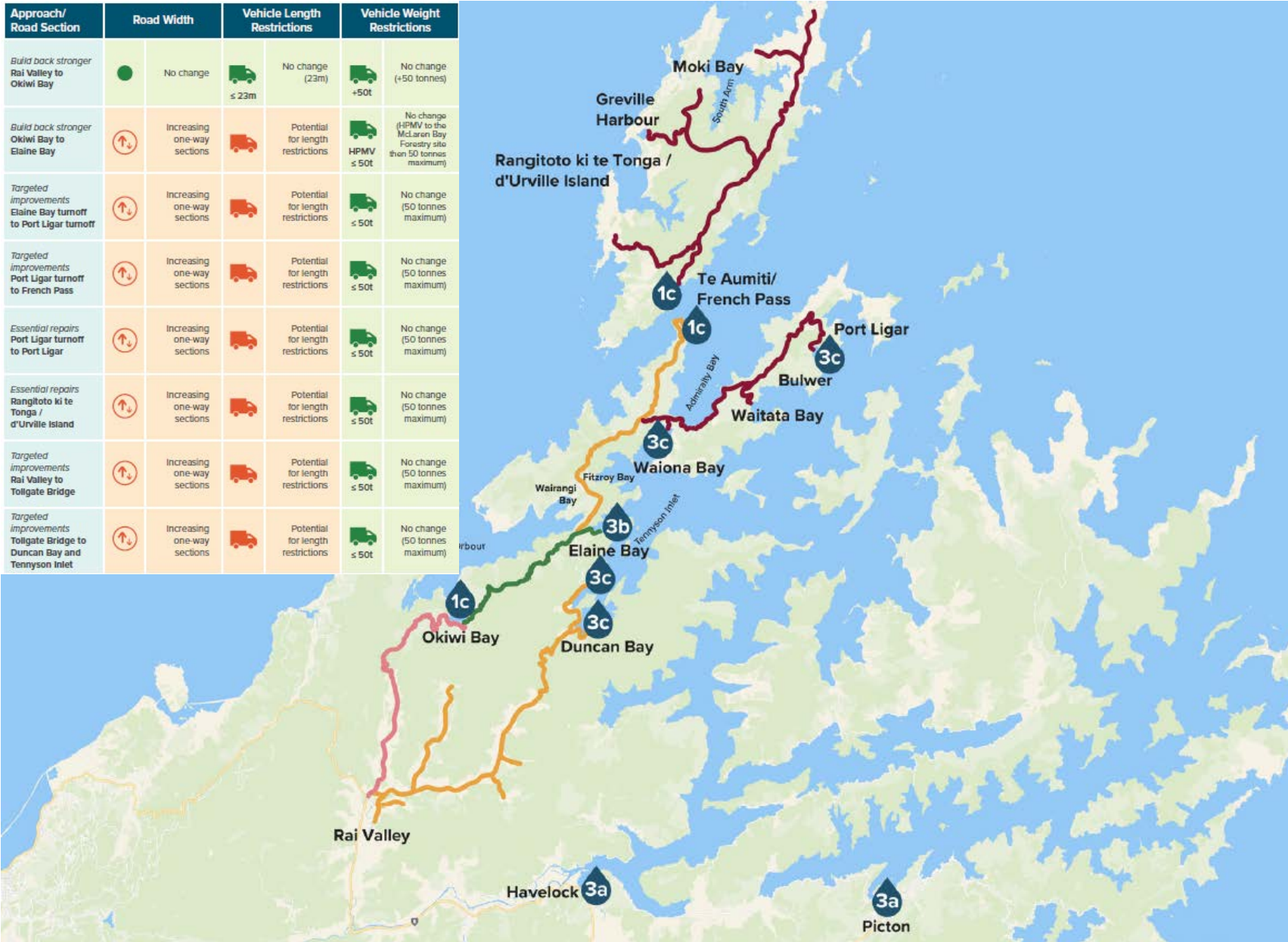


Figure 15: Risk and hazards matrix



6. French Pass Emerging Preferred: Road Access

SOUNDS FUTURE ACCESS PROGRAMME BUSINESS CASE



Approach/ Road Section	Road Width	Vehicle Length Restrictions	Vehicle Weight Restrictions
Build back stronger Rai Valley to Okiwi Bay	● No change	🚚 ≤ 23m	🚚 +50t No change (+50 tonnes)
Build back stronger Okiwi Bay to Elaine Bay	⬆️ Increasing one-way sections	🚚 Potential for length restrictions	🚚 HPMV ≤ 50t No change (HPMV to the McLaren Bay Forestry site than 50 tonnes maximum)
Targeted improvements Elaine Bay turnout to Port Ligar turnout	⬆️ Increasing one-way sections	🚚 Potential for length restrictions	🚚 ≤ 50t No change (50 tonnes maximum)
Targeted improvements Port Ligar turnout to French Pass	⬆️ Increasing one-way sections	🚚 Potential for length restrictions	🚚 ≤ 50t No change (50 tonnes maximum)
Essential repairs Port Ligar turnout to Port Ligar	⬆️ Increasing one-way sections	🚚 Potential for length restrictions	🚚 ≤ 50t No change (50 tonnes maximum)
Essential repairs Rangitoto ki te Tonga / d'Urville Island	⬆️ Increasing one-way sections	🚚 Potential for length restrictions	🚚 ≤ 50t No change (50 tonnes maximum)
Targeted improvements Rai Valley to Tollgate Bridge	⬆️ Increasing one-way sections	🚚 Potential for length restrictions	🚚 ≤ 50t No change (50 tonnes maximum)
Targeted improvements Tollgate Bridge to Duncan Bay and Tennyson Inlet	⬆️ Increasing one-way sections	🚚 Potential for length restrictions	🚚 ≤ 50t No change (50 tonnes maximum)

Roding Approach Key

- **Protect**
Build back stronger
(No additional restrictions)
- **Protect**
Build back stronger
(Additional restrictions)
- **Accomodate**
Build back with targeted improvements
(No additional restrictions)
- **Accomodate**
Build back with targeted improvements
(Additional restrictions)
- **Accomodate/retreat**
Build back with essential repairs only
- **Retreat others**
Build back roads that provide marine hub access

Marine key

- Maintain & protect existing marine hubs**
 - 1a Primary Marine Hub
 - 1b Arterial Marine Hub
 - 1c Local Marine Hub
 - 1d Emergency Ramp
- Protect & upgrade existing hubs (Passengers only)**
 - 2c Local Marine Hub
- Protect & upgrade existing hubs (All users)**
 - 3a Primary Marine Hub
 - 3b Arterial Marine Hub
 - 3c Local Marine Hub
 - 3d Emergency Ramp
- New infrastructure or upgrade of level (All users)**
 - 4a Primary Marine Hub
 - 4b Arterial Marine Hub
 - 4c Local Marine Hub
 - 4d Emergency Ramp



6. French Pass HAP: Marine Access

SOUNDS FUTURE ACCESS PROGRAMME BUSINESS CASE

Approach/ Road Section	Road Width	Vehicle Length Restrictions	Vehicle Weight Restrictions
Build back stronger Rai Valley to Okiwi Bay	● No change	🚚 ≤ 23m	🚚 No change (23m) 🚚 +50t
Build back stronger Okiwi Bay to Elaine Bay	⬆️⬆️ Increasing one-way sections	🚚 ≤ 23m	🚚 No change (23m) 🚚 HPMV ≤ 50t
Targeted improvements Elaine Bay turnoff to Port Ligar turnoff	⬆️⬆️ Increasing one-way sections	🚚 Potential for length restrictions	🚚 No change (50 tonnes maximum) 🚚 ≤ 50t
Targeted improvements Port Ligar turnoff to Te Aumiti / French Pass	⬆️⬆️ Increasing one-way sections	🚚 Potential for length restrictions	🚚 No change (50 tonnes maximum) 🚚 ≤ 50t
Essential repairs Port Ligar turnoff to Port Ligar	⬆️⬆️ Increasing one-way sections	🚚 Potential for length restrictions	🚚 No change (50 tonnes maximum) 🚚 ≤ 50t
Essential repairs Rangitoto ki to Tonga / d'Urville Island	⬆️⬆️ Increasing one-way sections	🚚 Potential for length restrictions	🚚 No change (50 tonnes maximum) 🚚 ≤ 50t
Targeted improvements Rai Valley to Tollgate Bridge	⬆️⬆️ Increasing one-way sections	🚚 Potential for length restrictions	🚚 No change (50 tonnes maximum) 🚚 ≤ 50t
Targeted improvements Tollgate Bridge to Duncan Bay and Tennyson Inlet	⬆️⬆️ Increasing one-way sections	🚚 Potential for length restrictions	🚚 No change (50 tonnes maximum) 🚚 ≤ 50t



Roading Approach Key

- **Protect**
Build back stronger
(No additional restrictions)

- **Protect**
Build back stronger
(Additional restrictions)

- **Accomodate**
Build back with targeted
improvements
(No additional restrictions)

- **Accomodate**
Build back with targeted
improvements
(Additional restrictions)

- **Accomodate/retreat**
Build back with
essential repairs only

- **Retreat others**
Build back roads that provide
marine hub access

Marine key

- Maintain & protect existing marine hubs**
 - 1a Primary Marine Hub
 - 1b Arterial Marine Hub
 - 1c Local Marine Hub
 - 1d Emergency Ramp

- Protect & upgrade existing hubs (Passengers only)**
 - 2c Local Marine Hub

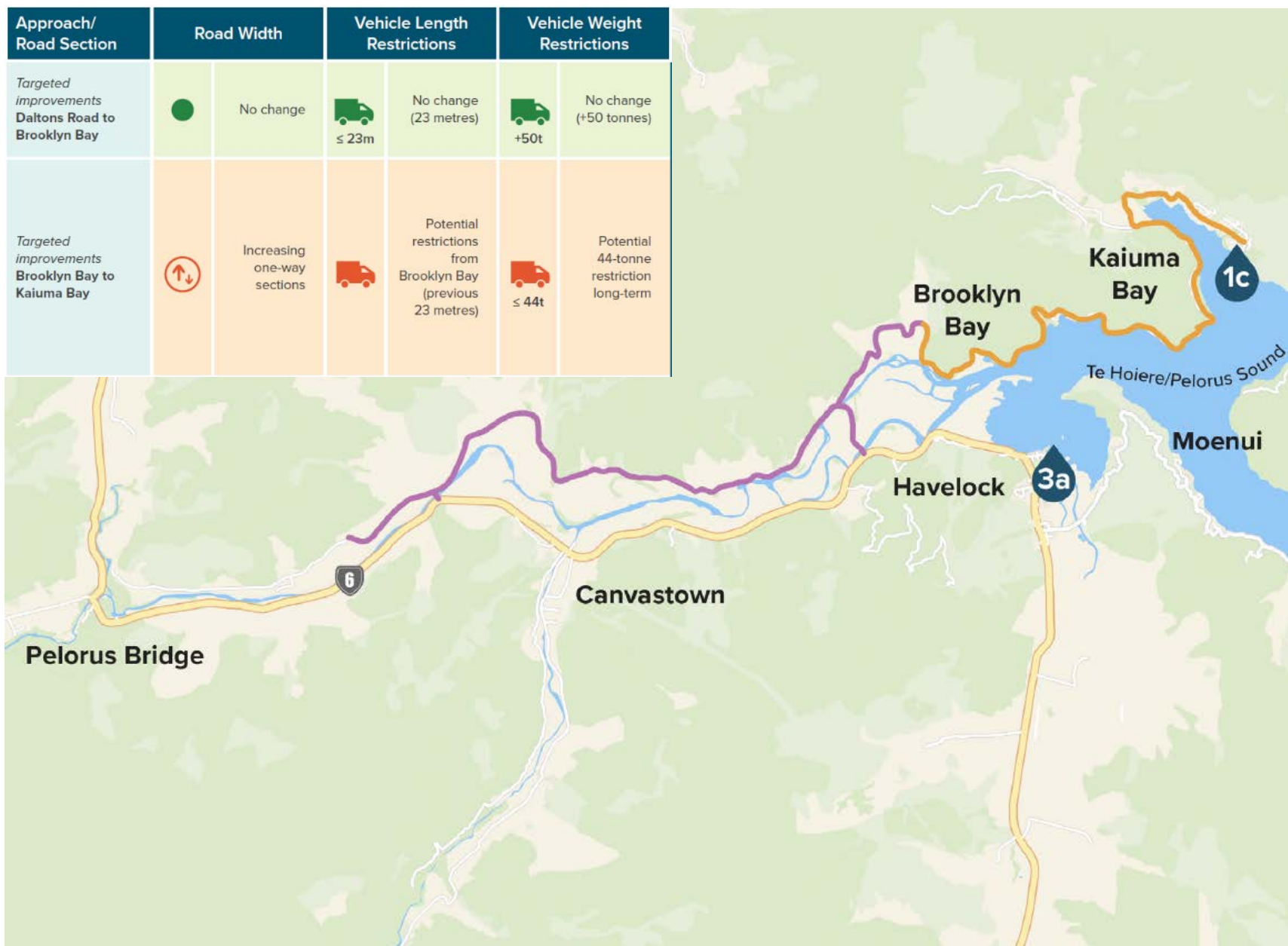
- Protect & upgrade existing hubs (All users)**
 - 3a Primary Marine Hub
 - 3b Arterial Marine Hub
 - 3c Local Marine Hub
 - 3d Emergency Ramp

- New infrastructure or upgrade of level (All users)**
 - 4a Primary Marine Hub
 - 4b Arterial Marine Hub
 - 4c Local Marine Hub
 - 4d Emergency Ramp



6. Pelorus Emerging Preferred: Road Focus

SOUNDS FUTURE ACCESS PROGRAMME BUSINESS CASE



Roading Approach Key

- Protect**
Build back stronger
(No additional restrictions)
- Protect**
Build back stronger
(Additional restrictions)
- Accommodate**
Build back with targeted improvements
(No additional restrictions)
- Accommodate**
Build back with targeted improvements
(Additional restrictions)
- Accommodate/retreat**
Build back with essential repairs only
- Retreat others**
Build back roads that provide marine hub access

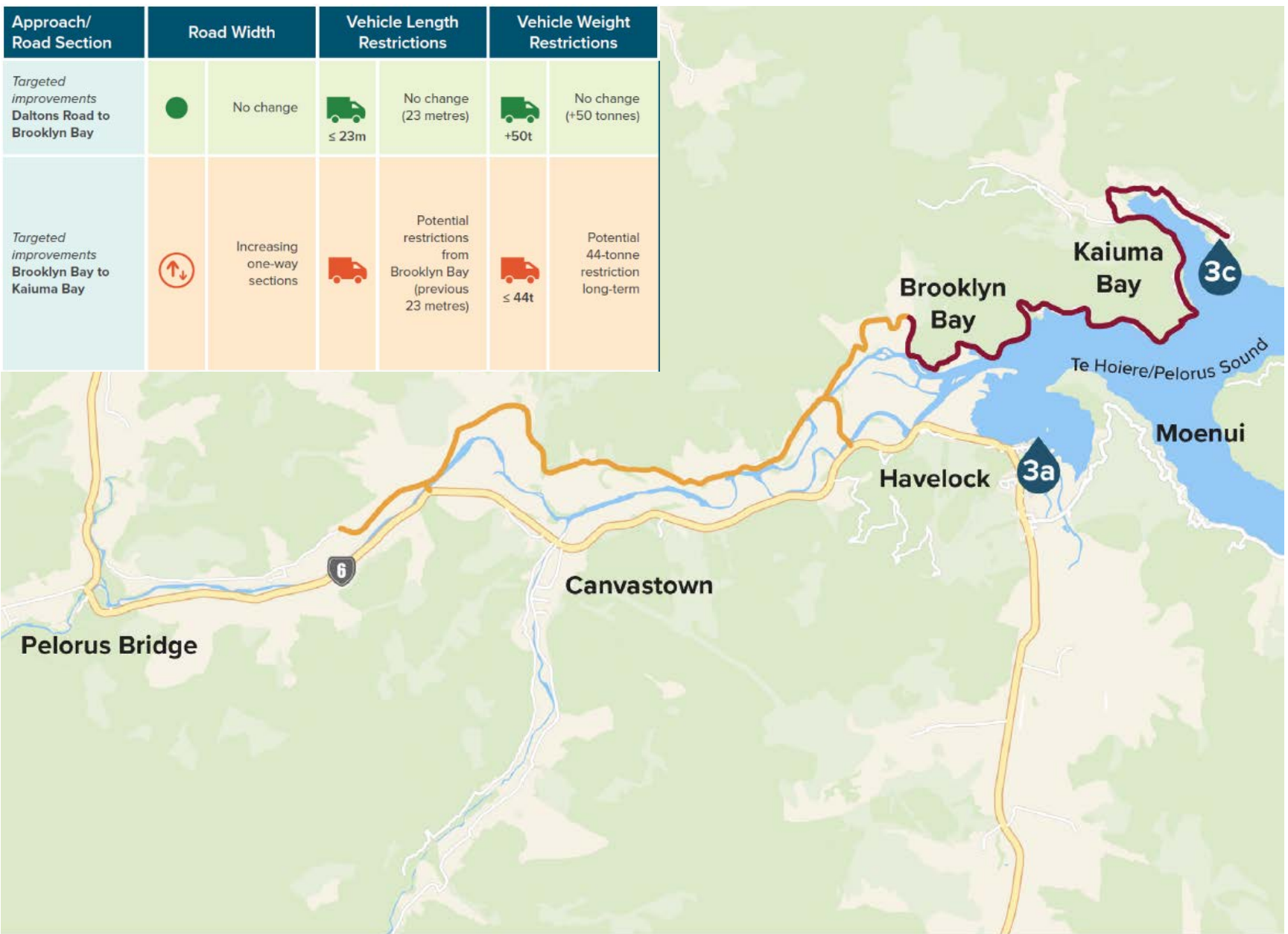
Marine key

- Maintain & protect existing marine hubs**
 - Primary Marine Hub
 - Arterial Marine Hub
 - Local Marine Hub
 - Emergency Ramp
- Protect & upgrade existing hubs (Passengers only)**
 - Local Marine Hub
- Protect & upgrade existing hubs (All users)**
 - Primary Marine Hub
 - Arterial Marine Hub
 - Local Marine Hub
 - Emergency Ramp
- New infrastructure or upgrade of level (All users)**
 - Primary Marine Hub
 - Arterial Marine Hub
 - Local Marine Hub
 - Emergency Ramp



6. Pelorus HAP: Balanced/ Marine Access

SOUNDS FUTURE ACCESS PROGRAMME BUSINESS CASE



Roading Approach Key

- Protect**
Build back stronger (No additional restrictions)
- Protect**
Build back stronger (Additional restrictions)
- Accommodate**
Build back with targeted improvements (No additional restrictions)
- Accommodate**
Build back with targeted improvements (Additional restrictions)
- Accommodate/retreat**
Build back with essential repairs only
- Retreat others**
Build back roads that provide marine hub access

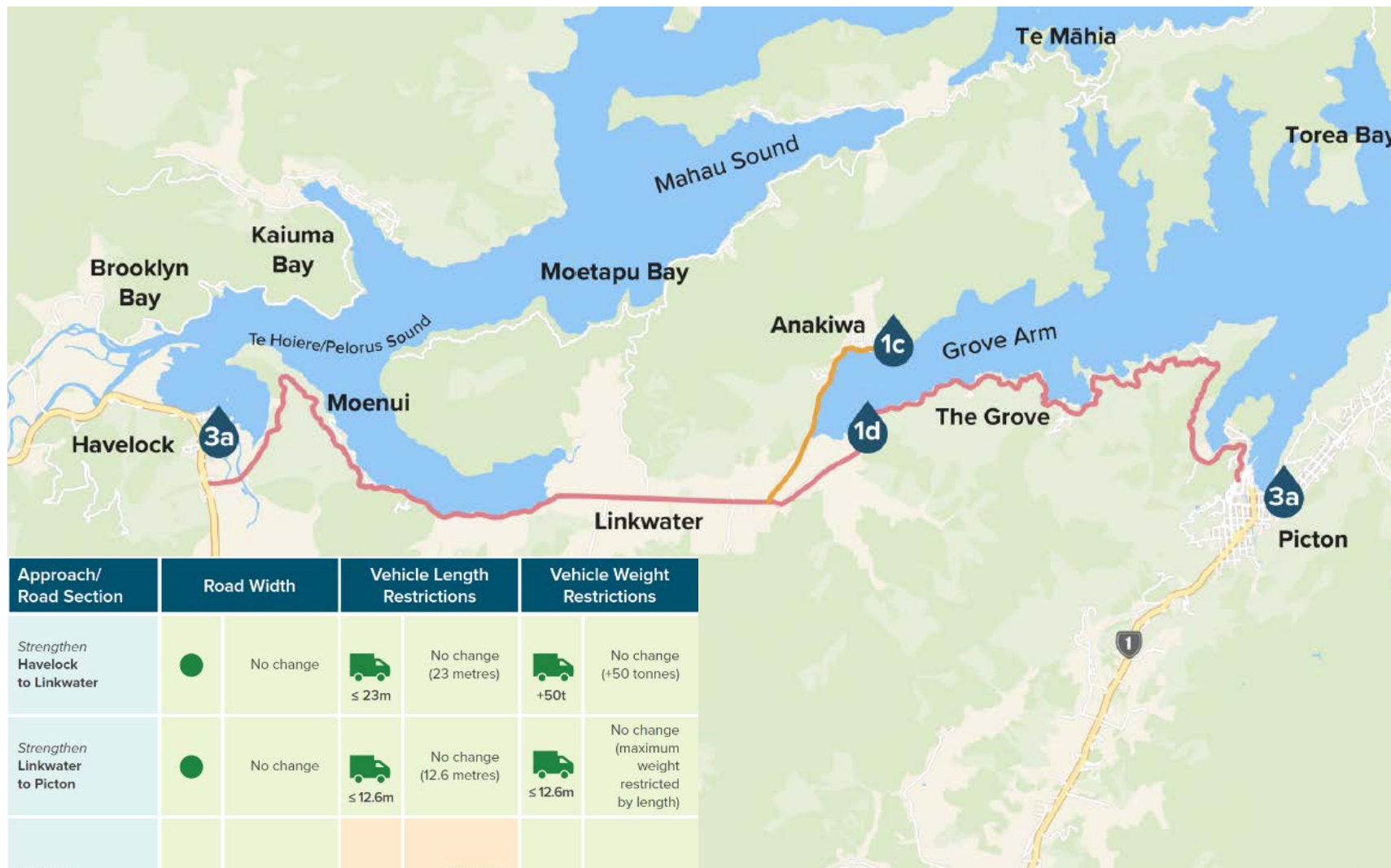
Marine key

- Maintain & protect existing marine hubs**
 - Primary Marine Hub
 - Arterial Marine Hub
 - Local Marine Hub
 - Emergency Ramp
- Protect & upgrade existing hubs (Passengers only)**
 - Local Marine Hub
- Protect & upgrade existing hubs (All users)**
 - Primary Marine Hub
 - Arterial Marine Hub
 - Local Marine Hub
 - Emergency Ramp
- New infrastructure or upgrade of level (All users)**
 - Primary Marine Hub
 - Arterial Marine Hub
 - Local Marine Hub
 - Emergency Ramp



6. Queen Charlotte Emerging Preferred: Road Focus

SOUNDS FUTURE ACCESS PROGRAMME BUSINESS CASE



Approach/ Road Section	Road Width		Vehicle Length Restrictions		Vehicle Weight Restrictions	
Strengthen Havelock to Linkwater	●	No change	≤ 23m	No change (23 metres)	+50t	No change (+50 tonnes)
Strengthen Linkwater to Picton	●	No change	≤ 12.6m	No change (12.6 metres)	≤ 12.6m	No change (maximum weight restricted by length)
Targeted improvements Anakiwa	●	No change		Potential for length restrictions	+50t	No change (+50 tonnes)

Roading Approach Key

- Protect**
Build back stronger
(No additional restrictions)
- Protect**
Build back stronger
(Additional restrictions)
- Accomodate**
Build back with targeted
improvements
(No additional restrictions)
- Accomodate**
Build back with targeted
improvements
(Additional restrictions)
- Accomodate/retreat**
Build back with
essential repairs only
- Retreat others**
Build back roads that provide
marine hub access

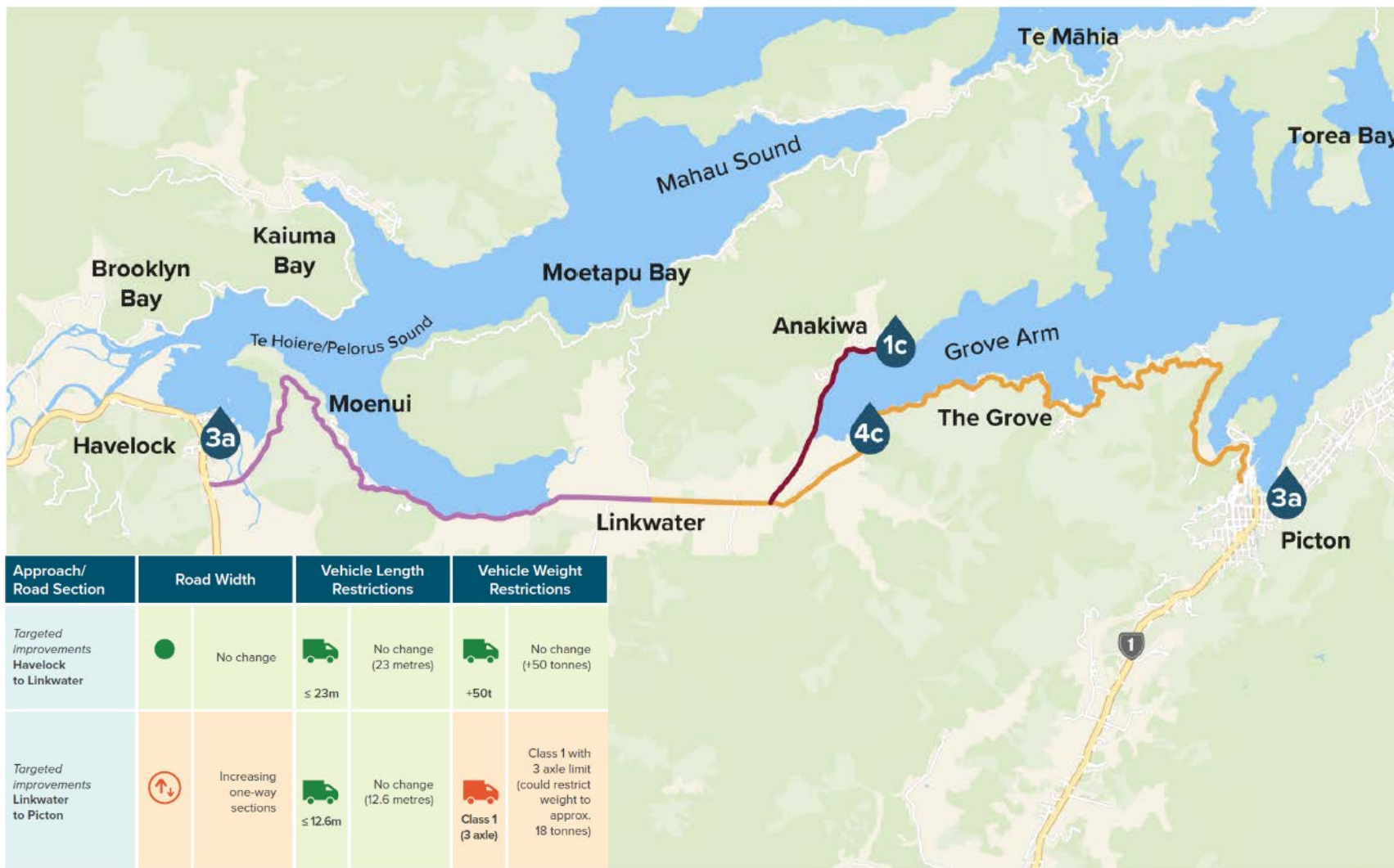
Marine key

- Maintain & protect existing marine hubs**
 - Primary Marine Hub
 - Arterial Marine Hub
 - Local Marine Hub
 - Emergency Ramp
- Protect & upgrade existing hubs (Passengers only)**
 - Local Marine Hub
- Protect & upgrade existing hubs (All users)**
 - Primary Marine Hub
 - Arterial Marine Hub
 - Local Marine Hub
 - Emergency Ramp
- New infrastructure or upgrade of level (All users)**
 - Primary Marine Hub
 - Arterial Marine Hub
 - Local Marine Hub
 - Emergency Ramp



6. Queen Charlotte HAP: Marine Access

SOUNDS FUTURE ACCESS PROGRAMME BUSINESS CASE



Approach/ Road Section	Road Width		Vehicle Length Restrictions		Vehicle Weight Restrictions	
Targeted improvements Havelock to Linkwater		No change	 ≤ 23m	No change (23 metres)	 +50t	No change (+50 tonnes)
Targeted improvements Linkwater to Picton		Increasing one-way sections	 ≤ 12.6m	No change (12.6 metres)	 Class 1 (3 axle)	Class 1 with 3 axle limit (could restrict weight to approx. 18 tonnes)
Essential repairs Anakiwa		Increasing one-way sections		Potential for length restrictions	 +50t	No change (+50 tonnes)

Roading Approach Key

- Protect**
Build back stronger
(No additional restrictions)
- Protect**
Build back stronger
(Additional restrictions)
- Accomodate**
Build back with targeted
improvements
(No additional restrictions)
- Accomodate**
Build back with targeted
improvements
(Additional restrictions)
- Accomodate/retreat**
Build back with
essential repairs only
- Retreat others**
Build back roads that provide
marine hub access

Marine key

- Maintain & protect existing marine hubs**
 - Primary Marine Hub
 - Arterial Marine Hub
 - Local Marine Hub
 - Emergency Ramp
- Protect & upgrade existing hubs (Passengers only)**
 - Local Marine Hub
- Protect & upgrade existing hubs (All users)**
 - Primary Marine Hub
 - Arterial Marine Hub
 - Local Marine Hub
 - Emergency Ramp
- New infrastructure or upgrade of level (All users)**
 - Primary Marine Hub
 - Arterial Marine Hub
 - Local Marine Hub
 - Emergency Ramp



6. Kenepuru Emerging Preferred: Balanced

SOUNDS FUTURE ACCESS PROGRAMME BUSINESS CASE



Roading Approach Key

- Protect**
Build back stronger
(No additional restrictions)
- Protect**
Build back stronger
(Additional restrictions)
- Accommodate**
Build back with targeted improvements
(No additional restrictions)
- Accommodate**
Build back with targeted improvements
(Additional restrictions)
- Accommodate/retreat**
Build back with essential repairs only
- Retreat others**
Build back roads that provide marine hub access

Marine key

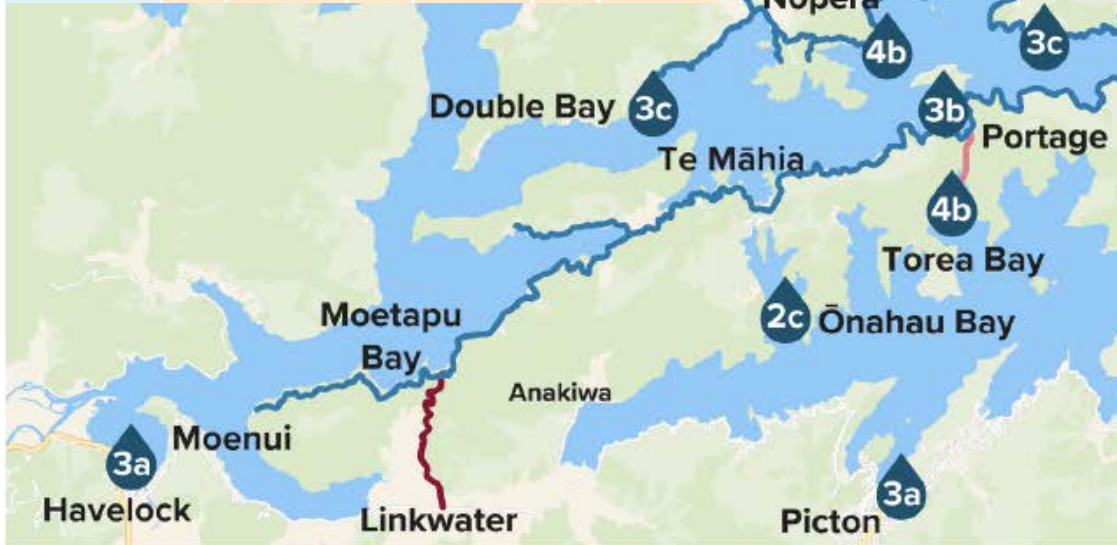
- Maintain & protect existing marine hubs**
 - 1a Primary Marine Hub
 - 1b Arterial Marine Hub
 - 1c Local Marine Hub
 - 1d Emergency Ramp
- Protect & upgrade existing hubs (Passengers only)**
 - 2c Local Marine Hub
- Protect & upgrade existing hubs (All users)**
 - 3a Primary Marine Hub
 - 3b Arterial Marine Hub
 - 3c Local Marine Hub
 - 3d Emergency Ramp
- New infrastructure or upgrade of level (All users)**
 - 4a Primary Marine Hub
 - 4b Arterial Marine Hub
 - 4c Local Marine Hub
 - 4d Emergency Ramp



6. Kenepuru HAP: Marine Focus

SOUNDS FUTURE ACCESS PROGRAMME BUSINESS CASE

Approach/ Road Section	Road Width	Vehicle Length Restrictions	Vehicle Weight Restrictions
Targeted Improvements Linkwater to Moetapu turnoff	Increasing one-lane sections	Potential for length restrictions	No change (50 tonnes max still permitted)
Targeted Improvements Moetapu turnoff to Mahau turnoff	Increasing one-lane sections	≤ 12.6m	Potential for less than 44 tonnes
Targeted Improvements Mahau turnoff to Portage	Increasing one-lane sections	≤ 12.6m	Potential for less than 44 tonnes
Strengthened Torea to Portage	No change	No change	No change (50 tonnes max still permitted)
Essential repairs Portage to Kenepuru Heads	Increasing one-lane sections	≤ 12.6m	Potential for less than 44 tonnes



Approach/ Road Section	Road Width	Vehicle Length Restrictions	Vehicle Weight Restrictions
Targeted Improvements Kenepuru Heads to Waitaria Bay	Increasing one-lane sections	Potential for length restrictions	No change (50 tonnes max still permitted)
Targeted Improvements Waitaria Bay to road ends	Increasing one-lane sections	Potential for length restrictions	No change (50 tonnes max still permitted)
Targeted Improvements Waitaria Bay to Clova Bay	Increasing one-lane sections	Potential for length restrictions	No change (50 tonnes max still permitted)
Targeted Improvements Kenepuru Heads to Titirangi	Increasing one-lane sections	Potential for length restrictions	No change (50 tonnes max still permitted)
Essential repairs Moetapu	Increasing one-lane sections	≤ 12.6m	Potential for less than 44 tonnes

Roding Approach Key

- Protect**
Build back stronger
(No additional restrictions)
- Protect**
Build back stronger
(Additional restrictions)
- Accomodate**
Build back with targeted improvements
(No additional restrictions)
- Accomodate**
Build back with targeted improvements
(Additional restrictions)
- Accomodate/retreat**
Build back with essential repairs only
- Retreat others**
Build back roads that provide marine hub access

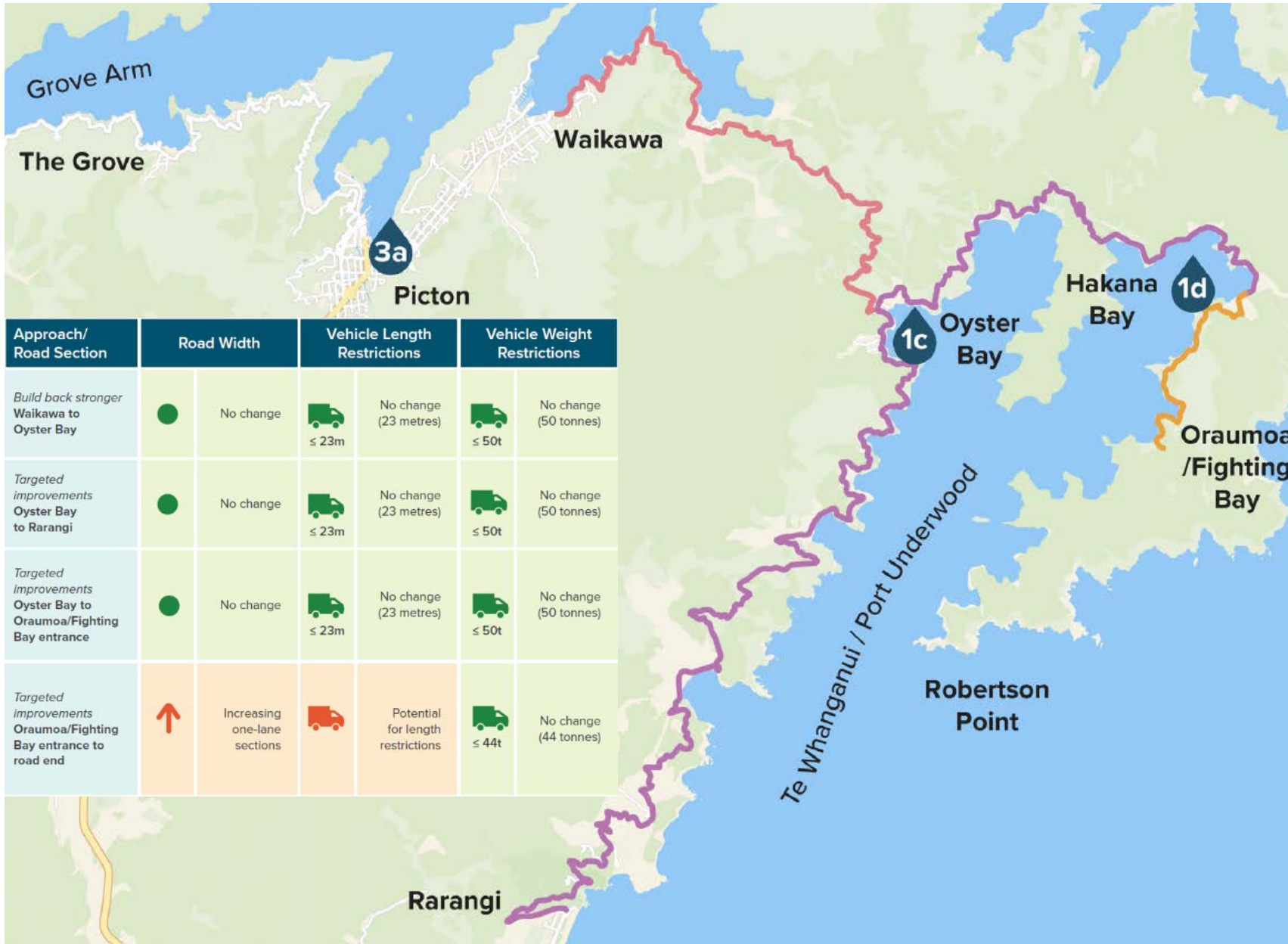
Marine key

- Maintain & protect existing marine hubs**
 - 1a Primary Marine Hub
 - 1b Arterial Marine Hub
 - 1c Local Marine Hub
 - 1d Emergency Ramp
- Protect & upgrade existing hubs (Passengers only)**
 - 2c Local Marine Hub
- Protect & upgrade existing hubs (All users)**
 - 3a Primary Marine Hub
 - 3b Arterial Marine Hub
 - 3c Local Marine Hub
 - 3d Emergency Ramp
- New infrastructure or upgrade of level (All users)**
 - 4a Primary Marine Hub
 - 4b Arterial Marine Hub
 - 4c Local Marine Hub
 - 4d Emergency Ramp



6. Port Underwood Emerging Preferred: Road Access

SOUNDS FUTURE ACCESS PROGRAMME BUSINESS CASE



Approach/ Road Section	Road Width		Vehicle Length Restrictions		Vehicle Weight Restrictions	
<i>Build back stronger</i> Waikawa to Oyster Bay	●	No change	≤ 23m	No change (23 metres)	≤ 50t	No change (50 tonnes)
<i>Targeted improvements</i> Oyster Bay to Rarangi	●	No change	≤ 23m	No change (23 metres)	≤ 50t	No change (50 tonnes)
<i>Targeted improvements</i> Oyster Bay to Oraumoa/Fighting Bay entrance	●	No change	≤ 23m	No change (23 metres)	≤ 50t	No change (50 tonnes)
<i>Targeted improvements</i> Oraumoa/Fighting Bay entrance to road end	↑	Increasing one-lane sections		Potential for length restrictions	≤ 44t	No change (44 tonnes)

Roothing Approach Key

- **Protect**
Build back stronger
(No additional restrictions)

- **Protect**
Build back stronger
(Additional restrictions)

- **Accomodate**
Build back with targeted improvements
(No additional restrictions)

- **Accomodate**
Build back with targeted improvements
(Additional restrictions)

- **Accomodate/retreat**
Build back with essential repairs only

- **Retreat others**
Build back roads that provide marine hub access

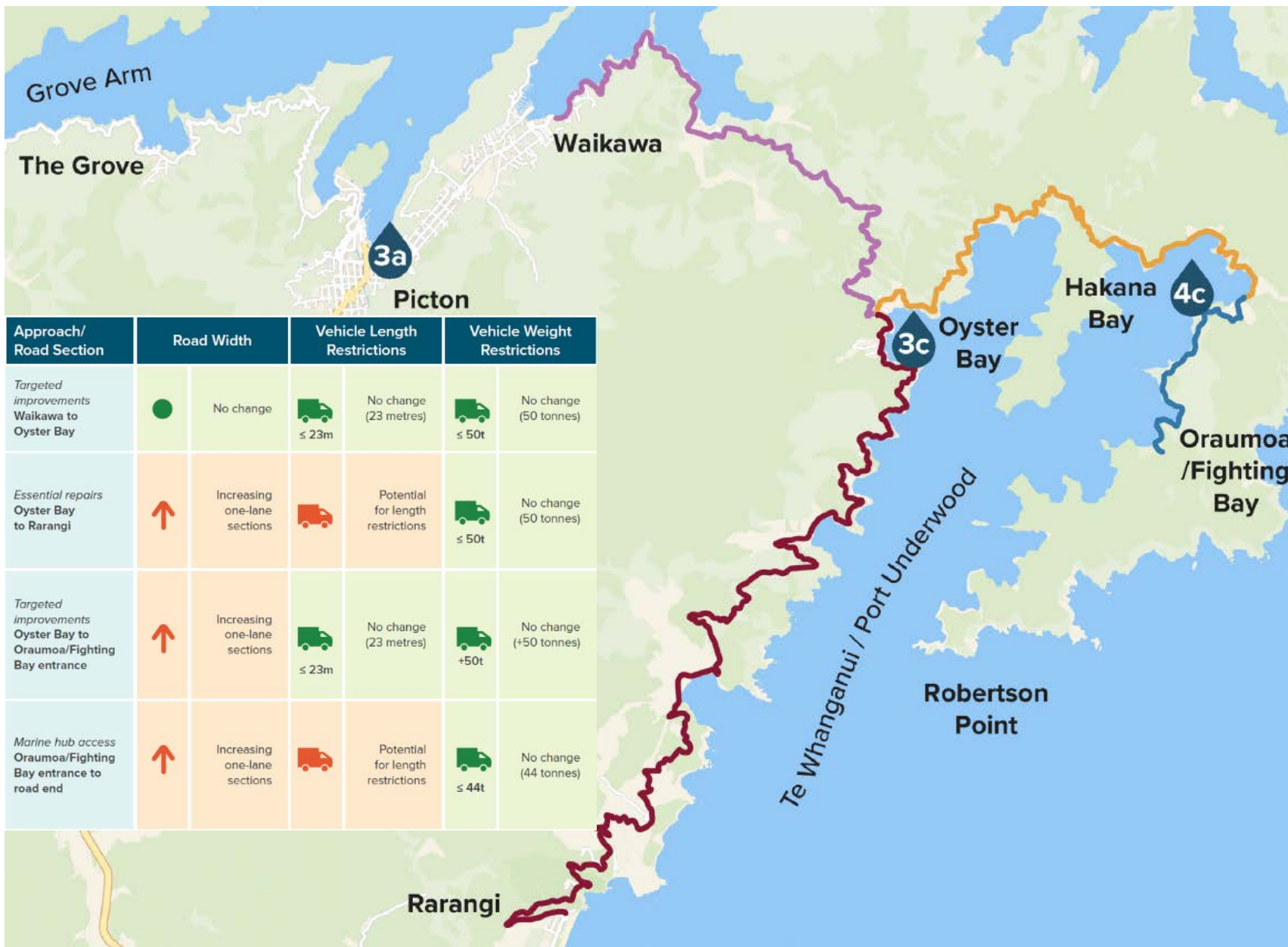
Marine key

- Maintain & protect existing marine hubs**
- 1a Primary Marine Hub
 - 1b Arterial Marine Hub
 - 1c Local Marine Hub
 - 1d Emergency Ramp
-
- Protect & upgrade existing hubs (Passengers only)**
- 2c Local Marine Hub
-
- Protect & upgrade existing hubs (All users)**
- 3a Primary Marine Hub
 - 3b Arterial Marine Hub
 - 3c Local Marine Hub
 - 3d Emergency Ramp
-
- New infrastructure or upgrade of level (All users)**
- 4a Primary Marine Hub
 - 4b Arterial Marine Hub
 - 4c Local Marine Hub
 - 4d Emergency Ramp



6. Port Underwood HAP: Marine Access

SOUNDS FUTURE ACCESS PROGRAMME BUSINESS CASE



Roading Approach Key

- Protect**
Build back stronger
(No additional restrictions)
- Protect**
Build back stronger
(Additional restrictions)
- Accomodate**
Build back with targeted improvements
(No additional restrictions)
- Accomodate**
Build back with targeted improvements
(Additional restrictions)
- Accomodate/retreat**
Build back with essential repairs only
- Retreat others**
Build back roads that provide marine hub access

Marine key

- Maintain & protect existing marine hubs**
 - 1a Primary Marine Hub
 - 1b Arterial Marine Hub
 - 1c Local Marine Hub
 - 1d Emergency Ramp
- Protect & upgrade existing hubs (Passengers only)**
 - 2c Local Marine Hub
- Protect & upgrade existing hubs (All users)**
 - 3a Primary Marine Hub
 - 3b Arterial Marine Hub
 - 3c Local Marine Hub
 - 3d Emergency Ramp
- New infrastructure or upgrade of level (All users)**
 - 4a Primary Marine Hub
 - 4b Arterial Marine Hub
 - 4c Local Marine Hub
 - 4d Emergency Ramp



7. Strategic alignment

Document	Alignment
National Adaptation Plan	VERY STRONG: Seeking to address identified climate adaptation issues.
Tiro Rangi: Waka Kotahi Adaptation Plan 2022-24	VERY STRONG: Contributes to the overall goal of Tiro Rangi by adapting access to the Sounds so that it is resilient to climate change.
GPS on Land Transport 2021	STRONG: Strongest with climate change. There is also alignment with freight connections and safety.
Arataki: Waka Kotahi's 30-year plan	STRONG: Alignment is strongest with resilience and security as it aims to enhance the community's long-term resilience to the impacts of climate change
Draft RLTP 2021-2031	STRONG: Well aligned with strategic objectives
Marlborough Roding AMP (2018-21)	STRONG: Aligns with achieving the appropriate customer levels of service.
Marlborough Long Term Plan	STRONG: Directly aligned with the biggest challenge noted for the transport network in the LTP.
Marlborough Climate Change Action Plan 2020	STRONG: Directly aligned with Goal 2 and will contribute to achieving the other three goals.



8. MCA Evaluation

Key MCA Evaluation Comments

Providing travel alternatives: Marine programmes provide alternatives if the road is closed, so are scored more highly

Reduce disrupted access: Marine options considered as a useful back up, but more unreliable compared to the road network

Improve resilience: Scores vary by zone based on underlying hazards

Technical Difficulty: Scope and scale of work considered. Areas or programmes with more unusual or not typical work scored more poorly

Social and Community Impacts: Marine options score less poorly for the community compared to business

Environmental Impacts: Scoring dependent on the receiving environment, susceptibility to certain hazard failure modes and hazard failure mechanisms. Programmes that result in more long-term benefits to the environment score more positively.

Climate Change Mitigation: Programmes with little construction, and maintenance of mostly gravel roads will have lower emissions and score better. Programmes where trips are suppressed due to poor access, or diverted to marine modes have slight benefits for mitigation.

Supplier Capacity and Capability: Marine focused programmes scored more negatively due to the difficulty/ lead times involved with new infrastructure

Area	Sensitivity test conclusions
French Pass	Balanced preferred in baseline, but other tests see Marine Access or Road Focus preferred
Pelorus	Road Focus preferred in all tests
Queen Charlotte	Road Focus/ Road Access preferred in all tests (these programmes are identical)
Kenepuru	Balanced preferred in baseline and equal weightings, but other tests see other programmes
Port Underwood	Road Focus preferred in all tests

Area	Road Focus	Road Access	Balanced	Marine Access	Marine Focus	Current Status
Rai Valley to Te Aumiti / French Pass	\$ 75M	\$ 45M	\$ 30M	\$ 20M	\$ 20M	\$ 4M
Te Hoiere/Pelorus	\$ 5M	\$ 4M	\$ 2M	\$ 2M	\$ 2M	\$ 1M
Queen Charlotte	\$ 30M	\$ 30M	\$ 15M	\$ 10M	\$ 10M	\$ 2M
Kenepuru	\$ 150M	\$ 80M	\$ 60M	\$ 50M	\$ 40M	\$ 10M
Te Whanganui/Port Underwood	\$ 40M	\$ 20M	\$ 15M	\$ 10M	\$ 7M	\$ 3M
Total average (rounded)	\$ 300M	\$ 180M	\$ 120M	\$ 90M	\$ 80M	\$ 20M

Figure 17: The estimated cost for each option.



8. MCA Evaluation

Theme		Investment Objectives			Achievability	Opportunities and Impacts						Weighted score	Rank
		40%			30%	30%							
Criteria Number		1	2	3	4	5			6	7	8		
Criteria		Improve ...resilience by providing travel alternatives	Reduce frequency and duration of disrupted access	Improve resilience of the transport assets	Technical Difficulty	Social and Community Impacts			Environment Effects	Climate Change Mitigation	Supplier capacity and capability		
						Final	Community Focus	Business Focus					
Total Weighting		8.0%	12.0%	20.0%	30.0%	13.5%	0.0%	0.0%	9.0%	4.5%	3.0%		
Port Underwood	Do Minimum	0	-2	-1	3	-2	-2	-2	-2	-1	3	0.055	5
	Road Focus	0	2	2	1	2	2	2	1	-2	2	1.270	1
	Road Access	0	1	1	2	1	1	1	1	-2	2	1.115	2
	Balanced	1	0	0	2	1	1	0	2	-1	2	1.010	3
	Marine Access	2	-1	-1	2	-1	1	-1	-2	-1	2	0.140	4
	Marine Focus	2	-2	-2	2	-1	1	-1	-1	-1	2	-0.090	6
Pelorus	Do Minimum	1	-1	-1	3	-1	-1	-1	-2	0	3	0.435	5
	Road Focus	1	2	2	0	2	2	2	1	-1	2	1.095	1
	Road Access	1	1	1	1	1	1	1	1	-1	2	0.940	2
	Balanced	2	1	0	0	1	1	1	1	-1	2	0.520	3
	Marine Access	2	1	0	0	1	1	1	1	-1	2	0.520	3
	Marine Focus	2	-1	-1	1	-1	-1	-3	-1	0	2	-0.025	6
Queen Charlotte	Do Minimum	1	-2	-2	3	-3	-3	-3	-2	0	3	-0.155	4
	Road Focus	1	1	2	-2	3	3	3	1	-3	1	0.390	1
	Road Access	1	1	2	-2	3	3	3	1	-3	1	0.390	1
	Balanced	1	-1	1	-1	2	2	2	1	-2	1	0.160	3
	Marine Access	2	-2	0	-1	1	1	1	1	-2	0	-0.245	5
	Marine Focus	2	-3	-1	-2	1	1	1	0	-1	-1	-0.940	6
French Pass	Do Minimum	-1	-2	-2	3	-3	-3	-3	-2	-1	3	-0.360	6
	Road Focus	0	2	1	-1	2	2	2	1	-3	1	0.395	4
	Road Access	1	0	1	1	1	1	1	1	-3	1	0.700	3
	Balanced	2	-1	2	1	1	1	1	1	-2	0	0.875	1
	Marine Access	2	-2	3	1	0	0	-1	1	-1	0	0.865	2
	Marine Focus	3	-2	2	-1	-2	-2	-2	1	-1	-1	-0.155	5
Kenepuru	Do Minimum	1	-3	-3	3	-3	-3	-3	-2	-1	3	-0.520	4
	Road Focus	1	0	-2	-3	2	2	-3	1	-3	-2	-1.055	6
	Road Access	2	-1	-1	-2	1	2	-3	1	-2	-1	-0.655	5
	Balanced	2	2	0	-1	0	1	-2	1	-2	-1	0.070	1
	Marine Access	3	1	1	-2	-2	-1	-2	2	-1	-2	-0.235	2
	Marine Focus	3	0	3	-3	-2	-2	-2	1	-1	-3	-0.375	3



9. Economic Evaluation

- Our assessment includes a transport economic efficiency assessment, aligned to Waka Kotahi guidance
- In addition, we assess the wider economic benefit considering the detrimental effect recent storm events have had on the Sounds and its communities
- Note that the productivity loss triggered by interrupted transport access in the Marlborough region cannot readily be transferred elsewhere, resulting in a reduction in the regional GDP and in the national GDP.

Area	Road Focus	Road Access	Balanced	Marine Access	Marine Focus	Current Status
Rai Valley to Te Aumiti / French Pass	Almost Certain	Almost Certain	Likely	Likely	Possible	Unlikely
Te Hoiere/Pelorus	Almost Certain	Almost Certain	Almost Certain	Almost Certain	Likely	Unlikely
Queen Charlotte	Almost Certain	Almost Certain	Likely	Possible	Possible	Unlikely
Kenepuru	Almost Certain	Likely	Likely	Possible	Possible	Unlikely
Te Whanganui/Port Underwood	Almost Certain	Likely	Likely	Likely	Possible	Unlikely
Total average	Almost Certain	Almost Certain	Likely	Possible	Possible	Unlikely

Figure 18: Ability to support previous level of economic activity.



10. Workshop Exercise

- Check name badge for your number
- Sit at table for your number
- Chatham House Rules
- Work together over 40 minutes to:
 - Nominate your spokesperson
 - Review material provided – see poster boards and information on table
 - Develop your group’s preferred option for the whole Sounds area
 - Provide reasons explaining why this is your preferred option and that it is achievable
 - Highlight what you believe is essential and what is nice to have
 - Note your preferred option on one page of the flipchart
 - Note your reasons on a separate page(s)
 - Also note any other matters that your group think are important
- Note: Please ask questions of the project team as needed
- 3–5-minute report back per group, including any key points of discussion for your group

Marlborough Sounds

Future Access Study

Engagement Document > June – July 2023

This document guides you through the emerging preferred options and the hazard adaptation pathways for future transport solutions in and out of the Marlborough Sounds.

Use this document to inform your views about the options.

You are also invited to one of 7 public drop-in sessions in the Sounds, Picton, Blenheim or Nelson or; to the online webinar. See the website for event details, the study's technical information and the other options considered.



marlborough.govt.nz/services/roads-and-transport/marlborough-sounds-future-access-study



11. Next Steps

- Notes from this workshop will be included in Consultation Summary
- Community engagement – getting involved
 - Provide your feedback via the survey ([link](#))
 - Talk to your communities and encourage participation
 - Come to a community drop-in session
- Finalisation of business case – August 2023
- Council and Waka Kotahi support of business case – by end 2023
- Council consult through LTP – early 2024
- Council and Waka Kotahi funding decision – mid 2024
- Planning – commence mid 2024
- Implementation – commence 2025



Anakiwa Road

C.2.2 Workshop Minutes



Sounds Stakeholder meeting

Project/File: 310205564 – Marlborough Sounds Future Access

Date/Time: 20 June 2023 / 1:00pm

Location: Lansdowne Sportshub, Blenheim

Attendees: **Marlborough District Council:** Mayor Nadine Taylor, Cr Scott Adams, Cr Jamie Arbuckle, Cr Sally Arbuckle, Cr Allanah Burgess, Cr David Crood Cr Barbara Faulls, Cr Raylene Innes, Cr Ben Minehan, Cr Brain Dawson, Marianne Aitken, Richard Conningham, Jessica Donaldson, Neil Henry, Steve Murrin, Dave Parsons, Mark Wheeler

Waka Kotahi: Emma Speight

Emergency Services: Brian Paton (Civil Defence)

Utilities: Steve Neal (Marlborough Lines)

Nelson Marlborough Public Health: Beth Tester, Hana Wilkinson, Helen McLean

Community/ Residents Associations: Andrew Caddie, Alistair Cameron, Heather Cameron, Kevin Bridget (Kenepuru and Central Sounds); Gerry Gregg (Kaiuma and Wakaretu); Andrew Johns (Ngakuta Bay); Lynley Perkins (Central Pelorus); Jim Yule (Kaiuma Bay); John Davison (Port Underwood); Norm Gourdie (Ngakuta Bay); Richard Kearsley (Cissy Bay),

Other Organisations: Gavin Beattie (Port Marlborough), Steve Chandler (Tasman Pine), Pete Coldwell (Marlborough Chamber of Commerce), Anouk Euzeby (Port Marlborough), Peter Heagrey (Heavy Transport), Trevor Hook (Te Mahia Bay Resort), James Galloway (O'Donnell Park Barging), Bruce Moffat (Destination Marlborough), Mel Price (Rural Women NZ), Jem Pupich (Ministry of Education), Glenda Robb (Sounds Reflection), Kim Waetherhead (Johnsons Barge Service Havelock), Evan White (Federated Farmers), Anton Wilke (Destination Marlborough)

Stantec: Andrew Maughan, Ken Clapcott, Courtney McCrostie

Absentees: **Iwi groups:** Corey Heberd (Rangitane), Dave Johnson (Ngāti Kuia), Darren King (Ngāti Koata), Justin Carter (Te Atiawa Trust), Naomi Solomon (Pou Toa Matarau Te Rūnanga o Toa Rangatira), Rowena Smith (Ngāti Apa), Shane Graham (Ngāti Rārua),

Waka Kotahi: Mark Nicholson

Emergency Services: Rob Carpenter (Coastguard/ Rescue Helicopters), Simon Felthem (Police), Chris Hayes (FENZ), Murray Neil (Ambulance)

Utilities: John Crisp (Transpower), Geoff Shand (Chorus)

Community/ Residents Associations: Linda Booth (Duncan Bay Residents Association), Wayne Boustridge (Port Underwood Residents Association), Tim Greenhouse (Okiwi Bay Residents Association), Emma Hopkinson-Young (Pelorus Residents Association), Jo Roberts (Moetapu Bay Residents Association), Jane Sorensen (D'Urville Residents Association)

Other Organisations: Lauren Ensor (Nelson Marlborough Public Health), David Hayes (Department of Conservation), Sarah Knox (Insurance Council), Simon Langley (MPI), Angela Mackenzie (Forestry), Gary Orchard (Pelorus Tours), Nathan Williams (Tour operator), Ned Wells (Marine Farming Association), Cougar Line, Pelorus Sound Water Taxi, Local Knowledge Charters, Havelock Water Taxi, Kenepuru Water Taxi, Te Hoiere Water Taxi

Distribution: As per attendees and absentees

Item
<p>Welcome and Overview</p> <ul style="list-style-type: none">• Welcome• Introductions• Purpose of the workshop:<ul style="list-style-type: none">○ Brief stakeholders and take questions on the emerging preferred option and adaptation approach○ Identify stakeholder preferences <p>Highlight other ways stakeholders can get involved</p>
<p>Overview of work to date</p> <ul style="list-style-type: none">• General agreement with the background, purpose. of study, engagement to date, strategic context, and programme option development• Explainer on the emerging preferred option, hazard adaptation pathway, and events that may trigger steps towards the hazard adaptation pathway. <p>Overview of the evaluation process: MCA and economic evaluation</p>
<p>Workshop Exercise</p> <p>In their tables attendees were asked to review the material provided and develop their groups preferred option for the whole of the Sounds area. The option needed to be achievable, and they were asked to highlight what was essential and what was nice to have.</p> <p>A summary of each table's comments is attached below.</p>

The meeting adjourned at 3:00pm.

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Ngā mihi nui,

STANTEC NEW ZEALAND



Courtney McCrostie

Transportation Engineer

Phone: +64 4 381 5776

courtney.mccrostie@stantec.com

Attachment: Summary of workshop activity output

Table A

French Pass

EMERGING PREFERRED OPTION (ROAD ACCESS)

Agree with emerging preferred option

- Average age in Okiwi Bay = 75yrs – getting them out any other way is very hard
- 1st road 2 sections ✓
- Forest – Elaine Bay – no other way out
- Mostly farmland past Elaine Bay
- No barge points – not even Elaine for trucks
- Mussel / fishing industry important access
- Marlborough lines – diesel generator farm – need to bring in by trucks or barge
- finish route

Te Hoiere/ Pelorus

HAZARD ADAPATION PATHWAY (BALANCED/ MARINE ACCESS)

- 45 residents
- 250 sections
- It will be a large settlement – how do we plan for access for this (will the increase in size to subdivision be allowed?)
- 46 slips
- Access to Havelock (is the infrastructure sufficient)
- Open the paper road over the top

- Need dredging
 - hugely silted – too shallow
 - but we need the ability to get in and out
- Will red sections restrict growth in the future?
- The Whatanihi community – ensure access for Marlborough Lines

Queen Charlotte

EMERGING PREFERRED OPTION (ROAD FOCUS/ ROAD ACCESS)

- Generally good – protect and accommodate ✓
- expensive
- High number of under slips
- Slumping – can't ignore it
- Recognise that it is the alternative to the SH's
- Reasonably simple
- Forestry
 - feeding into road,
 - a disaster economically if it wasn't repaired,
 - essential tourist route,
 - trucks (trailer on back)

Kenepuru

EMERGING PREFERRED OPTION (BALANCED)

- Te Mahia marine hub – very important access – restricted by carpark size (unless parking/infrastructure upgraded)
- Moetapu Bay
 - Marine hub?
 - Bus route for school children – safety?
- Privately owned jetties, (e.g., Raetihi)

- what is the scope for usage of private jetties?
 - And what is the strategy going forward?
- Strategy jetties review
- Havelock – additional infrastructure – what has been considered?
- Havelock channel – when will dredging happen?
- Portage to Kenepuru Heads
 - How many faults and slips between?
 - Is it 5 or more complex?
- What is the state of it right now? – underslip etc?
- From a community perspective – how does it affect them?
- Truck and trailer
 - probably truck unit only?
 - Truck and trailer – piloted
- The commitment to keep the access open
- Forestry – ongoing need to get forestry operations in reliably
- Confirm \$800,000 still available for barge sites
- Spoil dumps
- Which is happening with Waitaria jetty?
- Cost of the marine options – who pays?
- Cost of repairs and maintenance – who pays?
- Additional local marine hubs at:
 - Moetapu Bay
 - Ōnahau Bay
 - Te Mahia Bay

Port Underwood

EMERGING PREFERRED OPTION (ROAD ACCESS)

Agree with most

- The importance of the cable



- Comment about sustainability for forestry trucks
 - Waikawa to Oyster Bay
 - also mussel trucks
- Could we use the forestry road? (Queen Charlotte Forest)
 - is the forestry open to negotiating this?

HAZARD ADAPATION PATHWAY (MARINE ACCESS)

Agree

- Would support be available to keep cable access road open?

Table B

French Pass

EMERGING PREFERRED OPTION (ROAD ACCESS)

- Agree
- No change to marine

Pelorus

EMERGING PREFERRED OPTION (ROAD FOCUS)

- Agree but if population increases then is road good enough
- 251 sections
 - development
 - currently 30 houses,
 - 13 permanent families
 - 2nd largest sounds population when developed.
- Marine hub (1C) silts up badly –
 - barge access – shallow, needs improvement
- Concerns about logging
- Road safety – 2 accidents this year

Queen Charlotte

EMERGING PREFERRED OPTION (ROAD FOCUS/ ROAD ACCESS)

- Agree
- Important tourism route

- Emergency ramp either side



HAZARD ADAPTATION PATHWAY (MARINE ACCESS)

- emergency ramp at Mahakipawa Arm – important for removing vehicles

Kenepuru

- Agree
- Truck access needed for whole length
 - More communication that piloted trucks will be able to use the road
- Marine
 - add Te Mahia as a local marine hub
 - Need to start to build up the marine infrastructure
- -Cost of road vs cost of marine
 - Marine cheaper
- Has carbon footprint been taken into account?



Port Underwood

EMERGING PREFERRED OPTION (ROAD ACCESS)

- Agree

Table C

- Vehicle restrictions
 - Truck and trailer access
 - Happy with piloting trucks
- Funding
 - Cost exaggerated?
 - Roothing
 - Private/public partnership (roading)
 - What do Transpower contribute?
 - Marine
 - Marine – who funds it?
 - Private enterprise – funding for marine upgrades
 - Marine space – financial contribution to roading
- Tendering
 - Let it as separate tenders.
 - Tendering – sensible spending
 - Outside contract of Marlborough roads – joint venture
- Existing roading work
 - Maintenance
 - Localised roading crews to maintain road.
 - Work not being done efficiently
- Other



- Marine facility at port underwood?
- No issue with one lane sections
- Access to health care and communication
- Access to servicing line network communications



Table D

Table D was not used. There are no notes.

Table E

French Pass

- Good
- Protect road to
 - Elaine Bay
 - Resilience (fuel)
 - Support aquaculture
- What marine facilities are at Elaine Bay?

Pelorus

- Havelock channel would require dredging

Queen Charlotte

- Grove arm barge ramp is tidal

Kenepuru

- Portage to Kenepuru Heads:
 - why not to same standard as rest of road?
 - how do you connect?
- Whole road could be gravel
- Moetapu – ok as retreat / accommodation
- No stock truck Portage to Torea Bay
 - need to use Havelock + 10 metre to Torea ramp
 - can go orange / accommodate



- freight service fully subsidised 5 days / week to Fish Bay
- need to consider berths and parking requirements

Port Underwood

Table E did not make any comments regarding Port Underwood

Appendix D Iwi Engagement



Sounds Future Access - Iwi Hui

Project/File: 310205564
 Date/Time: 14 March 2023 / 11:00am
 Location: Waikawa Marae

Item
<p>Welcome and Introduction</p> <ul style="list-style-type: none"> • Welcome • Introductions • Project background (as per attached slides) • Initial cost estimate at \$200 - \$400m
<p>Key Themes</p> <ul style="list-style-type: none"> • Don't create inequalities for Māori • Iwi/ Māori association with areas in business case • Assessment to ensure there remains road access to multiple owned Māori lands, along the roading network • Importance of utilisation of our whenua re cultural identity (wānanga held there) and reconnection to that identity <ul style="list-style-type: none"> ○ taonga tuku iho¹ ○ Access is pivotal for this • Landless natives • Okoha to Havelock walking trail historically took 2-3 weeks, then horse and cart, and eventually taken over as road • Some whenua have never been accessible by road • Mahinga kai across the rohe • Concerns around heavy vehicle use of compromised road – future proofing • Ease of access to medical services, kai and other essentials • Better utilising the skills and expertise of local communities to support short/ medium/ long term recovery (preparing those as first responders) • Importance of factoring in climate change in planning • Archaeological/ koiwi/ wāhi tapu protection (any works) <ul style="list-style-type: none"> ○ Wāhi tapu 'general' site identification needed re future works • Planning permission for land use and housing needs assessed <ul style="list-style-type: none"> ○ Papakāinga provisions MDC policy needs urgently reviewed • Opportunities to improve access to:

¹ heirloom, something handed down, cultural property, heritage

Item
<ul style="list-style-type: none">○ Kai moana trails○ All weather access to heritage commemorations at different times of year<ul style="list-style-type: none">▪ Treaty signing at Horahora Kākahu Island○ Access to Māori land holdings for economic/ social development
Location Specific Comments <ul style="list-style-type: none">• Kenepuru<ul style="list-style-type: none">○ Access to Queen Charlotte Sounds walkway – may end up with only vessel access which provides barriers (financial/ time)○ Commercial interests (organically qualified kanuka) – access is pivotal.○ Marlborough Lines<ul style="list-style-type: none">▪ have access to pylons on land – they have to cut in access tracks▪ Land owner needs to make sure fire hazard is managed○ Existing road restrictions should not apply to land owners in the Kenepuru<ul style="list-style-type: none">▪ Local residents have prevented Māori land owners from accessing their land previously○ Cultural sites around the coastlines, and some near Waitaria○ Urupa at Okoha○ Desire to build marae on some of the land blocks?• Port Underwood<ul style="list-style-type: none">○ Customary access vs commercial balance○ Consider restricting big truck/ heavy vehicle access

The meeting adjourned at 2:00pm.

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Ngā mihi,

STANTEC NEW ZEALAND



Courtney McCrostie

Transportation Engineer

Phone: +64 4 381 5776

courtney.mccrostie@stantec.com

Attachment: [Attachment]

Appendix E Community Engagement

E.1 Issues and Options (January 2023)



Summary of Marlborough Sounds Community Workshop Feedback

French Pass

There were 90 individual comments received from this workshop, with three that were emailed through and incorporated into this summary. The most common topics raised were related to road maintenance (35) and having general road access (10). Other topics discussed were community, environmental and tourism impacts, and landuse concerns.

In terms of road maintenance, most of the comments noted a need for better and more frequent maintenance, citing issues such as its inconsistency, the reactive rather than proactive approach, and the time needed for repairs. Commenters also specified culverts as needing regular maintenance and having local contractors to do this as well as other maintenance jobs. Budgets for maintenance was also discussed, with commenters concerned about where money is allocated and how it should be levied.

Comments about road access were stating the importance of keeping roads open for accessing the community and medical services. Commenters also stated having road access is important for the residents and visitors, and for emergency services and utilities.

Picton

There were 78 individual comments received from this workshop, with 53 commenters from Port Underwood, 15 from Kenepuru, and four from French Pass/Pelorus. The most common topics raised were related to road maintenance (25), heavy vehicle usage (16) and landuse concerns (10). Other topics discussed include boat access, environmental impacts, and community impacts.

In terms of road maintenance, most of the comments stated a need to do regular maintenance, particularly clearing culverts and trimming encroaching vegetation. Commenters also suggested using local residents for culvert maintenance.

Port Underwood Road and the impact of heavy vehicles on this road is a common concern raised by commenters. Suggestions to mitigate this include diverting/removing heavy vehicles by introducing barging to transport goods.

Rai Valley

There were 78 individual comments received from this workshop, with 55 commenters from Rai Valley, 21 from French Pass/Pelorus, and two from Kenepuru. The most common topics raised were related to road maintenance (15), road clearing/clean-ups (7), and general road access (6). Other topics discussed include council communications, heavy vehicle impacts and use of local contractors.

In terms of road maintenance and clean-ups, most of the comments stated more frequent maintenance is needed and clearing of debris caused by roadside vegetation and forestry. Commenters also cited using locally based contractors to provide more regular maintenance and oversight of remote areas.

Comments about road access were stating the importance of keeping roads open to access the community and essential services. Commenters also stated having road access is important for accessing emergency services and utilities. There were also some comments about restricting vehicle access, particularly heavy trucks on the Ronga Road (until it is fixed).

Havelock

A total of 193 individual comments were received from this workshop, with 82 of the commenters coming from the Havelock zone, 71 from French Pass and Pelorus, 38 from Kenepuru, and two from Port Underwood.

For French Pass/Pelorus commenters, the main topics raised were concerns with road maintenance, road access, and heavy vehicle/forestry impacts. Lack of routine maintenance and issues such as slips and road washouts (particularly on Okiwi Bay/Elaine Bay) are ongoing problems. The ongoing impact of heavy vehicles and the local forestry industry are also exacerbating road issues and deteriorating conditions. Some commenters have also noted the importance of having road access for the local community, visitors to the region, and the forestry industry.

Havelock commenters mainly raised issues around road maintenance and road access. The maintenance of culverts were particularly mentioned, with commenters wanting more culvert cleaning and unblocking and increasing the capacity. Having road access is also important, with commenters particularly noting access to Moetapu Bay as crucial and the road needing urgent work.

Kenepuru commenters raised issues around road maintenance, road access and community impacts. Commenters want local road maintenance reinstated and roads maintained to a good standard (doesn't have to all be sealed). Kenepuru Road is also cited as a road that needs repairs and access maintained including to other parts such as Mahua Road.

Port Underwood commenters noted Queen Charlotte Drive as needing repairs urgently and that heavy vehicle access into Oyster Bay is important for the mussel industry.

Waitaria

There were 71 individual comments received from this workshop, with 44 commenters from Waitaria and 27 from Kenepuru. The main topics raised were related to boating infrastructure (15), road maintenance (14), and road access (11). Other topics raised relate to funding and community impacts.

For boating infrastructure, commenters expressed concerns about the cost of boating and the difficulty for less able people to use them. Commenters also suggested barges at different locations such as Summerbys and Torea.

Commenters noted a lack of ongoing road maintenance as an issue, as well as the management of the maintenance programme. Commenters also recommended using local contractors to deliver the work.

Portage

There were 43 individual comments received from this workshop, with some received as written submissions. The most common topics raised were related to community impacts (14) and road access (10). Other topics raised included boating infrastructure/access, heavy vehicle impacts and council communications.

Commenters were particularly concerned with the impacts on the community if road access was taken away. They need access to schools, social networks and healthcare which relies on having road access and not just water access, which is not accessible to everyone and is weather dependent. Having a road is also important for the community to have access to emergency services and utilities.

Zoom Webinar

There were nine individual comments received from the webinar engagement session, with three commenters from Kenepuru, one from French Pass, and five unknown. Road maintenance was raised the most, with some noting the lack of it and issues such as blocked culverts and lack of gravel. Road access and environmental impacts were also other concerns raised, with commenters questioning how to access health provisions and noting erosion effects.

E.2 Emerging Preferred Option and Hazard Adaptation Pathway Drop in Sessions (June 2023)



Marlborough Sounds Community Drop-In Sessions

Summary

From 16 to 28 June, approximately 500 people participated in the public engagement sessions. These were comprised of seven public drop-in sessions held in various locations across the Sounds, Blenheim, Picton and Nelson, and one Zoom webinar (52 participants). Over 261 questions were tracked and responded to either directly or through information provided in the FAQs, website, newsletters, survey helpline and other channels.

The intention was to provide a variety of locations, dates and times to ensure all who wanted to participate could do so. In addition, consideration was given to engaging with people beyond the Sounds as decisions could also impact the wider Marlborough community.

The drop-in sessions' format allowed for attendees to walk through the venue, while reviewing the maps of the affected areas, which were posted on the walls and placed on tables. This format enabled open conversations and a more relaxed atmosphere, which was important as the information being provided was quite sensitive and personal for the attendees. Facilitators from MDC and the technical team made themselves available to answer questions and encourage people to write down their thoughts or ideas on sticky notes or add their feedback to the survey. There were also other partners including Waka Kotahi present.

Blenheim

On Tuesday 20 June, from 5:00 – 7:00 pm, approximately 48 people attended. A summary is below:

- 15 written comments were received, and all related to the Kenepuru zone
- The project team attending this session considered it to have been a very good meeting.
- Many conversations were Kenepuru focused.
- People were very happy the road was going to be repaired/ maintained.
- There was some discussion around speed limit reductions.
- There was a suggestion that local crews should also be considered for hire for road maintenance.
- People were happy to have single lane/unsealed sections, as long as they have a road.
- There was some confusion about the HAP vs EPO. It was explained that the HAP is a journey – a series of steps. The EPO is what is proposed now. The EPO was also outlined in the booklet that had been provided.
- There were some questions around why Portage to the Heads will get essential repairs only, when the rest of the road is targeted improvements.

- It was explained that while the section between the Mahau turn off and Portage has a similar percentage of the road length highly susceptible to natural slope instability as the section between Portage and the Heads, the section before Portage is a higher classification of road under the ONRC and ONF.
- There was some discussion around feasibility of the marine hub locations and what would be provided at each level.
- People from Duncan Bay (French Pass) seemed happy with the presented proposed options.
- There were some questions about the marine hub upgrades in Double Bay.

Waitaria Bay

On Wednesday 21 June, from 10:00 am – 12:00 pm, approximately 80 people attended. A summary is below:

- 52 written comments were received. One comment related to the marine hub at Kaiuma, but the rest were focused on the Kenepuru zone.
- People like the drop-in/conversation format used.
- Positive comments around the repair work that has been done to date.
- Passenger ferry services and water taxis need to be reliable and more regular from multiple locations.
- Waitaria Bay wharf needs investment (a walkway out to a floating jetty) and repairs because if it is damaged, people would have no access.
- There was a request to extend the carpark at Punga Cove.
- Torea Road boat access needs to be upgraded.
- The road from Kenepuru Heads to Torea Road is the essential link and should not be relegated to accommodate this protect.
- A common question was: Why was Portage to the Heads essential repairs only, and not targeted improvements?
 - It was explained that while the section between the Mahau turn off and Portage has a similar percentage of the road length highly susceptible to natural slope instability as the section between Portage and the Heads, the section before Portage is a higher classification of road under the ONRC and ONF.
- Most people at this session accepted there would be possible rate increases.
- There were several questions around whether stock trucks and trailers would be able to use the road. The response was:
 - In any instance where we say there may be length restrictions, most vehicles longer than the length restrictions would be able to get through but are not able to remain in their own

lane, there is also going to be more single lane sections. It is likely they will require a pilot vehicle. There is also likely to be weight restrictions on some sections of road.

French Pass

On Thursday 22 June from 10:00 am – 12:00 pm, approximately 10 people attended. A summary is below:

- No written comments were received.
- Generally, people seemed happy with the EPO.
- There was some discussion on the possibility of charging non-locals to use the road. It was explained that MDC doesn't have the power to do this, but Central Government does.
- One question that came up several times at this drop-in session was: What does targeted improvements mean?
 - Improvements are focused on improving resilience of the transport system.
 - Targeted improvements are targeting investment in improvements where there is a good return on investment in doing so. For example, if there is a large instability issue, a small, localised improvement is unlikely to improve the resilience of that area.

Linkwater

On Friday 23 June, from 2:00 pm – 4:00 pm, approximately 120 people attended. A summary is below:

- 31 written comments were received, and all related to the Kenepuru zone.
- Many people were interested in knowing more about the impact on their rates and how all the repairs and suggested options would be paid for.
- People from Moetapu Bay were generally quite concerned, but overall, everyone seemed reasonably on board with the EPO.
- Moetapu Bay residents also voiced their concern about access for emergency services and fire engines if roads were inaccessible or not maintained, especially during summer.
- Would a fire engine be able to access properties on Moetapu Bay road if road is not replaced?
 - The strategy is to repair the road. All essential services will have access in this case.
 - If the HAP is implemented this will likely be as a result of a significant event and an extended period without full road access should be expected. In this instance essential services may need to be provided via water access. This will need to be worked through as part of the HAP planning. The current proposal is the reinstatement of roads, improved risk mitigation and response planning.
- People were interested in the marine infrastructure and thought it needed to be made so people could easily set up/ install private marine access going forward.
- People felt that improvements were needed at Havelock, and the Waitaria Bay wharf needed to be fixed.

- There was a suggestion to make Waitaria a local marine hub.
- People on Queen Charlotte Drive seemed happy with the session and information provided.
- It was raised that Marine Focus would not work for those who did not live close to the water.
- Road safety concerns were raised, and it was noted that the repairs needed to be emphasised as a priority.

Zoom Online

On Monday 26 June, from 5:30 pm – 7:00 pm, approximately 52 people attended and roughly 53 questions and comments were responded to.

Rai Valley

On Tuesday 27 June, from 10:00 am – 12:00 pm, approximately 60 people attended. A summary is below:

- 41 written comments were received. 12 related to the French Pass zone, seven to the Pelorus zone, 1 to the Kenepuru zone, and 1 to the Port Underwood zone.
- Road maintenance was a key topic of several conversations.
- Maintenance (or lack thereof) came through strongly.
- A suggestion came in that the culverts should be numbered.
- It was noted that there was no mechanism to charge aquaculture trucks for using the roads.
- Generally, people seemed on board with the EPO.

Nelson

On Tuesday 27 June, from 3:00 pm – 5:00 pm, approximately 80 people attended. A summary is below:

- 11 written comments were received, and all related to the French Pass area.
- The need for maintenance came through strongly again.
- Most people were satisfied with the EPO.
- Some suggestions about adding a local marine hub at Te Mahia.
- Lots of comments on the safety of some of the roads in French Pass, particularly the road out to Port Ligar.
 - There was a request for better delineation through edge marker posts, barrier or something similar.
- Several questions were around vehicle restrictions.
- When there are length restrictions on vehicles does that mean no access for stock trucks or other longer trucks?

- In any instance where we say there may be length restrictions, most vehicles longer than the length restrictions would be able to get through but are not able to remain in their own lane, there is also going to be more single lane sections. It is likely they will require a pilot vehicle. There is also likely to be weight restrictions on some sections of road.

Picton

On Wednesday 28 June 12:00 pm – 2:00 pm, approximately 50 people attended. A summary is below:

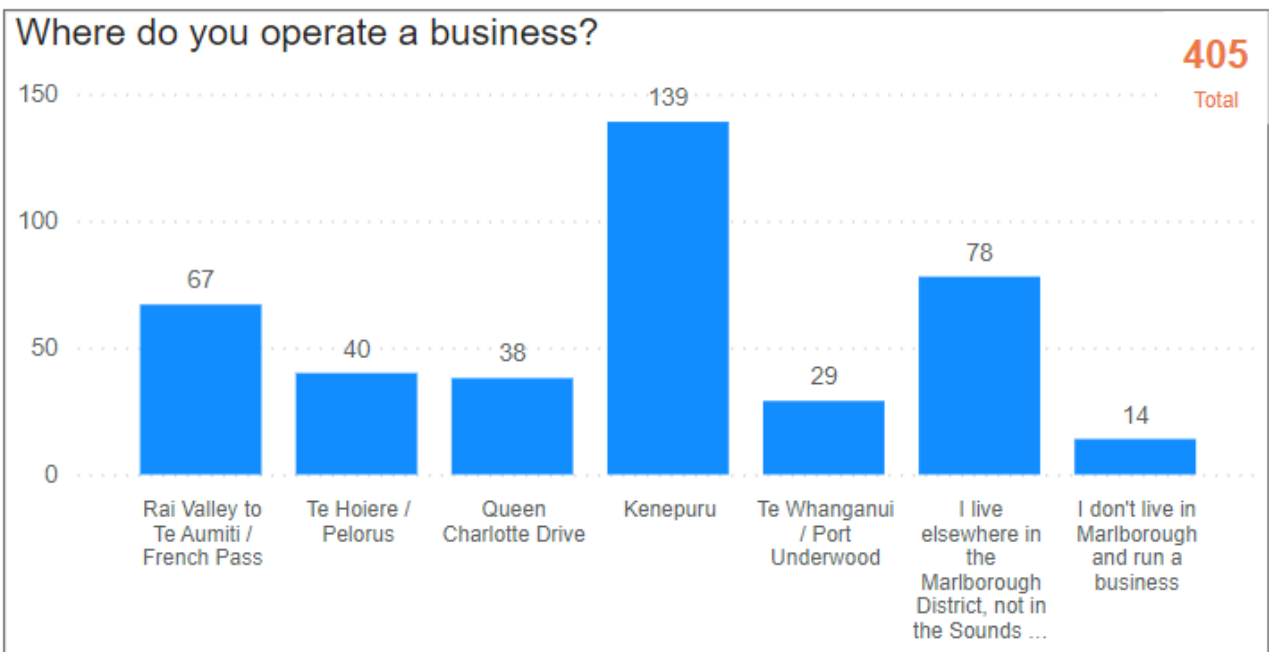
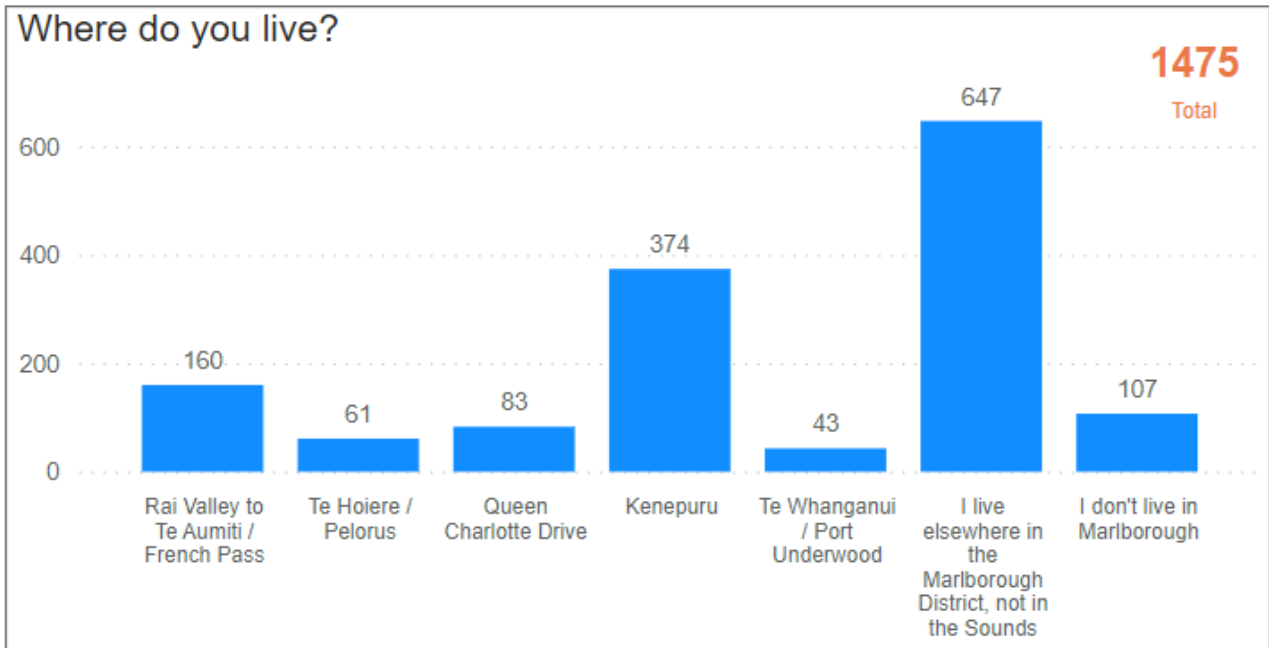
- 24 written comments were received. 12 related to the Kenepuru zone, six to the Port Underwood zone, four to the French Pass zone, one to the Pelorus zone, and one to the Queen Charlotte zone.
- Several people had questions about targeted rates and funding.
- There were conversations around restricting logging vehicles.
- There was some discussion around final location of the proposed new marine hub under HAP and some people thought this would be needed sooner rather than later.
- Generally, people seemed onboard with the EPO.

Appendix F Wider Community Impacts Survey January 2023 Results Summary



Appendix G Emerging Preferred Option Survey Results

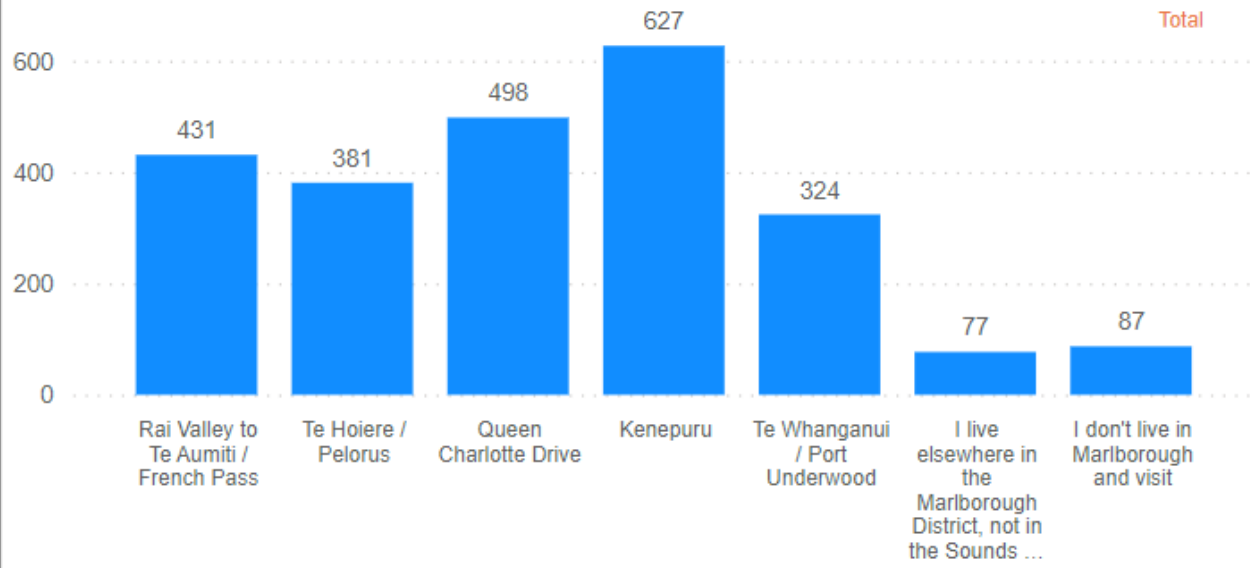
G.1 General Questions



Where do you visit?

2425

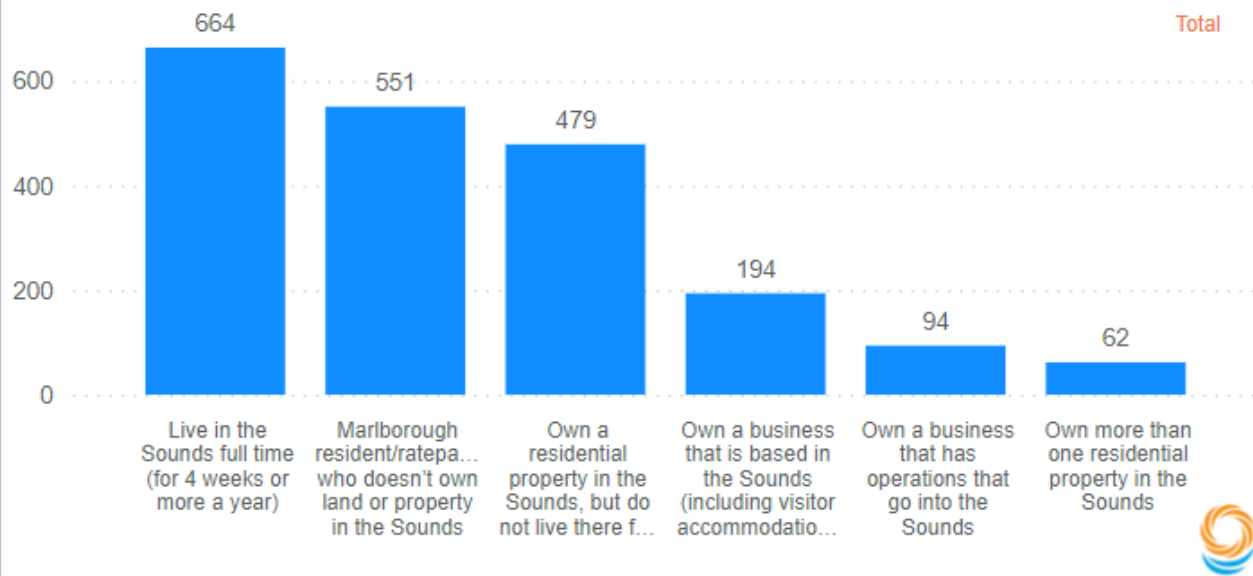
Total



Which best describes you?

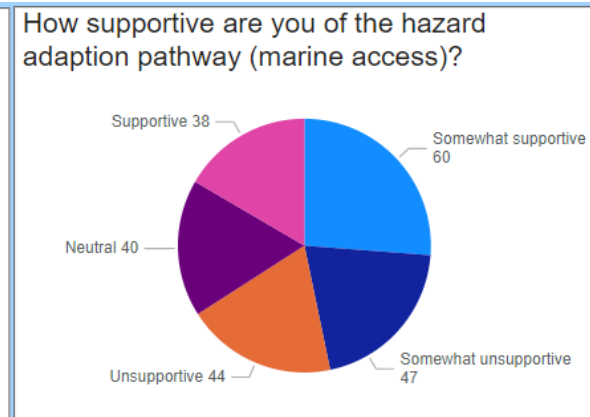
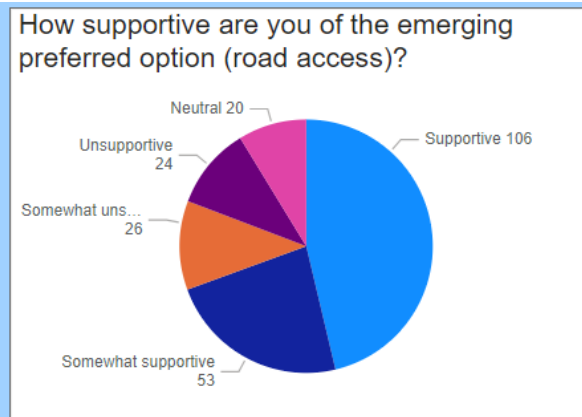
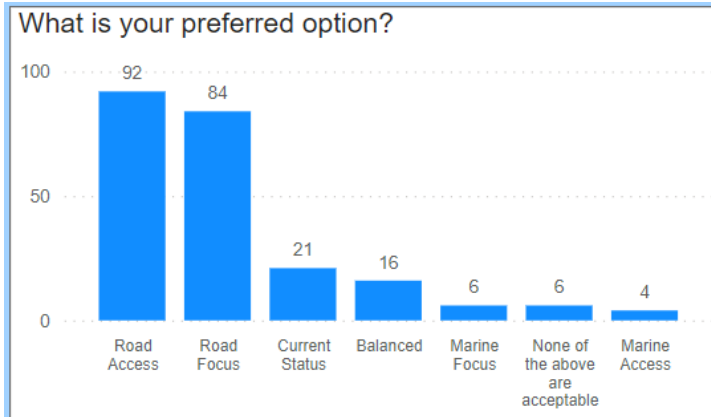
2044

Total

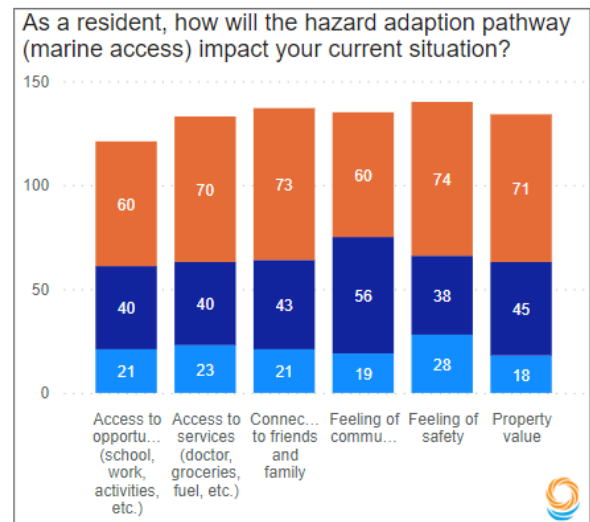
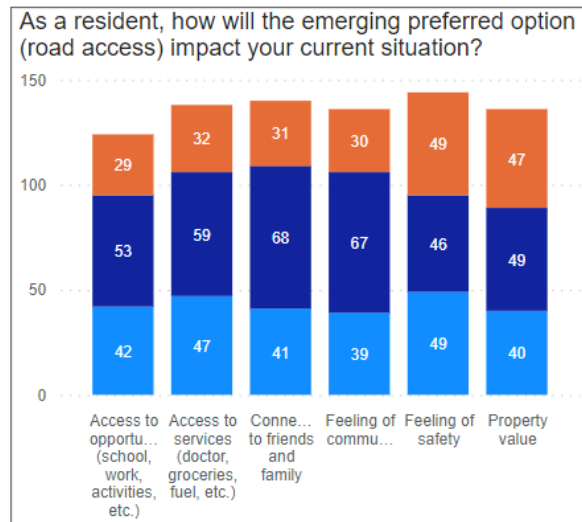
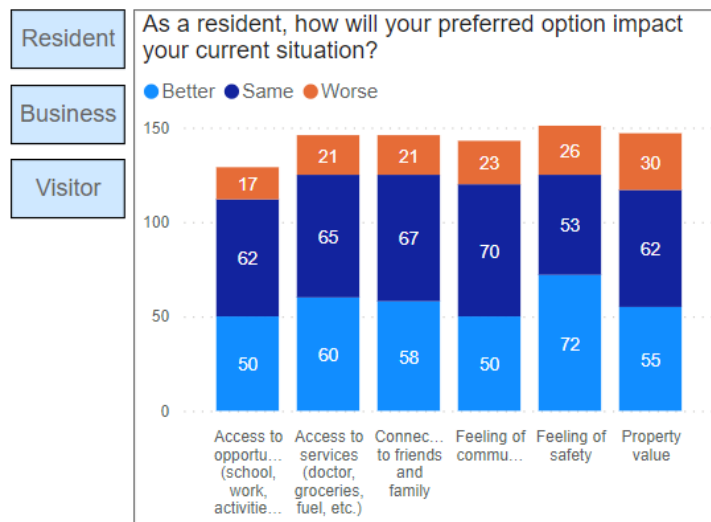


G.2 Te Aumiti/French Pass

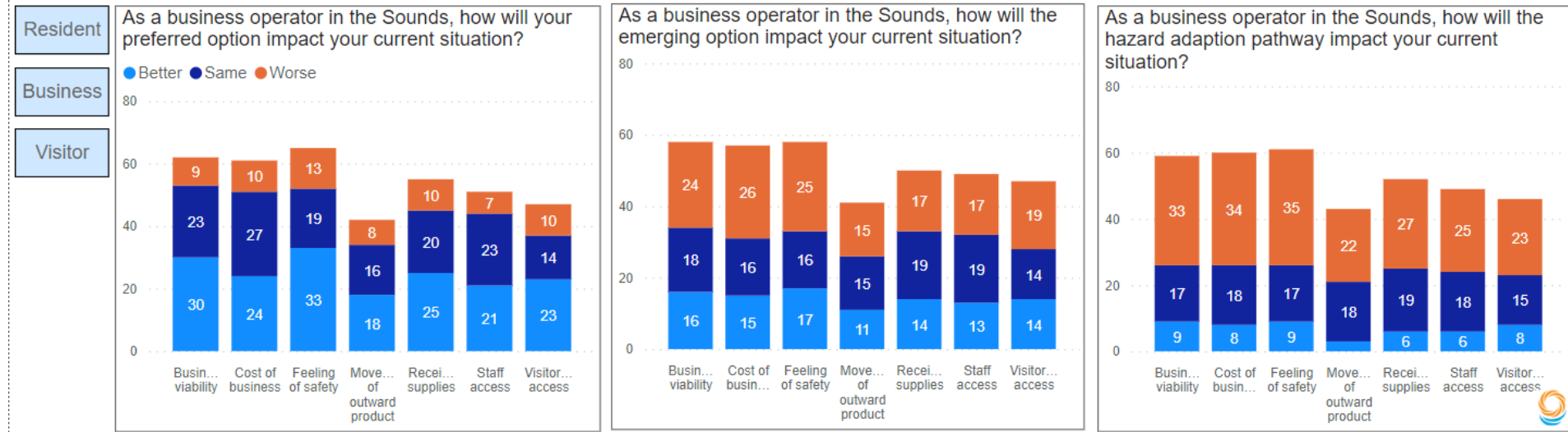
G.2.1 Respondent Option Preference



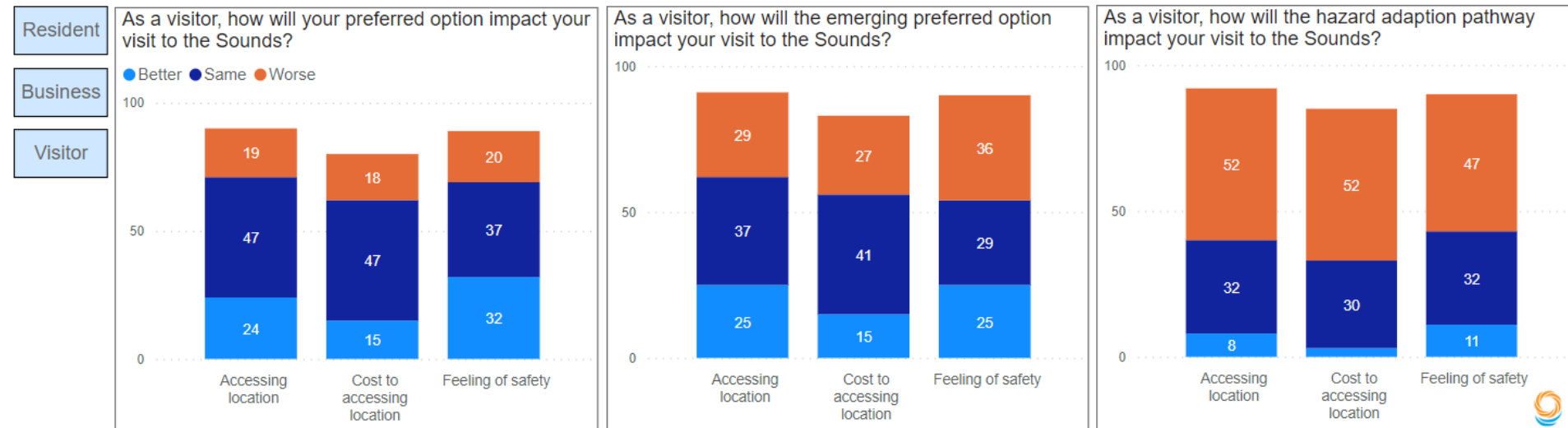
G.2.2 Impacts on Residents



G.2.3 Impacts on Businesses

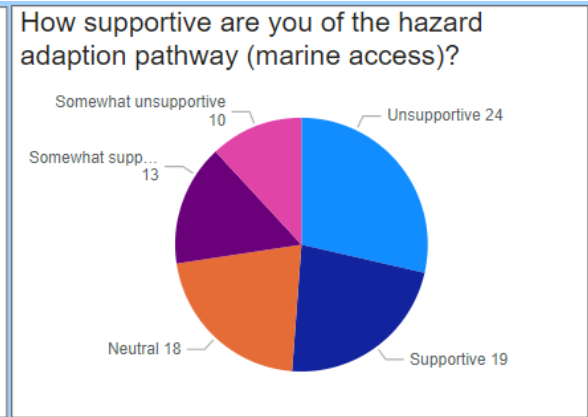
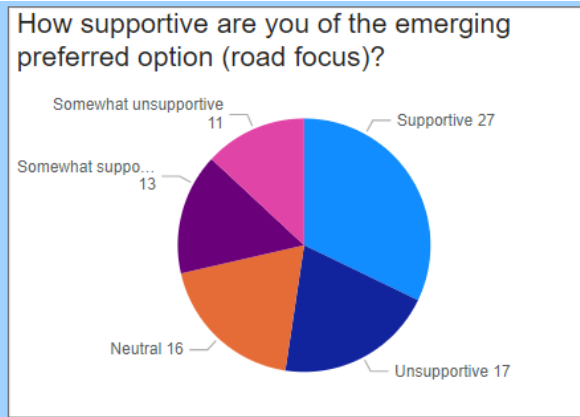
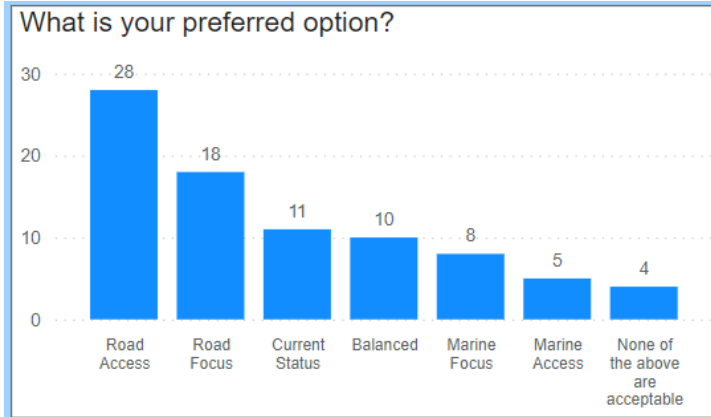


G.2.4 Impacts on Visitors

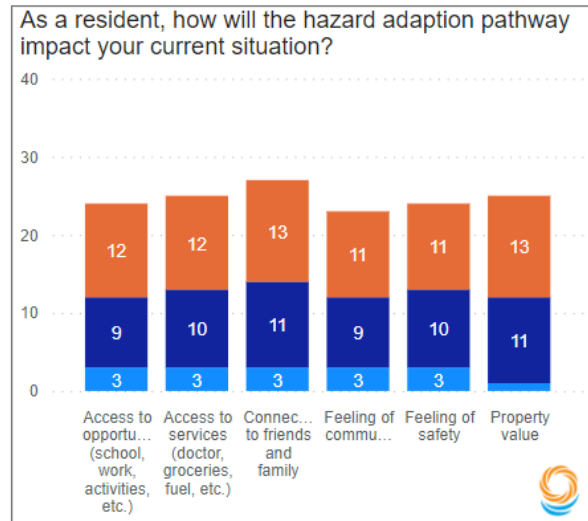
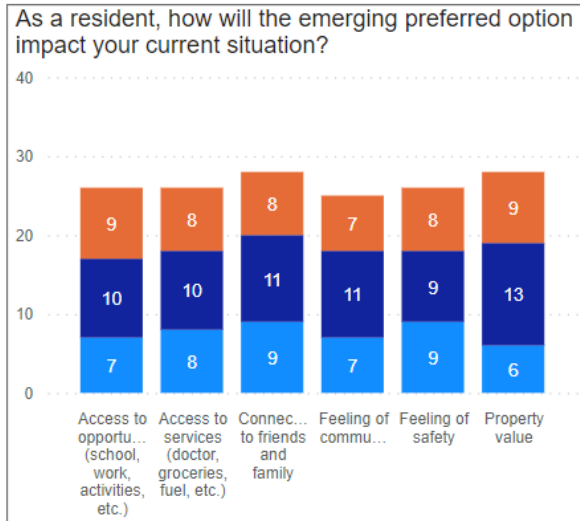
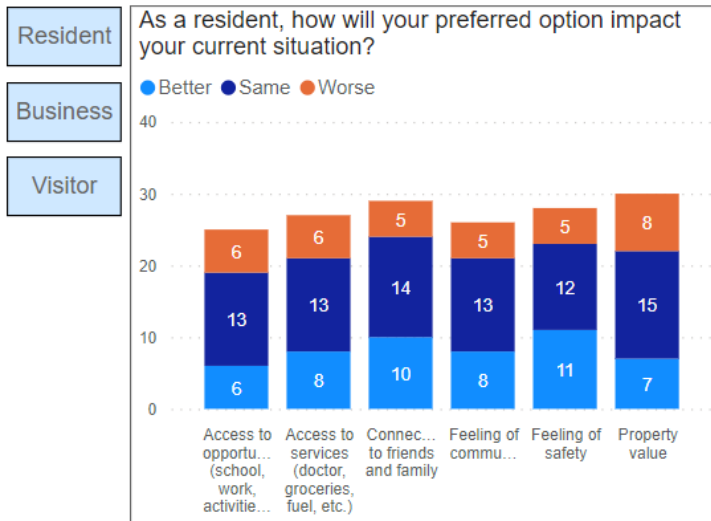


G.3 Te Hoiere/Pelorus

G.3.1 Respondent Option Preference

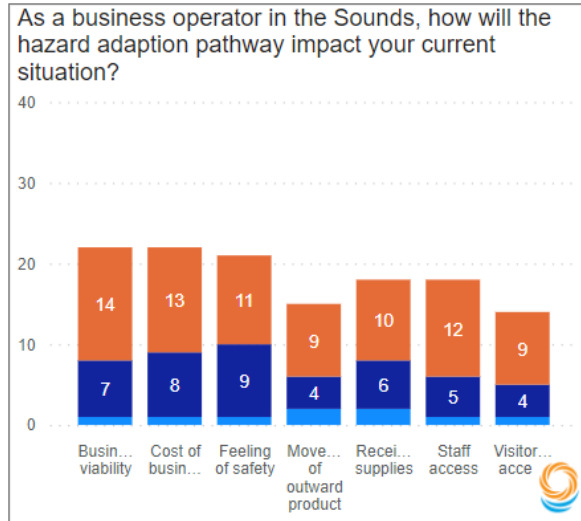
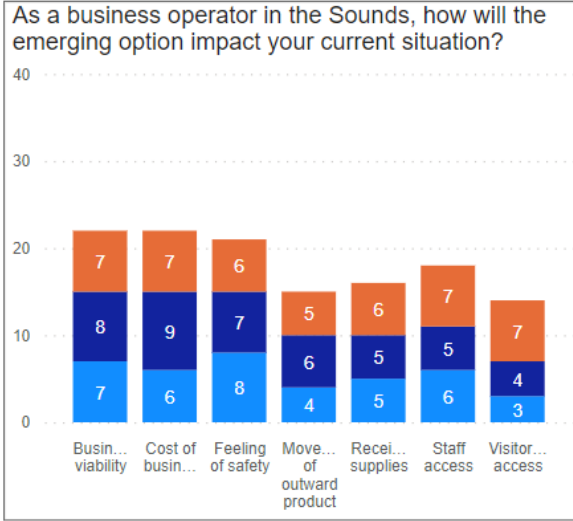
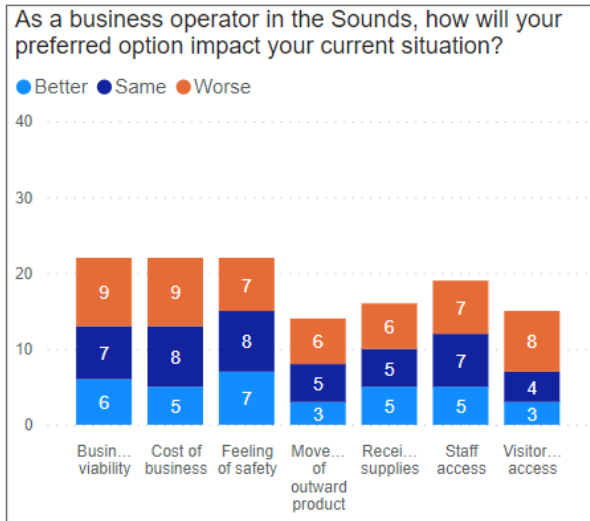


G.3.2 Impacts on Residents



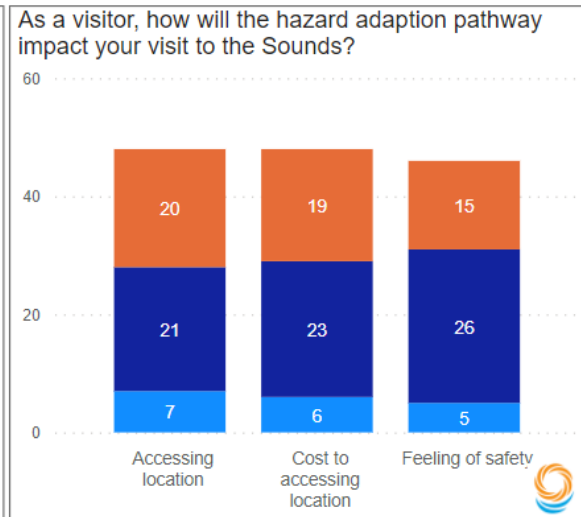
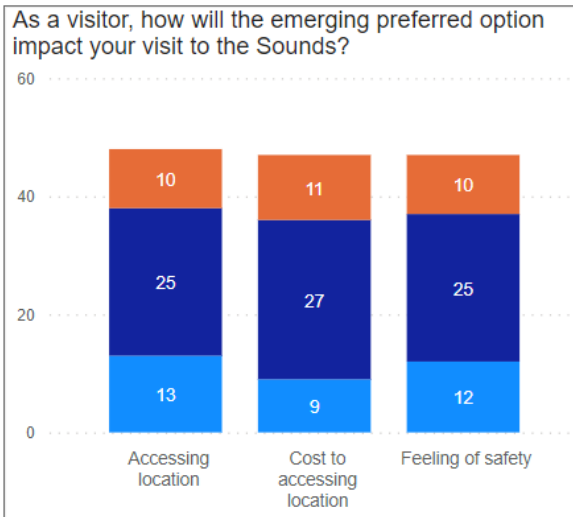
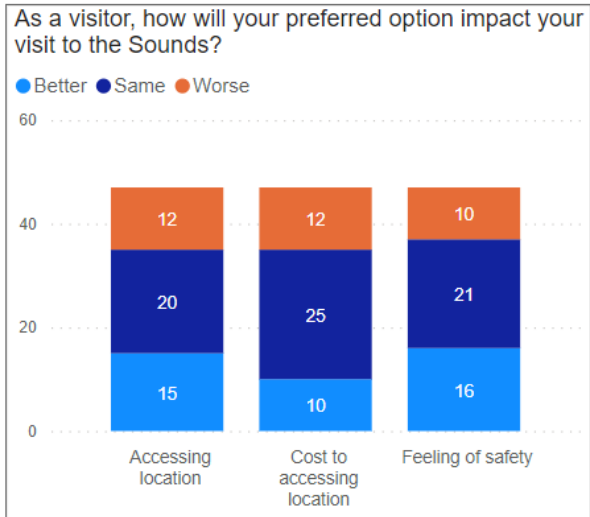
G.3.3 Impacts on Businesses

- Resident
- Business
- Visitor



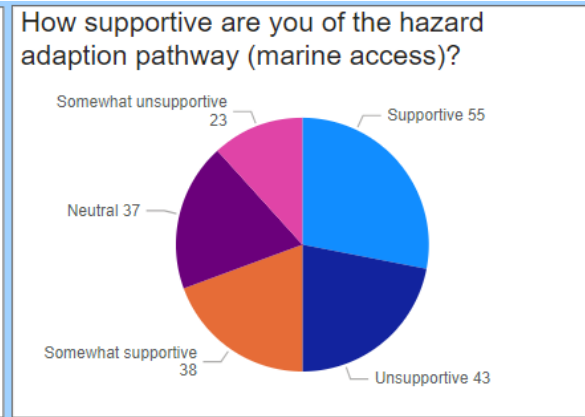
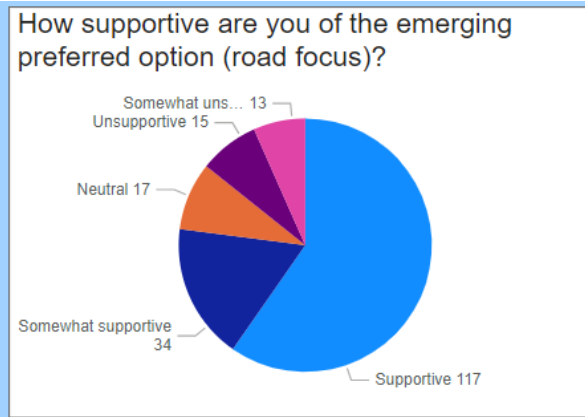
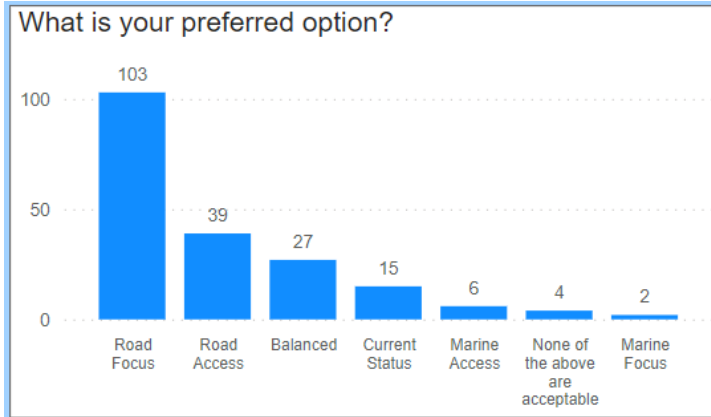
G.3.4 Impacts on Visitors

- Resident
- Business
- Visitor

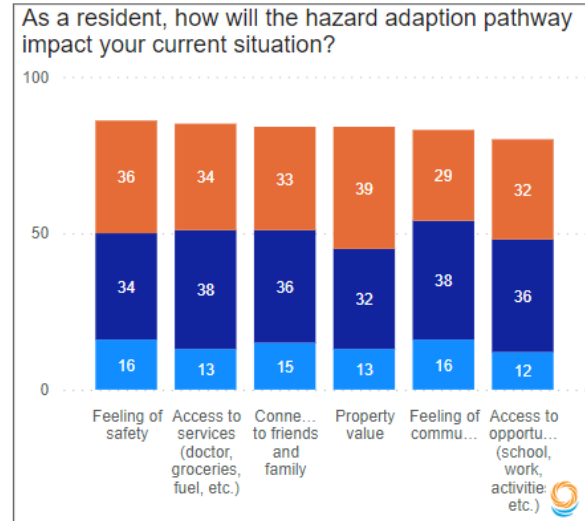
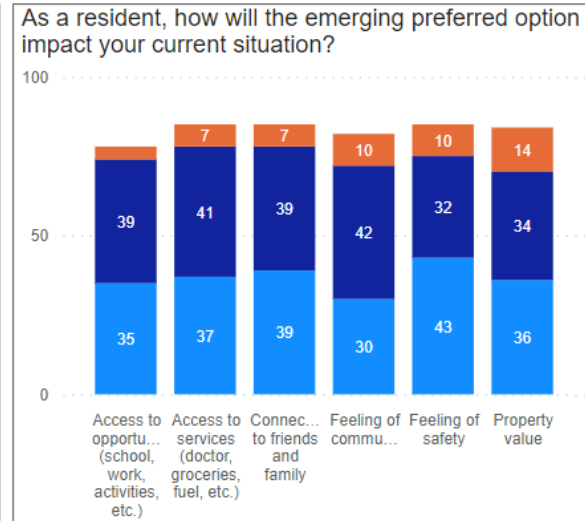
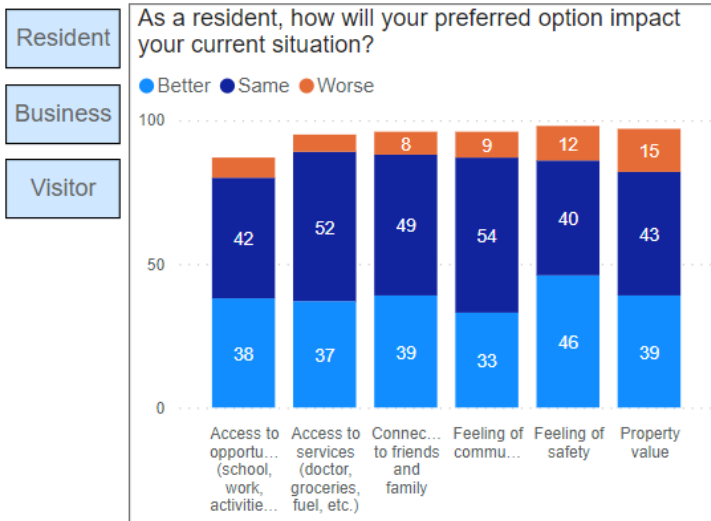


G.4 Queen Charlotte

G.4.1 Respondent Option Preference

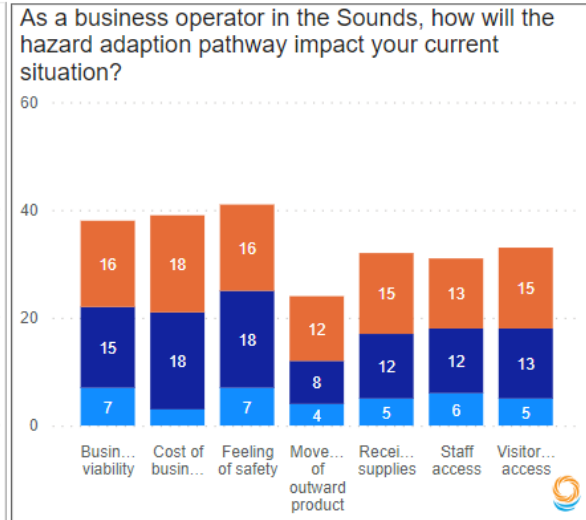
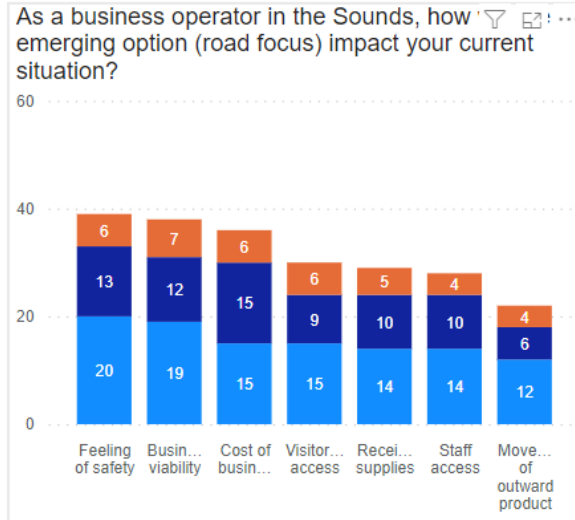
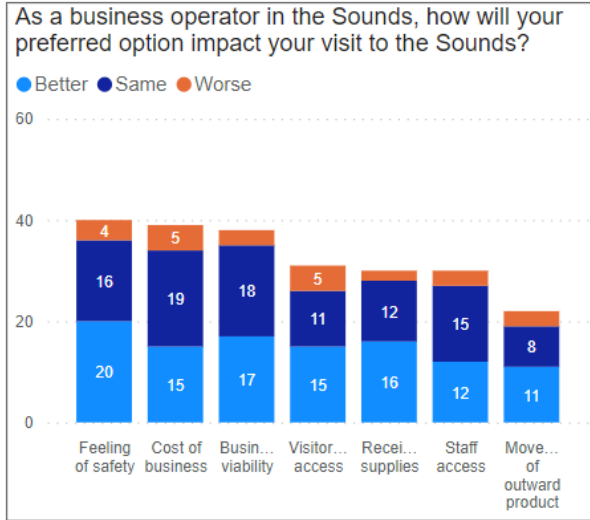


G.4.2 Impacts on Residents



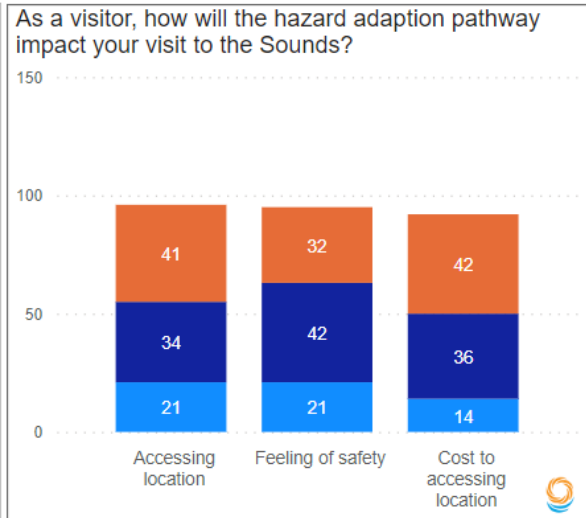
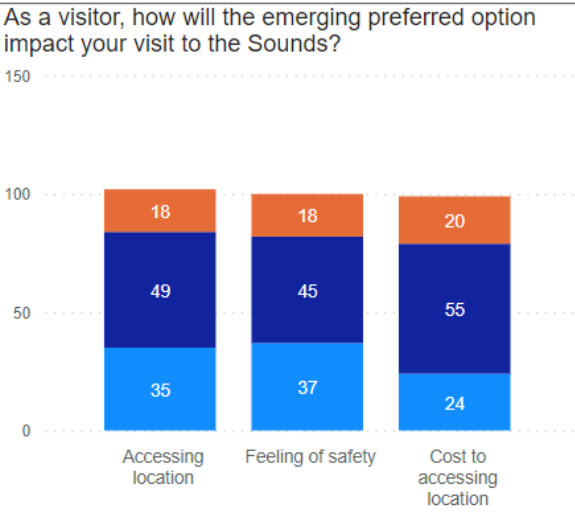
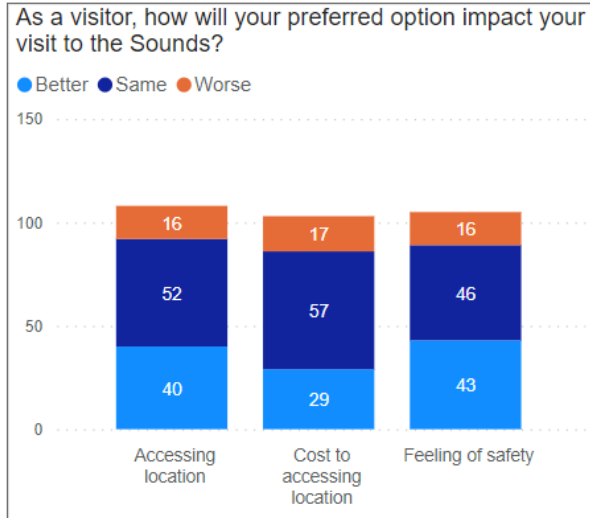
G.4.3 Impacts on Businesses

- Resident
- Business
- Visitor



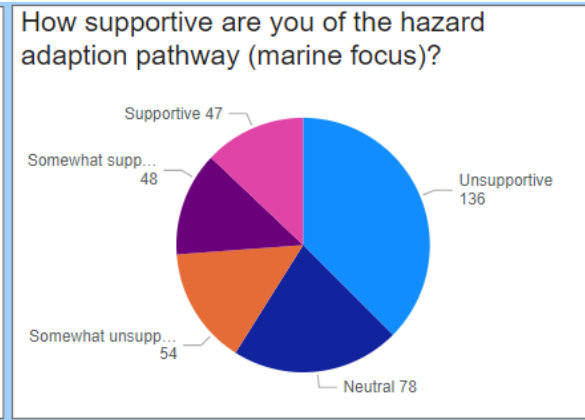
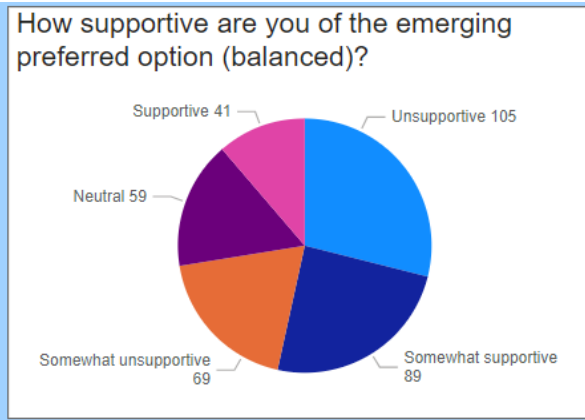
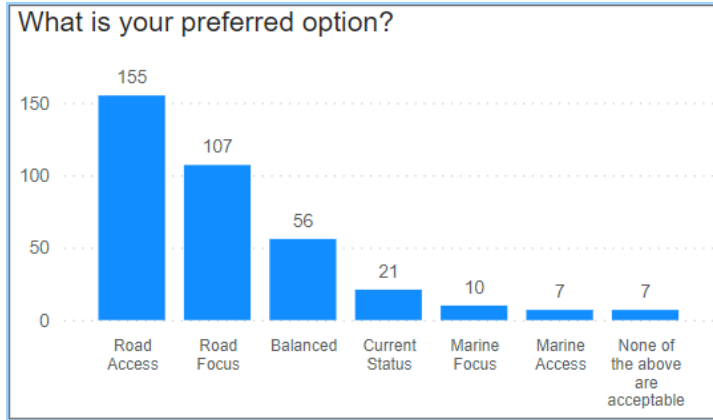
G.4.4 Impacts on Visitors

- Resident
- Business
- Visitor

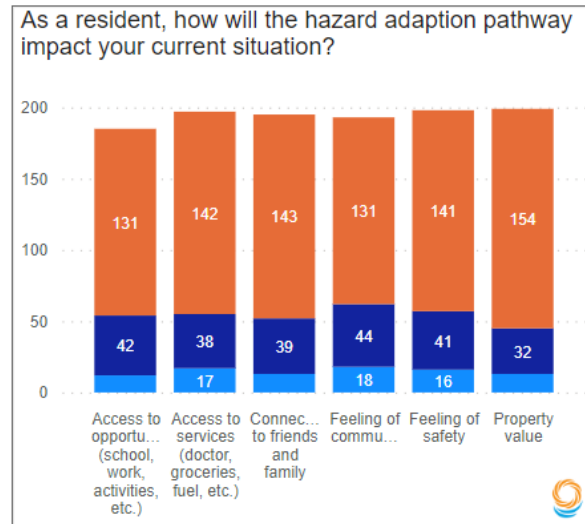
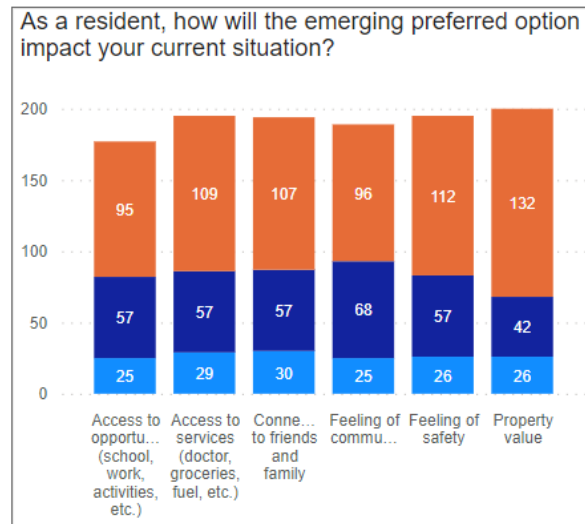
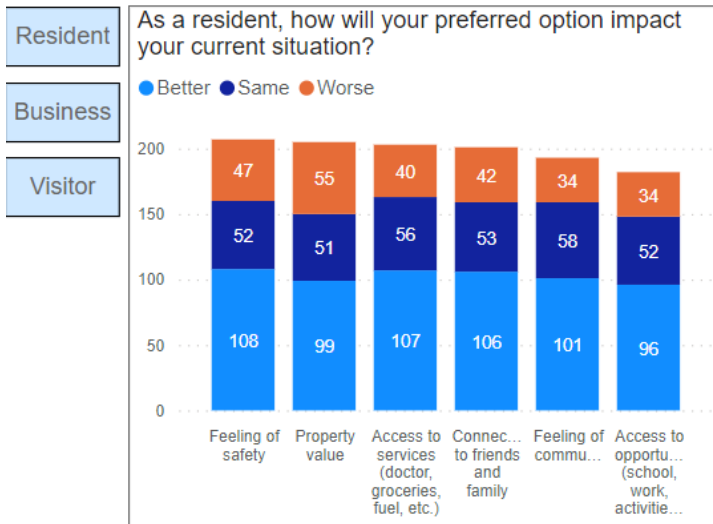


G.5 Kenepuru

G.5.1 Respondents Option Preference

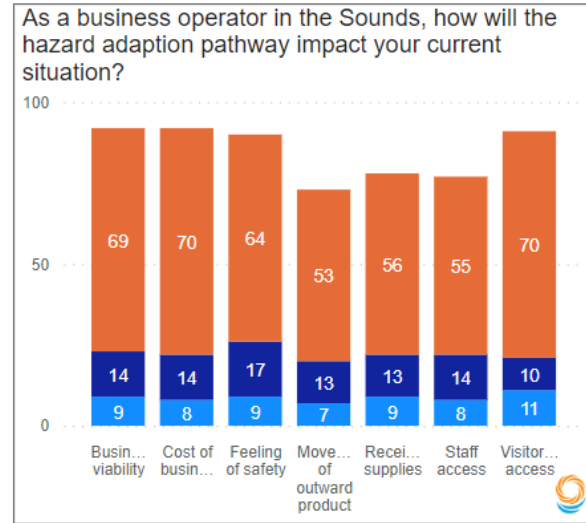
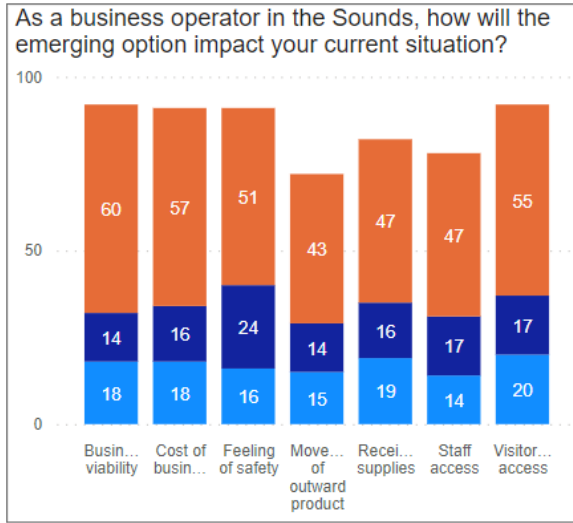
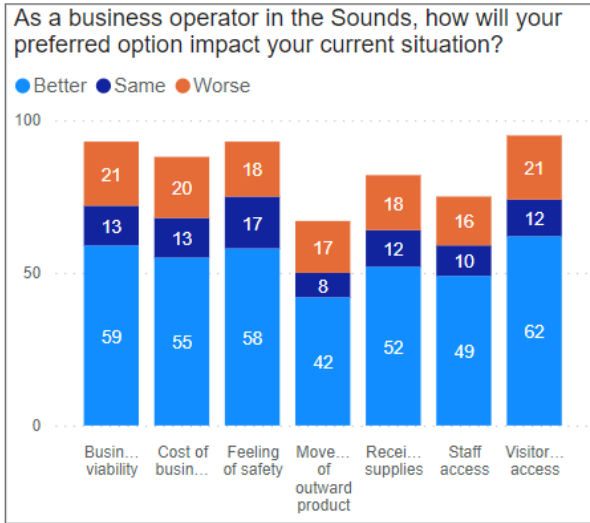


G.5.2 Impacts on Residents



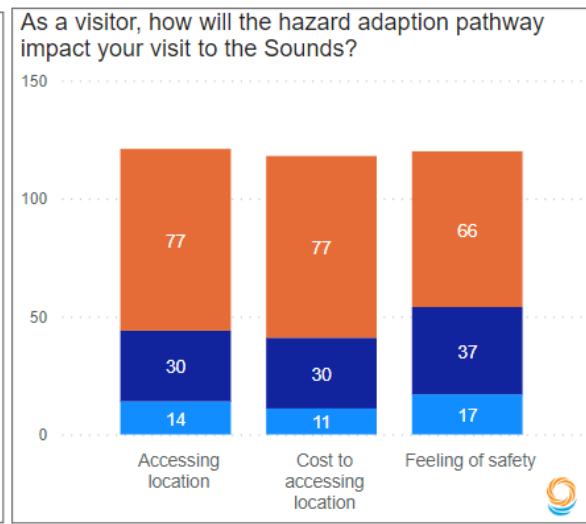
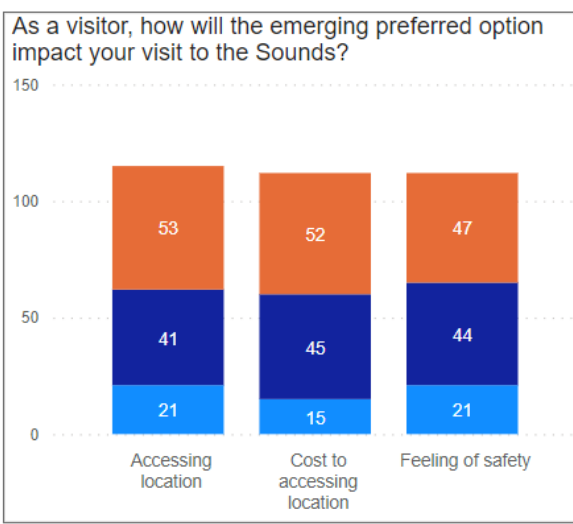
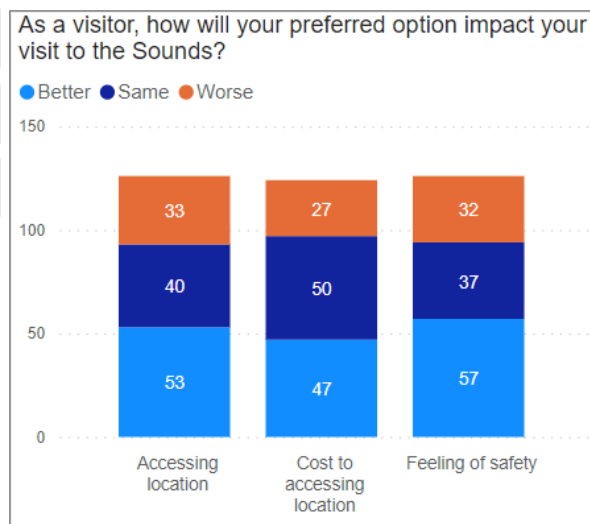
G.5.3 Impacts on Businesses

- Resident
- Business
- Visitor



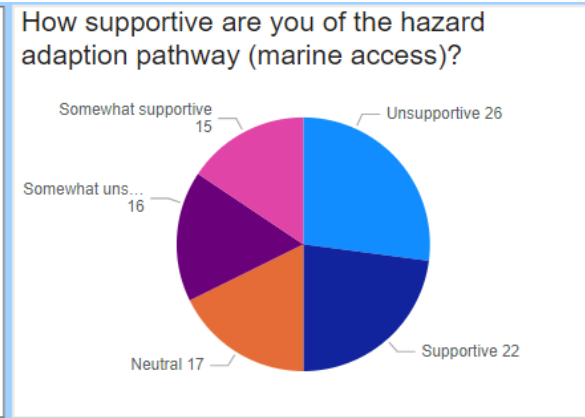
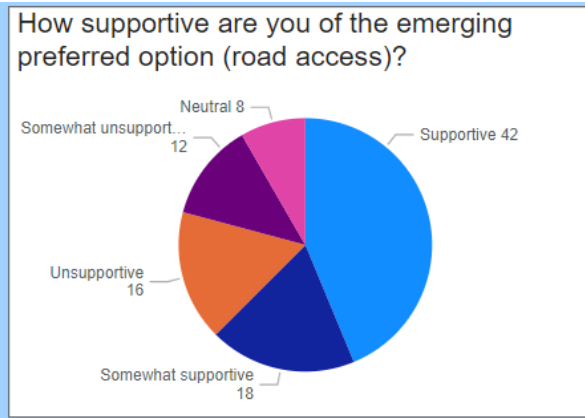
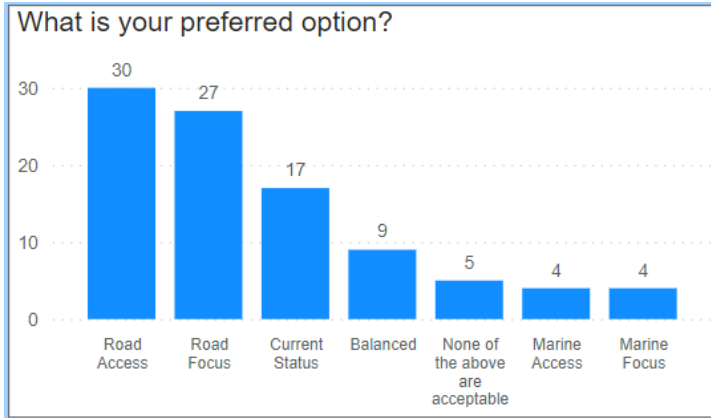
G.5.4 Impacts on Visitors

- Resident
- Business
- Visitor

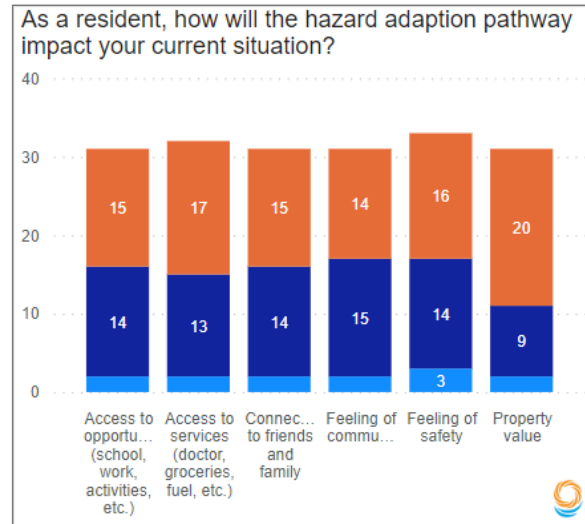
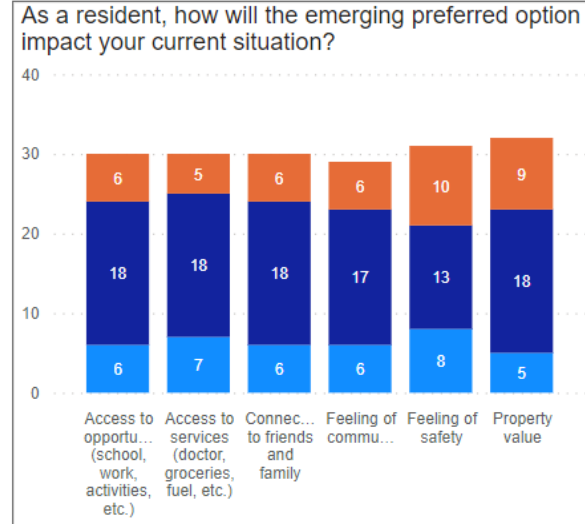
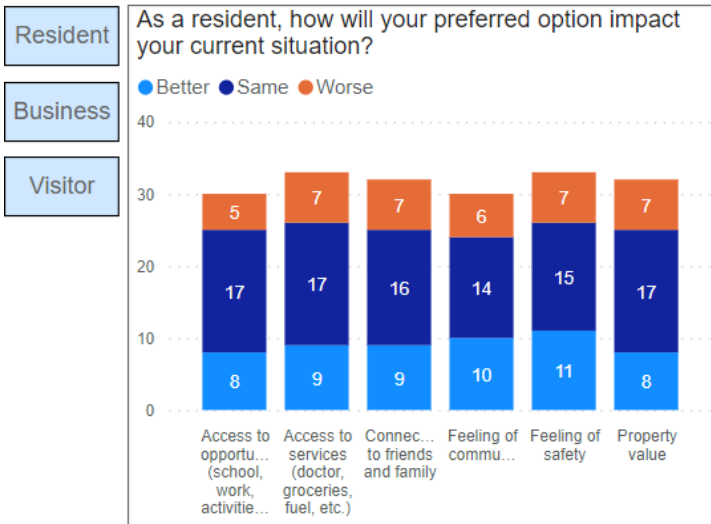


G.6 Te Whanganui/Port Underwood

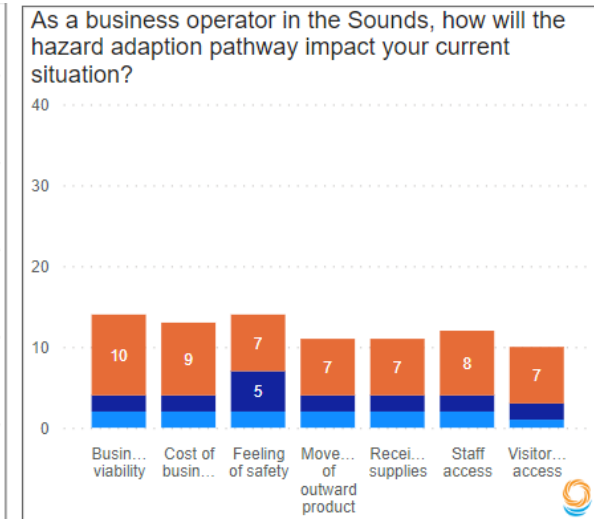
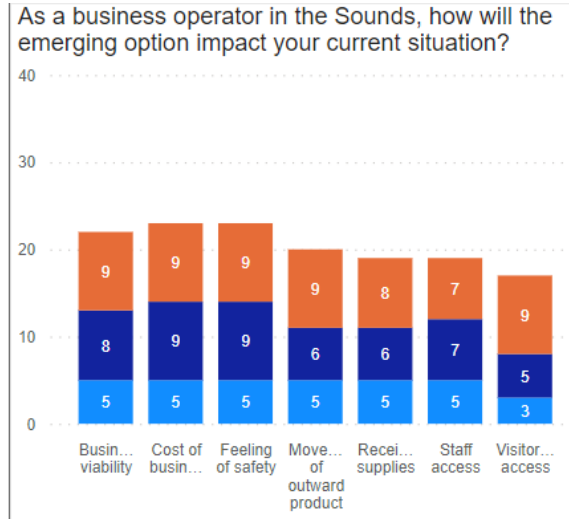
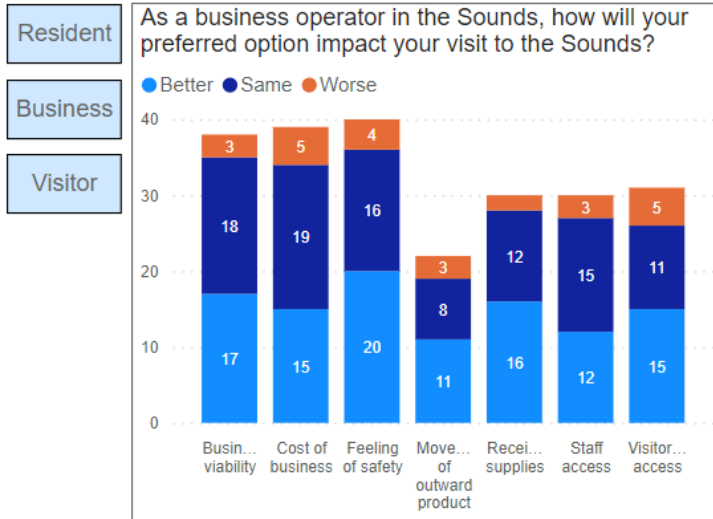
G.6.1 Respondents Option Preference



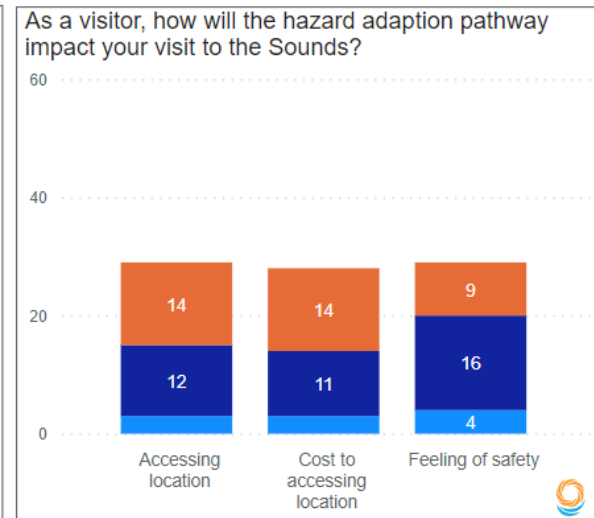
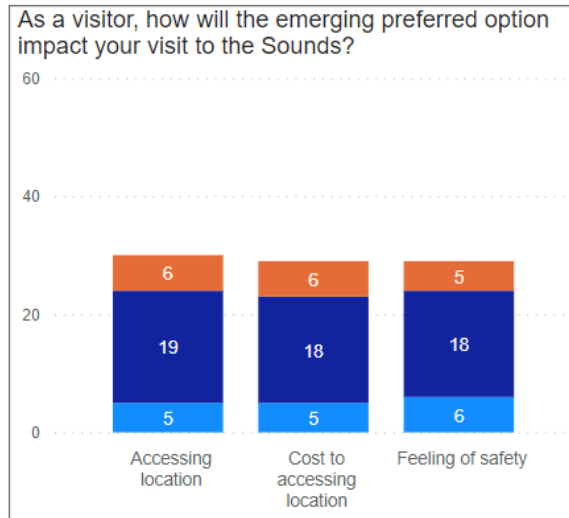
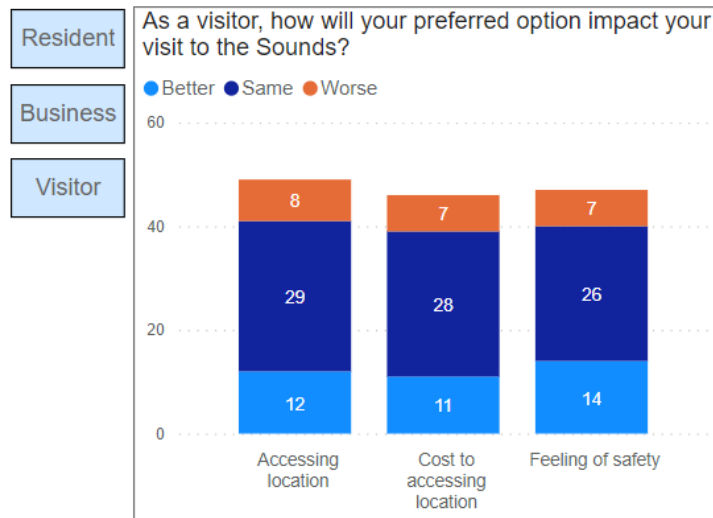
G.6.2 Impacts on Residents



G.6.3 Impacts on Businesses

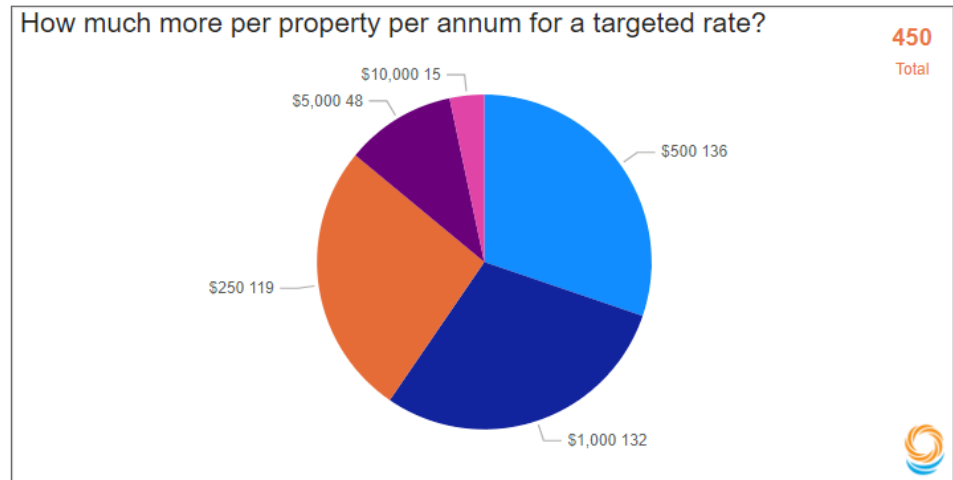
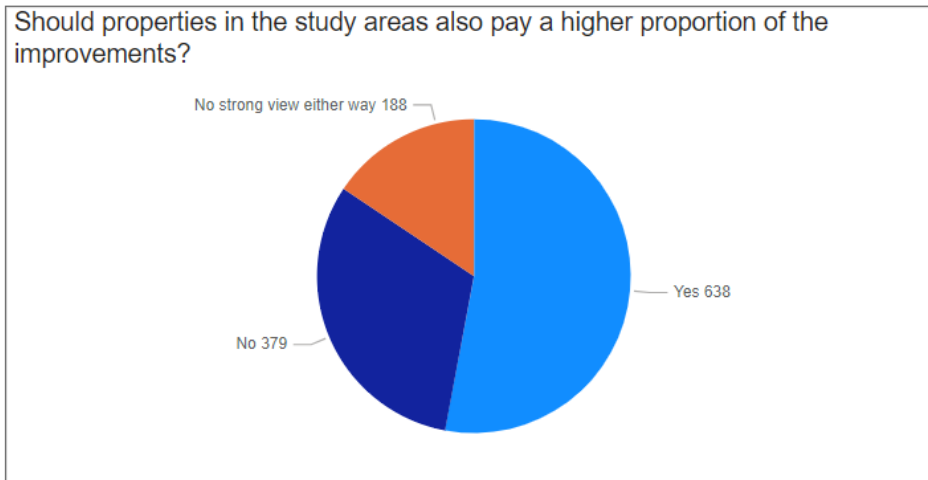
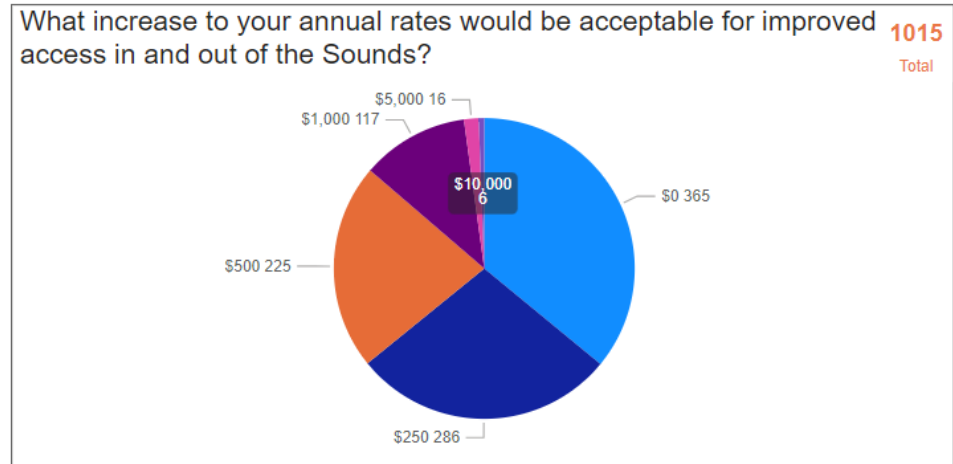
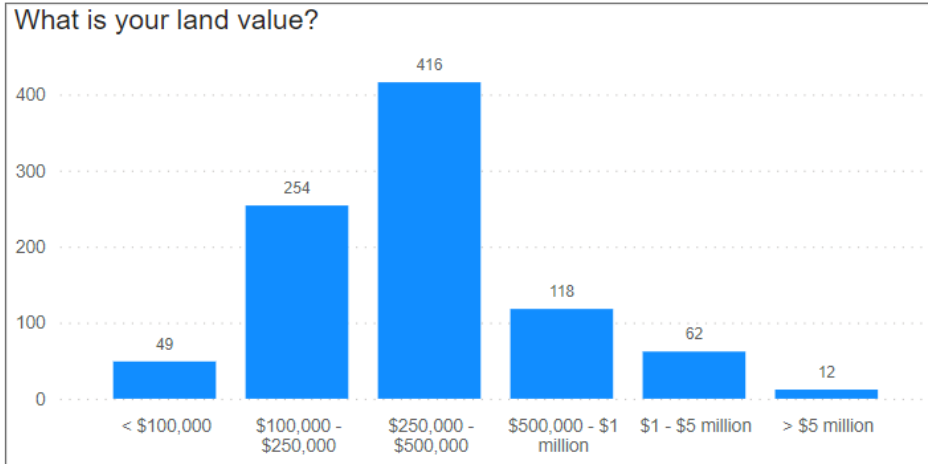


G.6.4 Impacts on Visitors



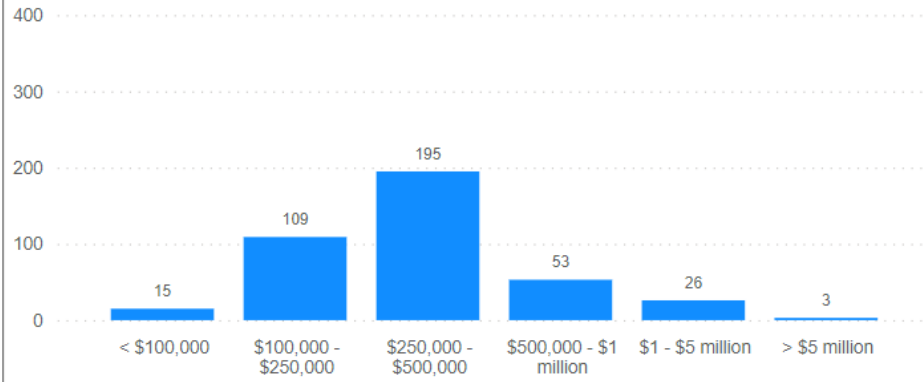
G.7 Rating Impact

G.7.1 All respondents



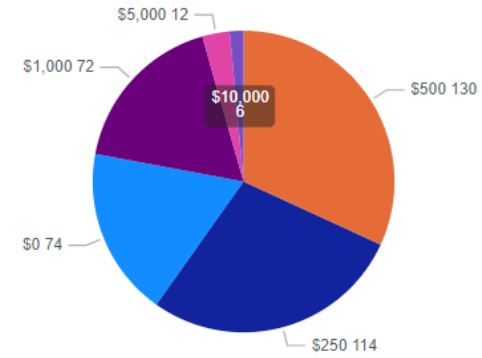
G.7.2 Live in the Sounds

What is your land value?

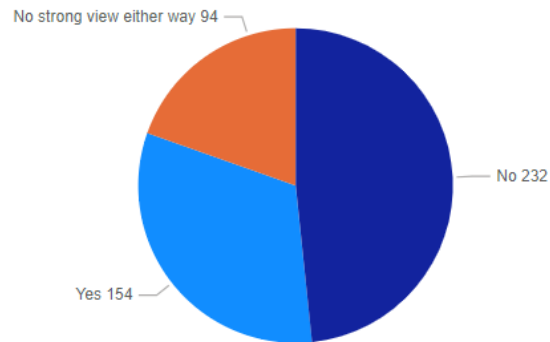


What increase to your annual rates would be acceptable for improved access in and out of the Sounds?

408
Total

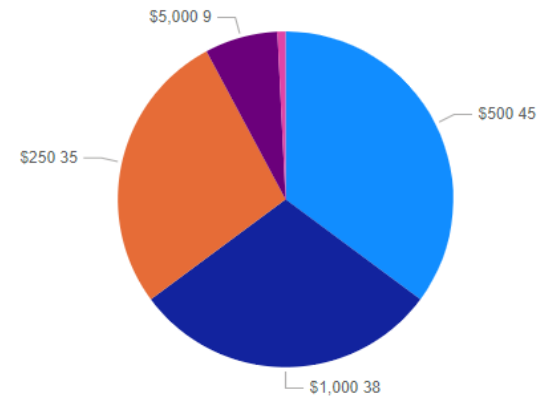


Should properties in the study areas also pay a higher proportion of the improvements?

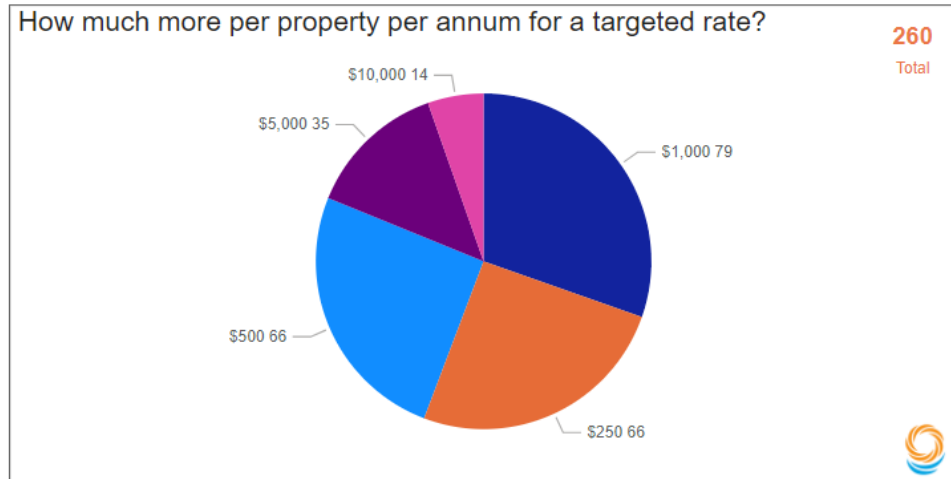
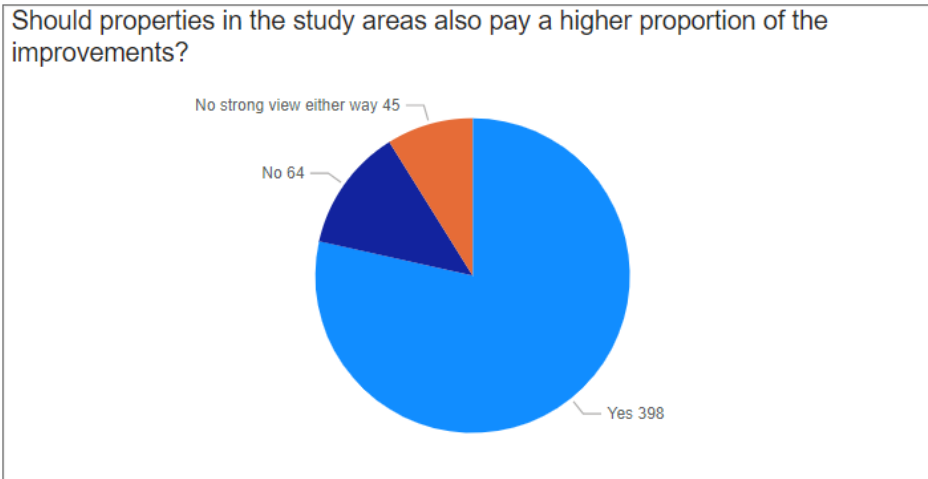
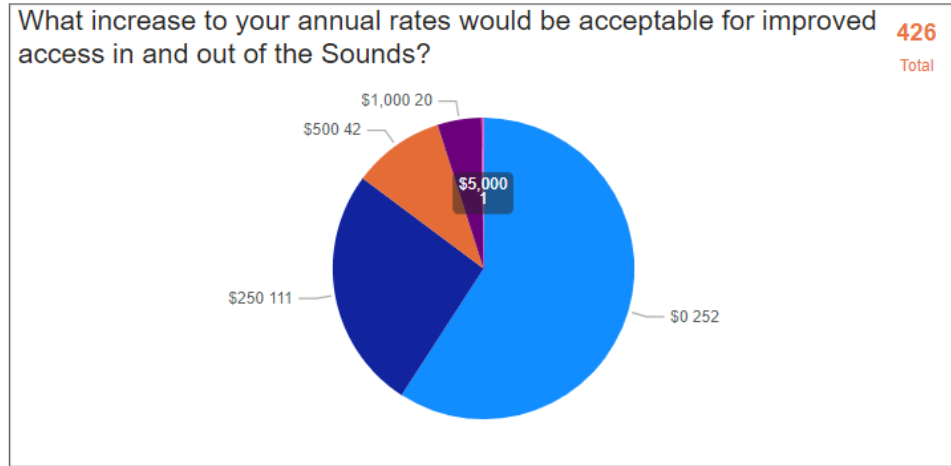
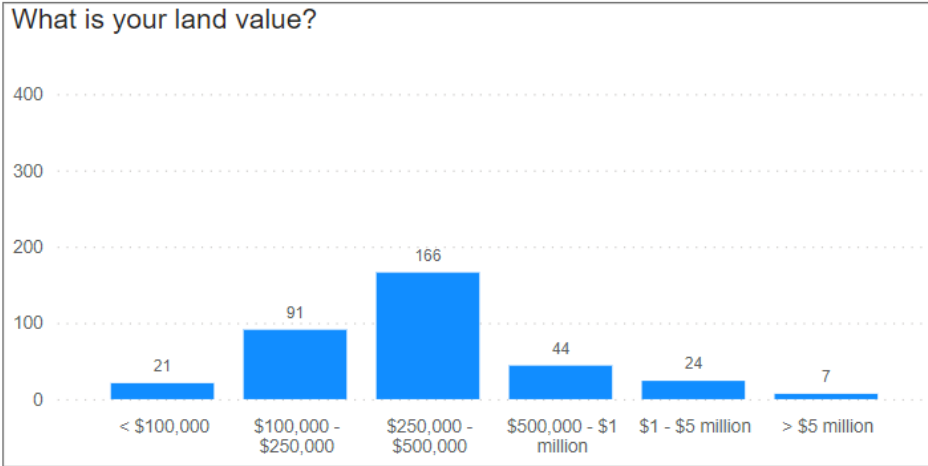


How much more per property per annum for a targeted rate?

128
Total

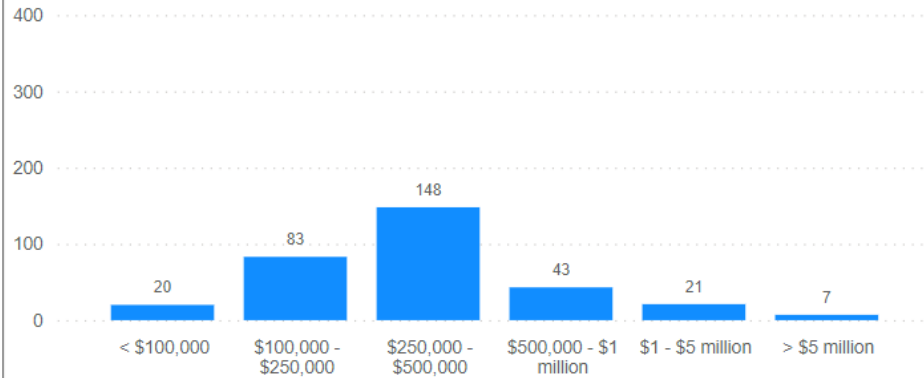


G.7.3 Live Outside the Sounds (including those outside of Marlborough)



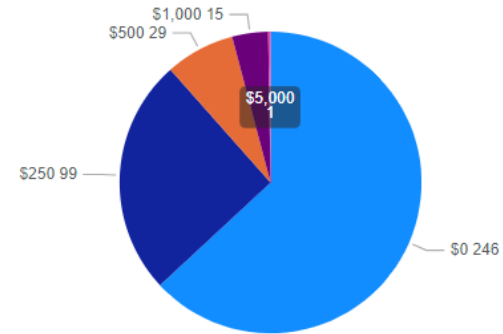
G.7.4 Live Outside the Sounds in Marlborough

What is your land value?

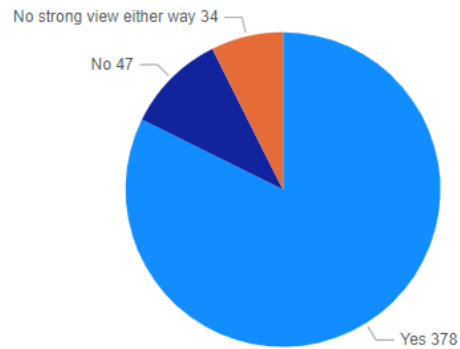


What increase to your annual rates would be acceptable for improved access in and out of the Sounds?

390
Total

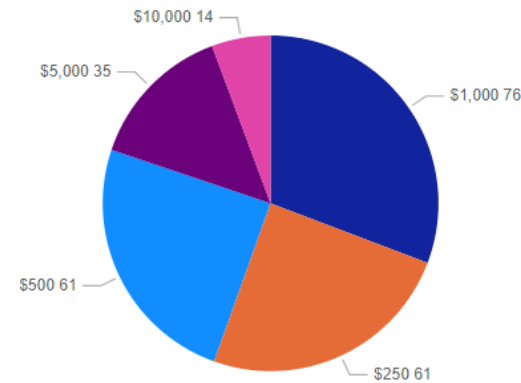


Should properties in the study areas also pay a higher proportion of the improvements?



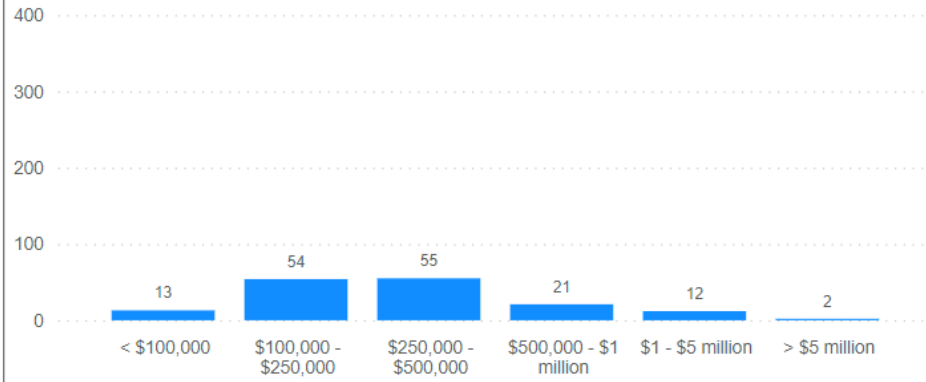
How much more per property per annum for a targeted rate?

247
Total



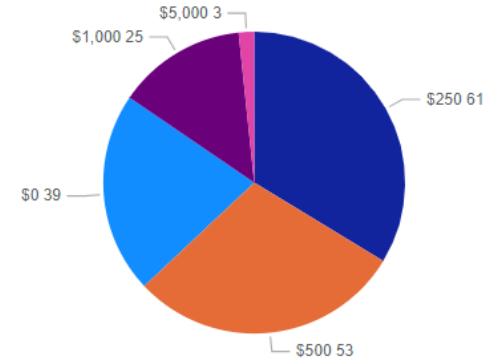
G.7.5 Residence not stated

What is your land value?

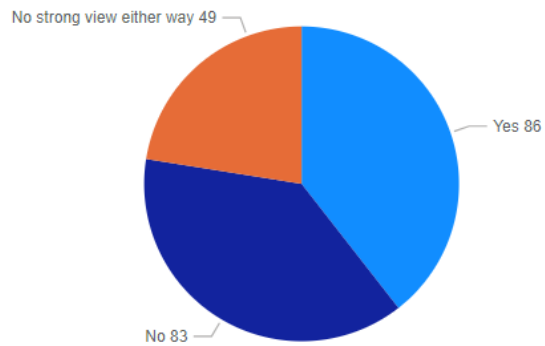


What increase to your annual rates would be acceptable for improved access in and out of the Sounds?

181
Total

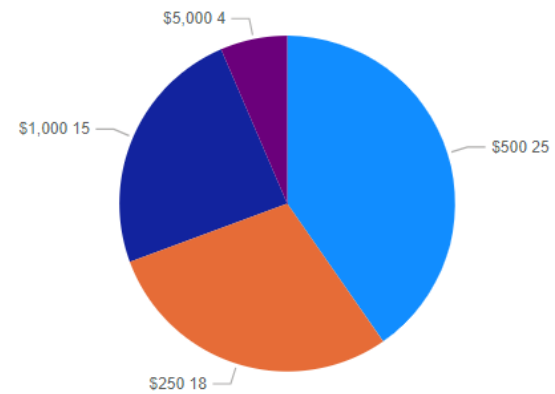


Should properties in the study areas also pay a higher proportion of the improvements?



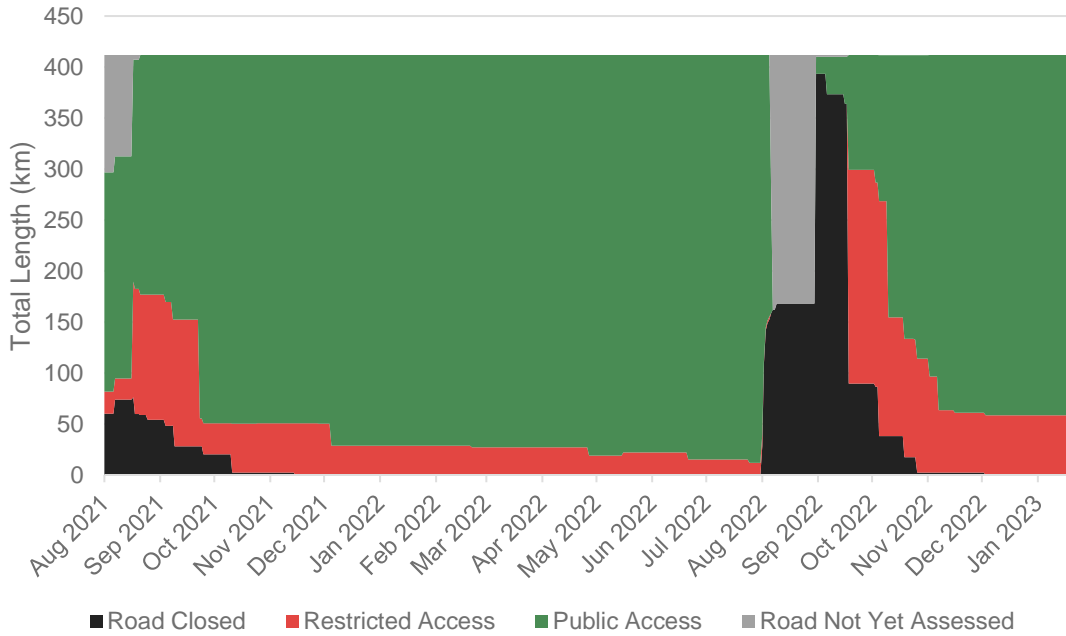
How much more per property per annum for a targeted rate?

62
Total

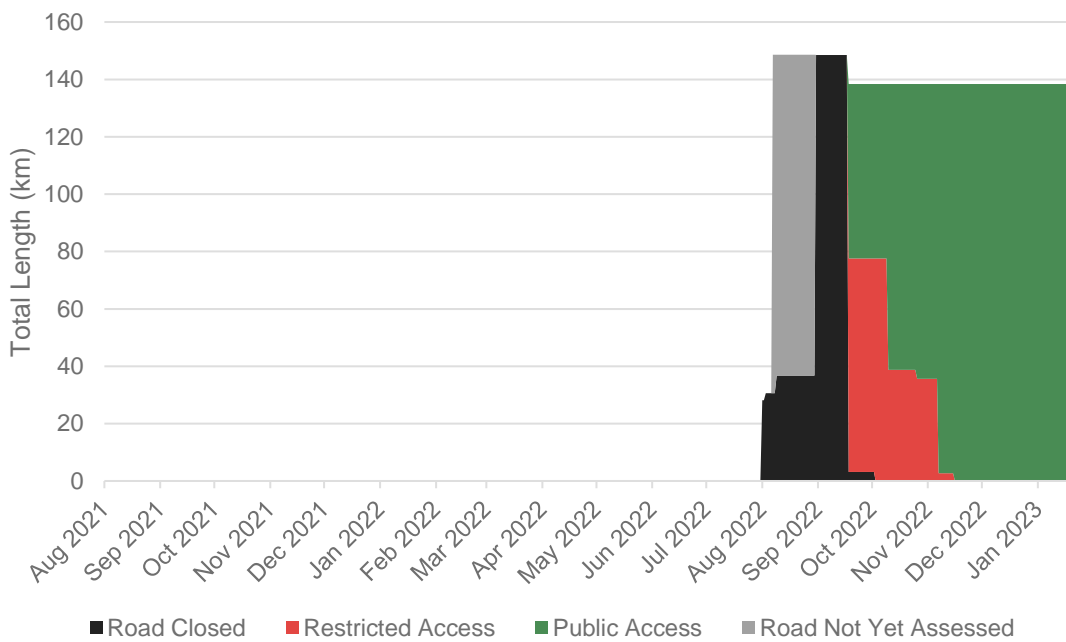


Appendix H Road Status Graphs Following 2021 Event

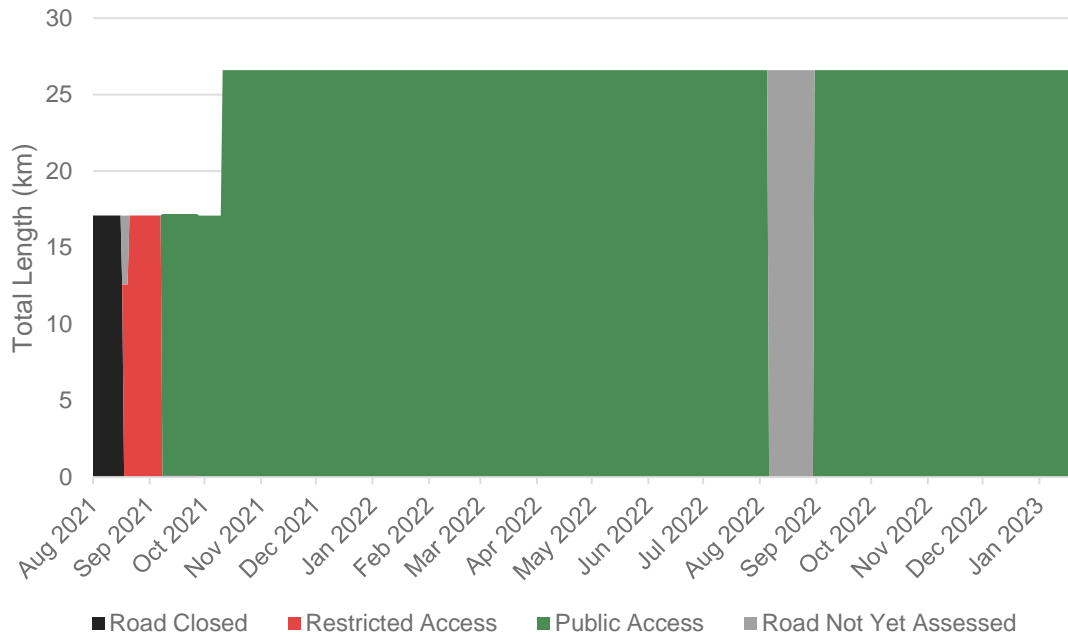
H.1 The Sounds



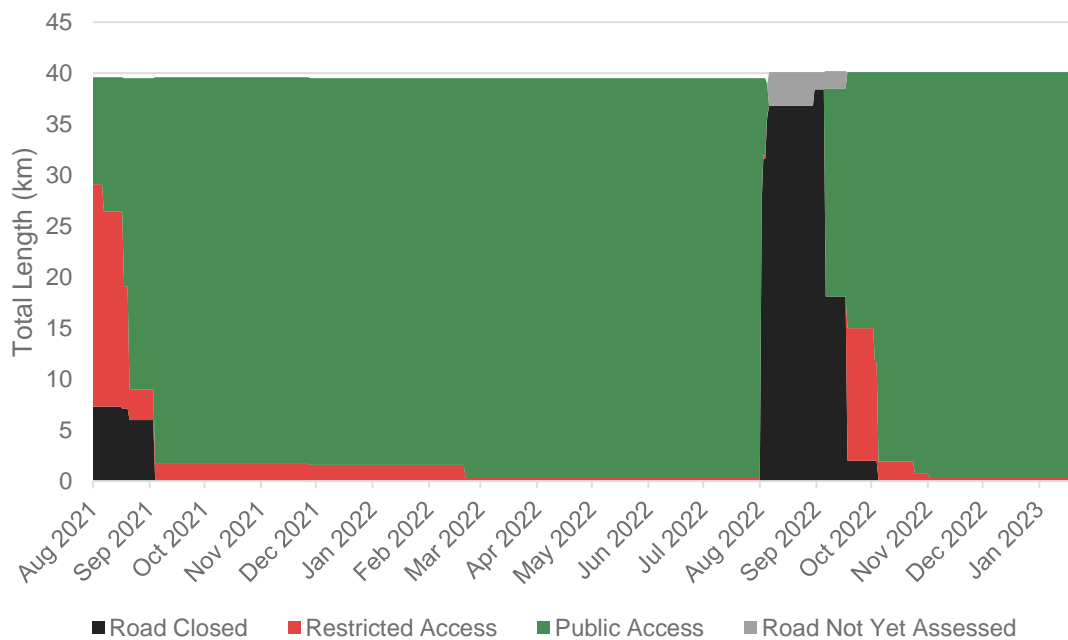
H.2 Te Aumiti/French Pass



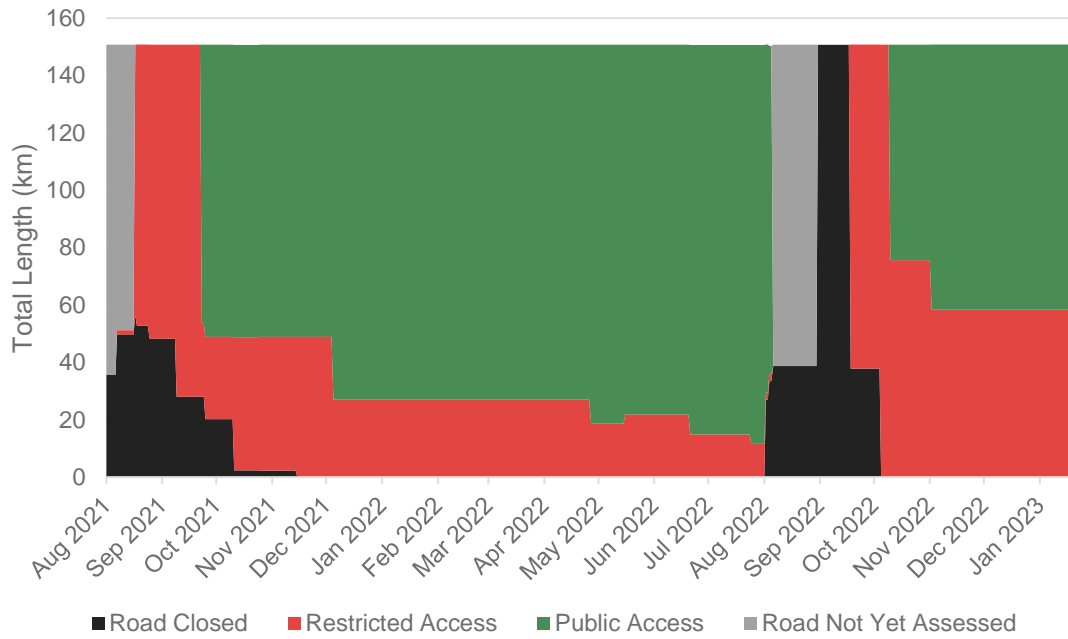
H.3 Te Hoiere/Pelorus



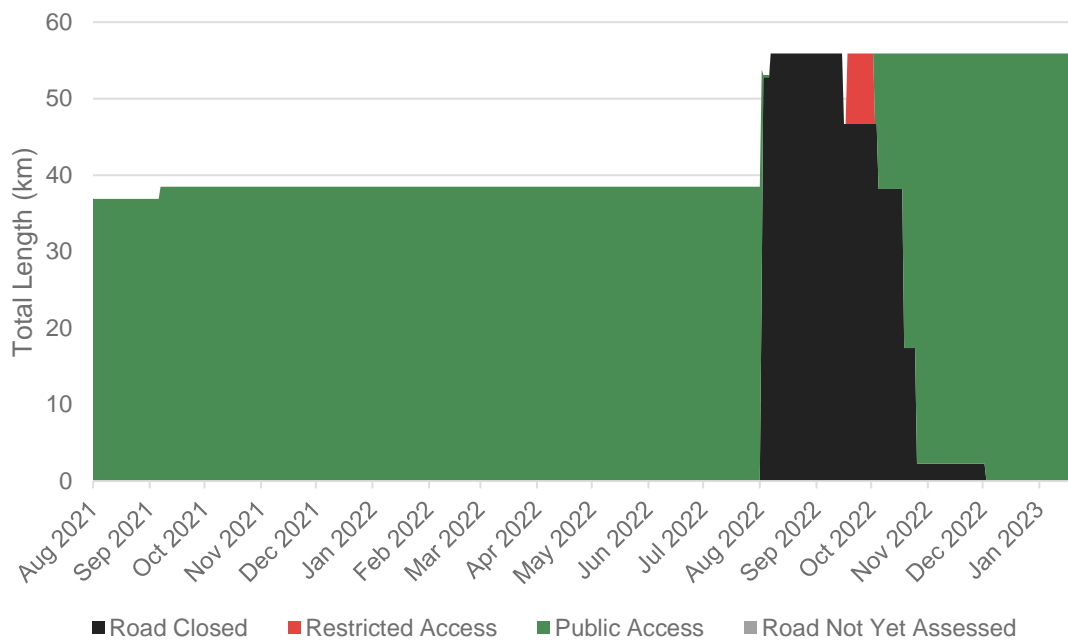
H.4 Queen Charlotte



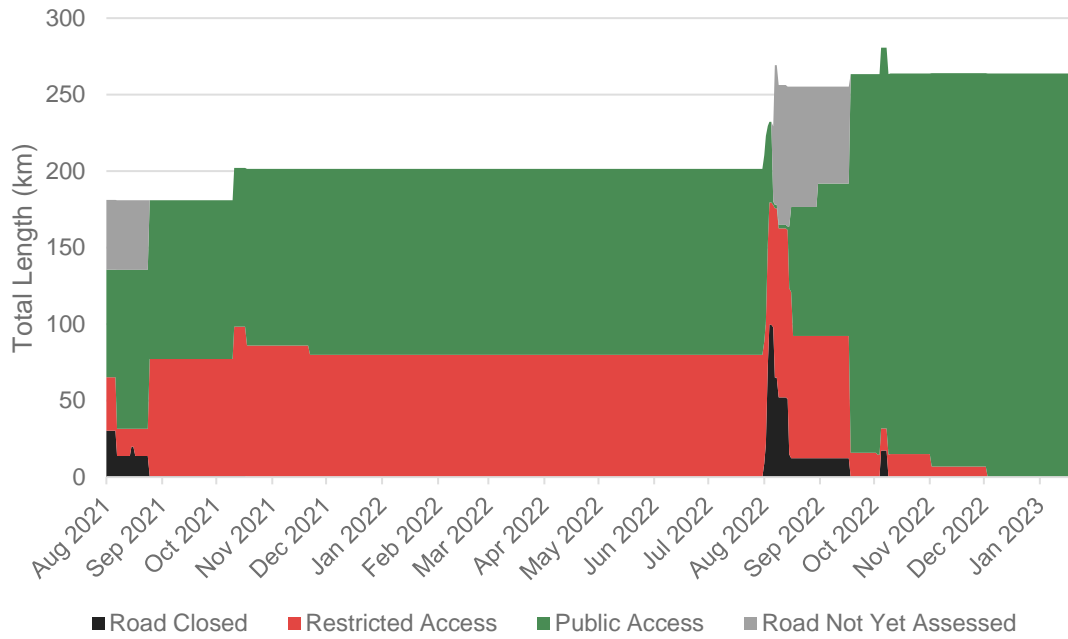
H.5 Kenepuru



H.6 Te Whanganui/Port Underwood



H.7 Outside the Sounds



Appendix I Social Health and Impact Assessment



Sounds Future Access Study

Social and Health Impact Assessment Technical Note

	Name	Position	Signature	Date
Prepared by:	Yadi Wang	Economist	YW	03/04/2023
Reviewed by:	Kyle Barrie	Practice Leader – Economics	KB	05/04/2023
Approved by:	Kyle Barrie	Practice Leader – Economics	KB	05/04/2023

Revision	Date	Description	Prepared	Reviewed	Approved

1 Introduction

- 1.1.1 This technical note sets out an applied methodology for conducting an initial streamlined social and health impact assessment (SHIA) of the proposed infrastructure options set out in the Sound Future Access Programme Business Case (PBC). It then goes on to set out the results of applying that methodology.
- 1.1.2 The approach is as follows:
- **Methodology:** We have reviewed key SHIA guidance documents including from the World Health Organisation (WHO) and the New Zealand Ministry for Health to extract key methods, criteria, and processes that has informed a 'streamlined' SHIA methodology that can be applied to each of the proposed options.
 - **Initial Assessment:** The streamlined approach, at a high-level, has enabled a streamlined assessment of the potential impact on social and health related outcomes of each option. The focus of this assessment will be to inform one part of the multi-criteria assessment (MCA) conducted for each of the proposed options.
 - **Detailed Assessment:** Following the MCA, it is expected that a preferred option will be selected, allowing for a more in-depth assessment of the social and health impact of that option i.e., rather than applying the streamlined approach.
- 1.1.3 This technical note helps provide a transparent assessment in the timescales available to progress the PBC.
- 1.1.4 While it is defined as part of the process in the guidance, no additional community consultation has been undertaken as part of this study to avoid 'consultation fatigue'. In addition to limited time available to complete the initial assessment, there is sufficient information gathered to date – from the consultations and survey – that can help inform the initial and detailed assessments.
- 1.1.5 However, it may be useful as part of the detailed assessment to engage with key Council staff and health representatives to discuss the anticipated effects of the preferred option on the community.

1.2 Methodology Description

- 1.2.1 The NZ Ministry of Health's Guidance on Health Impact Assessment (the *Guidance*) specifies that "health impact assessments draw on the concepts of determinants of health and health outcomes", where understanding the range of determinants and their influences on different health outcomes on communities is important in understanding the impacts.
- 1.2.2 A total of 9 Social and Health determinants were identified to derive 4 Social and Health Impacts that are:
- Family/community wellbeing
 - Mental wellbeing
 - Spiritual wellbeing
 - Physical wellbeing
- 1.2.3 A matrix identifying the connection of determinants of social & health and social & health outcomes is presented in
- 1.2.4
- 1.2.5 Table 1-1 SHIA Matrix

Health Determinants	Health Determinants Specific to policy	Social and Health Impacts/Outcomes			
		Family/Community wellbeing	Mental wellbeing	Spiritual wellbeing	Physical wellbeing
Social and cultural factors	Social support, social cohesion	√	√		
	Social isolation	√	√		
	Participation in community and public affairs	√			
	Family connections	√	√		
	Cultural and spiritual participation			√	
	Reputation of community area	√			
Individual/behavioural factors	Physical activity				√
	People's belief in the future and sense of control over their own lives	√	√		
	Stress levels		√		√

1.2.6 overleaf.

Table 1-1 SHIA Matrix

Health Determinants	Health Determinants Specific to policy	Social and Health Impacts/Outcomes			
		Family/Community wellbeing	Mental wellbeing	Spiritual wellbeing	Physical wellbeing
Social and cultural factors	Social support, social cohesion	√	√		
	Social isolation	√	√		
	Participation in community and public affairs	√			
	Family connections	√	√		
	Cultural and spiritual participation			√	
	Reputation of community area	√			
Individual/behavioural factors	Physical activity				√
	People's belief in the future and sense of control over their own lives	√	√		
	Stress levels		√		√

1.2.7 To understand how the local communities social and health wellbeing was impacted by the recent storm events, the Sounds Future Access Survey proposed 10 scoring and 19 open questions covering four

topics including social impacts, physical health, mental health, and business confidence. The four survey topics are closely aligned with the four health outcomes outlined in the *Guidance*. Therefore, the observations and insights drawn based on the responses to the scoring and open questions are used to support the SHIA in two ways:

- enable the establishment of the base case upon which the impacts of proposed interventions (i.e., road-focus, marine-focus, etc.) could be reliably gauged and compared.
- allow to determine and adjust weights assigned to the four Social and Health Impacts (specified by the *Guidance*) in an evidence-based manner.

1.2.8 Responses to the scoring survey questions are readily available for quantitative analysis, where the summary statistics about the physical health score, mental health score, and business confidence score reported by the respondents are summarised in Appendix A

1.2.9 Regarding the open questions, responses to these questions are in provided in the form of free texts. Content analysis enabling quantitative analysis about the qualitative responses were adopted. This is achieved by analysing word frequency, enabling insights and inferences to be drawn based on signal words' appearance frequency.

1.2.10 The key findings drawn from the survey score and responses are:

- Mental health score decreased more significantly than physical health score (see Appendix A and Appendix B).
- Business owners' level of confidence in their business going concern dropped from 8.8/10 (prior to the storm events) to 6.3/10 (post to the storm events), indicating strong negative impacts on business confidence and future outlook.
- Words with strong negative connotations (isolation, separation, etc.) appeared frequently in survey responses regarding social impacts.
- Words related to social relationships (parents, partners, friends, council, neighbourhood, etc.) showed high word frequency, indicating that social relations carried heavy weights when respondents described social impacts.

1.2.11 Based on those findings, the 4 Social and Health impacts are prioritised as: 1) mental wellbeing, 2) family and community wellbeing, 3) spiritual wellbeing, and 4) physical wellbeing. The weighted factor assigned to them (in Table 1-2) are calculated using the following equation:

$$w_i = \frac{\frac{1}{P_i} \times 100\%}{\sum_{N=4}^i \frac{1}{P_i} \times 100\%} \times 100\%$$

Where:

w_i is the weight factor of Social and Health impact i

P_i is the ranking of Social and Health impact i

Table 1-2 Weight Factors for Social and Health Impacts

	Ranking	Weight Factor
Family/Community wellbeing	2	24%
Mental wellbeing	1	48%
Spiritual wellbeing	3	16%
Physical wellbeing	4	12%

- 1.2.12 Based on the Multi-Criteria Analysis User Guidance by Waka Kotahi, a 7-point score system was employed to score the Social and Health impacts of proposed interventions depending on the level of approach planned in each road segment or marine area. The scoring system is presented in Appendix B .
- 1.2.13 Finally, the social and health impact scores of candidate interventions are calculated for each study area, which are summarised in Appendix C .

Appendix A Summary statistics for survey scores by study zones

Residents (n=735)		Physical Health Score											
Zones	Count	Score Prior				Score Post				Score Drop (Prior - post)			
		Mean	Stdev	Max	Min	Mean	Stdev	Max	Min	Mean	Stdev	Max	Min
Kenepuru and Queen Charlotte Drive	167	8.29	1.74	10	2	7.30	1.95	10	3	0.97	1.66	7	-4
Pelorus	6	8.50	1.22	10	7	6.83	1.94	9	4	1.67	1.63	4	0
Port Underwood	16	8.31	1.70	10	3	7.50	2.42	10	2	0.81	1.68	6	0
French Pass	47	8.28	1.38	10	5	7.72	2.20	10	1	0.55	1.53	7	-2
Grand Total	236	8.29	1.65	10	2	7.39	2.03	10	1	0.89	1.64	7	-4

Business and Residents (n=186)		Physical Health Score											
Zones	Count	Score Prior				Score Post				Score Drop (Prior - post)			
		Mean	Stdev	Max	Min	Mean	Stdev	Max	Min	Mean	Stdev	Max	Min
Kenepuru and Queen Charlotte Drive	47	8.87	1.73	10	0	6.89	2.34	10	0	1.98	2.15	7	-1
Pelorus	3	9.33	0.58	10	9	8.00	1.00	9	7	1.33	1.15	2	0
Port Underwood	4	8.25	2.36	10	5	8.75	1.50	10	7	-0.50	3.32	3	-5
French Pass	8	8.88	1.55	10	6	7.38	3.07	10	2	1.50	1.85	4	0
Grand Total	62	8.85	1.69	10	0	7.13	2.37	10	0	1.73	2.20	7	-5

Residents (n=735)		Mental Health Score											
Zones	Count	Score Prior				Score Post				Score Drop (Prior – post)			
		Mean	Stdev	Max	Min	Mean	Stdev	Max	Min	Mean	Stdev	Max	Min
Kenepuru and Queen Charlotte Drive	168	8.62	1.78	10	0	6.23	2.23	10	0	2.41	2.35	10	-3
Pelorus	6	7.50	2.43	10	4	6.00	1.67	8	4	1.50	2.59	5	-1
Port Underwood	16	8.06	2.52	10	0	6.69	2.36	10	0	1.38	1.75	5	0
French Pass	48	8.81	1.18	10	5	6.79	2.36	10	2	2.02	2.14	8	0
Grand Total	238	8.59	1.76	10	0	6.37	2.25	10	0	2.24	2.28	10	-3

Business and Residents (n=186)		Mental Health Score											
Zones	Count	Score Prior				Score Post				Score Drop (Prior - post)			
		Mean	Stdev	Max	Min	Mean	Stdev	Max	Min	Mean	Stdev	Max	Min
Kenepuru and Queen Charlotte Drive	47	8.87	1.92	10	0	5.61	2.12	10	0	3.26	2.27	8	0
Pelorus	3	9.33	0.58	10	9	7.00	1.00	8	6	2.33	0.58	3	2
Port Underwood	4	9.50	1.00	10	8	9.00	1.15	10	8	0.50	1.00	2	0
French Pass	8	9.13	1.36	10	7	6.00	2.56	10	2	3.13	1.46	5	0
Grand Total	62	8.97	1.76	10	0	5.95	2.24	10	0	3.02	2.16	8	0

Business and Residents (n=186)		Business confidence Score											
Zones	Count	Score Prior				Score Post				Score Drop (Prior - post)			
		Mean	Stdev	Max	Min	Mean	Stdev	Max	Min	Mean	Stdev	Max	Min
Kenepuru and Queen Charlotte Drive	94	9.06	2.06	10	0	5.98	2.72	10	0	3.12	2.87	10	-2
Pelorus	12	8.17	2.29	10	3	6.75	2.56	10	2	1.42	1.73	5	0
Port Underwood	13	8.92	2.81	10	0	8.31	2.10	10	5	0.62	2.50	5	-5
French Pass	34	8.38	2.37	10	1	6.38	2.63	10	1	2.00	2.06	8	-1
Grand Total	153	8.83	2.22	10	0	6.33	2.70	10	0	2.52	2.71	10	-5

Appendix B Intervention scores based on 7-point scoring system

ROADS	Code	Approach	Vehicle Restrictions	Lane width	Score Point
	Ai	Build back stronger (protect)	No additional restrictions (from current)	Retain existing	3
	Aii	Build back as was	Additional restrictions on vehicle size/weight	Increasing number of one lane sections	3
	Bi	Build back with targeted improvements (accommodate)	No additional restrictions (from current)	Retain existing	2
	Bii	Build back as was but with isolated one lane sections	Additional restrictions on vehicle size/weight	Increasing number of one lane sections	1
	C	Build back with essential repairs only (accommodate/retreat)	Additional restrictions on vehicle size/weight	Increasing number of one lane sections	1
	D	Build back roads that provide access to marine hubs (retreat others)	Additional restrictions on vehicle size/weight	Increasing number of one lane sections	-1

MARINE	Code	Approach	Operations		Services		Score Point
			Protect	Increase	Freight	Passenger	
	X	Existing - maintain and protect (resilience)	X				0
Yi	Existing - protect and upgrade facilities for pax	X			X	0	
Yii	Existing - protect and upgrade facilities for freight	X	X	X		1	
Yiii	Existing - protect and upgrade facilities for all users	X				2	
Zi	New - emergency ramp	X	X	X	X	2	
Zii	New - local marine hub	X	X			3	
Ziii	New - arterial marine hub	X	X			3	

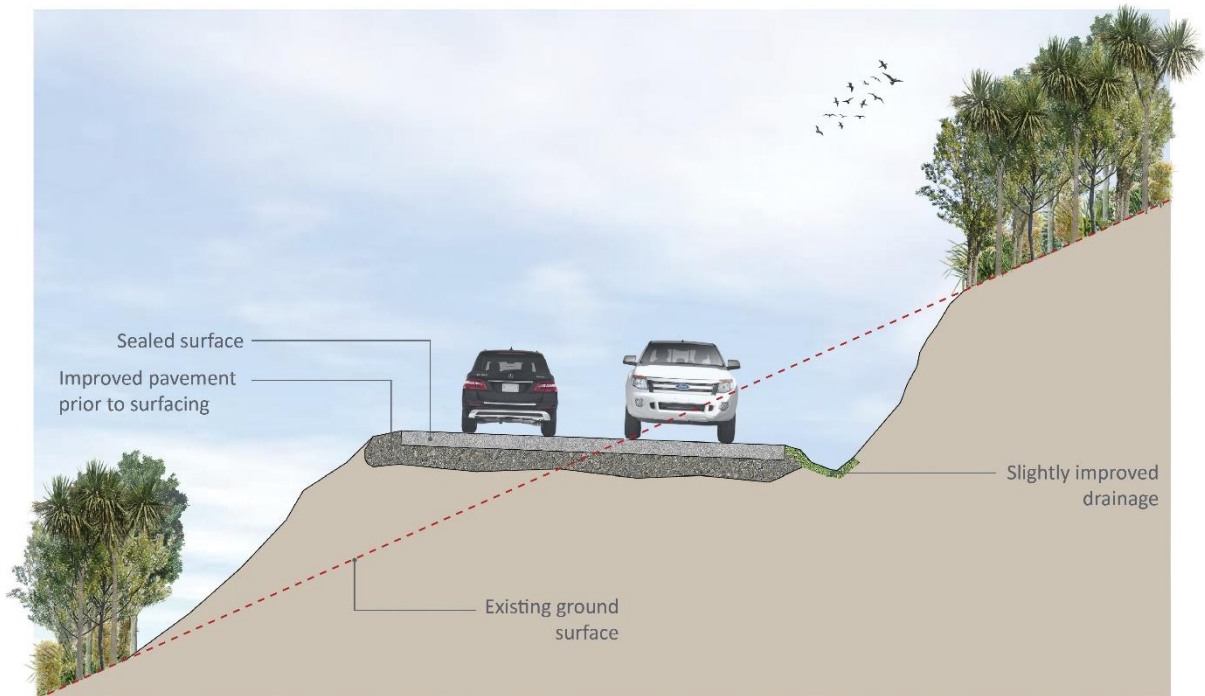
Appendix C Social and Health scores by intervention and study areas

Score Results	Road Focus					Road Access				
	Mental	Physical	Family/Community	Spiritual	Total	Mental	Physical	Family/Community	Spiritual	Total
French Pass	0.59	0.15	0.30	0.20	1.23	0.66	0.17	0.33	0.22	1.38
Queen Charlotte Drive	0.96	0.24	0.48	0.32	2.00	0.96	0.24	0.48	0.32	2.00
Kenepuru	0.96	0.24	0.48	0.32	2.00	0.69	0.17	0.35	0.23	1.44
Pelorus	0.60	0.15	0.30	0.20	1.25	0.48	0.12	0.24	0.16	1.00
Port Underwood	0.84	0.21	0.42	0.28	1.75	0.60	0.15	0.30	0.20	1.25
Average	0.79	0.20	0.40	0.26	1.65	0.68	0.17	0.34	0.23	1.41
Score Results	Balanced					Marine Access				
	Mental	Physical	Family/Community	Spiritual	Total	Mental	Physical	Family/Community	Spiritual	Total
French Pass	0.66	0.17	0.33	0.22	1.38	0.70	0.18	0.35	0.23	1.46
Queen Charlotte Drive	0.64	0.16	0.32	0.21	1.33	0.96	0.24	0.48	0.32	2.00
Kenepuru	0.72	0.18	0.36	0.24	1.50	0.54	0.14	0.27	0.18	1.13
Pelorus	0.72	0.18	0.36	0.24	1.50	0.72	0.18	0.36	0.24	1.50
Port Underwood	0.54	0.14	0.27	0.18	1.13	0.42	0.11	0.21	0.14	0.88
Average	0.66	0.16	0.33	0.22	1.37	0.67	0.17	0.33	0.22	1.39
Score Results	Marine Focus									
	Mental	Physical	Family/Community	Spiritual	Total					
French Pass	0.59	0.15	0.30	0.20	1.23					
Queen Charlotte Drive	0.80	0.20	0.40	0.27	1.67					
Kenepuru	0.30	0.08	0.15	0.10	0.63					
Pelorus	0.48	0.12	0.24	0.16	1.00					
Port Underwood	0.42	0.11	0.21	0.14	0.88					
Average	0.52	0.13	0.26	0.17	1.08					

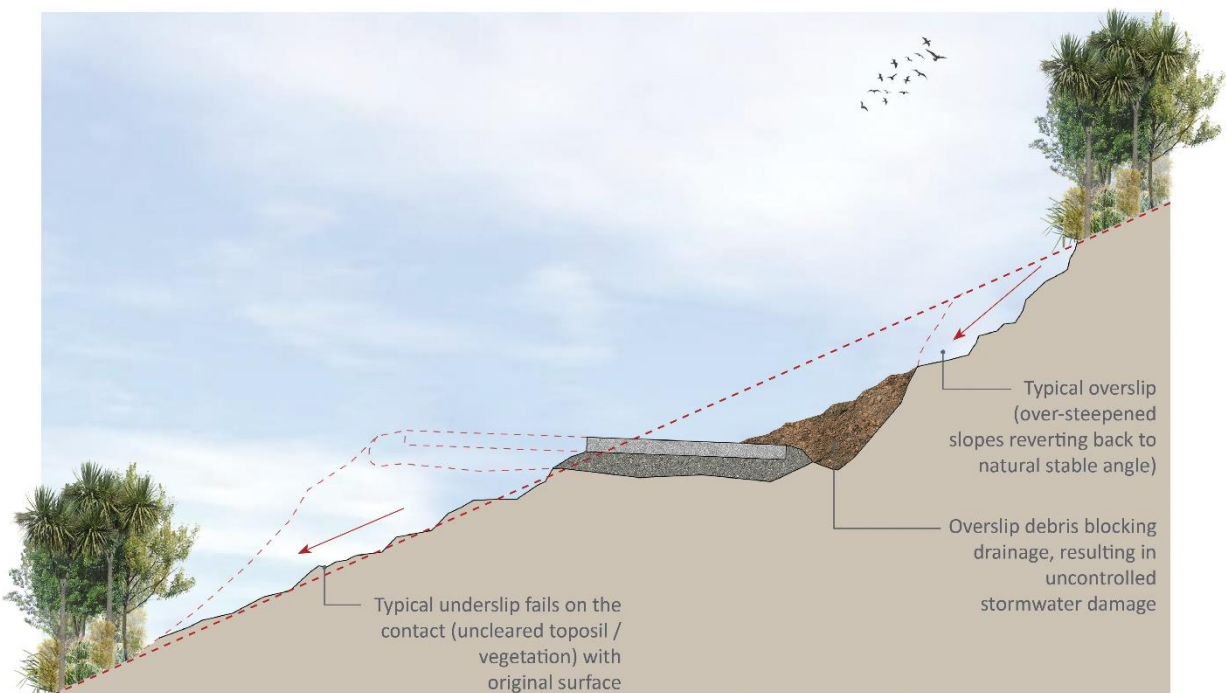
Appendix D 7-point scoring system by Waka Kotahi’s Multi-criteria analysis user guidance

7-point scoring system		
Point	Magnitude	Definition
3	Large positive	Major positive impacts resulting in substantial and long-term improvements or enhancements of the existing environment.
2	Moderate positive	Moderate positive impact, possibly of short-, medium- or longterm duration. Positive outcome may be in terms of new opportunities and outcomes of enhancement or improvement.
1	Slight positive	Minimal positive impact, possibly only lasting over the short term. May be confined to a limited area.
0	Neutral	Neutral – no discernible or predicted positive or negative impact
-1	Slight negative	Minimal negative impact, possibly only lasting over the short term, and definitely able to be managed or mitigated. May be confined to a small area.
-2	Moderate negative	Moderate negative impact. Impacts may be short, medium or long term and are highly likely to respond to management actions.
-3	Large negative	Impacts with serious, long-term and possibly irreversible effect leading to serious damage, degradation or deterioration of the physical, economic, cultural or social environment. Required major rescope of concept, design, location and justification, or requires major commitment to extensive management strategies to mitigate the effect.

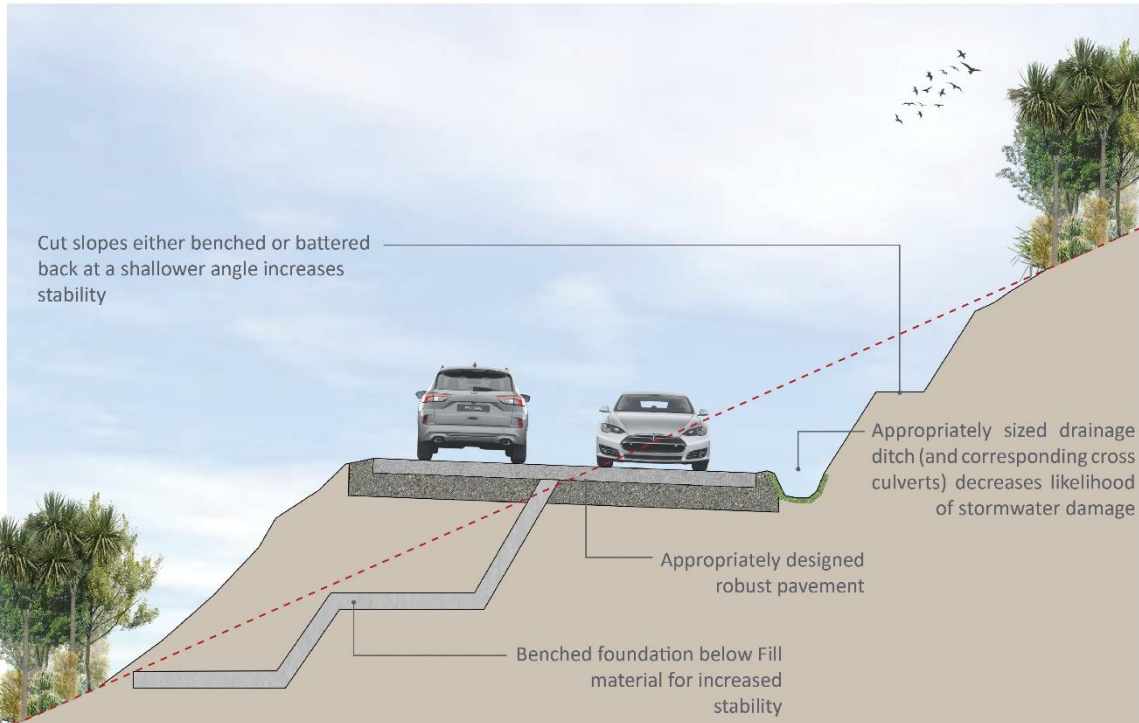
Road Sealed



Post Storm/Earthquake Event (typical failure scenario)



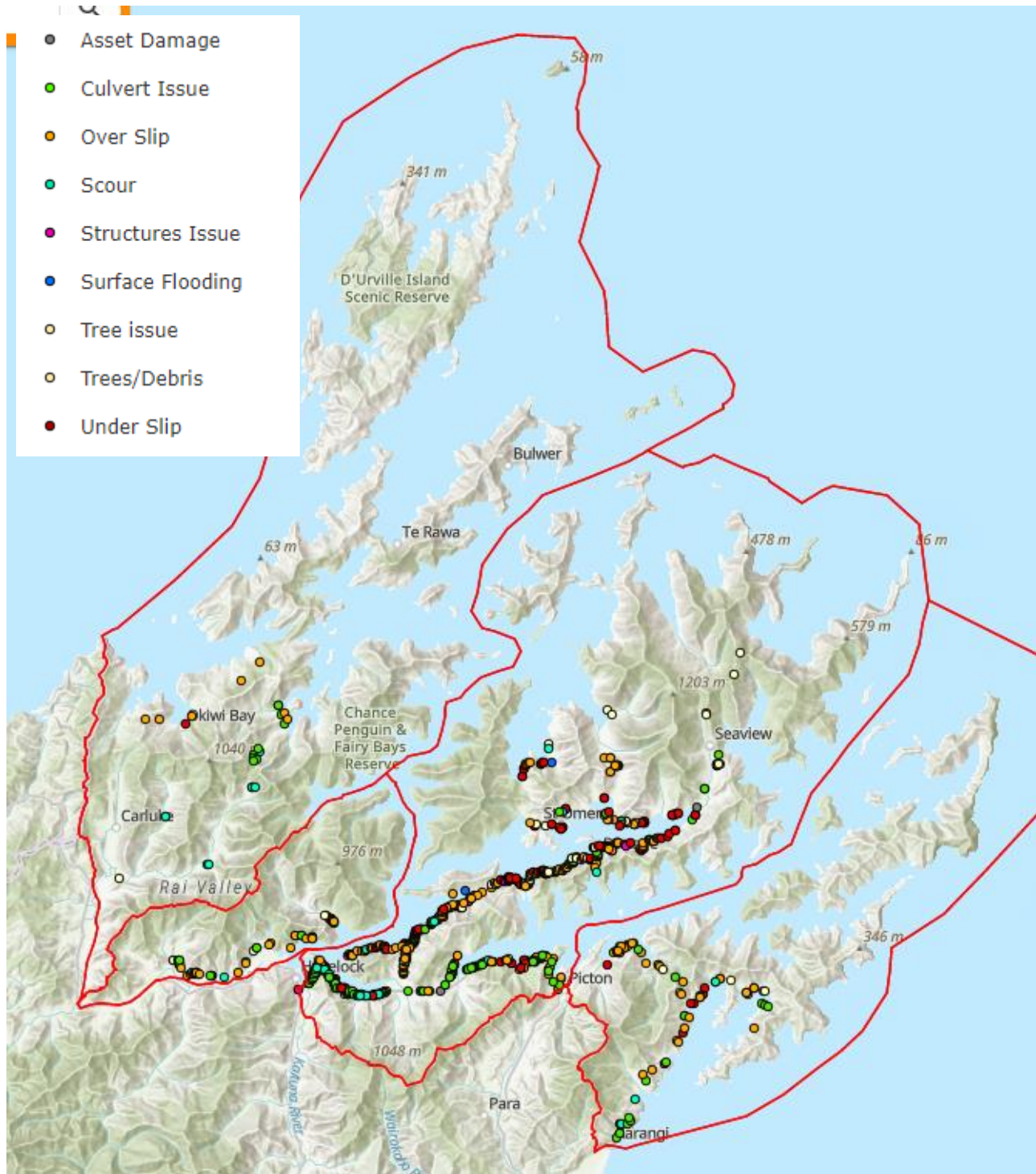
Modern Road Design Features



Appendix K Event Fault Summary

K.1 2021 Event

K.1.1 Fault Map



K.1.2 Faults Per Road Segment

Zone and Segment		Length (km)	Asset Damage	Culvert Issue	Pave-ment	Scour	Structural Issues	Surface Flooding	Trees/ Debris	Over Slip	Under Slip	Total
Te Aumiti/French Pass	FP1	26.2	0	0	0	0	0	0	0	2	0	2
	FP2	17.3	0	0	0	0	0	0	0	3	1	4
	FP3	12.7	0	0	0	0	0	0	0	0	0	0
	FP4	10.8	0	0	0	0	0	0	0	0	0	0
	FP5	30.1	0	0	0	0	0	0	0	0	0	0
	FP6	57.1	0	0	0	0	0	0	0	0	0	0
	FP7	28.8	0	1	0	3	0	0	1	0	0	5
	FP8	21.1	0	9	0	5	1	0	0	2	1	18
	<i>Total</i>	<i>204.1</i>	<i>0</i>	<i>10</i>	<i>0</i>	<i>8</i>	<i>1</i>	<i>0</i>	<i>1</i>	<i>7</i>	<i>2</i>	<i>29</i>
Te Hoiere / Pelorus	P1	15.1	0	10	0	8	0	0	3	15	0	36
	P2	21.3	0	2	0	3	0	0	1	20	2	28
	<i>Total</i>	<i>31.2</i>	<i>0</i>	<i>12</i>	<i>0</i>	<i>11</i>	<i>0</i>	<i>0</i>	<i>4</i>	<i>35</i>	<i>2</i>	<i>64</i>
Queen Charlotte	QC1	15.1	3	24	15	16	1	0	3	30	20	112
	QC2	21.3	0	16	49	3	0	1	2	42	12	125
	QC3	5.7	1	5	0	1	0	0	1	6	3	17
	<i>Total</i>	<i>42.1</i>	<i>4</i>	<i>45</i>	<i>64</i>	<i>20</i>	<i>1</i>	<i>1</i>	<i>6</i>	<i>78</i>	<i>35</i>	<i>254</i>
Kenepuru	K1	4.8	0	16	0	2	0	0	0	13	1	32
	K2	12.0	0	64	0	0	2	1	10	28	11	116
	K3	18.6	0	8	0	4	2	0	28	47	37	126
	K4a	1.7	0	0	0	2	0	0	1	4	0	7
	K4b	14.1	1	5	0	1	3	0	6	19	27	62
	K5	12.9	0	1	0	1	0	0	9	16	9	36
	K6a	16.6	0	1	0	1	0	0	4	5	8	19
	K6b	13.2	0	3	0	1	0	1	1	10	5	21
	K7	15.1	0	2	0	1	0	0	5	5	2	15
	K8	38.0	0	3	0	1	0	0	5	4	2	15
	K9	7.6	0	4	0	1	0	0	0	18	10	33
<i>Total</i>	<i>154.6</i>	<i>1</i>	<i>107</i>	<i>0</i>	<i>15</i>	<i>7</i>	<i>2</i>	<i>69</i>	<i>169</i>	<i>112</i>	<i>482</i>	
Te Whanganui / Port Underwood	PU1	14.9	0	4	0	0	0	0	2	25	0	31
	PU2	26.5	0	11	0	6	2	0	0	6	5	30
	PU3	13.3	0	1	0	3	0	0	3	11	3	21
	PU4	4.0	0	3	0	0	0	0	0	1	0	4
	<i>Total</i>	<i>58.7</i>	<i>0</i>	<i>19</i>	<i>0</i>	<i>9</i>	<i>2</i>	<i>0</i>	<i>5</i>	<i>43</i>	<i>8</i>	<i>86</i>
Total	490.5	5	193	64	63	11	3	85	332	159	915	



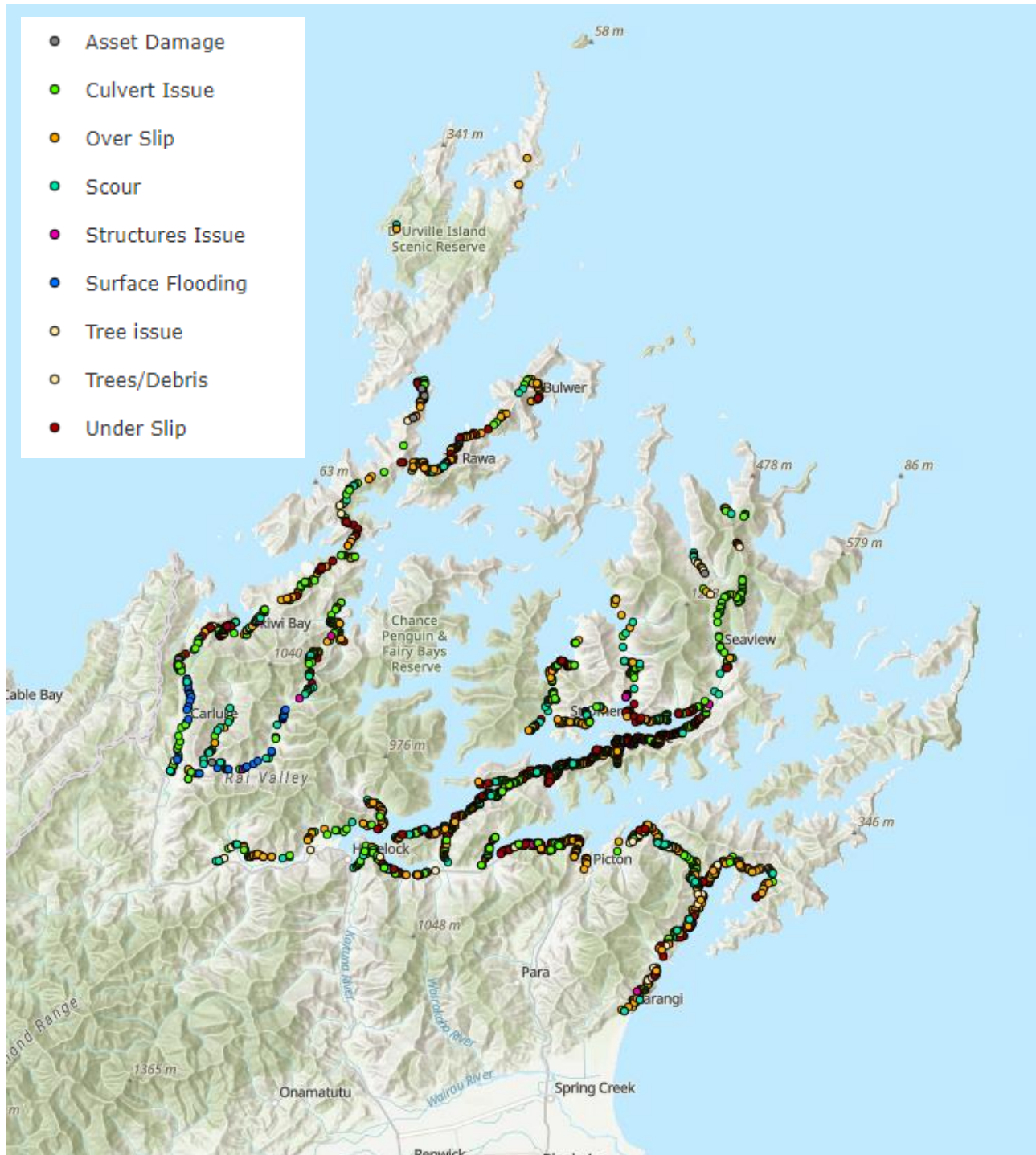
K.1.3 Faults Per Kilometre for Each Road Segment

Zone and Segment		Asset Damage	Culvert Issue	Pave-ment	Scour	Structural Issues	Surface Flooding	Trees / Debris	Over Slip	Under Slip	Total
Te Aumiti/French Pass	FP1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.08
	FP2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.06	0.23
	FP3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FP4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FP5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FP6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FP7	0.00	0.03	0.00	0.10	0.00	0.00	0.03	0.00	0.00	0.17
	FP8	0.00	0.43	0.00	0.24	0.05	0.00	0.00	0.09	0.05	0.85
Te Hoiere / Pelorus	P1	0.00	0.66	0.00	0.53	0.00	0.00	0.20	0.99	0.00	2.38
	P2	0.00	0.09	0.00	0.14	0.00	0.00	0.05	0.94	0.09	1.31
Queen Charlotte	QC1	0.20	1.59	0.99	1.06	0.07	0.00	0.20	1.99	1.32	7.42
	QC2	0.00	0.75	2.30	0.14	0.00	0.05	0.09	1.97	0.56	5.87
	QC3	0.18	0.88	0.00	0.18	0.00	0.00	0.18	1.05	0.53	2.98
Kenepuru	K1	0.00	3.33	0.00	0.42	0.00	0.00	0.00	2.71	0.21	6.67
	K2	0.00	5.33	0.00	0.00	0.17	0.08	0.83	2.33	0.92	9.67
	K3	0.00	0.43	0.00	0.22	0.11	0.00	1.51	2.53	1.99	6.77
	K4a	0.00	0.00	0.00	1.18	0.00	0.00	0.59	2.35	0.00	4.12
	K4b	0.07	0.35	0.00	0.07	0.21	0.00	0.43	1.35	1.91	4.40
	K5	0.00	0.08	0.00	0.08	0.00	0.00	0.70	1.24	0.70	2.79
	K6a	0.00	0.06	0.00	0.06	0.00	0.00	0.24	0.30	0.48	1.14
	K6b	0.00	0.23	0.00	0.08	0.00	0.08	0.08	0.76	0.38	1.59
	K7	0.00	0.13	0.00	0.07	0.00	0.00	0.33	0.33	0.13	0.99
	K8	0.00	0.08	0.00	0.03	0.00	0.00	0.13	0.11	0.05	0.39
	K9	0.00	0.53	0.00	0.13	0.00	0.00	0.00	2.37	1.32	4.34
Te Whanganui / Port Underwood	PU1	0.00	0.27	0.00	0.00	0.00	0.00	0.13	1.68	0.00	2.08
	PU2	0.00	0.42	0.00	0.23	0.08	0.00	0.00	0.23	0.19	1.13
	PU3	0.00	0.08	0.00	0.23	0.00	0.00	0.23	0.83	0.23	1.58
	PU4	0.00	0.75	0.00	0.00	0.00	0.00	0.00	0.25	0.00	1.00



K.2 2022 Event

K.2.1 Fault Map



K.2.2 Faults Per Road Segment

Zone and Segment		Length (km)	Asset Damage	Culvert Issue	Pave-ment	Scour	Structural Issues	Surface Flooding	Trees / Debris	Over Slip	Under Slip	Total
Te Aumiti/French Pass	FP1	26.2	0	31	0	15	1	5	8	22	19	101
	FP2	17.3	0	20	0	7	1	2	4	29	19	82
	FP3	12.7	0	9	0	3	0	0	3	9	12	36
	FP4	10.8	0	8	0	2	0	0	3	32	6	51
	FP5	30.1	0	21	0	7	0	0	6	79	24	137
	FP6	57.1	0	0	0	1	0	0	0	4	1	6
	FP7	28.8	0	13	0	14	3	1	0	14	3	48
	FP8	21.1	0	35	0	9	1	0	2	14	7	68
	<i>Total</i>	<i>204.1</i>	<i>0</i>	<i>137</i>	<i>0</i>	<i>58</i>	<i>6</i>	<i>8</i>	<i>26</i>	<i>203</i>	<i>91</i>	<i>529</i>
Te Hoiere / Pelorus	P1	15.1	0	10	0	9	0	0	5	23	0	47
	P2	21.3	1	14	0	4	1	0	1	39	2	62
	<i>Total</i>	<i>31.2</i>	<i>1</i>	<i>24</i>	<i>0</i>	<i>13</i>	<i>1</i>	<i>0</i>	<i>6</i>	<i>62</i>	<i>2</i>	<i>109</i>
Queen Charlotte	QC1	15.1	0	27	0	9	0	0	14	26	12	88
	QC2	21.3	1	10	0	2	2	0	7	122	46	190
	QC3	5.7	0	9	0	0	0	0	5	7	4	25
	<i>Total</i>	<i>42.1</i>	<i>1</i>	<i>46</i>	<i>0</i>	<i>11</i>	<i>2</i>	<i>0</i>	<i>26</i>	<i>155</i>	<i>62</i>	<i>303</i>
Kenepuru	K1	4.8	0	8	0	8	0	0	2	17	2	37
	K2	12.0	0	47	0	15	0	0	7	64	28	161
	K3	18.6	3	84	0	45	0	0	26	141	111	410
	K4a	1.7	1	6	0	5	0	0	1	15	2	30
	K4b	14.1	7	38	0	11	2	0	7	93	92	250
	K5	12.9	1	15	0	12	0	0	1	21	26	76
	K6a	16.6	1	18	0	14	1	0	0	20	20	74
	K6b	13.2	0	17	0	11	0	0	1	31	18	78
	K7	15.1	0	13	0	12	0	0	0	14	1	40
	K8	38.0	2	48	0	11	0	0	6	19	6	92
	K9	7.6	0	7	0	12	1	0	1	30	17	68
<i>Total</i>	<i>154.6</i>	<i>15</i>	<i>301</i>	<i>0</i>	<i>156</i>	<i>4</i>	<i>0</i>	<i>52</i>	<i>465</i>	<i>323</i>	<i>1,316</i>	
Te Whanganui / Port Underwood	PU1	14.9	0	32	0	0	0	0	11	87	9	139
	PU2	26.5	1	20	0	9	2	0	16	110	21	179
	PU3	13.3	0	5	0	3	0	0	23	83	18	132
	PU4	4.0	0	0	0	0	0	0	1	13	4	18
	<i>Total</i>	<i>58.7</i>	<i>1</i>	<i>57</i>	<i>0</i>	<i>12</i>	<i>2</i>	<i>0</i>	<i>51</i>	<i>293</i>	<i>52</i>	<i>468</i>
Total	490.5	18	565	0	250	15	8	161	1,178	530	2,725	



K.2.3 Faults Per Kilometre for Each Road Segment

Zone and Segment		Asset Damage	Culvert Issue	Pave-ment	Scour	Structural Issues	Surface Flooding	Trees / Debris	Over Slip	Under Slip	Total
Te Aumiti/French Pass	FP1	0.00	1.18	0.00	0.57	0.04	0.19	0.31	0.84	0.73	3.85
	FP2	0.00	1.16	0.00	0.40	0.06	0.12	0.23	1.68	1.10	4.74
	FP3	0.00	0.71	0.00	0.24	0.00	0.00	0.24	0.71	0.94	2.83
	FP4	0.00	0.74	0.00	0.19	0.00	0.00	0.28	2.96	0.56	4.72
	FP5	0.00	0.70	0.00	0.23	0.00	0.00	0.20	2.62	0.80	4.55
	FP6	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.07	0.02	0.11
	FP7	0.00	0.45	0.00	0.49	0.10	0.03	0.00	0.49	0.10	1.67
	FP8	0.00	1.66	0.00	0.43	0.05	0.00	0.09	0.66	0.33	3.22
Te Hoiere / Pelorus	P1	0.00	0.66	0.00	0.60	0.00	0.00	0.33	1.52	0.00	3.11
	P2	0.05	0.66	0.00	0.19	0.05	0.00	0.05	1.83	0.09	2.91
Queen Charlotte	QC1	0.00	1.79	0.00	0.60	0.00	0.00	0.93	1.72	0.79	5.83
	QC2	0.05	0.47	0.00	0.09	0.09	0.00	0.33	5.73	2.16	8.92
	QC3	0.00	1.58	0.00	0.00	0.00	0.00	0.88	1.23	0.70	4.39
Kenepuru	K1	0.00	1.67	0.00	1.67	0.00	0.00	0.42	3.54	0.42	7.71
	K2	0.00	3.92	0.00	1.25	0.00	0.00	0.58	5.33	2.33	13.42
	K3	0.16	4.52	0.00	2.42	0.00	0.00	1.40	7.58	5.97	22.04
	K4a	0.59	3.53	0.00	2.94	0.00	0.00	0.59	8.82	1.18	17.65
	K4b	0.50	2.70	0.00	0.78	0.14	0.00	0.50	6.60	6.52	17.73
	K5	0.08	1.16	0.00	0.93	0.00	0.00	0.08	1.63	2.02	5.89
	K6a	0.06	1.08	0.00	0.84	0.06	0.00	0.00	1.20	1.20	4.46
	K6b	0.00	1.29	0.00	0.83	0.00	0.00	0.08	2.35	1.36	5.91
	K7	0.00	0.86	0.00	0.79	0.00	0.00	0.00	0.93	0.07	2.65
	K8	0.05	1.26	0.00	0.29	0.00	0.00	0.16	0.50	0.16	2.42
	K9	0.00	0.92	0.00	1.58	0.13	0.00	0.13	3.95	2.24	8.95
Te Whanganui / Port Underwood	PU1	0.00	2.15	0.00	0.00	0.00	0.00	0.74	5.84	0.60	9.33
	PU2	0.04	0.75	0.00	0.34	0.08	0.00	0.60	4.15	0.79	6.75
	PU3	0.00	0.38	0.00	0.23	0.00	0.00	1.73	6.24	1.35	9.92
	PU4	0.00	0.00	0.00	0.00	0.00	0.00	0.25	3.25	1.00	4.50



Appendix L Indicative Efficiency Rating



Indicative Efficiency Rating Tool Instructions

****If you are doing a standard safety intervention please use the SSI toolkit (<https://www.nzta.govt.nz/resources/standard-safety-intervention-toolkit/>) to get an efficiency rating****

Step 1. The user must fill out the primary and secondary benefits on the Key Questions and Results tab (cells E4 and E6). If there is no secondary benefit, then the cell should be left blank.

Step 2. The user must fill out the relevant sections in the Benefits Inputs Tab. These sections should correspond to the primary and secondary benefits of the project. To fill out these sections you will require historical data and investment objectives:

- The historical data should describe the current state, e.g. travel time, DSI rates, PT patronage
- The investment objectives should relate to what the project is trying to achieve, e.g. a reduction in travel time, reduction in DSI, increase in resilience

Step 3. Once the benefits input is completed the user should return to the Key Questions and Results tab to input the indicative costs (cell E13 and E15).

Step 4. Below where the costs are input, you should now see a Suggested efficiency rating (cell E37) and an IER range (cell E39). Use these as the project's indicative efficiency rating.

Note: This tool has been designed under the assumption that only the largest 2 benefit streams will be counted for individual projects. If a project has more than 2 benefits streams, we recommend that they focus on the primary sources of benefits. Based on an analysis of previous multi benefit streams projects, the 2 largest benefits will make up approximately 72% of total benefits.

Road category definition

Urban arterial: Arterial and collector roads within urban areas carrying traffic volumes of greater than 7000 vehicles/day

Urban other: Other urban roads, carrying fewer than 7000 vehicles/day

Rural strategic: Arterial or collector roads, connecting main centres of population and carrying over 2500 vehicles/day

Rural other : Other roads outside urban areas

Questions

Inputs

Step 1 What is the primary problem / benefits do you anticipate?

Impact on reliability & access - Resilience

Step 1a What is the secondary type of problem / benefits (if any - leave blank if no secondary problem/benefit needed to be included?)

Step 3 What is the expected level of investment needed to address the identified problem/s?

Cost Input

\$ 320,000,000

Additional Service Provide Costs (per year) - O&M

\$ 32,000,000

No inputs required

Outputs

Suggested Efficiency Rating

Very High

IER range

Greater than 10

Impact on Safety

Total number of DSI over the past 5 years * Crash data can be obtained from CAS

Speed Environment

SSI Intervention?

No input required

No input required

Impact on mode choice & access - Active mode

Region

Statistical Area 2 (SA2) * If the project spans multiple areas, use the area where most of the trips will be generated

Walking Facility Length (km) * Leave blank if no walking facility

Cycling Facility Length (km) * Leave blank if no cycling facility

Impact on network productivity & user experience - Travel time changes

Road Category * definitions of this can be found in the instructions

Traffic Volume (veh/day) * Or alternatively only include total peak hour traffic volume

Existing travel time (min)

Target percentage improvements in travel time

Impact on mode choice & access - PT

Current PT Patronage (pax/day)

Target total PT Patronage (pax/day)

Existing travel time (min)

Target percentage improvements in travel time

Impact on reliability & access - Resilience

What is the impacted traffic volume per day

Road Category * definitions of this can be found in the instructions

Estimated Number of Closure per Year

Average Period of Closure (or loss of service), in hours

Disruption / detour time during closure, in hours per vehicle

Estimated % of resilience problems removed by proposed activity

Appendix M Do Minimum Maps and Descriptions

M.1 Te Aumiti/French Pass

Road: Roads would remain as they are as of early 2023, with no vehicle restrictions, although Rai Valley to Elaine Bay and Croisilles-French Pass Road between the Port Ligar turn off and French Pass/Anaru would have multiple one-lane sections under traffic management. The level of service would be expected to deteriorate over time.

Marine Infrastructure: There would be no investment in marine infrastructure.

Marine Services: There would be no change to the existing marine services in this area.

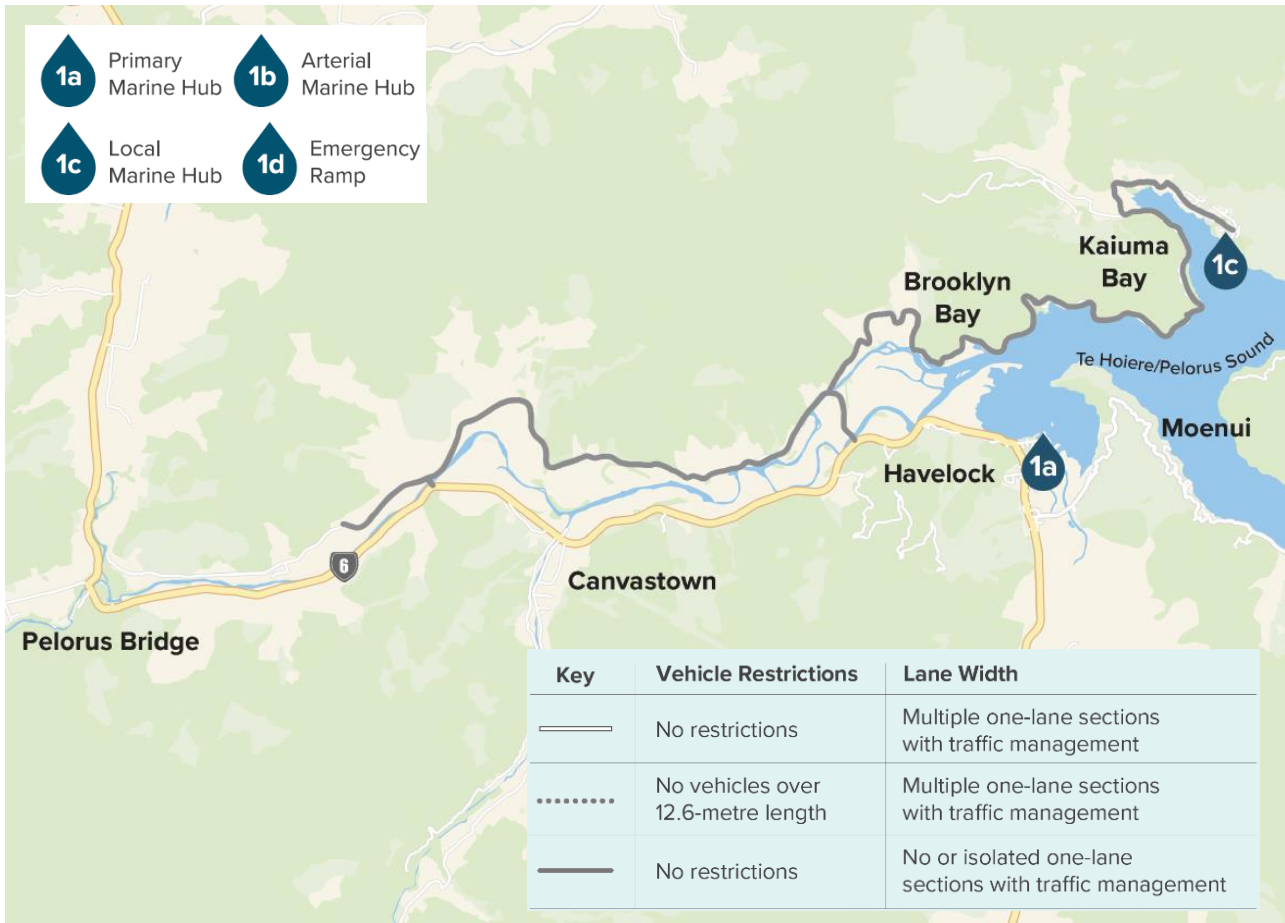


M.2 Te Hoiere/Pelorus

Roads: Roads would remain as they are as of early 2023, with no vehicle restrictions and no/limited one-lane sections under traffic management, as they are currently. The level of service would be expected to deteriorate over time.

Marine Infrastructure: There would be no investment in marine infrastructure.

Marine Services: There would be no change to the existing marine services in this area.



M.3 Queen Charlotte

Roads: Roads would remain as they are as of early 2023, with multiple one-lane sections along the length of the road between Havelock and Picton, and vehicles restricted to those under 12.6 m in length, as they are currently. Permits could be issued for longer vehicles. There would be no restrictions on Anakiwa Road, except for a weight limit of three tonnes beyond the Tirimoana Jetty. The level of service would be expected to deteriorate over time.

Marine Infrastructure: There would be no investment in marine infrastructure.

Marine Services: There would be no change to the existing marine services in this area.

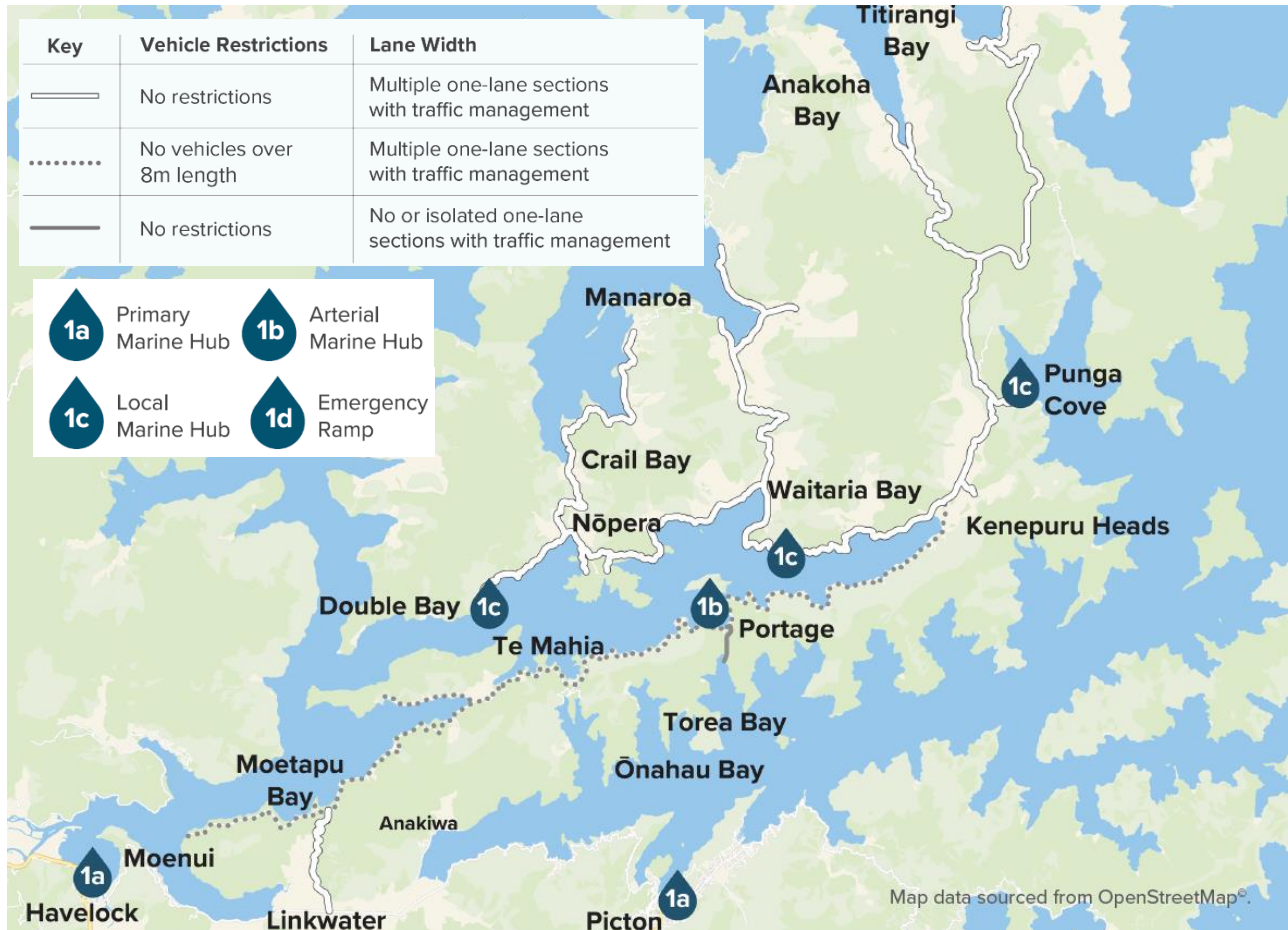


M.4 Kenepuru

Roads: Roads would remain as they are as of early 2023, with multiple one-lane sections under traffic management on all roads in Kenepuru, and access restricted to residents only. Kenepuru Road between Moetapu Bay Road and the Heads would be restricted to vehicles under 8 m in length, as they currently are. The level of service would be expected to deteriorate over time.

Marine Infrastructure: There would be no investment in marine infrastructure.

Marine Services: There would be no change to the existing marine services in this area.

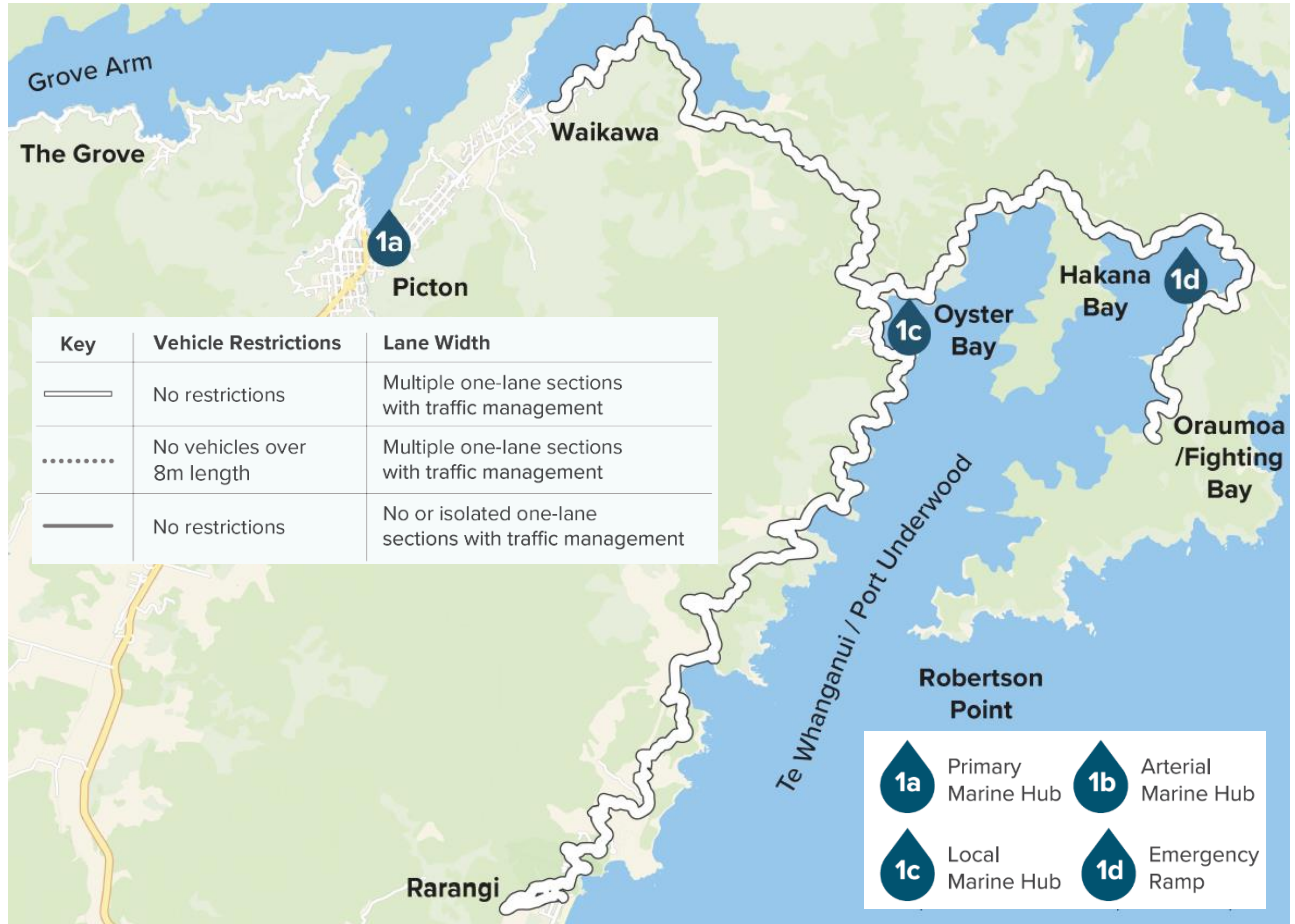


M.5 Te Whanganui/Port Underwood

Roads: Roads would remain as they are as of early 2023, with multiple one-lane sections on the roads in Te Whanganui/Port Underwood, but no vehicle restrictions. The level of service would be expected to deteriorate over time.

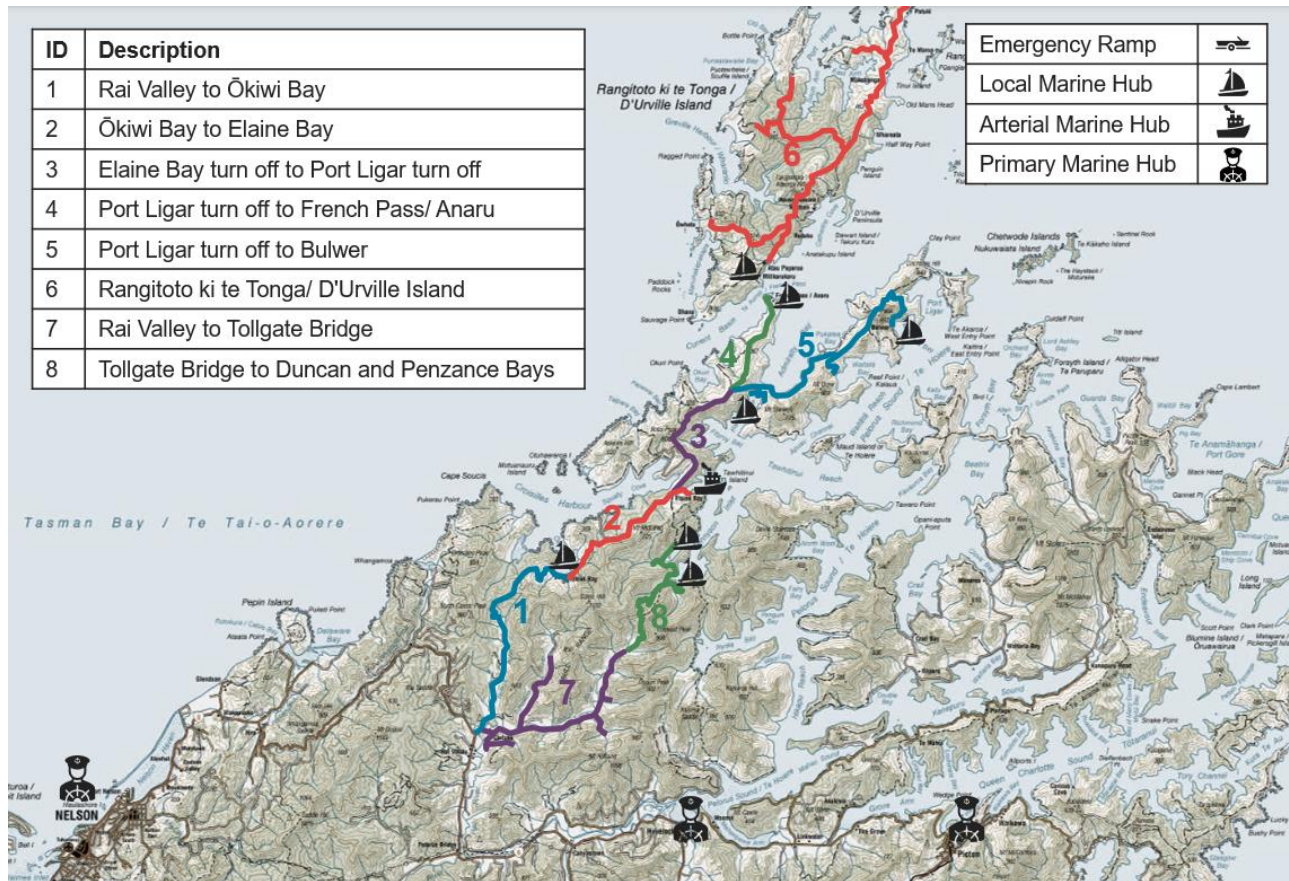
Marine Infrastructure: There would be no investment in marine infrastructure.

Marine Services: There would be no change to the existing marine services in this area.

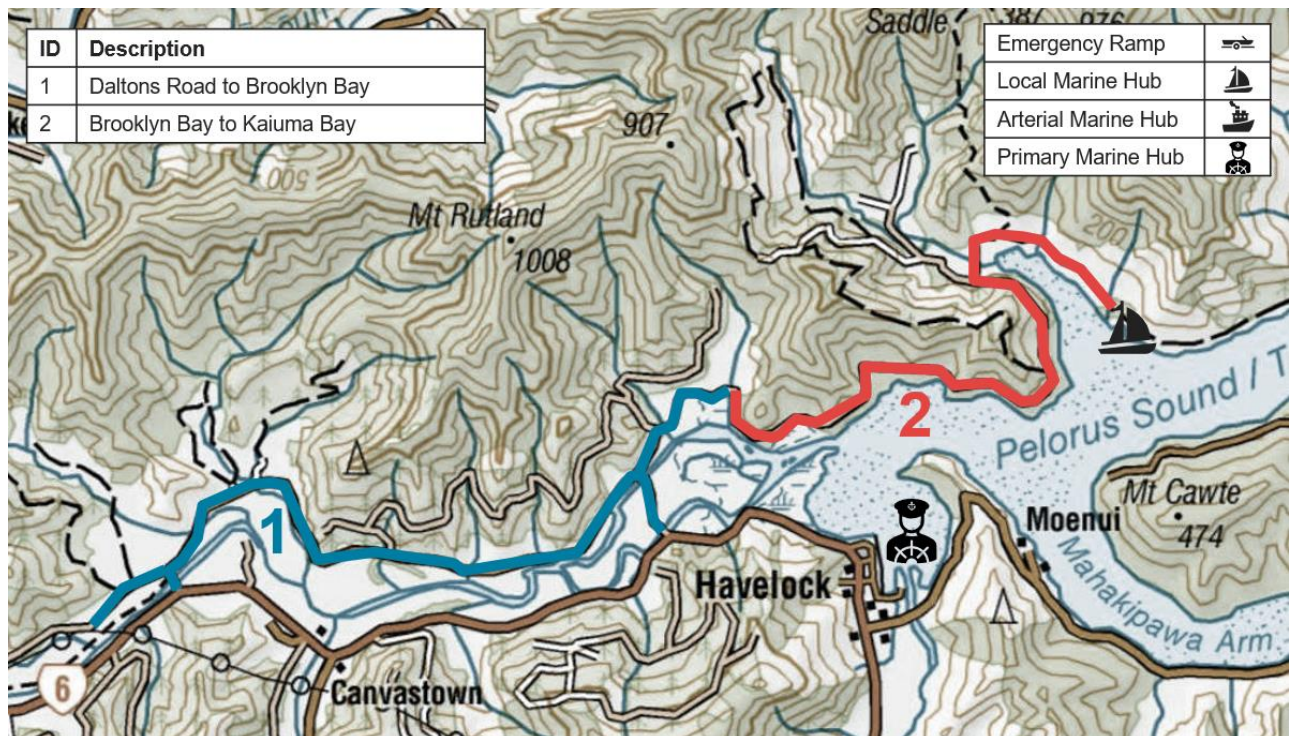


Appendix N Route Segment Maps

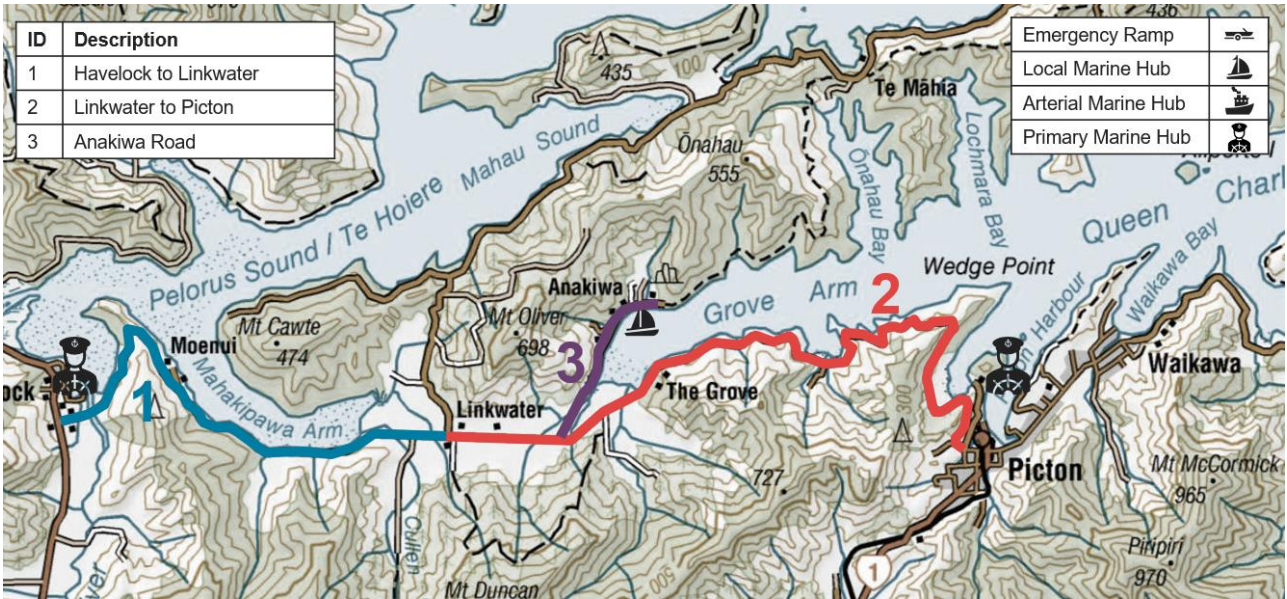
N.1 Te Aumiti/French Pass



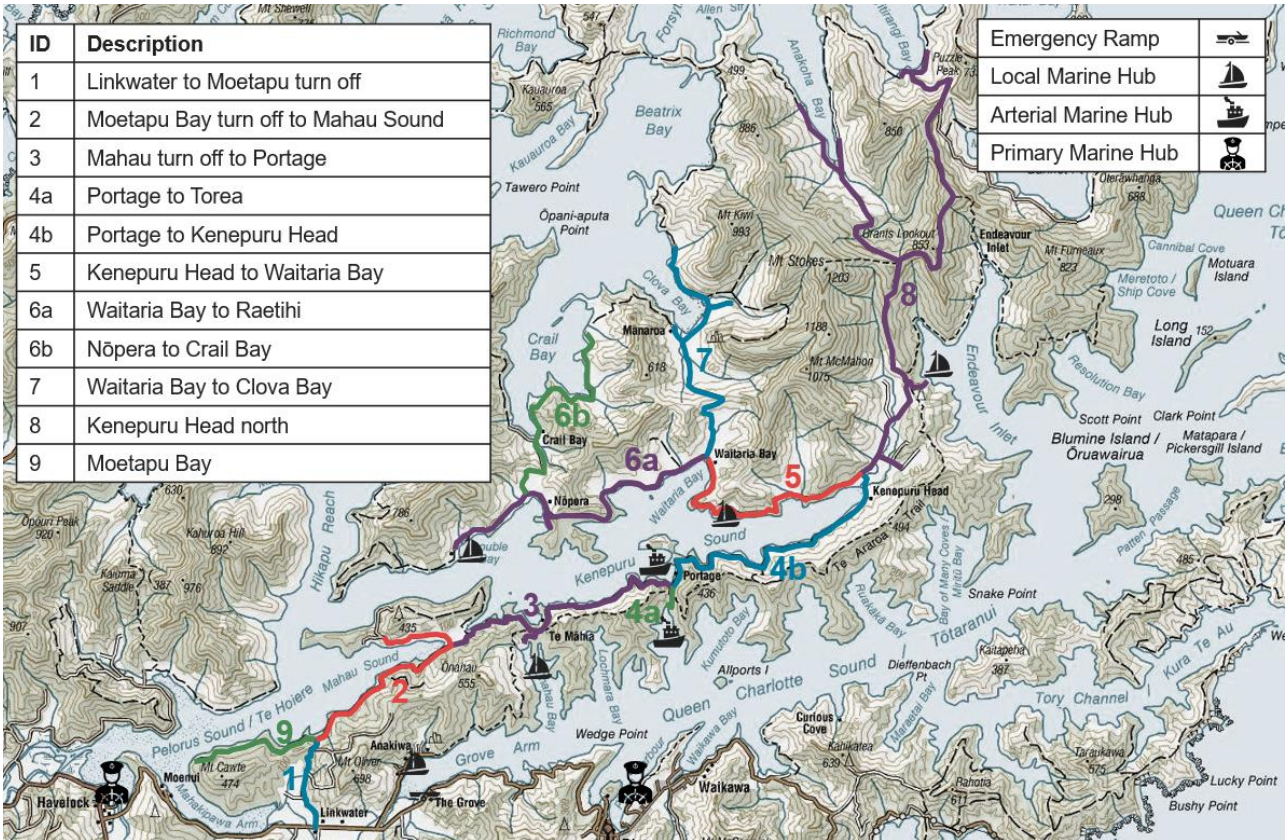
N.2 Te Hoiere/Pelorus



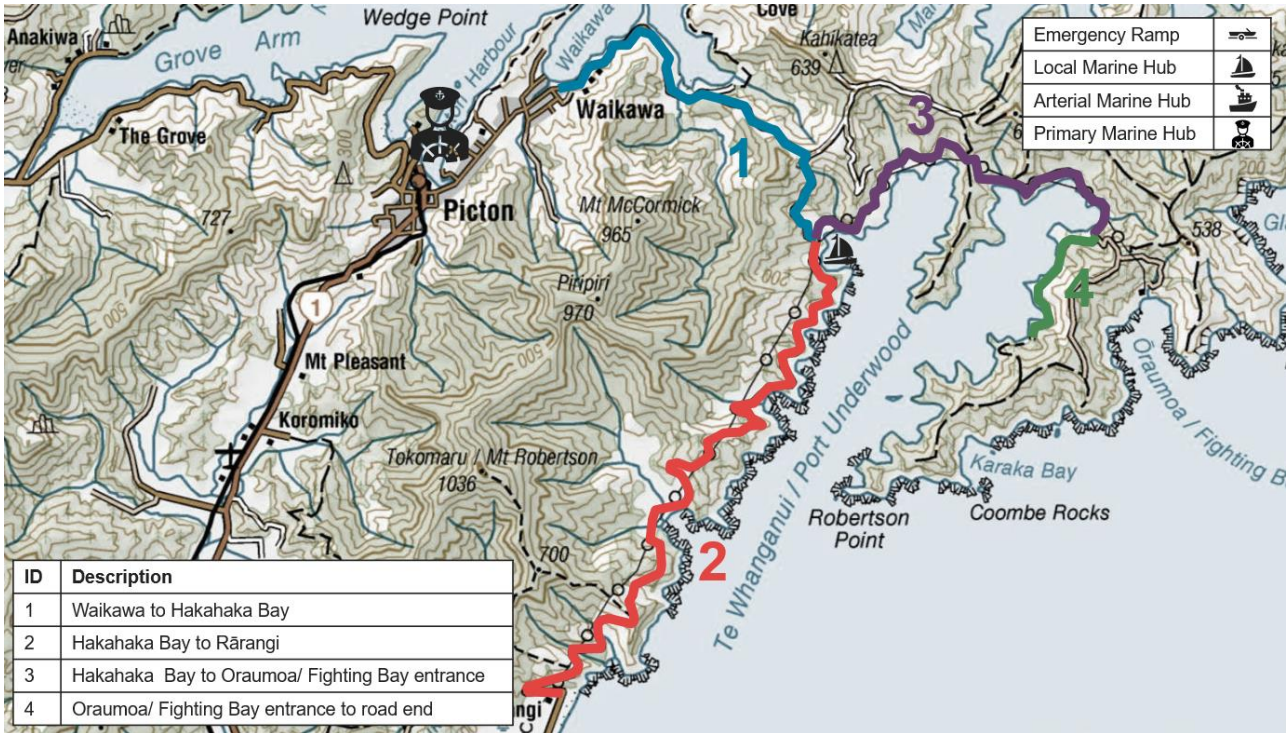
N.3 Queen Charlotte



N.4 Kenepuru



N.5 Te Whanganui/Port Underwood



Appendix O Faults and Hazards Susceptibility Summary



MARLBOROUGH ROADS FUTURE ACCESS STUDY

FAULT / HAZARD SUCCEPTIBILITY SUMMARY

Segment #	Segment Name	Road Name	Surfacing			% of road segment exposed per natural hazard susceptibility rating										2021 Storm Event - Faults Database						2022 Storm Event - Faults Database						Weighted Susceptibility Score								
			Sealed	Unsealed	Total Distance	Natural Slope Stability		Human Induced Slope Stability		Liquefaction	Flood inundation		Coastal	Tsunami	Debris Flow		# Total	# per Sub Classification (only relevant listed)					# Total	# per Sub Classification (only relevant listed)					Natural Slope Stability	Human Induced Slope Stability	Liquefaction	Flood inundation	Coastal	Tsunami	Debris Flow	
			(km)	(km)	(km)	Very High (%)	High (%)	Very High (%)	High (%)	Medium (%)	Very High (%)	High (%)	High (%)	Medium (%)	Very High (#)	High (#)	Culvert Issue	Over-slip	Surface Flooding	Scour	Underslip	Culverts	Over-slip	Surface Flooding	Scour	Underslip	Natural Slope Stability	Human Induced Slope Stability	Liquefaction	Flood inundation	Coastal	Tsunami	Debris Flow			
FRENCH PASS AREA																																				
1	SH6 to Okiwi Bay	Ronga And Croilles	25	1	26	2%	1%	28%	27%	21%	0%	11%	3%	6%	1.5	1.9	2	0	2	0	0	0	0	139	44	22	18	20	23	0.2	1.4	0.3	0.3	0.1	0.0	0.8
2	Okiwi Bay to Elaine Bay	Croisilles-French Pass Road	17	0	17	6%	3%	39%	60%	3%	0%	1%	0%	4%	1.4	1.5	4	0	3	0	0	1	83	21	29	2	8	18	0.6	2.6	0.0	0.0	0.0	0.0	0.7	
3	Elaine Bay turnoff to Port Ligar turnoff	Croisilles-French Pass Road	7	6	13	0%	0%	4%	73%	0%	0%	0%	0%	1.2	0.2	0	0	0	0	0	0	0	38	9	9	0	4	12	0.0	2.3	0.0	0.0	0.0	0.0	0.4	
4	Port Ligar turnoff to French Pass	Croisilles-French Pass Road	3	8	11	0%	34%	10%	29%	2%	0%	0%	2%	2%	0.1	0.4	0	0	0	0	0	0	62	13	32	0	2	9	1.4	1.1	0.0	0.0	0.1	0.0	0.1	
5	Port Ligar turnoff to Bulwer Bay	Te Towaka-Port Ligar Road2	1	29	30	6%	7%	57%	40%	3%	0%	0%	0%	1%	2.4	1.2	0	0	0	0	0	0	153	28	78	0	13	28	0.7	2.3	0.0	0.0	0.0	0.0	1.0	
6	Rangitoto ki te Tonga / D'Urville Island	Not Summarised	0	57	57	0%	3%	6%	94%	0%	0%	0%	0%	0.6	0.7	0	0	0	0	0	0	3	0	2	0	0	1	0.1	2.9	0.0	0.0	0.0	0.0	0.3		
7	Ronga Road to Tennyson Inlet Road/T	Opouri Road	19	10	29	2%	0%	0%	15%	38%	0%	35%	0%	0%	0.8	1.4	5	1	0	0	3	0	67	16	13	14	15	4	0.2	0.4	0.6	0.9	0.0	0.0	0.5	
8	Opouri Road/ Tollgate Bridge to Dunca	Tennyson Inlet Road	21	0	21	0%	5%	28%	46%	22%	0%	1%	1%	1%	2.1	1.2	15	9	2	0	4	0	76	36	13	0	12	12	0.2	2.0	0.3	0.0	0.0	0.0	0.9	
QUEEN CHARLOTTE DRIVE																																				
1	Havelock to Linkwater	Mahakipawa Hill	13	2	15	11%	0%	48%	16%	40%	0%	8%	10%	19%	1.5	1.7	147	49	49	0	18	25	96	34	28	0	6	14	0.8	1.4	0.6	0.2	0.4	0.1	0.8	
2	Linkwater to Picton	Queen Charlotte Drive	21	0	21	0%	10%	62%	3%	35%	0%	6%	3%	5%	0.8	2.2	84	19	42	1	3	15	200	10	124	0	2	53	0.4	1.3	0.5	0.1	0.1	0.0	0.7	
KENERPERU AREA																																				
3	Linkwater to Moetapu turnoff	Kenepuru Road (Linkwater-He	5	0	5	14%	0%	66%	3%	25%	0%	0%	0%	1.3	2.9	53	7	36	0	5	3	37	8	17	0	8	2	1.1	1.4	0.4	0.0	0.0	0.0	1.0		
4	Moetapu turnoff to Mahau turnoff	Kenepuru Road (Linkwater-He	8	4	12	29%	0%	70%	15%	5%	0%	0%	1%	10%	2.5	1.3	117	7	59	2	7	26	172	47	65	0	20	33	2.2	1.9	0.1	0.0	0.0	0.1	1.0	
5	Mahau turnoff to Portage	Kenepuru Road (Linkwater-He	17	2	19	52%	0%	74%	24%	4%	0%	0%	4%	2.1	1.9	141	10	51	0	7	39	419	84	142	0	49	113	3.9	2.2	0.1	0.0	0.0	0.0	1.0		
6	Portage to Kenepuru Heads	Kenepuru Road (Linkwater-He	16	0	16	54%	1%	64%	22%	11%	0%	7%	2%	9%	2.2	2.1	71	5	24	0	3	29	279	45	106	0	17	95	4.1	2.0	0.2	0.2	0.1	0.0	1.1	
7	Kenepuru Heads to Waitaria Bay	Kenepuru Road (Heads-Raetihi	14	0	14	17%	0%	34%	42%	31%	0%	0%	9%	50%	1.8	2.6	37	1	16	0	1	10	79	15	21	0	12	29	1.3	1.9	0.5	0.0	0.3	0.2	1.0	
8	Waitaria Bay to road ends	Kenepuru Road (Heads-Raetihi	5	24	29	14%	0%	23%	47%	36%	0%	0%	18%	31%	1.1	1.7	39	2	15	1	3	13	152	39	51	0	25	36	1.0	1.9	0.5	0.0	0.7	0.2	0.7	
9	Waitaria Bay to Clova Bay	Manaroa Road	2	14	15	5%	2%	17%	35%	62%	0%	2%	6%	15%	2.1	1.9	16	2	5	0	1	3	40	13	14	0	12	1	0.4	1.4	0.9	0.1	0.2	0.1	1.0	
10	Kenepuru Heads to Titirangi	Titirangi Road	1	37	38	18%	0%	10%	47%	21%	0%	9%	1%	3%	2.2	1.5	14	2	4	0	1	2	91	47	19	0	11	6	1.3	1.6	0.3	0.2	0.0	0.0	1.0	
11	Moetapu	Moetapu Bay Road	7	1	8	60%	12%	71%	29%	0%	0%	0%	1%	3.7	2.0	36	4	20	0	1	11	67	7	29	0	13	16	5.0	2.3	0.0	0.0	0.0	0.0	1.5		
12	Anikiwa	Anakiwa Road	5	0	6	4%	5%	30%	7%	73%	0%	5%	26%	44%	0.7	2.6	19	6	8	0	0	4	27	10	7	0	1	4	0.5	0.8	1.1	0.1	1.1	0.2	0.7	
PERLOROUS AREA																																				
1	Daltons Road to Kaiuma Bay/Te Hoiere	Kaiuma Bay Road	3	9	11	0%	0%	43%	6%	68%	0%	45%	8%	12%	1.4	1.7	33	8	15	0	7	0	34	8	15	0	7	0	0.0	1.0	1.0	1.1	0.3	0.1	0.8	
2	Kaiuma Bay/ Te Hoiere Road to Kaiuma	Kaiuma Bay Road	3	17	20	7%	0%	28%	25%	38%	0%	4%	4%	31%	3.4	1.0	30	3	20	0	3	2	71	16	46	0	4	2	0.6	1.3	0.6	0.1	0.1	0.2	1.2	
PORT UNDERWOOD AREA																																				
1	Waikawa to Hakahaka Bay	Port Underwood Road	15	0	15	0%	0%	85%	12%	3%	1%	1%	0%	1.6	1.6	30	3	25	0	0	0	151	34	86	0	10	9	0.0	2.1	0.0	0.1	0.0	0.0	0.8		
2	Hakahaka Bay to Rarangi	Port Underwood Road	9	18	27	0%	0%	60%	27%	14%	0%	3%	3%	11%	0.6	1.8	21	10	6	0	2	3	199	23	114	0	19	21	0.0	2.0	0.2	0.1	0.1	0.1	0.5	
3	Hakahaka Bay to Fighting Bay entrance	Tumbledown Bay Road	4	9	13	0%	0%	62%	18%	22%	0%	1%	6%	11%	1.0	2.0	20	0	11	0	2	4	132	4	83	0	4	17	0.0	1.8	0.3	0.0	0.3	0.1	0.7	
4	Fighting Bay to road end	Tumbledown Bay Road	0	4	4	0%	0%	71%	15%	20%	0%	0%	4%	10%	3.0	1.7	4	3	1	0	0	0	19	1	13	0	0	4	0.0	1.9	0.3	0.0	0.1	0.0	1.2	
TOTAL PROJECT AREA																																				
Colour scales:			0	20	60	0% 20%										0.0	4.0	0 40 400						0.0 1.0 5.0												

Appendix P Road Network Management Strategic Response

The Waka Kotahi Resilience Response Framework was used to determine the appropriate strategic response for the resilience problem at a road segment level, but also consider the role of the individual road segment within the overall transport network for the zone. The Table below provides a description of the relevant features of the response, an explanation of how it has been applied in the Sounds Programmes, and an explanation and diagram from the guidance.

Strategic Response	Sounds Programmes	Resilience Response Framework Guidance
<p>Accept (monitor) Where risk is low, or too costly to address, best course of action is to accept the risk, monitor and identify thresholds for when action is required.</p>	<p>Included at a road segment level within programmes that see marine transport becoming more important.</p>	<p>Risk and response are considered alongside one another, with the type and size of the risk having a significant impact on the response. As risk increases the response is likely to become increasingly physical and will come with a higher implementation cost.</p>
<p>Preparedness Develop response plans in case the risk happens earlier than expected, or before a physical response has been implemented.</p>	<p>Included in all programmes.</p>	<p>The diagram illustrates the Resilience Response Framework. It features two inverted triangles. The left triangle is labeled 'Risk' at the top and 'Likelihood/consequence' at the bottom. The right triangle is labeled '\$' at the top and '\$\$\$' at the bottom, representing 'Cost of implementation'. Between the triangles, a list of actions is provided, categorized into: Business as usual, Monitoring, Preparedness, Operating procedures, Maintenance improvements, Minor improvements, Enhanced network resilience, and Capital investment. The framework is divided into three horizontal sections: Risk management (top), Response Framework (middle), and Control (bottom). The formula 'Risk = likelihood x consequence' is also shown.</p>
<p>Reduce (maintain) Lowest level of physical response to risk, often through a low cost, targeted maintenance intervention.</p>	<p>Targeted maintenance programme included in all programmes and Do Minimum.</p>	
<p>Reduce (improve) New capital investment, for example to reduce the risk, adopt or retrofit road to a higher design standard, and/or develop an alternative route.</p>	<p>Included at a road segment level where risk can be reduced, and resilience improved. Alternative mode (marine) included in response, but not alternative routes as these do not exist.</p>	
<p>Prevent/remove/avoid Reduce risk for example by creating a new alternative route. Use land use planning controls to prevent development in areas that are subject to future resilience issues.</p>	<p>Included at a road segment level where alternative mode (marine) can be provided. Land use planning controls included at programme level in all programmes.</p>	



Appendix Q Programme Development Tables, Maps and Descriptions

Q.1 Te Aumiti/French Pass

Q.1.1 Programme Development Table

Network Feature		1. Road Focus	2. Road Access	3. Balanced	4. Marine Access	5. Marine Focus	Comments
Road	FP1	Ai	Ai	Bi	Bi	Bii	The route into Ōkiwi Bay is a Secondary Collector and is part of the key freight route into Elaine Bay. This is an important access and freight connection for all the Te Aumiti/French Pass zone. For this reason the C and D approaches are not appropriate.
	FP2	Ai	Aii	Bi	Bi	C	This is an Access road but is part of the key freight route into Elaine Bay. While there is marine access at Elaine Bay, this is part of an important freight route, so the lowest level of investment is C, which is a last resort and only used for Programme 5.
	FP3	Bi	Bii	Bii	Bii	D	Access roads where A approaches are not justified due to the lower traffic volumes and freight movements. Highest level of investment in roads is Bi, transitioning to Bii, and finally D, which is the last resort. Added resilience can be provided as most instability is human induced, and this resilience is needed for these segments as they provide the connection to D'Urville Island and French Pass marine hub.
	FP4	Bi	Bii	Bii	Bii	D	
	FP5	Bii	C	C	D	D	Ai, Aii, and Bi approaches not justified as these are Low Volume roads with no overarching network connectivity role. Marine options are available.
	FP6	Bii	C	C	D	D	
	FP7	Bi	Bii	Bii	Bii	C	This is an Access route where the lower traffic and freight volumes mean the A approaches are not justified. The highest level of investment in roads is Bi, transitioning to Bii. There is no coastline, so the lowest level of repair is C.
	FP8	Bii	Bii	Bii	C	D	These are Access and Low Volume roads where the Ai, Aii, and Bi approaches not justified due to the lower traffic volumes. Marine options are available.
Marine	Elaine Bay	Yiii	Yiii	Yiii	Yiii	Yiii	Elaine Bay is an Arterial Hub. It is seen as a possible back up to Havelock to an emergency and currently supports a large amount of freight movements. It will be protected from potential geohazards and upgraded for all users under all programmes.
	Ōkiwi Bay	X	X	Yiii	Yiii	Yiii	Ōkiwi Bay, French Pass/Anaru, and Kapowai Bay are Local Hubs. They become more important as the road access declines in Programmes 3-5. In Programmes 1 and 2 it is protected from potential geohazards, in Programme 3-5 it is upgraded for all users and performs an important access role.
	French Pass / Anaru	X	X	Yiii	Yiii	Yiii	
Kapowai Bay ⁹²	X	X	Yiii	Yiii	Yiii		

⁹² Rangitoto ki te Tonga/ D'Urville Island



Network Feature		1. Road Focus	2. Road Access	3. Balanced	4. Marine Access	5. Marine Focus	Comments
Marine cont.	Penzance Bay	X	Yiii	Yiii	Yiii	Yiii	These are Local Hubs. Due to the areas ability to support possible marine transport this infrastructure is protected from potential geohazards and upgraded for all users under all programmes except Programme 1: Road Focus.
	Duncan Bay	X	Yiii	Yiii	Yiii	Yiii	
	Bulwer	X	Yiii	Yiii	Yiii	Yiii	
	Cissy Bay	X	Yiii	Yiii	Yiii	Yiii	
	Wairangi Bay	NA	NA	NA	NA	Ziii	The development of a new arterial hub near Wairangi Bay is only required under Programme 5: Marine Focus. This is because it is the only programme where the road from Elaine Bay to Rai Valley may not be capable of taking the current level of freight, and an alternative connection into Nelson may be required.
	Other minor hubs	NA	NA	NA	Zii	Zii	New local marine hubs (additional to those mentioned above) may become necessary under Programmes 4 and 5 as road access declines.



Q.1.2 Road Focus

Roads: The route from Rai Valley to Elaine Bay would be strengthened. Remaining roads would receive targeted improvements. Some sections of road may have an increasing number of one-lane sections and may have vehicle restrictions.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs), and Elaine Bay (arterial hub).

Marine Services: There would be no change to the existing marine services in this area.

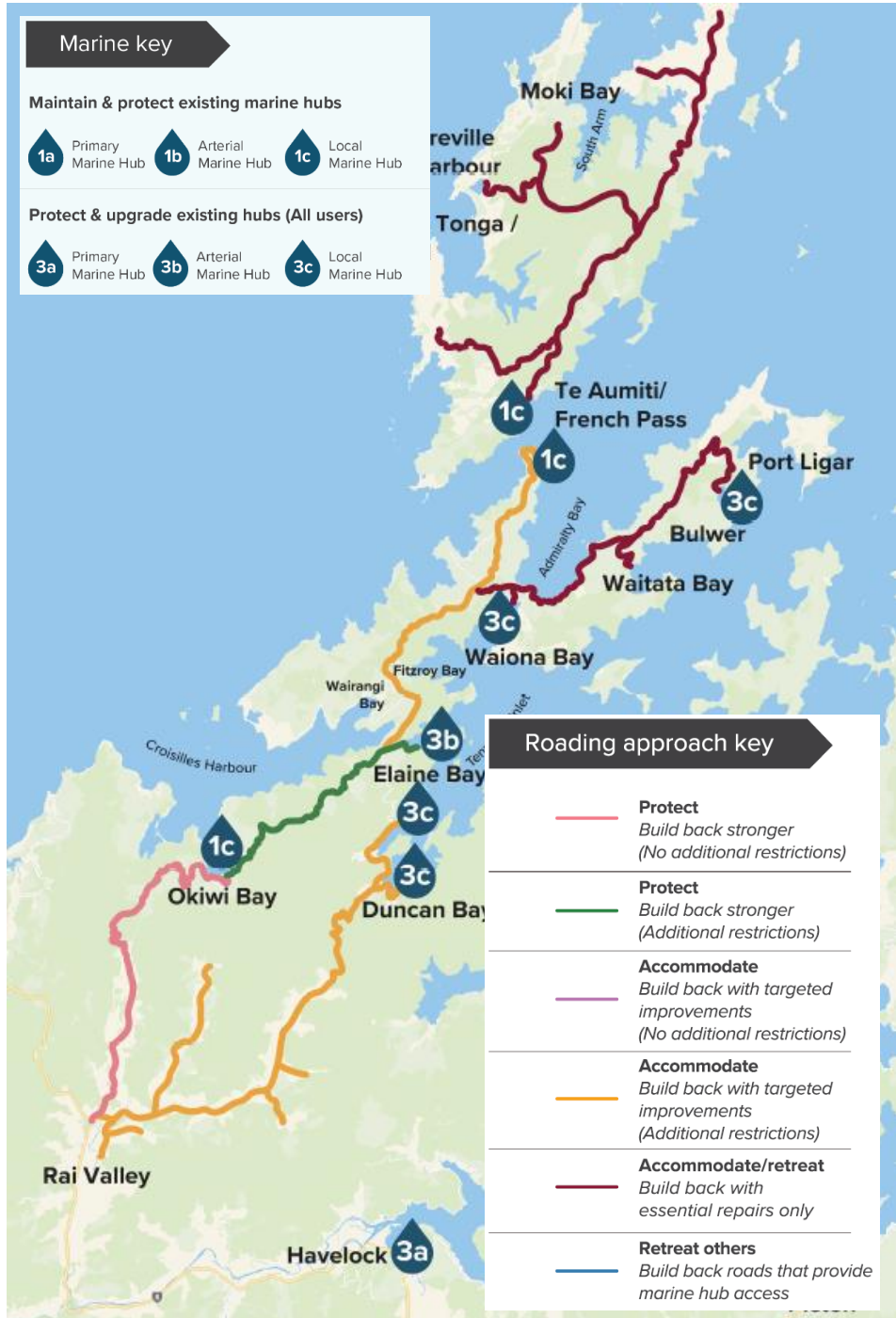


Q.1.3 Road Access

Roads: The route from Rai Valley to Elaine Bay would be strengthened, although the section between Okiwi Bay and Elaine Bay may be subject to increased one-lane sections and possible vehicle length restrictions. The routes from Elaine Bay to Te Aumiti/French Pass, and Rai Valley to Tennyson Inlet would receive targeted improvements, but there would be an increase in the number of one-lane sections and there may be vehicle length restrictions. The road to Port Ligar and the roads on Rangitoto ki te Tonga / d'Urville Island would receive essential repairs only and would experience increasing one-lane sections and possible vehicle length restrictions.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs), Elaine Bay (arterial hub), Duncan Bay, Tennyson Inlet, Cissy Bay and Port Ligar (local hubs).

Marine Services: There would be no change to the existing marine services in this area.

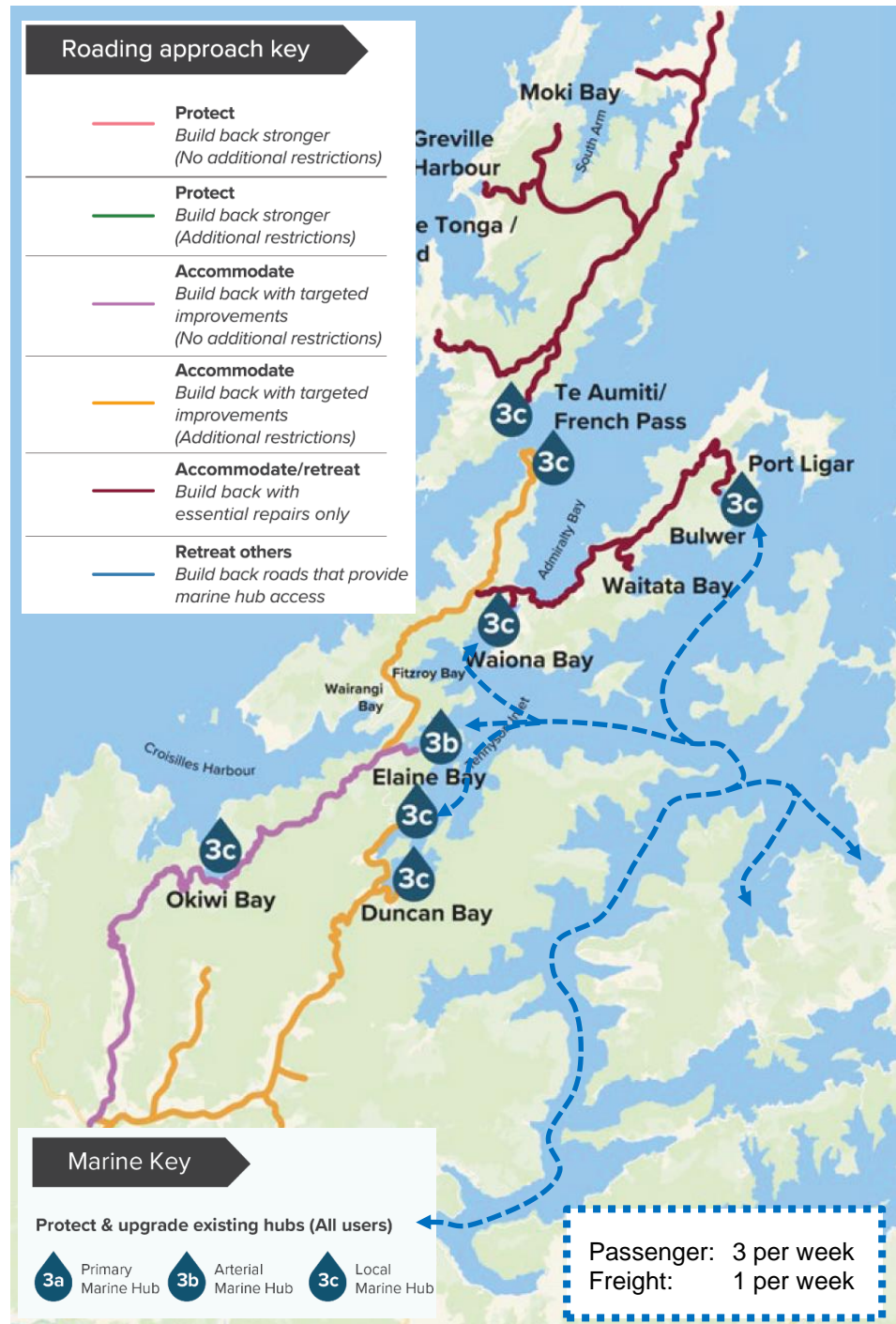


Q.1.4 Balanced

Roads: The routes from Rai Valley to Te Aumiti/French Pass and Rai Valley to Tennyson Inlet would receive targeted improvements. For the routes from Elaine Bay to Te Aumiti/French Pass and Rai Valley to Tennyson Inlet there would be an increase in the number of one-lane sections and there may be vehicle length restrictions. The road to Port Ligar and the roads on Rangitoto ki te Tonga/d'Urville Island would receive essential repairs only and would experience increasing one-lane sections and vehicle length restrictions.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs), Elaine Bay (arterial hub), Duncan Bay, Tennyson Inlet, Cissy Bay, Port Ligar, Te Aumiti/French Pass, Rangitoto ki te Tonga / d'Urville Island, and Okiwi Bay (local hubs).

Marine Services: Passenger services from Havelock to the Outer Sounds would increase to three services per week. A once-per-week scheduled freight service between Havelock and the Outer Sounds may be introduced. Routes, frequencies and subsidies would be subject to consultation.



Q.1.5 Marine Access

Roads: The road from Rai Valley to Elaine Bay would receive targeted improvements and would not be subject to additional vehicle restrictions. The routes from Elaine Bay to Te Aumiti/French Pass, and Rai Valley to Tollgate Bridge would also receive targeted improvements, but there would be an increase in the number of one lane sections and there may be vehicle length restrictions. The road from Tollgate Bridge to Tennyson Inlet would receive essential repairs only and would experience increasing one-lane sections and vehicle length restrictions. The road to Port Ligar and the roads on Rangitoto ki te Tonga/d'Urville Island would only be repaired so that access to marine hubs would be provided.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs); Elaine Bay (arterial hub); and Duncan Bay, Tennyson Inlet, Cissy Bay, Port Ligar, Te Aumiti/French Pass, Rangitoto ki te Tonga / d'Urville Island, and Okiwi Bay (local hubs). Other local marine hubs would be established as required.

Marine Services: Passenger services from Havelock to the Outer Sounds would become daily. A twice-weekly scheduled freight service between Havelock and the Outer Sounds would be introduced. Routes, frequencies and subsidies would be subject to consultation.



Q.1.6 Marine Focus

Roads: The road from Rai Valley to Okiwi Bay would receive targeted improvements, although there may be an increase in the number of one-lane sections. The route from Okiwi Bay to Elaine Bay and Rai Valley to Tollgate Bridge would receive essential repairs only. There would be an increase in the number of one-lane sections and possible vehicle length restrictions. All other roads would only be repaired so that access to marine hubs is provided.

Marine Infrastructure: A new arterial marine hub and access road would be established near Wairangi Bay as an alternative access into the Sounds. There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs), Elaine Bay (arterial hub), Duncan Bay, Tennyson Inlet, Cissy Bay, Port Ligar, Te Aumiti/French Pass, Rangitoto ki te Tonga / d'Urville Island, and Okiwi Bay (local hubs). Other local marine hubs would be established as required.

Marine Services: Passenger services from Havelock to the Outer Sounds would increase to twice daily. Daily freight services between Elaine Bay and Havelock, and Wairangi Bay and Nelson would be introduced. Routes, frequencies and subsidies would be subject to consultation.



Q.2 Pelorus

Q.2.1 Programme Development Table

Network Feature		1. Road Focus	2. Road Access	3. Balanced	4. Marine Access	5. Marine Focus	Comments
Road	P1	Bi	Bii	Bii		C	This is an Access route where A approaches are not justified due to low traffic volumes. Highest level of investment in roads is Bi, transitioning to Bii. There is no coastline, so the area will always rely on roads, and the lowest level of repair is C.
	P2	Bii	Bii	C		D	A approaches and Bi not justified as this is a Low Volume road with no overarching network connectivity role. Marine options are available.
Marine	Kaiuma Bay	X	X	Yiii		Yiii	Kaiuma Bay is a Local Hub. It becomes more important as the road access declines in Programmes 3-5. In Programmes 1 and 2 it is protected from potential geohazards, in Programme 3-5 it is upgraded for all users and performs an important access role.

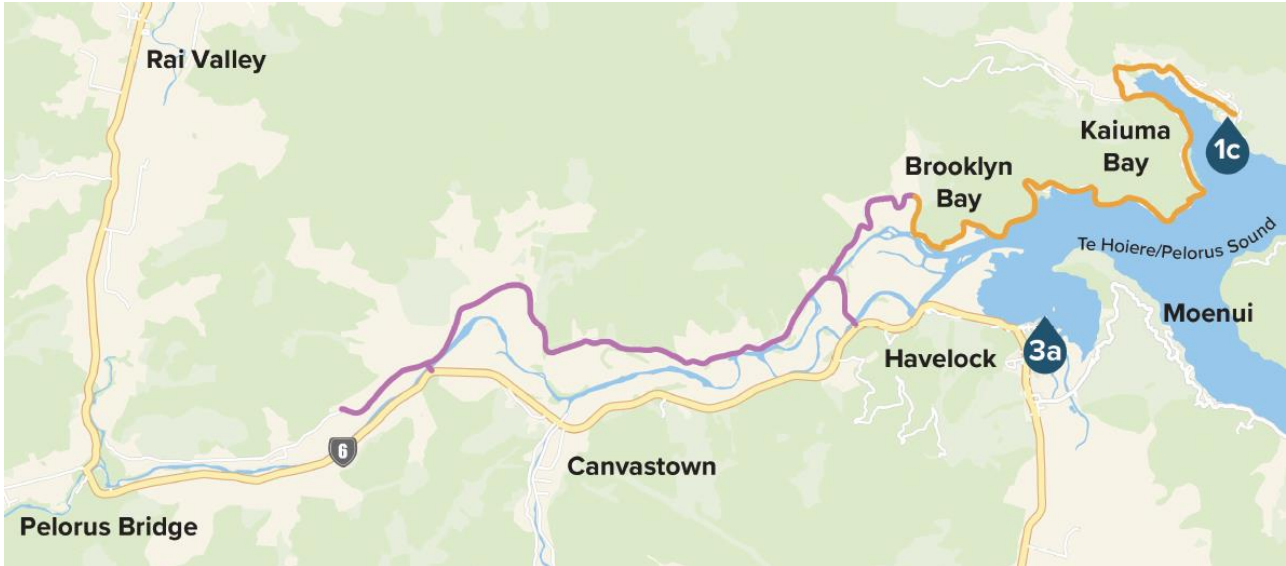


Q.2.2 Road Focus

Roads: The route would receive targeted improvements. The section between Brooklyn Bay and Kaiuma Bay may have increasing one-lane sections, and vehicle weight and length restrictions.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs).

Marine Services: There would be no change to the existing marine services in this area.



Roading approach key

	Protect <i>Build back stronger (No additional restrictions)</i>
	Protect <i>Build back stronger (Additional restrictions)</i>
	Accommodate <i>Build back with targeted improvements (No additional restrictions)</i>
	Accommodate <i>Build back with targeted improvements (Additional restrictions)</i>
	Accommodate/retreat <i>Build back with essential repairs only</i>
	Retreat others <i>Build back roads that provide marine hub access</i>

Marine Key

Maintain & protect existing marine hubs



Protect & upgrade existing hubs (All users)



Q.2.3 Road Access

Roads: The route would receive targeted improvements and there may be increased one-lane sections along the road. The section between Brooklyn Bay and Kaiuma Bay may have vehicle weight and length restrictions.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs).

Marine Services: There would be no change to the existing marine services in this area.



Roothing approach key

- Protect**
*Build back stronger
(No additional restrictions)*
- Protect**
*Build back stronger
(Additional restrictions)*
- Accommodate**
*Build back with targeted
improvements
(No additional restrictions)*
- Accommodate**
*Build back with targeted
improvements
(Additional restrictions)*
- Accommodate/retreat**
*Build back with
essential repairs only*
- Retreat others**
*Build back roads that provide
marine hub access*

Marine Key

Maintain & protect existing marine hubs



Protect & upgrade existing hubs (All users)



Q.2.4 Balanced/Marine Access


Roads: There would be targeted improvements between Daltons Road and Brooklyn Bay, and there may be increased one-lane sections. Additional vehicle restrictions along this length would not be expected. Only essential repairs would be completed between Brooklyn Bay and Kaiuma Bay, and there may be weight and length restrictions on vehicles.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs) and Kaiuma (local hub).

Marine Services: There would be no change to the existing marine services in this area.



Roading approach key

	Protect <i>Build back stronger (No additional restrictions)</i>
	Protect <i>Build back stronger (Additional restrictions)</i>
	Accommodate <i>Build back with targeted improvements (No additional restrictions)</i>
	Accommodate <i>Build back with targeted improvements (Additional restrictions)</i>
	Accommodate/retreat <i>Build back with essential repairs only</i>
	Retreat others <i>Build back roads that provide marine hub access</i>

Marine Key

Protect & upgrade existing hubs (All users)

	Primary Marine Hub		Local Marine Hub*
---	-----------------------	---	----------------------

*A selection of Local Marine Hubs are indicatively shown, whilst other locations will need to be added if an event severely compromised road connections. Locations to be determined by consultation.

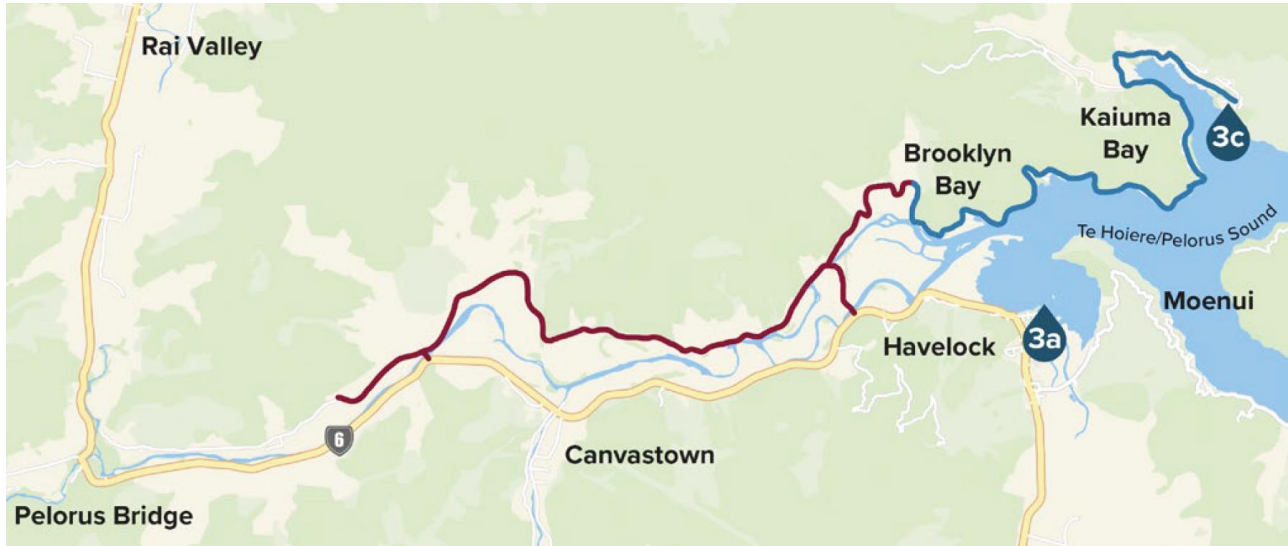


Q.2.5 Marine Focus

Roads: Only essential repairs would be completed between Daltons Road and Brooklyn Bay. While this may mean an increase in one-lane sections, it is not expected to result in additional vehicle restrictions. The road between Brooklyn Bay and Kaiuma Bay would only be repaired to ensure people have access to a marine hub

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs), and Kaiuma (local hub). Other local hubs may be established as needed.

Marine Services: There would be no change to the existing marine services in this area.



Roading approach key

	Protect <i>Build back stronger (No additional restrictions)</i>
	Protect <i>Build back stronger (Additional restrictions)</i>
	Accommodate <i>Build back with targeted improvements (No additional restrictions)</i>
	Accommodate <i>Build back with targeted improvements (Additional restrictions)</i>
	Accommodate/retreat <i>Build back with essential repairs only</i>
	Retreat others <i>Build back roads that provide marine hub access</i>

Marine Key

Protect & upgrade existing hubs (All users)

 Primary
Marine Hub

 Local
Marine Hub*

*A selection of Local Marine Hubs are indicatively shown, whilst other locations will need to be added if an event severely compromised road connections. Locations to be determined by consultation.



Q.3 Queen Charlotte

Q.3.1 Programme Development Tables

Note: The Road Focus and Road Access programmes are the same for the Queen Charlotte zone. This is due to the importance of the link between Picton and Havelock.

Network Feature		1. Road Focus	2. Road Access	3. Balanced	4. Marine Access	5. Marine Focus	Comments
Road	QC1	Ai		Ai	Bi	Bii	This is a Primary Collector road and is a strategic link for the region. It provides the main access route into Kenepuru Sound and is part of the alternative route for the state highways between Picton and Havelock. Approaches that reduce lane width are not appropriate due to the large volume of traffic and freight using the road. The exception is Programme 5: Marine Focus, where more freight will be moved by marine transport. Approaches C and D are unjustifiable due to the strategic importance of the route.
	QC2	Ai		Aii	Bii	Bii	This is a Primary Collector road and is a strategic link for the region. It is part of the alternative route for the state highways between Picton and Havelock. Approaches C and D are unjustifiable due to the strategic importance of the route. The existing pre weather event length restriction of 12.6 m means that reductions in lane widths (ii sub-approaches) are more acceptable for this segment.
	QC3	Bii		Bii	C	C	This is a Secondary Collector Road and provides access to Anakiwa, Outward Bound and the Queen Charlotte Track. Highest level of investment in roads is Bii, transitioning to C.
Marine	Picton Marina	Yiii		Yiii	Yiii	Yiii	The marinas at Picton and Havelock are key pieces of infrastructure required to support all marine travel in the Sounds. For this reason, both facilities should be protected from potential geohazards and upgraded for all users under all programmes.
	Havelock Marina	Yiii		Yiii	Yiii	Yiii	
	Anakiwa	X		X	X	X	Anakiwa is a Local Hub. As Anakiwa retains some form of road access under all programmes the marine infrastructure only needs to be protected from geohazards so it can be used in case of emergency.
	The Grove / Okiwa Bay	X		X	Zii	Zii	The Grove is an emergency hub. It becomes more important as the road access declines in Programmes 4 and 5. In Programmes 1, 2 and 3 it is protected from potential geohazards, but in Programmes 4 and 5 it is upgraded to a local hub to provide additional connection for local communities.

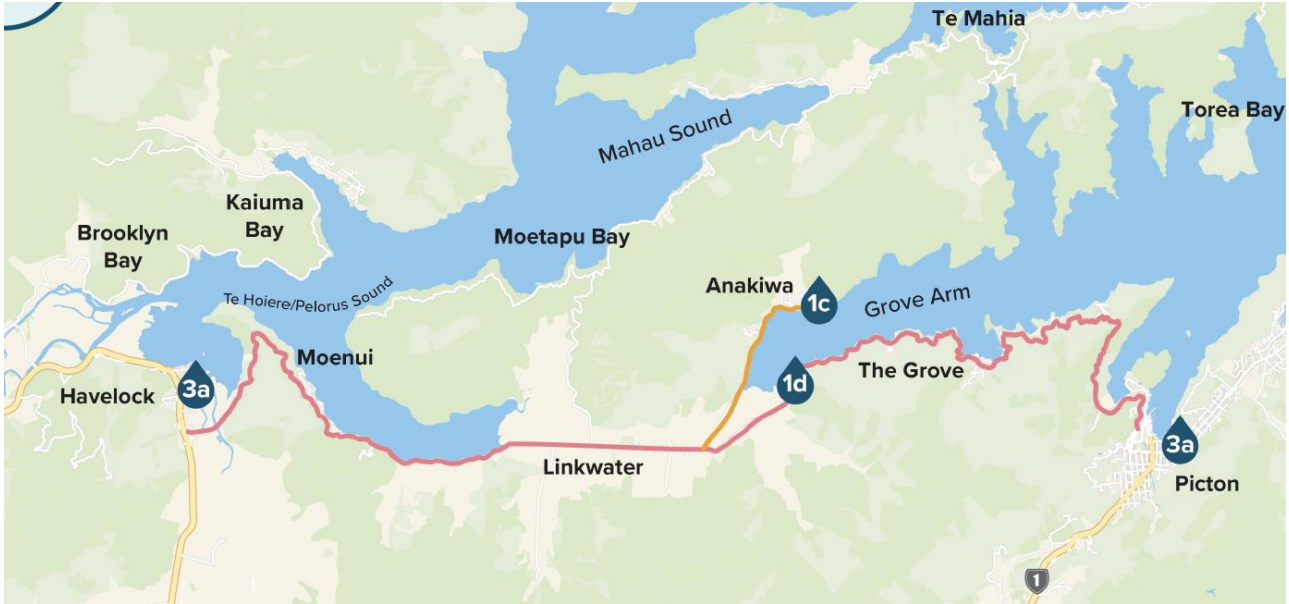


Q.3.2 Road Focus/Road Access

Roads: The route from Havelock to Picton would be strengthened, and Anakiwa Road would receive targeted improvements. The 12.6 m length restriction between Linkwater and Picton from before the 2021 event would remain.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs).

Marine Services: There would be no change to the existing marine services in this area.



Roding approach key

- **Protect**
Build back stronger
(No additional restrictions)

- **Protect**
Build back stronger
(Additional restrictions)

- **Accommodate**
Build back with targeted
improvements
(No additional restrictions)

- **Accommodate**
Build back with targeted
improvements
(Additional restrictions)

- **Accommodate/retreat**
Build back with
essential repairs only

- **Retreat others**
Build back roads that provide
marine hub access

Marine Key

- Maintain & protect existing marine hubs**
 - 1c Local Marine Hub
 - 1d Emergency Ramp
- Protect & upgrade existing hubs (All users)**
 - 3a Primary Marine Hub



Q.3.3 Balanced

Roads: The route from Havelock to Picton would be strengthened, although the section between Linkwater and Picton may be subject to additional vehicle weight restrictions. The 12.6 m length restriction between Linkwater and Picton from before the 2021 event would remain. Anakiwa Road would receive targeted improvements, although there may be length restrictions on vehicles.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs).

Marine Services: There would be no change to the existing marine services in this area.



Roading approach key

- Protect**
*Build back stronger
 (No additional restrictions)*
- Protect**
*Build back stronger
 (Additional restrictions)*
- Accommodate**
*Build back with targeted
 improvements
 (No additional restrictions)*
- Accommodate**
*Build back with targeted
 improvements
 (Additional restrictions)*
- Accommodate/retreat**
*Build back with
 essential repairs only*
- Retreat others**
*Build back roads that provide
 marine hub access*

Marine Key

Maintain & protect existing marine hubs



Local
Marine Hub



Emergency
Ramp

Protect & upgrade existing hubs (All users)



Primary
Marine Hub

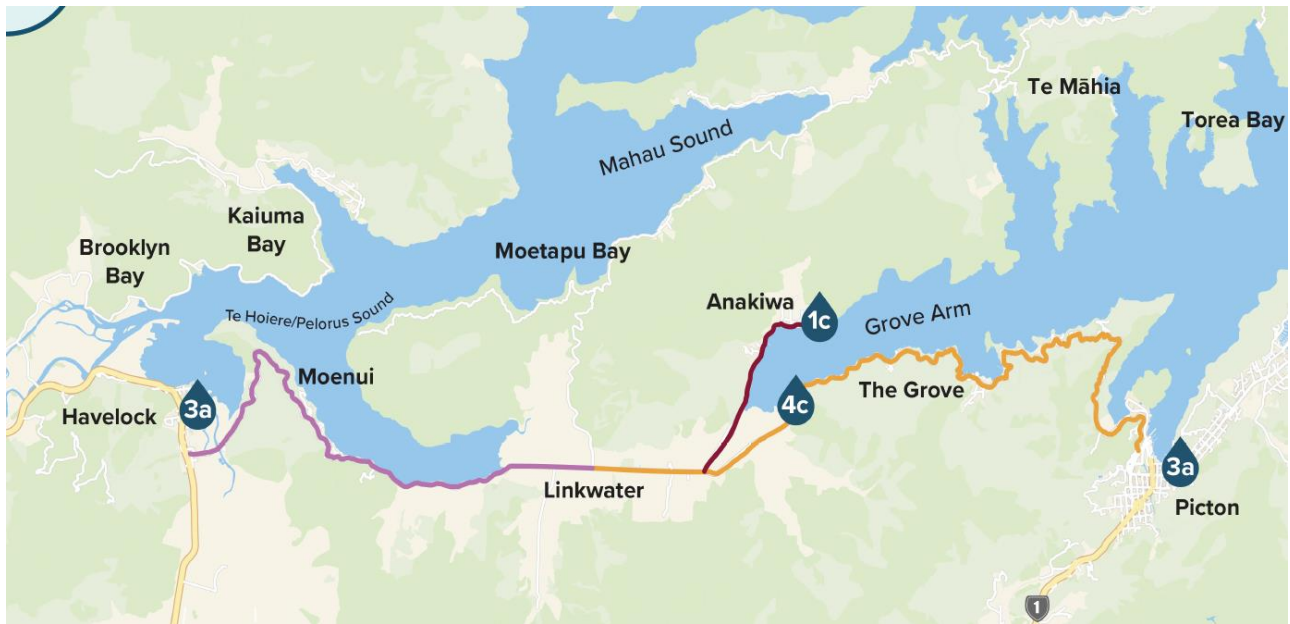


Q.3.4 Marine Access

Roads: The route from Havelock to Picton would receive targeted improvements, although the section between Linkwater and Picton may be subject to additional vehicle weight restrictions. The 12.6 m length restriction between Linkwater and Picton from before the 2021 event would remain. Anakiwa Road would receive essential repairs only, and there may be length restrictions on vehicles.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs) and develop a new local hub at The Grove.

Marine Services: There would be no change to the existing marine services in this area.



Roading approach key

- **Protect**
Build back stronger
(No additional restrictions)

- **Protect**
Build back stronger
(Additional restrictions)

- **Accommodate**
Build back with targeted improvements
(No additional restrictions)

- **Accommodate**
Build back with targeted improvements
(Additional restrictions)

- **Accommodate/retreat**
Build back with essential repairs only

- **Retreat others**
Build back roads that provide marine hub access

Marine Key

- Maintain & protect existing marine hubs**
 Local Marine Hub
- Protect & upgrade existing hubs (All users)**
 Primary Marine Hub
- New infrastructure or upgrade of level (All users)**
 Local Marine Hub

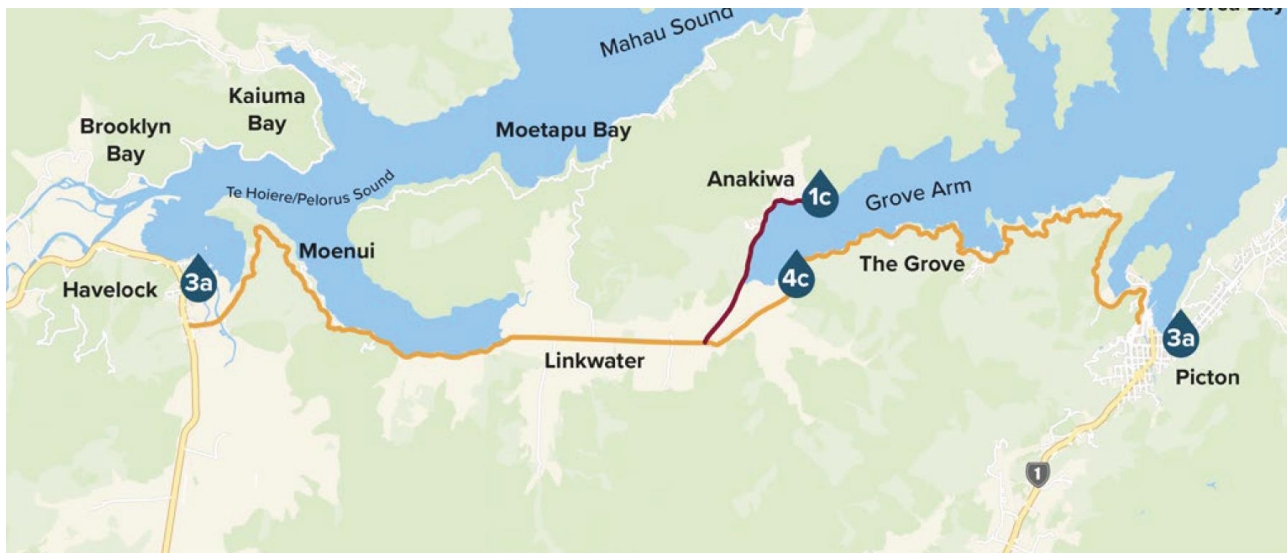


Q.3.5 Marine Focus

Roads: The route from Havelock to Picton would receive targeted improvements. The section from Havelock to Linkwater may have length restrictions, and the section between Linkwater and Picton may have additional vehicle weight restrictions. The 12.6 m length restriction between Linkwater and Picton from before the 2021 event would remain. Anakiwa Road would receive essential repairs only, and there may be length restrictions on vehicles.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs), and a new local hub developed at The Grove.

Marine Services: There would be no change to the existing marine services in this area.



Roading approach key

- **Protect**
Build back stronger
(No additional restrictions)

- **Protect**
Build back stronger
(Additional restrictions)

- **Accommodate**
Build back with targeted improvements
(No additional restrictions)

- **Accommodate**
Build back with targeted improvements
(Additional restrictions)

- **Accommodate/retreat**
Build back with essential repairs only

- **Retreat others**
Build back roads that provide marine hub access

Marine Key

- Maintain & protect existing marine hubs**
● 1c Local Marine Hub
- Protect & upgrade existing hubs (All users)**
● 3a Primary Marine Hub
- New infrastructure or upgrade of level (All users)**
● 4c Local Marine Hub



Q.4 Kenepuru

Q.4.1 Programme Development Table

Network Feature		1. Road Focus	2. Road Access	3. Balanced	4. Marine Access	5. Marine Focus	Comments	
Road	K1	Bi	Bii	Bii	C	C	This is a Secondary Collector route, and due to the underlying natural slope instability the A approaches are not justified. The highest level of investment in roads is Bi. There is no coastline, so the area will always rely on roads, and the lowest level of repair is C which is applicable to the marine options.	
	K2	Bi	Bii	Bii	D	D	This is a Secondary Collector route, and due to the underlying natural slope instability the A approaches are not justified. The highest level of investment in roads is Bi. Marine options are available so the lowest level of repair is D for the marine programmes.	
	K3	Bi	Bii	Bii	D	D		
	K4a	Ai	Ai	Ai	Ai	Ai	This is the strategic connection between arterial marine hubs of Torea and Portage. It provides an alternative entry point into Kenepuru Sound should the road be closed. This is a key connection so Ai is the only appropriate approach.	
	K4b	Bi	Bii	C	D	D	This is an Access route, and due to the underlying natural slope instability the A approaches are not justified. The highest level of investment in roads is Bi. Marine options are available so the lowest level of repair is D. This segment is C under Programme 3: Balanced as the route has a lower ONRC rating than those preceding it.	
	K5	Bi	Bii	Bii	Bii	D	These are Access routes and provide road access to the marine hubs at Goulter Bay (arterial), and Fish Bay and Double Bay (local). The low traffic volumes mean the A approaches are not justified. Vehicle access to these marine hubs is important, so the B approaches are justified under all programmes, except Programme 5: Marine Focus.	
	K6a	Bi	Bii	Bii	Bii	D		
	K6b	Bi	Bii	Bii	C	D		
	K7	Bi	Bii	Bii	C	C	D	These are Low Volume routes and do not have the same level of natural slope instability as segments K1, K2, K3 and K4b. The A approaches are not justified due to the lower traffic volumes.
	K8	Bi	Bii	Bii	C	C	D	
K9	Bi	Bii	C	D	D	D	This is an Access route, and due to the underlying natural slope instability and lower traffic volumes the A approaches are not justified. The highest level of investment in roads is Bi. Marine options are available so the lowest level of repair is D.	
Marine	Torea Bay	X	Yiii	Yiii	Yiii	Yiii	Torea and Portage are Arterial Hubs. They are either side of the road connection between Queen Charlotte Sound/ Tōtaranui and Kenepuru Sound and provide important infrastructure to facilitate movement via the link. Under Programme 1: Road Focus, the hubs are protected from potential geohazards, but in all others they are upgraded for all users.	
	Portage	X	Yiii	Yiii	Yiii	Yiii		
	Goulter Bay	Zii	Zii	Ziii	Ziii	Ziii	Ziii	A new marine hub is proposed under all programme options. Under Programmes 1 and 2 its priority is to provide additional infrastructure for emergency response. Under Programmes 3, 4, and 5 it is an Arterial Hub, which supports the majority of freight transferring from road to marine access.



Network Feature		1. Road Focus	2. Road Access	3. Balanced	4. Marine Access	5. Marine Focus	Comments
Marine cont.	Fish Bay	X	X	Yiii	Yiii	Yiii	Fish Bay and Double Bay are Local Hubs. They become more important as the road access declines in Programmes 3-5. In Programmes 1 and 2 they are protected from potential geohazards, in Programme 3-5 they are upgraded for all users and perform an important access role.
	Double Bay	X	X	Yiii	Yiii	Yiii	
	Punga Cove	X	X	Yi	Yi	Yi	Punga Cove is a Local Hub. It becomes more important as the road access declines in Programmes 3-5. In Programmes 1 and 2 it is protected from potential geohazards, and in Programme 3-5 it is upgraded for passengers.
	Other minor hubs	NA	NA	Zii	Zii	Zii	New local marine hubs (additional to those mentioned above) may become necessary under Programmes 3, 4 and 5 as road access declines.

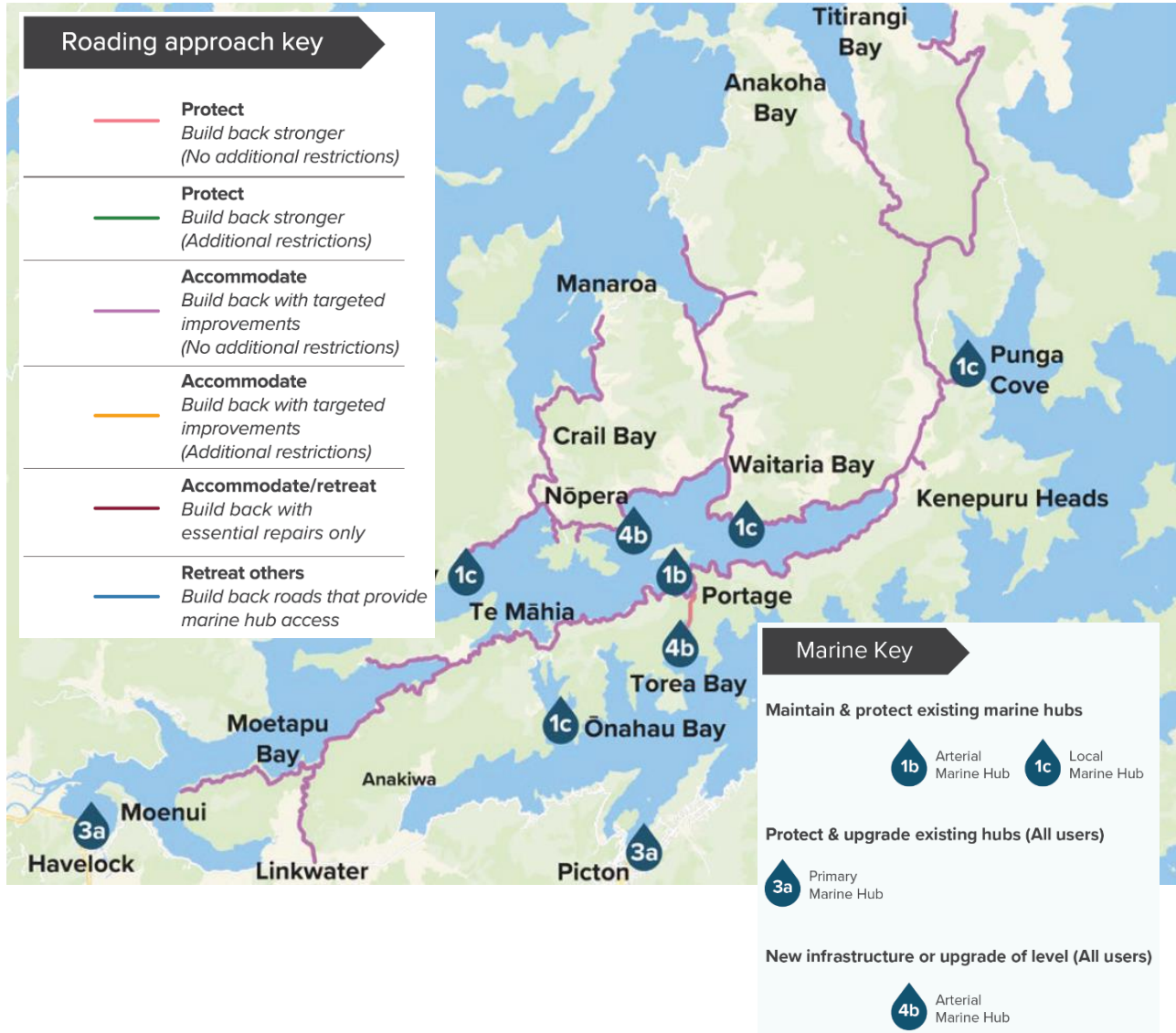


Q.4.2 Road Focus

Roads: The road between Torea and Portage would be strengthened. All other roads would receive targeted improvements.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs), and a new arterial hub would be developed near Goulter Bay.

Marine Services: There would be no change to the existing marine services in this area.



Q.4.3 Road Access

Roads: The road between Torea and Portage would be strengthened. All other roads would receive targeted improvements, although there may be an increase in the number of one-lane sections. On Kenepuru Road between Moetapu Bay Road and the Heads, and on Moetapu Bay Road, there would be potential for length restrictions to 12.6 m, and weight restrictions to under Class 1 (44 t) in the long term.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs), and Torea and Portage (arterial hubs). A new arterial hub would be developed near Goulter Bay.

Marine Services: There would be no change to the existing marine services in this area.



Roading approach key

- **Protect**
Build back stronger
(No additional restrictions)

- **Protect**
Build back stronger
(Additional restrictions)

- **Accommodate**
Build back with targeted improvements
(No additional restrictions)

- **Accommodate**
Build back with targeted improvements
(Additional restrictions)

- **Accommodate/retreat**
Build back with essential repairs only

- **Retreat others**
Build back roads that provide marine hub access

Marine Key

- Maintain & protect existing marine hubs**
● 1c Local Marine Hub

- Protect & upgrade existing hubs (All users)**
● 3a Primary Marine Hub ● 3b Arterial Marine Hub

- New infrastructure or upgrade of level (All users)**
● 4b Arterial Marine Hub



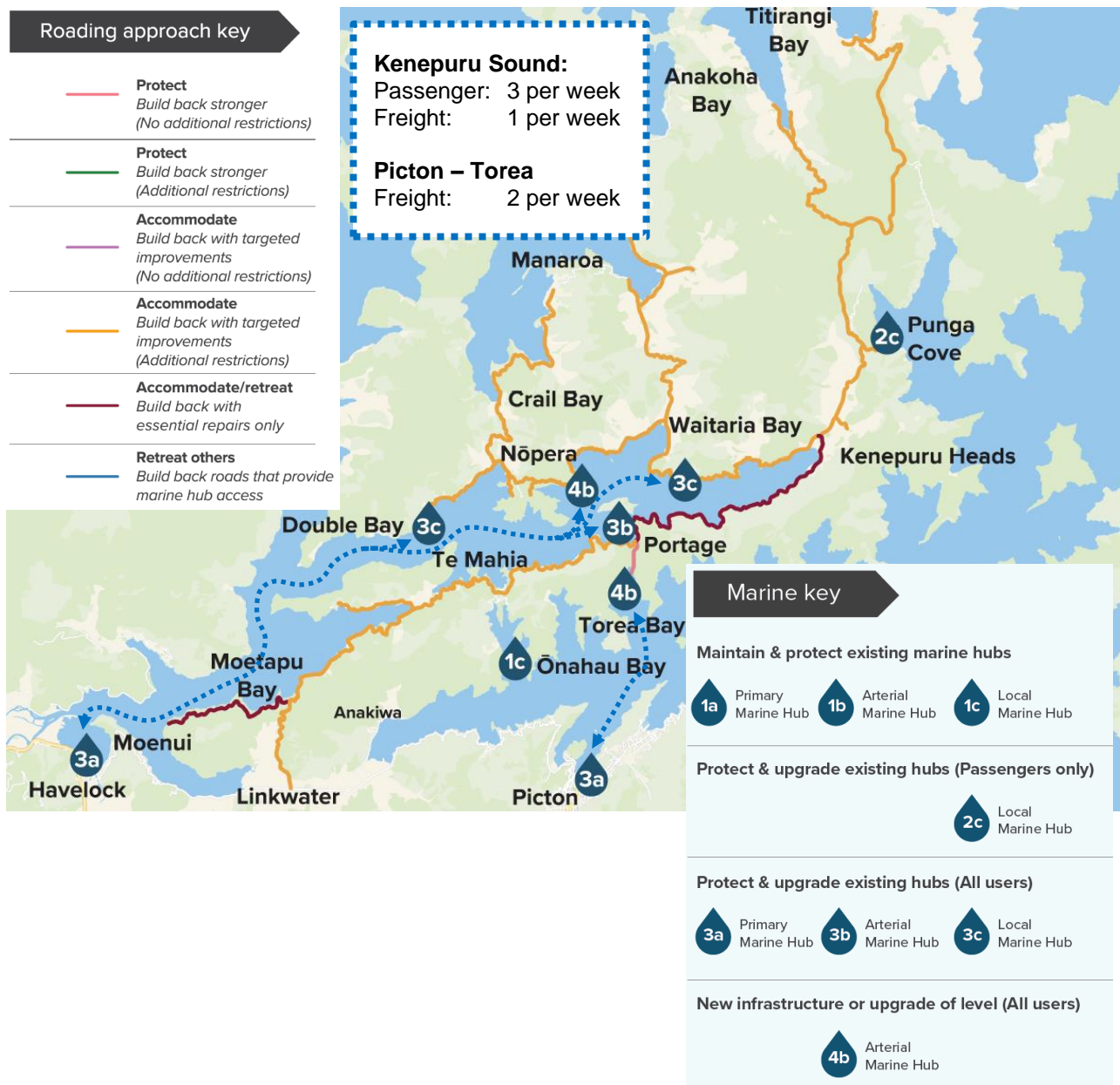
Q.4.4 Balanced

Roads: The road between Torea and Portage would be strengthened. The roads north of the Heads would receive targeted improvements, although there may be an increase in the number of one-lane sections and vehicle length restrictions may be implemented.

Kenepuru Road between Linkwater and Portage would also receive targeted improvements, with potential for an increase in the number of one lane sections. Only essential repairs would be completed between Portage and the Heads, and on Moetapu Bay Road. On Kenepuru Road between Moetapu Bay Road and the Heads, and on Moetapu Bay Road, there would be potential for length restrictions to 12.6 m, and weight restrictions to under Class 1 (44 t) in the long term. The residents only restriction would be removed.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs), Torea and Portage (arterial hubs), and Double Bay, Fish Bay and Punga Cove. A new arterial marine hub would be developed near Goulter Bay.

Marine Services: Passenger services between Havelock and Kenepuru Sound would be introduced three times per week, and passenger services in the Queen Charlotte Sound would be as existing. A twice-weekly freight service between Picton and Torea would be introduced, as would a scheduled freight service between Havelock and Kenepuru Sound.



Q.4.5 Marine Access

Roads: The road between Torea and Portage would be strengthened. Kenepuru Road between the Heads and Raetihi would receive targeted improvements although there may be an increase in the number of one-lane sections and vehicle length restrictions may be implemented. The side roads north of the Heads would receive essential repairs only and there may be vehicle length restrictions. Kenepuru Road between Moetapu Bay Road and the Heads, and Moetapu Bay Road would only receive repairs that ensure access to marine hubs.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs), Torea and Portage (arterial hubs), and Double Bay, Fish Bay and Punga Cove (local hubs). A new arterial hub would be developed near Goulter Bay. Other local hubs may be established as needed.

Marine Services: Passenger services between Havelock and Kenepuru Sound would be increased to daily, and passenger services in the Queen Charlotte Sound would be as existing. Freight services between Picton and Torea, and Havelock and Kenepuru would be increased to three to four times per week.



Roading approach key

- **Protect**
Build back stronger
(No additional restrictions)

- **Protect**
Build back stronger
(Additional restrictions)

- **Accommodate**
Build back with targeted improvements
(No additional restrictions)

- **Accommodate**
Build back with targeted improvements
(Additional restrictions)

- **Accommodate/retreat**
Build back with essential repairs only

- **Retreat others**
Build back roads that provide marine hub access

Marine Key

Maintain & protect existing marine hubs

1c Local Marine Hub

Protect & upgrade existing hubs (Passengers only)

2c Local Marine Hub

Protect & upgrade existing hubs (All users)

3a Primary Marine Hub **3b** Arterial Marine Hub **3c** Local Marine Hub

New infrastructure or upgrade of level (All users)

4b Arterial Marine Hub



Q.4.6 Marine Focus

Roads: The road between Torea and Portage would be strengthened. Kenepuru Road between Linkwater and the Moetapu Bay turnoff would receive essential repairs only, and there may be vehicle length restrictions. All other roads would only receive repairs that ensure access to the closest marine hub.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs); Torea and Portage (arterial hubs); and Double Bay, Fish Bay and Punga Cove. A new arterial hub would be developed near Goulter Bay, and local hubs at Crail Bay, Clova Bay, Anakoha Bay, and Titirangi Bay would be developed as required. Other local hubs may be established as needed.

Marine Services: Passenger services between Havelock and Kenepuru Sound would increase to twice daily, and passenger services in the Queen Charlotte Sound would be as existing. Daily freight services between Picton and Torea, and Havelock and Kenepuru would be introduced.



Roading approach key

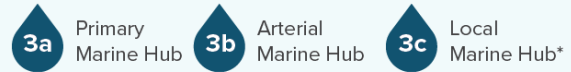
	Protect <i>Build back stronger (No additional restrictions)</i>
	Protect <i>Build back stronger (Additional restrictions)</i>
	Accommodate <i>Build back with targeted improvements (No additional restrictions)</i>
	Accommodate <i>Build back with targeted improvements (Additional restrictions)</i>
	Accommodate/retreat <i>Build back with essential repairs only</i>
	Retreat others <i>Build back roads that provide marine hub access</i>

Marine key

Protect & upgrade existing hubs (Passengers only)



Protect & upgrade existing hubs (All users)



New infrastructure or upgrade of level (All users)



*A selection of Local Marine Hubs are indicatively shown, whilst other locations would need to be added if an event severely compromised road connections. Locations to be determined by consultation.

Q.5 Te Whanganui/Port Underwood

Q.5.1 Programme Development Table

Network Feature		1. Road Focus	2. Road Access	3. Balanced	4. Marine Access	5. Marine Focus	Comments
Road	PU1	Ai	Ai	Bi	Bi	Bi	This is a Secondary Collector/Access route and provides access to the Cook Strait Power Cable. It is also a key route for forestry. The highest level of investment in roads is Ai, transitioning to Bi at Programme 3: Balanced.
	PU2	Ai	Bi	Bii	C	C	This is an Access route, although it carries a large volume of freight. There is an alternative route to the north. The highest level of investment is Ai, and the lowest is C.
	PU3	Ai	Bi	Bii	Bii	C	This is an Access/Low Volume route and provides access to the Cook Strait Power Cable. The highest level of investment in roads is Ai, transitioning to the B approaches. C is only an option for this segment under Programme 5: Marine Focus.
	PU3	Aii	Bii	C	D	D	This is a Low Volume road where reduction in lane widths is acceptable as there is no overarching network connectivity.
Marine	Oyster Bay	X	X	Yiii	Yiii	Yiii	Oyster Bay is a Local Hub. It becomes more important as the road access declines. In Programmes 1 and 2 it is protected from potential geohazards, and in Programmes 3, 4, and 5 it is upgraded for all users.
Marine cont.	Hakana Bay	X	X	X	Zii	Zii	Marine access to Hakakna Bay becomes important when access beyond the Ōraumoa/Fighting Bay entrance becomes marine based in Programmes 4 and 5.
	Other minor hubs	NA	NA	NA	Zii	Zii	New local marine hubs (additional to those mentioned above) may become necessary under Programmes 4 and 5 as road access declines.

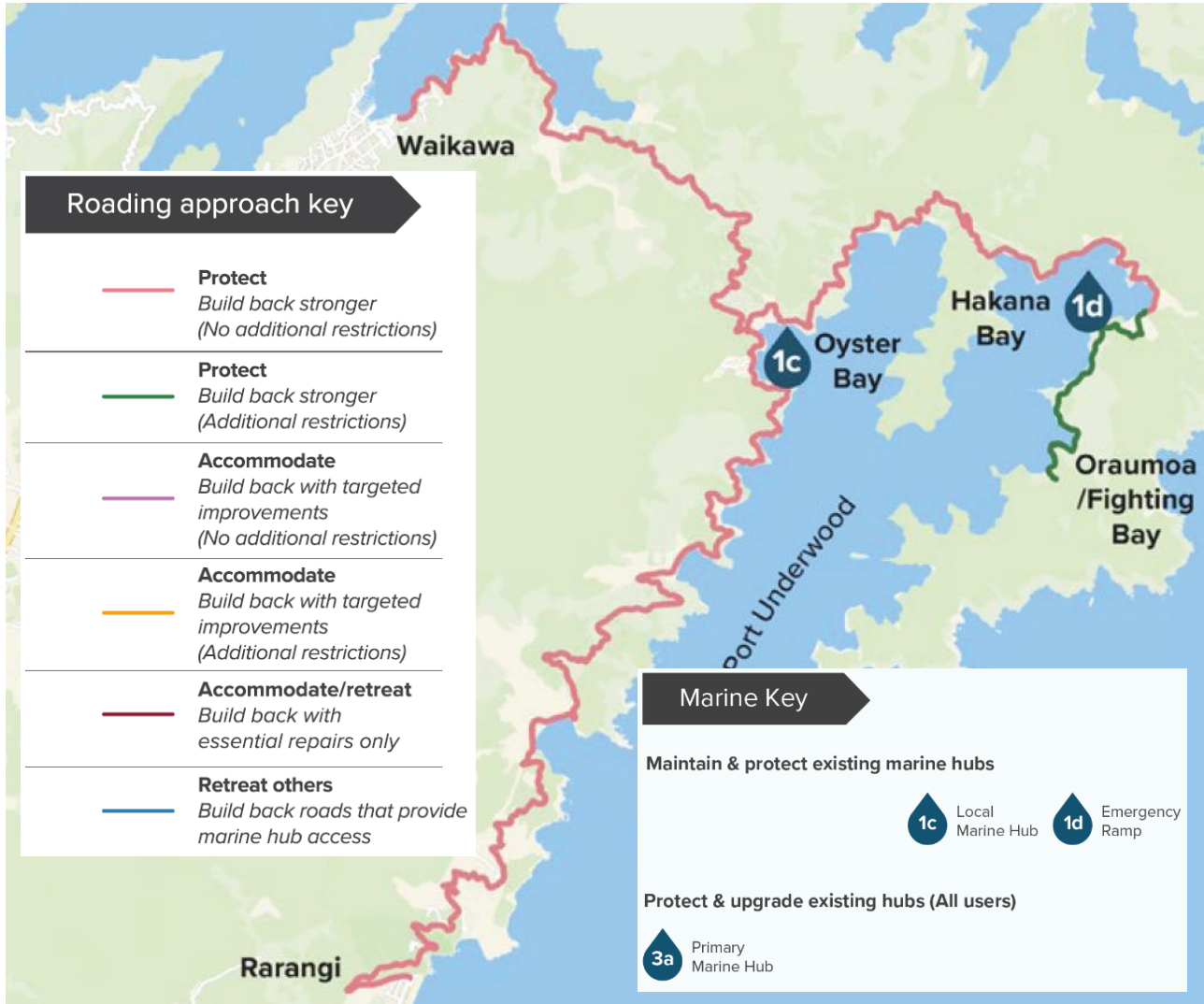


Q.5.2 Road Focus

Roads: Port Underwood Road between Waikawa and Oyster Bay would be strengthened. All other roads would receive targeted improvements, but Tumbledown Bay Road between Oyster Bay and the Oraumoa/Fighting Bay entrance may have length restrictions.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs).

Marine Services: There would be no change to the existing marine services in this area.



Q.5.3 Road Access

Roads: Port Underwood Road between Waikawa Bay and Oyster Bay would be strengthened. All other roads would receive targeted improvements, but Tumbledown Bay Road between the Oraumoa/Fighting Bay entrance and the road end may have length restrictions.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs).

Marine Services: There would be no change to the existing marine services in this area.

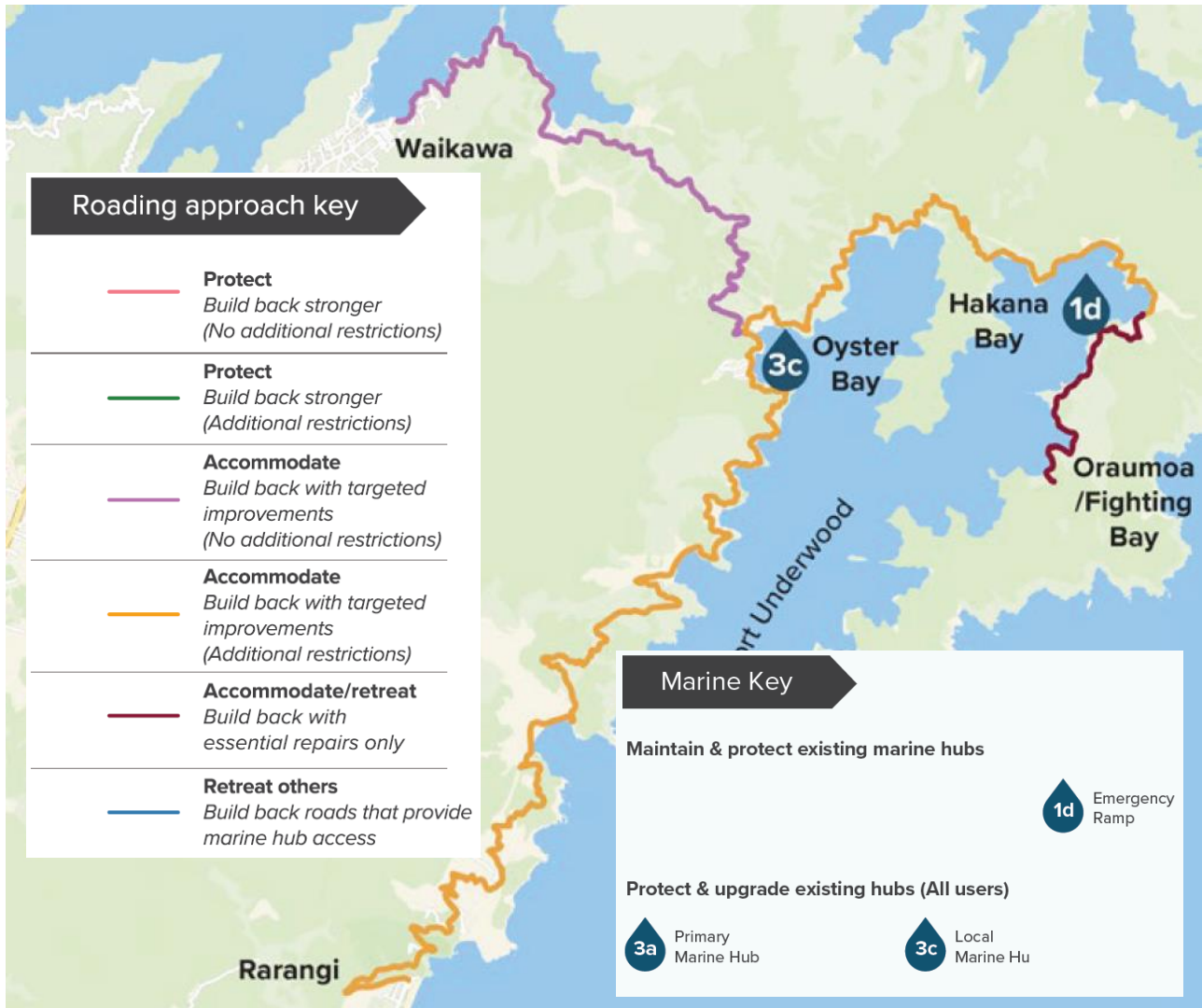


Q.5.4 Balanced

Roads: Port Underwood Road between Waikawa and Oyster Bay would be strengthened. Port Underwood Road between Oyster Bay and Rarangi, and Tumbledown Bay Road between Oyster Bay and the Oraumoa/Fighting Bay entrance would also receive targeted improvements but would have increasing one-lane sections and may experience vehicle length restrictions. Tumbledown Bay Road between the Oraumoa/Fighting Bay entrance and the road end would receive essential repairs only.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs) and the Oyster Bay local hub.

Marine Services: There would be no change to the existing marine services in this area.

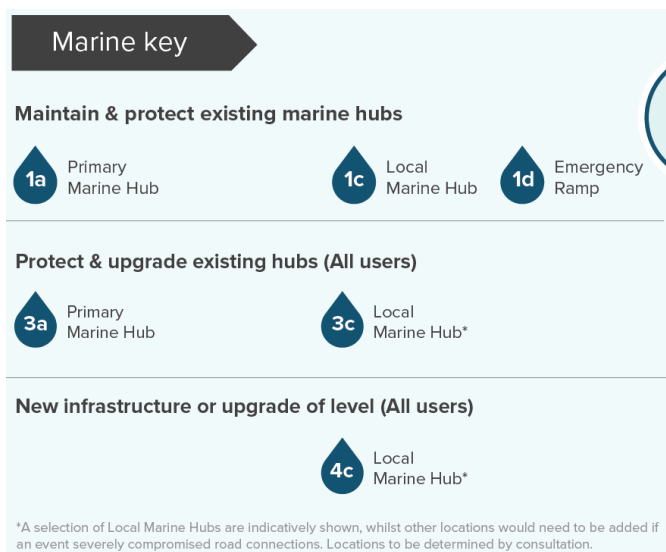


Q.5.5 Marine Access

Roads: Port Underwood Road between Waikawa and Oyster Bay would receive targeted improvements. Port Underwood Road between Oyster Bay and Rarangi would only receive essential repairs and may experience vehicle length restrictions. Tumbledown Bay Road between Oyster Bay and the Oraumoa/Fighting Bay entrance would also receive targeted improvements but would have increasing one-lane sections. Tumbledown Bay Road between the Oraumoa/Fighting Bay entrance and the road end would only receive repairs that provide access to a marine hub.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs), and the Oyster Bay local hub. A new local hub may be developed near Hakana Bay.

Marine Services: There would be no change to the existing marine services in this area.

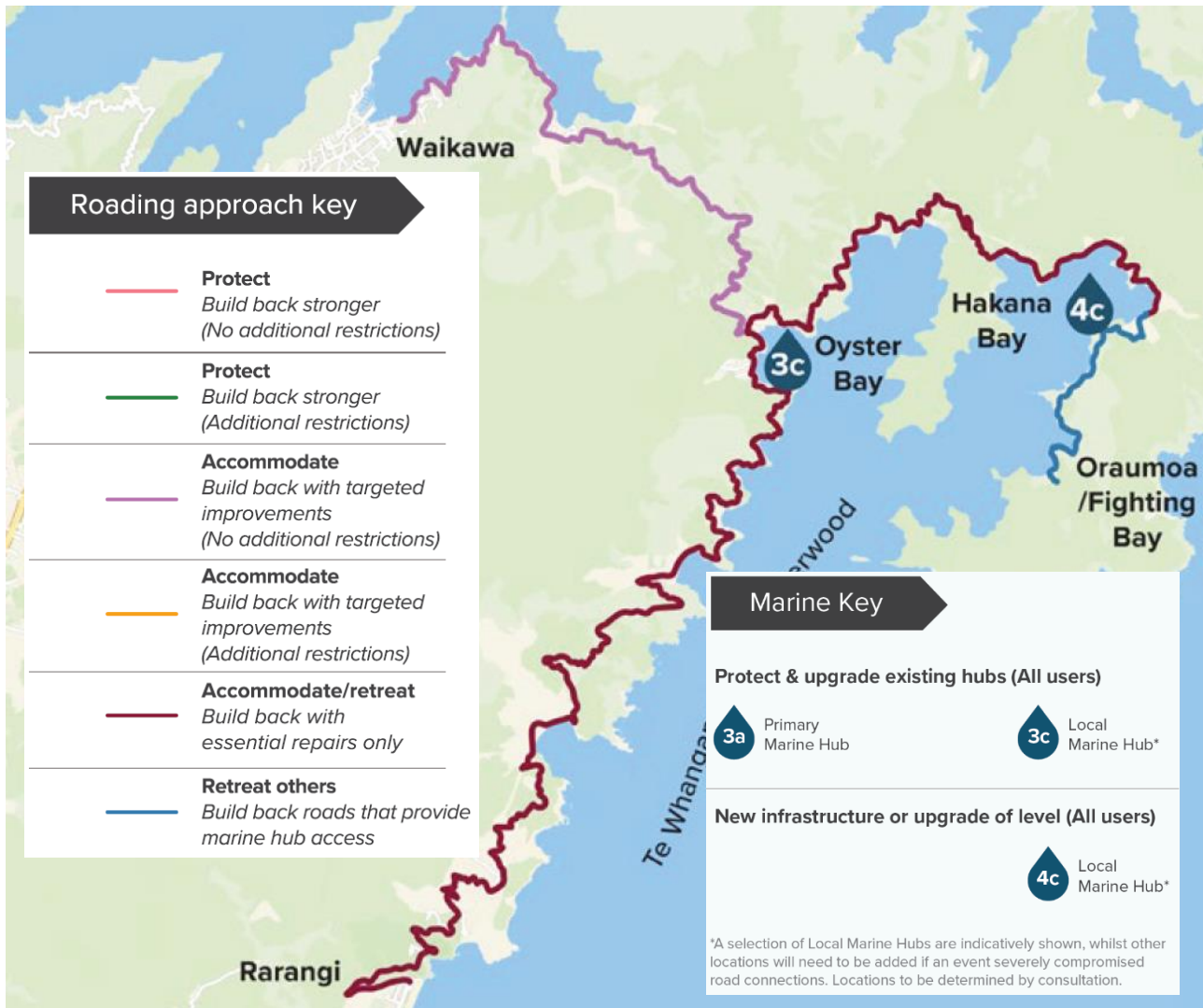


Q.5.6 Marine Focus

Roads: Port Underwood Road between Waikawa and Oyster Bay would receive targeted improvements. Port Underwood Road between Oyster Bay and Rarangi, and Tumbledown Bay Road between Oyster Bay and the Oraumoa/Fighting Bay entrance would receive essential repairs only and may experience vehicle length restrictions. Tumbledown Bay Road between the Oraumoa/Fighting Bay entrance and the road end would receive essential repairs only.

Marine Infrastructure: There would be investment to protect and upgrade the marine facilities at Havelock and Picton (primary hubs) and the Oyster Bay local hub. A new local hub may be developed near Hakana Bay.

Marine Services: There would be no change to the existing marine services in this area.



Appendix R Multi Criteria Analysis



Marlborough Sounds Future Access PBC - Multi Criteria Analysis Report



August 2024

Ref: 31020564

PREPARED FOR:

Marlborough District Council

PREPARED BY: Sarah Connolly

Stantec New Zealand

Revision Schedule

Revision No.	Date	Description	Prepared by	Quality Reviewer	Independent Reviewer	Project Manager Final Approval
1	23/08/2023	Final Report	Sarah Connolly	Courtney McCrostie	Courtney McCrostie	Andrew Maughan

Disclaimer

The conclusions in the report are Stantec's professional opinion, as of the time of the report, and concerning the scope described in the report. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. The report relates solely to the specific project for which Stantec was retained and the stated purpose for which the report was prepared. The report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorised use or reliance is at the recipient's own risk.

Stantec has assumed all information received from the client and third parties in the preparation of the report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This report is intended solely for use by the client in accordance with Stantec's contract with the client. While the report may be provided to applicable authorities having jurisdiction and others for whom the client is responsible, Stantec does not warrant the services to any third party. The report may not be relied upon by any other party without the express written consent of Stantec, which may be withheld at Stantec's discretion.



Contents

1.	Purpose	1
2.	MCA Process	1
2.1	Assessment Process	1
2.2	Changes to Assessment Criteria	1
2.3	Technical Moderation Session	1
2.4	Weightings	1
2.5	Sensitivity Analysis	2
3.	MCA Results	2
3.1	Sensitivity Tests	4
4.	Initial Cost Estimate and Transport BCR	6
5.	Emerging Preferred Programme	7
6.	Next Steps	7

List of tables

Table 1: Base weighting	2
-------------------------	---

List of figures

Figure 1: Weighting scenarios	2
Figure 2: MCA moderated scores	4
Figure 3: Sensitivity Tests	5
Figure 4: Cost Estimates	6

List of Attachments

Attachment 1 MCA Process Memo
Attachment 2 MCA Moderation Memo Meeting Notes
Attachment 3 MCA Moderation Meeting Slides
Attachment 4 Emerging Preferred Option



1. Purpose

The purpose of this memo is to summarise the MCA process for the Sounds Future Access PBC. This report includes:

- An outline of the Multi-Criteria Assessment (MCA) process.
- A summary of the MCA scoring.
- The total scores for each programme and sensitivity analysis.
- Initial cost estimates
- Emerging Preferred Programme
- Next steps

2. MCA Process

2.1 Assessment Process

Following the development of the long list of programmes and agreement on the assessment criteria, subject matter experts (SMEs) from Stantec, Marlborough District Council and Marlborough Roads were identified. The SMEs undertook independent scoring for criteria that reflected their technical expertise.

A memo and a summary of technical information was provided to assessors and a briefing session was held on 23 March 2023 to explain the programmes, assessment task, outputs required and to help ensure that people were assessing programme options consistently (refer to MCA Assessor Guidance Memo and Attachments). Stantec provided one-to-one support to individual SMEs who were seeking clarification or confirming assumptions and reasoning to arrive at a final set of scores, as required throughout the assessment period.

To ensure that there was differentiation between programme options, scoring was undertaken for each programme option, including the Do Minimum.

2.2 Changes to Assessment Criteria

Criteria were discussed and agreed with MDC and Waka Kotahi representatives at a meeting on 21 February 2023.

It was agreed that impacts on Te Ao Māori, affordability and value for money would be considered in parallel with the MCA, and not scored through the MCA process. The latter two criteria form part of the economic assessment, and costs and benefits will be considered in the Appraisal Summary Table alongside the MCA and iwi ranking in the final decision making for the preferred option.

It was agreed to excluded climate change adaptation, scheduling/programming, cumulative and property impacts from the MCA. For more information see Attachment 1 MCA Process Memo.

2.3 Technical Moderation Session

SMEs presented their scores for moderation with the project team at a session on 31 March 2023.

There was significant discussion and moderation for all scores. The workshop discussion is summarised in the meeting notes in Attachment 2, and key discussion points for scoring are provided in Attachment 3, the workshop presentation.

The Social and Community criteria was scored separately to provide a 'community focus' score and a 'business focus' score, to reflect the different effects of the programmes on sub-sectors of the community. These separate scores were combined to provide a 'final' score. It was agreed that the effect on different sub-sectors of the community would be tested further through sensitivity testing.

As a result of the workshop some of the initial scores were changed. SMEs provided their final scores on 4 April 2023, following the moderation session. The moderated scores were accepted and included in the MCA.

2.4 Weightings

Weightings recognise that some criteria are considered more important than others. The baseline weightings for the Investment Objectives were drawn from the ILM, whilst weightings for other criteria were assigned based on the key drivers for the project and risks. The weightings were agreed with the client and Waka Kotahi representatives.



Table 1: Base weighting

Investment Objectives (40%)			Potential Achievability (30%)	Opportunities and Impacts (30%)			
Travel alternatives	Disrupted access	Resilience of assets	Technical Difficulty	Social and community	Environmental effects	Climate change mitigation	Supplier capacity and capability
8%	12%	20%	30%	13.5%	9%	4.3%	3%

2.5 Sensitivity Analysis

The aim of sensitivity analysis is to test how sensitive the outcomes of the MCA were to the different criteria. The following weighting themes were tested:

- Investment Objective Focus
- Equal Weighting
- Investment Objectives and Achievability Focus
- Social and Community Focus
- Investment Objective and Social and Community Focus

A breakdown of how each criteria contributed to the overall score for each sensitivity test is provided in Figure 1.

	Travel Alternatives	Disrupted Access	Resilience of Assets	Technical Difficulty	Social and Community	Environmental effects	Climate Change Mitigation	Supplier Capacity and Capability
Base Weighting	8.0%	12.0%	20.0%	30.0%	13.5%	9.0%	4.5%	3.0%
Sensitivity Test								
Investment Objective Focus	20.0%	30.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Equal Weighting	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%
Investment Objectives and Achievability	12.0%	18.0%	30.0%	40.0%	0.0%	0.0%	0.0%	0.0%
Social and Community Focus	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
Investment Objectives and Social and Community	12.0%	18.0%	30.0%	0.0%	40.0%	0.0%	0.0%	0.0%

Figure 1: Weighting scenarios

3. MCA Results

Figure 2 presents the scores agreed at the technical moderation workshop and ranking of each programme.

For context to understand the following table the programmes were structured in general as follows:

- The Marlborough Sounds area was split into 5 separate areas and MCA evaluation was undertaken at an area level.
- Each area was split into smaller segments and segments had different strategies.



- The different strategies encompassed Protect, Accommodate, Retreat and Avoid themes which in most cases varied across the different segments within each area.
- Overall intervention themes supported either more or less the following key outcomes:
 - Repair roads to provide road access (the levels of service of road access varied within areas and segment depending upon technical constraints and road importance).
 - Improve roads (resilience and relevant safety improvements) where it made sense and would add value in terms of reducing impact of road outages in future possible events.
 - Where necessary invest in alternate routes (the predominant alternative route available is marine transport in the Sounds).
- A total of 29 programmes were evaluated (named themes road focus and road access were the same option for the Queen Charlotte Drive area).
- A road focus theme tended to be an option where more repairs were undertaken on roads and proactive investment was proposed into resilience improvements. This was considered a 'protect' strategy. At the other end of the spectrum, a marine focus strategy provided road access to marine infrastructure that supports marine transport as the primary transport system in the Marlborough Sounds and is aligned with a strategy that 'avoids' the geological hazards. Strategies in between included reduced extent of repairs and resilience improvements, alongside differing levels investment in alternative marine access options.
- The programmes are summarised below (the below is an extract from guidance provided to evaluators):

<ul style="list-style-type: none"> • Current Status: This is the baseline, with road conditions as of February 2023, with some damage repaired following the 2022 storm event and the restriction of non-residents removed, except in Kenepuru. • Road Focus: Most roads strengthened, with marine transport primarily for emergency response. • Road Access: Key roads strengthened, with marine available where needed as backup. 	<ul style="list-style-type: none"> • Balanced: A mix of investment in road and marine transport. • Marine Access: Essential roads repaired, and marine transport made more available and more resilient. • Marine Focus: Roads repaired where affordable, but roads are mostly focused on providing access to marine transport as the primary transport mode/method for access into and out of the area.
---	--

Although options in different areas may have the same category title, such as road focus or marine access, the exact programmes vary based on the specific area's unique vulnerabilities and priorities – i.e. a road focus option for one area could look quite different to road focus in another area. The specifics for each area are on the following pages.

The scoring showed a clear trend towards the Road Focus and Road Access Programmes for the Port Underwood, Pelorus and Queen Charlotte Zones, and for the Balanced and Marine Access Programmes for French Pass and Kenepuru, which have more scope for marine transport. However, for French Pass, these programmes score negatively against investment objective 2 – reduce frequency and duration of disrupted access, which does not a good outcome from the investment.

Figure 2 also shows that the Do-Minimum for all zones results in very low resilience for the roading assets, and more frequent/longer periods of disrupted access.



Theme	Investment Objectives			Achievability	Opportunities and Impacts						Weighted score	Rank	
	1	2	3	4	5			6	7	8			
Criteria Number	1	2	3	4	5			6	7	8			
Criteria	Improve ...resilience by providing travel alternatives	Reduce frequency and duration of disrupted services	Improve resilience of the transport assets	Technical Difficulty	Social and Community Impacts			Environment Effects	Climate Change Mitigation	Supplier capacity and capability			
					Final	Community Focus	Business Focus						
Total Weighting	8.0%	12.0%	20.0%	30.0%	45%	0.0%	0.0%	9.0%	4.5%	3.0%			
Port Underwood	Do Minimum	0	-2	-1	3	-2	-2	-2	-2	-1	3	0.055	5
	Road Focus	0	2	2	1	2	2	2	1	-2	2	1.270	1
	Road Access	0	1	1	2	1	1	1	1	-2	2	1.115	2
	Balanced	1	0	0	2	1	1	0	2	-1	2	1.010	3
	Marine Access	2	-1	-1	2	-1	1	-1	-2	-1	2	0.140	4
	Marine Focus	2	-2	-2	2	-1	1	-1	-1	-1	2	-0.090	6
Pelorus	Do Minimum	1	-1	-1	3	-1	-1	-1	-2	0	3	0.435	5
	Road Focus	1	2	2	0	2	2	2	1	-1	2	1.095	1
	Road Access	1	1	1	1	1	1	1	1	-1	2	0.940	2
	Balanced	2	1	0	0	1	1	1	1	-1	2	0.520	4
	Marine Access	2	0	0	1	1	1	1	1	-1	2	0.700	3
	Marine Focus	2	-1	-1	1	-1	-1	-3	-1	0	2	-0.025	6
Queen Charlotte	Do Minimum	1	-2	-2	3	-3	-3	-3	-2	0	3	-0.155	4
	Road Focus	1	1	2	-2	3	3	3	1	-3	1	0.390	1
	Road Access	1	1	2	-2	3	3	3	-2	-3	1	0.390	1
	Balanced	1	-1	1	-1	2	2	2	1	-2	1	0.160	3
	Marine Access	2	-2	0	-1	1	1	1	1	-2	0	-0.245	5
	Marine Focus	2	-3	-1	-2	1	1	1	0	-1	-1	-0.940	6
French Pass	Do Minimum	-1	-2	-2	3	-3	-3	-3	-2	-1	3	-0.360	6
	Road Focus	0	2	1	-1	2	2	2	1	-3	1	0.395	4
	Road Access	1	0	1	1	1	1	1	1	-3	1	0.700	3
	Balanced	2	-1	2	1	1	1	1	1	-2	0	0.875	1
	Marine Access	2	-2	3	1	0	0	-1	1	-1	0	0.865	2
	Marine Focus	3	-2	2	-1	-2	-2	-2	1	-1	-1	-0.155	5
Kenepuru	Do Minimum	1	-3	-3	3	-3	-3	-3	-2	-1	3	-0.520	4
	Road Focus	1	0	-2	-3	2	2	-3	1	-3	-2	-1.055	6
	Road Access	2	-1	-1	-2	1	2	-3	1	-2	-1	-0.655	5
	Balanced	2	2	0	-1	0	1	-2	1	-2	-1	0.070	1
	Marine Access	3	1	1	-2	-2	-1	-2	2	-1	-2	-0.235	2
	Marine Focus	3	0	3	-3	-2	-2	-2	1	-1	-3	-0.375	3

Figure 2: MCA moderated scores

3.1 Sensitivity Tests

The ranking of various programmes, depending on the sensitivity test that was applied, is presented in Figure 3.



Zone	Programme	Base Weighting			Investment Objective Focus	Equal Weighting			Investment Objective and Achievability	Social and Community Focus			Investment Objective and Social and Community Focus			Average Ranking
		S&C: Baseline	S&C: Community Focus	S&C: Business Focus		S&C: Baseline	S&C: Community Focus	S&C: Business Focus		S&C: Baseline	S&C: Community Focus	S&C: Business Focus	S&C: Baseline	S&C: Community Focus	S&C: Business Focus	
		Rank	Rank	Rank		Rank	Rank	Rank		Rank	Rank	Rank	Rank	Rank	Rank	
Port Underwood	Do Minimum	5	6	5	5	6	6	6	5	6	6	6	6	6	6	6
	Road Focus	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Road Access	2	2	2	2	3	3	2	2	2	2	2	2	2	2	2
	Balanced	3	3	3	3	2	2	2	3	2	2	3	3	3	3	3
	Marine Access	4	4	4	4	4	4	4	4	4	2	4	4	4	4	4
	Marine Focus	6	5	6	6	5	5	5	6	4	2	4	5	5	5	5
Pelorus	Do Minimum	5	5	5	6	5	5	5	3	5	5	5	6	6	5	5
	Road Focus	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Road Access	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Balanced	3	3	3	3	3	3	3	4	2	2	2	3	3	3	3
	Marine Access	3	3	3	3	3	3	3	4	2	2	2	3	3	3	3
	Marine Focus	6	6	6	5	6	6	6	6	5	5	6	5	5	6	6
Queen Charlotte	Do Minimum	4	4	4	6	5	5	5	1	6	6	6	6	6	6	5
	Road Focus	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1
	Road Access	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1
	Balanced	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3
	Marine Access	5	5	5	4	4	4	4	5	4	4	4	4	4	4	4
	Marine Focus	6	6	6	5	6	6	6	6	4	4	4	5	5	5	5
French Pass	Do Minimum	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	Road Focus	4	4	4	2	3	3	2	4	1	1	1	1	1	1	2
	Road Access	3	3	3	5	3	3	2	3	2	2	2	3	3	3	3
	Balanced	1	1	1	2	1	1	1	2	2	2	2	2	2	2	2
	Marine Access	2	2	2	1	1	1	2	1	4	4	4	4	4	4	3
	Marine Focus	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5
Kenepuru	Do Minimum	4	5	4	6	5	5	4	4	6	6	4	6	6	6	5
	Road Focus	6	6	6	5	6	6	6	6	1	1	4	3	5	5	5
	Road Access	5	4	5	4	4	3	5	5	2	1	4	4	2	4	4
	Balanced	1	1	1	3	1	1	2	1	3	3	1	1	1	3	2
	Marine Access	2	2	2	2	2	2	1	3	4	4	1	5	4	2	3
	Marine Focus	3	3	3	1	3	3	3	2	4	5	1	2	3	1	3

Figure 3: Sensitivity Tests



For Port Underwood, Pelorus and Queen Charlotte Zones, sensitivity testing made no material difference to the rankings. The 'average ranking' shows the Road Focus and Road Access Programmes ranked highest.

For the French Pass and Kenepuru Zones, the Balanced programme has the highest average ranking. But there was some variability across the tests performed, depending on what was considered important.

The MCA supports:

	Best Performer	Good
Port Underwood	Road Focus	Road Access
Pelorus	Road Focus	Road Access
Queen Charlotte	Road Focus/Road Access	Balanced
French Pass	Balanced	Road Focus
Kenepuru	Balanced	Marine Access/Marine Focus

The MCA does not support:

- Do Minimum - which was predominantly ranked last or second to last across all zones.
- Marine Focus – which was ranked last or second last across all zones except for the Kenepuru Zone, where it could be considered.

4. Initial Cost Estimate and Transport BCR

An initial cost estimate has been prepared for each programme. The P50 cost estimate is shown below, alongside the MCA scores and rankings and estimated transport BCRs.

Note that transport BCRs are indicative only for this phase of work to understand how each of the options might rank against each other (relatively) for transport efficiency. The methodology does not comply with Waka Kotahi requirements to understand if the transport infrastructure is considered uneconomic (i.e.. a transport BCR \geq 1.0). This analysis is proposed for the emerging preferred/preferred option.

		P50	MCA Score	Rank by MCA	Transport BCR	Rank by BCR
Port Underwood	Do Minimum	\$ 3,205,800	0.055	5	0.22	6
	Road Focus	\$ 41,373,800	1.270	1	0.37	5
	Road Access	\$ 21,438,300	1.115	2	0.49	4
	Balanced	\$ 17,010,500	1.010	3	0.51	3
	Marine Access	\$ 7,172,100	0.140	4	0.73	1
	Marine Focus	\$ 6,719,137	-0.090	6	0.72	2
Pelorus	Do Minimum	\$ 842,400	0.435	5	0.39	6
	Road Focus	\$ 6,085,300	1.095	1	0.51	5
	Road Access	\$ 4,180,800	0.940	2	0.63	4
	Balanced	\$ 2,193,360	0.520	4	1.14	1
	Marine Access	\$ 1,887,600	0.700	3	0.94	2
	Marine Focus	\$ 1,762,453	-0.025	6	0.82	3
Queen Charlotte	Do Minimum	\$ 1,903,200	-0.155	4	0.68	5
	Road Focus	\$ 32,081,400	0.390	1	1.68	3
	Road Access	\$ 32,081,400	0.390	1	1.68	3
	Balanced	\$ 12,234,430	0.160	3	3.01	1
	Marine Access	\$ 9,166,300	-0.245	5	1.97	2
	Marine Focus	\$ 7,915,743	-0.940	6	0.68	5
French Pass	Do Minimum	\$ 4,126,200	-0.360	6	0.30	6
	Road Focus	\$ 75,410,400	0.395	4	0.57	4
	Road Access	\$ 43,059,900	0.700	3	0.76	2
	Balanced	\$ 27,008,930	0.875	1	0.83	1
	Marine Access	\$ 22,049,300	0.865	2	0.61	3
	Marine Focus	\$ 20,234,977	-0.155	5	0.49	5
Kenepuru	Do Minimum	\$ 8,556,600	-0.520	4	0.57	5
	Road Focus	\$ 145,202,200	-1.055	6	0.86	3
	Road Access	\$ 81,872,700	-0.655	5	1.07	2
	Balanced	\$ 57,625,490	0.070	1	1.12	1
	Marine Access	\$ 46,504,900	-0.235	2	0.59	4
	Marine Focus	\$ 41,646,497	-0.375	3	0.53	6

Figure 4: Cost Estimates



5. Emerging Preferred Programme

The identification of an emerging preferred option may consider aspects not considered in the MCA, such as political considerations, funding constraints or other risks.

The decision on the emerging preferred option was confirmed at a meeting with senior MDC and Marlborough Roads representatives. The MCA was not the primary driver of selecting a preferred option, it was an important input.

The considerations were:

- Does the programme contribute positively to the investment objectives?
 - MCA results for the Investment objectives used to assess.
- How does the programme rank overall against the MCA criteria?
 - MCA scoring used to assess.
- What level of economic activity does it restore?
 - Economic impact values used to assess.
- How efficient is it from a transport perspective?
 - i.e.. road more efficient than boat, the initial transport economics were used to assess.
- Are there any other overriding factors that need to be considered?
 - e.g. key inter regional link like QCD and inter island transmission and communications link as in Port Underwood

Then on balance, a decision was made regarding the Emerging Preferred Option for consultation. Justification is summarised in Attachment 4.

6. Next Steps

The next steps are:

- Community engagement and feedback on the Emerging Preferred Programme
- Refine cost estimates
- Confirm process for the economic assessment of the Preferred Programme, in line with the established methodologies in the MBCM.

Attachments

- 1 MCA Process Memo
- 2 Moderation Meeting Notes
- 3 Moderation Meeting Slides
- 4 Emerging Preferred Option





Appendices

Attachment 1 MCA Process Memo



To: Neil Henry
 Marlborough District Council

From: Sarah Connolly
 Dunedin

Project/File: 310205264
 Date: 7 March 2023

Reference: Sounds Future Access - Programme Business Case

Purpose

The purpose of this memo is to set out and confirm the parameters for the MCA process.

The MCA process is a recognised process used with a business case to assess multiple criteria. It can be used to compare different alternatives and options and assist with conversations between investors and stakeholders to help inform decision making.

The Waka Kotahi MCA Guidance (see Attachment) provides a good practice process and approach to ensure robust and holistic assessment when moving from a longlist to a shortlist or preferred option. It ensures investment decisions are being made consistently and transparently across business cases. It also helps to identify environmental impacts and opportunities and aligns investment and RMA and Public Works Act obligations. This relates to the need for a robust, transparent and well-documented optioneering process throughout the entire business case process. Please refer to the guidance for more information.

Scoring System

A 7 point scoring system is proposed, as recommended in the Waka Kotahi MCA Guidance:

Magnitude	Definition	Score
Large positive	Major positive impacts resulting in substantial and long-term improvements or enhancements of the existing environment.	3
Moderate positive	Moderate positive impact, possibly of short, medium or long term duration. Positive outcome may be in terms of new opportunities and outcomes of enhancement or improvement.	2
Slight positive	Minimal positive impact, possibly only lasting over the short term. May be confined to a limited area.	1
Neutral	No discernible or predicted positive or negative impact.	0
Slight negative	Minimal negative impact, possibly only lasting over the short term, and definitely able to be managed or mitigated. May be confined to a limited area.	-1
Moderate negative	Moderate negative impact, possibly of short, medium or long term duration. Impacts highly likely to respond to management actions.	-2
Large negative	Major negative impacts with serious, long term and possibly irreversible effect leading to serious damage, degradation or deterioration of the physical, economic, cultural or social environment. Required major rescope of concept,	-3

Reference: Sounds Future Access - Programme Business Case

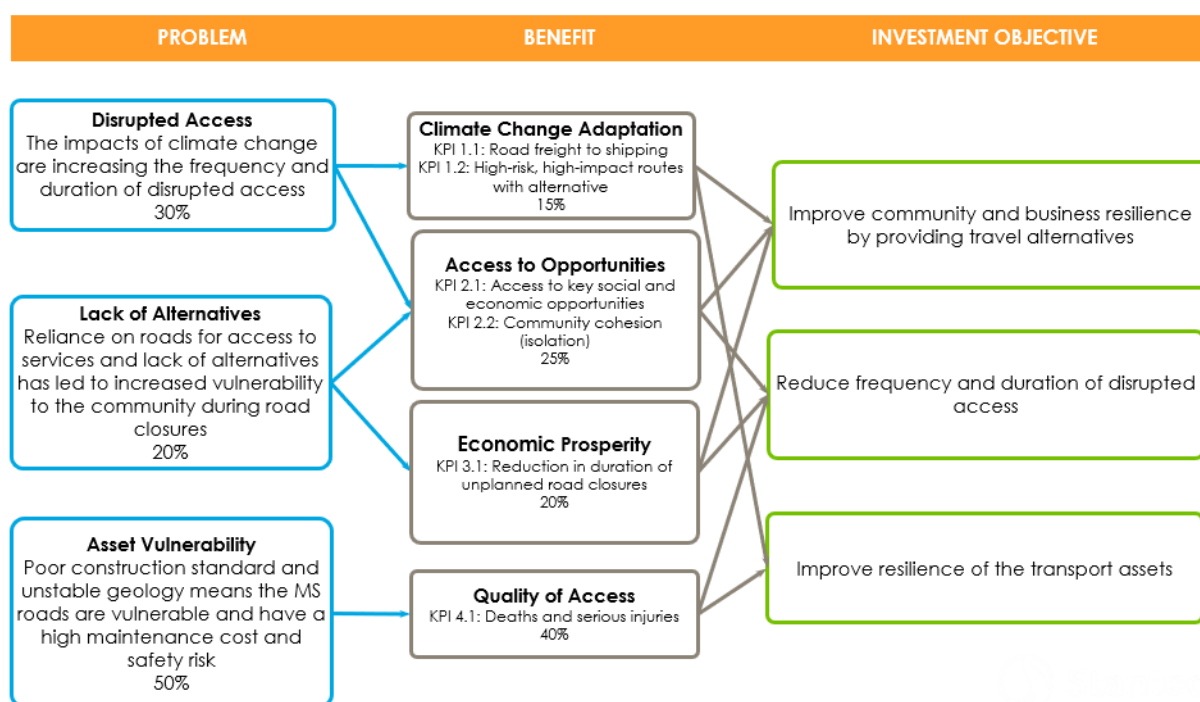
Magnitude	Definition	Score
	design, location and justification, or requires major commitment to extensive management strategies to mitigate the effect.	

Do Minimum

The Do Minimum is the roads as they currently are as of February 2023, with some damage repaired following the 2022 storm event, but some roads have significantly lower levels of service and restricted access compared to pre-July 2021. The Do Minimum assumes no further investment in road or water infrastructure other than ongoing routine maintenance. It assumes disruptions will be increasingly frequent, high maintenance and emergency repair costs, and marine alternatives will remain poorly developed.

Benefit Weightings

At the Stakeholder Workshop (January 2023), the ILM was presented with draft benefits and KPIs. Problem and Benefit weightings are shown below. These weightings will be used to calculate the Investment Objective weightings which will be used in the MCA process.



Assessment Criteria

Draft MCA criteria were presented and discussed at an investment partner meeting on 21 February 2023, attended by staff from Marlborough District Council and Waka Kotahi. The criteria were refined and are shown in the table, along with a description and assessment method.

Draft weightings are included for the Investment Objectives (40%), Potential Achievability (30%) and Opportunities (30%).

Reference: Sounds Future Access - Programme Business Case

No.	Criteria	Description	Assessed by
Investment (critical success factors)			
Investment Objectives – How well does the option achieve the Investment Objectives? (40%)			
1	Improve community and business resilience by providing travel alternatives (30%)	Does the option/programme provide alternative routes/modes if road access is closed? Is access futureproofed as the climate changes? Does it help to adapt to climate change?	Stantec
2	Reduce frequency and duration of disrupted access (40%)	Does the option/programme alter the occurrence of unplanned road closures, or reduce the duration of unplanned road closures? What will the impact be if the frequency of events changes in the future, as the climate continues to change?	Stantec
3	Improve resilience of the transport assets (30%)	Does the option/programme improve the resilience of transport assets to future extreme intensity and duration rainfall events? Does it help to adapt to climate change?	Stantec MDC
Potential Achievability (30%)			
4	Technical Difficulty (100%)	How difficult will the option/programme be to design and construct? Are there any material supply constraints that will impact this? What are the technical risks involved in implementing the option? Include consideration of challenges for water access.	Stantec MDC
Opportunities and Impacts (30%)			
5	Social and Community Impacts (45%)	What social impacts are associated with this programme? For example, human health (safety), feelings of community, access to emergency services, impacts on community in relation to jobs, recreation, services and severance, impacts on farming and business operations.	Stantec MDC
6	Environment Effects (30%)	What environmental effects are associated with this programme? Environmental effects could include those related to terrestrial and marine ecology, stormwater, water quality, noise and vibration, visual impact, urban design, natural hazards, biodiversity, resource efficiency and air quality.	Stantec MDC
7	Climate Change Mitigation (15%)	What effect will the programme have on long-term carbon emissions e.g. through enabled, embodied and construction carbon.	Stantec
8	Supplier capacity and capability (10%)	Is there sufficient capacity amongst suppliers, including designers for more complex solutions? Are there any resource constraints?	MDC
In Parallel with MCA			

Reference: Sounds Future Access - Programme Business Case

Impacts on Te Ao Maori	Considered in parallel to the MCA, in conversation with local iwi. Ideally local iwi will provide feedback on the programmes identifying their preferences. This will then be considered alongside the MCA, BCR and Affordability in the final decision making.	MDC
Affordability	Economic Assessment. Costs and benefits assessed in parallel to the MCA and considered in the Appraisal Summary Table (AST) alongside the MCA and iwi ranking in the final decision making. Quantification of benefits.	Stantec
Value for Money		
Excluded		
Climate Change Adaptation	Double counting with Investment Objective 1 and 3.	
Scheduling/programming	This will be considered as part of the Management Case.	
Cumulative Impacts	Cumulative costs and benefits are in the Economic Impact Assessment.	
Property Impacts	Impact of options on property owners is in the Economic Impact Assessment. Property acquisition to date has been a small proportion of the cost of the recovery programme. This will only need to be considered at the next stage.	

Sensitivity Testing

Different weighting systems will be developed and applied to the MCA scores, to demonstrate the effect of changing the importance ascribed to each criteria. We anticipate developing weighting systems that allow us to understand the impact of different stakeholder priorities. This can then inform decision making.

Programme Assessment

Our initial work indicates five programmes for each of the four zones. We anticipate keeping the zone programmes separate from one another, rather than having overarching programmes that cover the whole of the Sounds. This is a pragmatic decision – we think it will be easier for both the project team and the community to understand the set of programmes for each zone, and how these have been scored.

This approach will allow us to identify the preferred programme for each zone separately, rather than mixing and matching different zone programmes. We do not see that this would add any value.

Interdependencies between zone programmes will be flagged to ensure that we do not proceed with a 'mismatch' between zone programmes. For example, the preferred programme for Kenepuru may rely partly on further investment in Elaine Bay, which falls in the French Pass zone. We will capture these interdependencies and cross check to make sure the zone programmes align with one another.

Attachment 2 MCA Moderation Memo Meeting Notes



To: Sounds Project Team
Stantec, MDC

From: Sarah Connolly
Dunedin

Project/File: 310205564

Date: 4 April 2023

Reference: MCA Moderation Meeting on 31 March 2023, 8.30-3pm

Present

Stantec: Courtney McCrostie, Sarah Connolly, Kelly Bombay, Andrew Maughan, Ken Clapcott, Andrew Craig

MDC: Steve Murrin, Neil Henry (part only)

Waka Kotahi: Toshi Hodliffe, Neil Cree, Fraser Purves, Andrew James

Feedback on Scores

Port Underwood	Pelorus	QC Drive	French Pass	Kenepuru
1. Travel Alternatives				
Discussed revised scores: Road Focus 0 Road Access -1 Balanced 0 or 1 Marine 1 or 2.	Note not much scope for travel alternatives within this zone.	Focus on alternatives only.	Double counting with resilience. When scoring this criterion focus on whether people will have alternatives to road. Rescore all zones using this approach.	Will change most scores due to refocus on alternatives. Consider Do Min +1, Road Focus 1 or 2, Balanced +3, Marine Access +3, Marine Focus +3.
2 Disrupted Access				
No comments. Note marine option is not that good.	Balanced and Marine Access are the same, scores should be the same.	Balanced to go to a 0.	Too negative about the disruption to marine? Marine outages will be far shorter than road outages due to weather. Applies to all zones. Balanced could score higher?	Reconsider Marine Access and Marine Focus in light of earlier comments about outages. Change to Road Focus 0, Road Access +1. Check not been influenced by vehicle restrictions or wider considerations.
3. Resilience of Assets				
Do not double count with social	Balanced and Marine Access	No comments.	Improved marine hubs includes	No comments.

Reference: MCA Moderation Meeting

Port Underwood	Pelorus	QC Drive	French Pass	Kenepuru
and community, lifelines etc, this criterion is about the assets. Do Min as 0 – may be too high.	are the same, scores should be the same.		resilience/ protection eg from NW swells. Take this into account in score.	
4. Technical difficulty				
Confirm if scale is 0 to -3, or +3 to -3. Questions about why Road Access it +1 and the others are +2 – is this an error?	Same comments as for Port Underwood re Road Access programme.	Double check scores. Balanced a -1 or 0.	Maybe should all be +1? Change Balanced to a +1.	Are all the same, -2 or -3? Should Marine programmes move up a point? Easier to do marine if roads are there.
5. Social and community				
Is marine focus right at -2? It is not as bad as the Do Min – check scores.	Make sure the benefit of Kaiuma Bay is reflected in the Balanced and Marine Access Programmes. Are the Road Access and Marine Focus really this far apart in scores?	Reduce jump in scores between Marine Access and Marine Focus.	Change Balanced from 0 to +1. Range too great from Road Focus +2 to Marine Focus -2. Five steps away seems too great. All scores seem a bit negative. Bring up Balanced, Marine Access and Marine Focus.	Make Road Focus score lower eg +1. Other scores to reflect change – eg Road Access down, Balanced and Marine Access up.
6. Environmental effects				
Marine Focus and Marine Access to be changed to -1 and -2.	Marine Focus score of -3 may be too negative – consider raising score.	No comments.	Change Marine Access to +1.	Reconsider scores for all zones in light of discussion about long term environmental effects of continuing to provide roads in fragile areas – is this the right approach. Road Focus and Road Access 0 or +1?
7. Climate change mitigation				
Revise approach to not use weighted average but instead	Correct Road Focus for construction, to be -1. Should	No comments.	Update scores when have final cost estimates.	No comments.

Reference: MCA Moderation Meeting

Port Underwood	Pelorus	QC Drive	French Pass	Kenepuru
use judgement for the final score.	the Do Min score be lower?			
8. Supplier capacity and capability				
No comments.	No comments.	Rescore – Marine programmes are too negative. Road Focus lower score?	Note effluent difficult to manage.	Consider that these areas are difficult to access, and they are remote – Road Access and Road Focus lower scores to reflect this.

General Points

- All team leads to provide a list of key assumptions they made in awarding scores.
- The definition for a score of '-3' is quite extreme and sounds like it could be a fatal flaw – tone down wording a bit.
- Option to breakdown French Pass into three zones was considered. It was advised that if teams wanted to do that for their criterion then they could take that approach, but needed to provide the team with an aggregated single score for the zone, for the final MCA.
- For Kenepuru, the communication materials need to explain why none of the roads has been categorised as 'red' (build back stronger, no restrictions). This was fatal flawed due to land instability – it's just not possible to achieve in Kenepuru.
- The level of service needs to be appropriate for the role of the road in the network, how many properties use it, etc.

Attachment 3 MCA Moderation Meeting Slides





Multi Criteria Analysis Moderation

Marlborough Sounds Future Access



Agenda

8:30 – 10:30 Port Underwood

10:30 – 11:00 BREAK

11:00 – 12:30 Pelorus and Queen Charlotte

12:30 – 1:00 LUNCH

1:00 – 2:30 French Pass

2:30 – 3:00 BREAK

3:00 – 4:30 Kenepuru

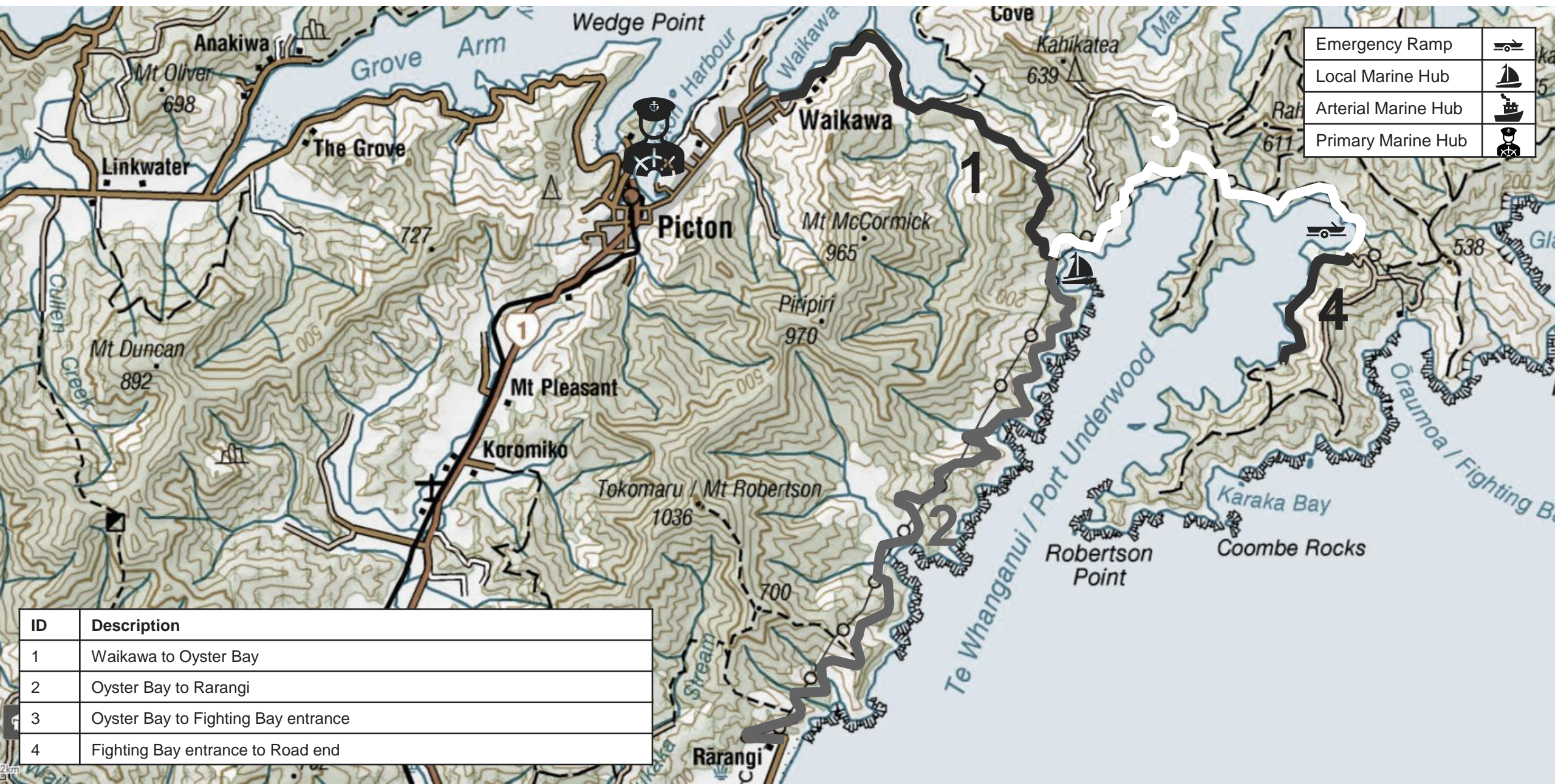


Port Underwood





PORT UNDERWOOD: SEGMENT OUTLINE

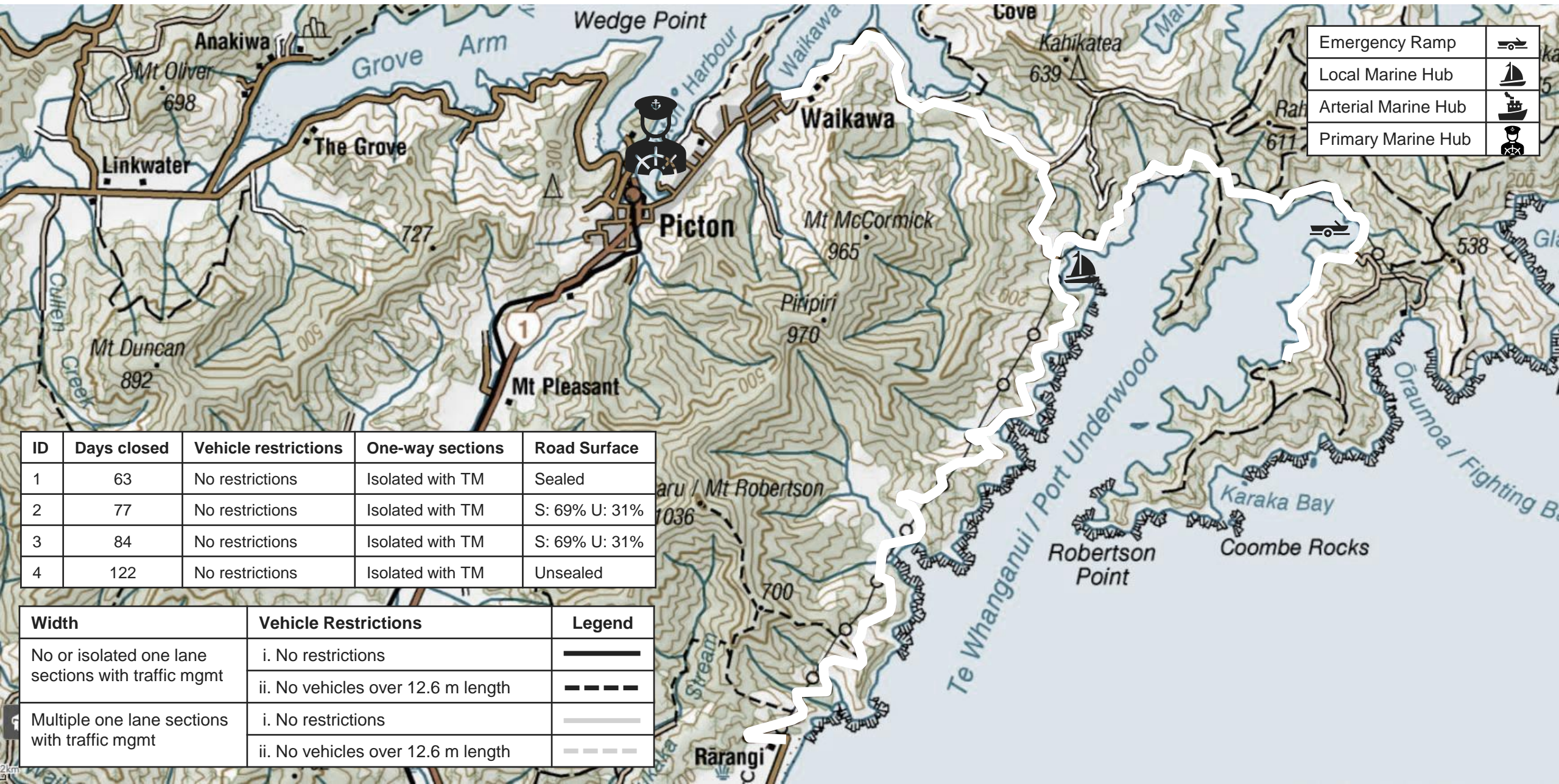


Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

ID	Description
1	Waikawa to Oyster Bay
2	Oyster Bay to Rarangi
3	Oyster Bay to Fighting Bay entrance
4	Fighting Bay entrance to Road end



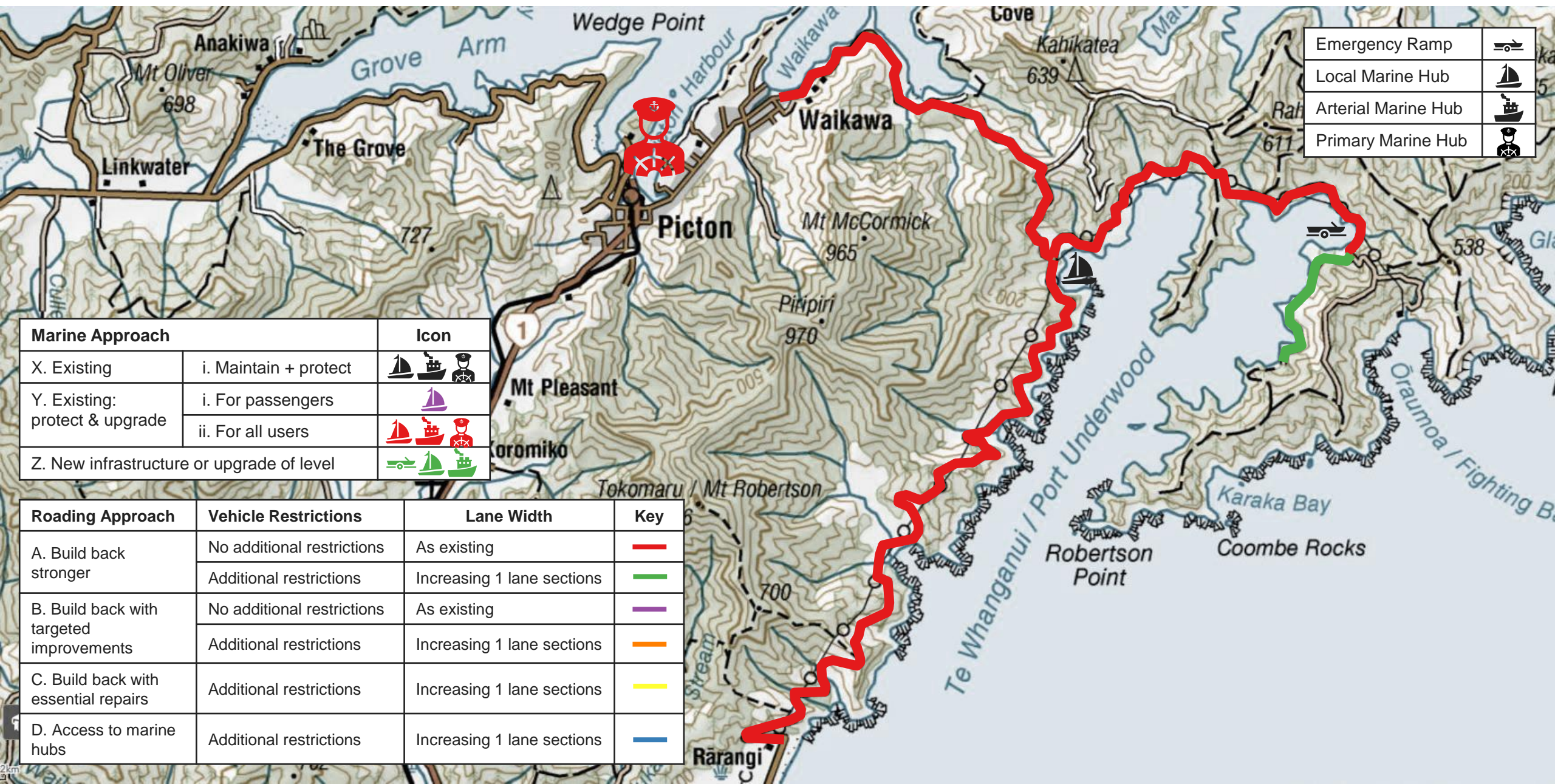
PORT UNDERWOOD: DO NOTHING



Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

ID	Days closed	Vehicle restrictions	One-way sections	Road Surface
1	63	No restrictions	Isolated with TM	Sealed
2	77	No restrictions	Isolated with TM	S: 69% U: 31%
3	84	No restrictions	Isolated with TM	S: 69% U: 31%
4	122	No restrictions	Isolated with TM	Unsealed

Width	Vehicle Restrictions	Legend
No or isolated one lane sections with traffic mgmt	i. No restrictions	
	ii. No vehicles over 12.6 m length	
Multiple one lane sections with traffic mgmt	i. No restrictions	
	ii. No vehicles over 12.6 m length	



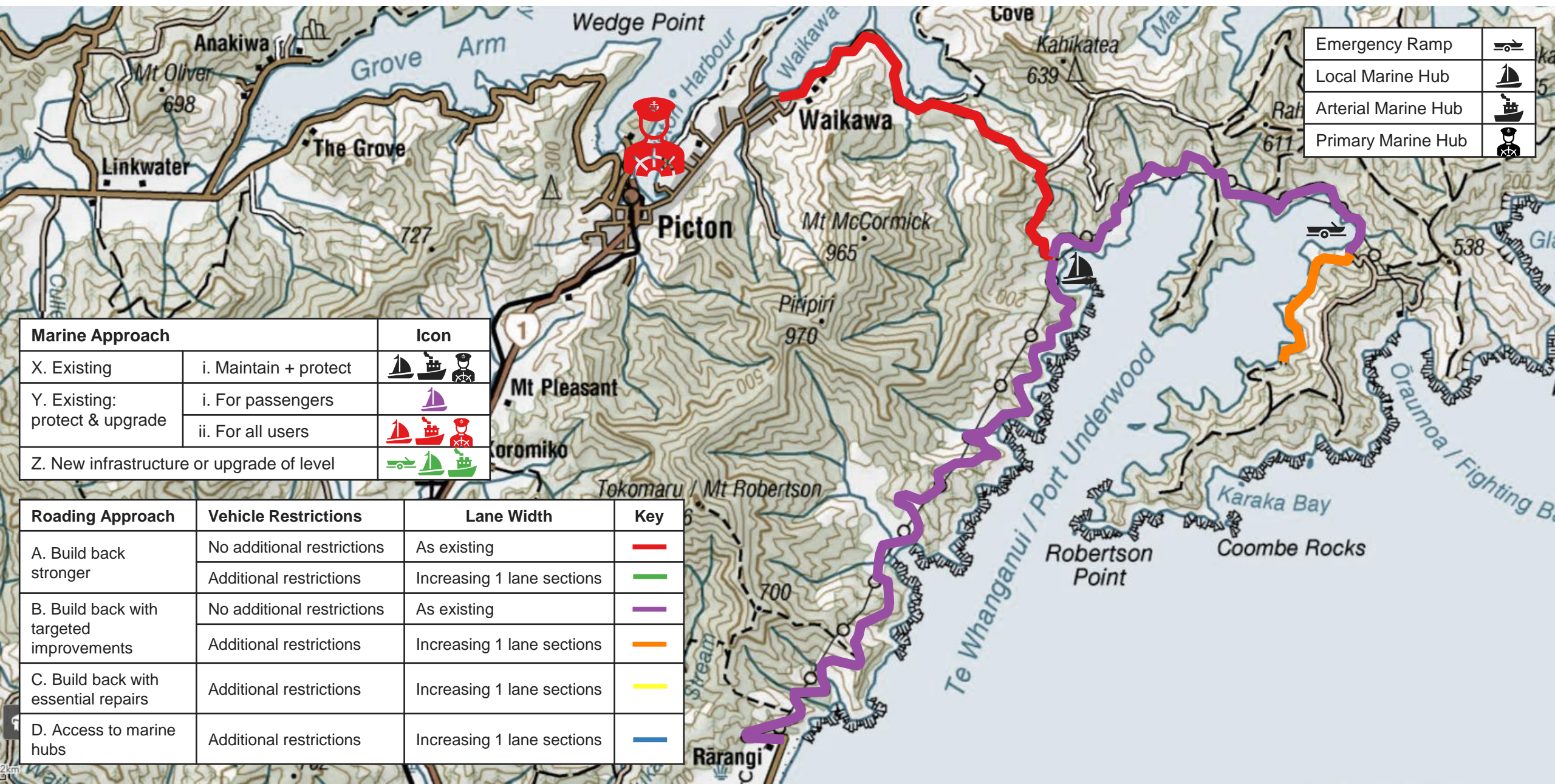
Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		

Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	



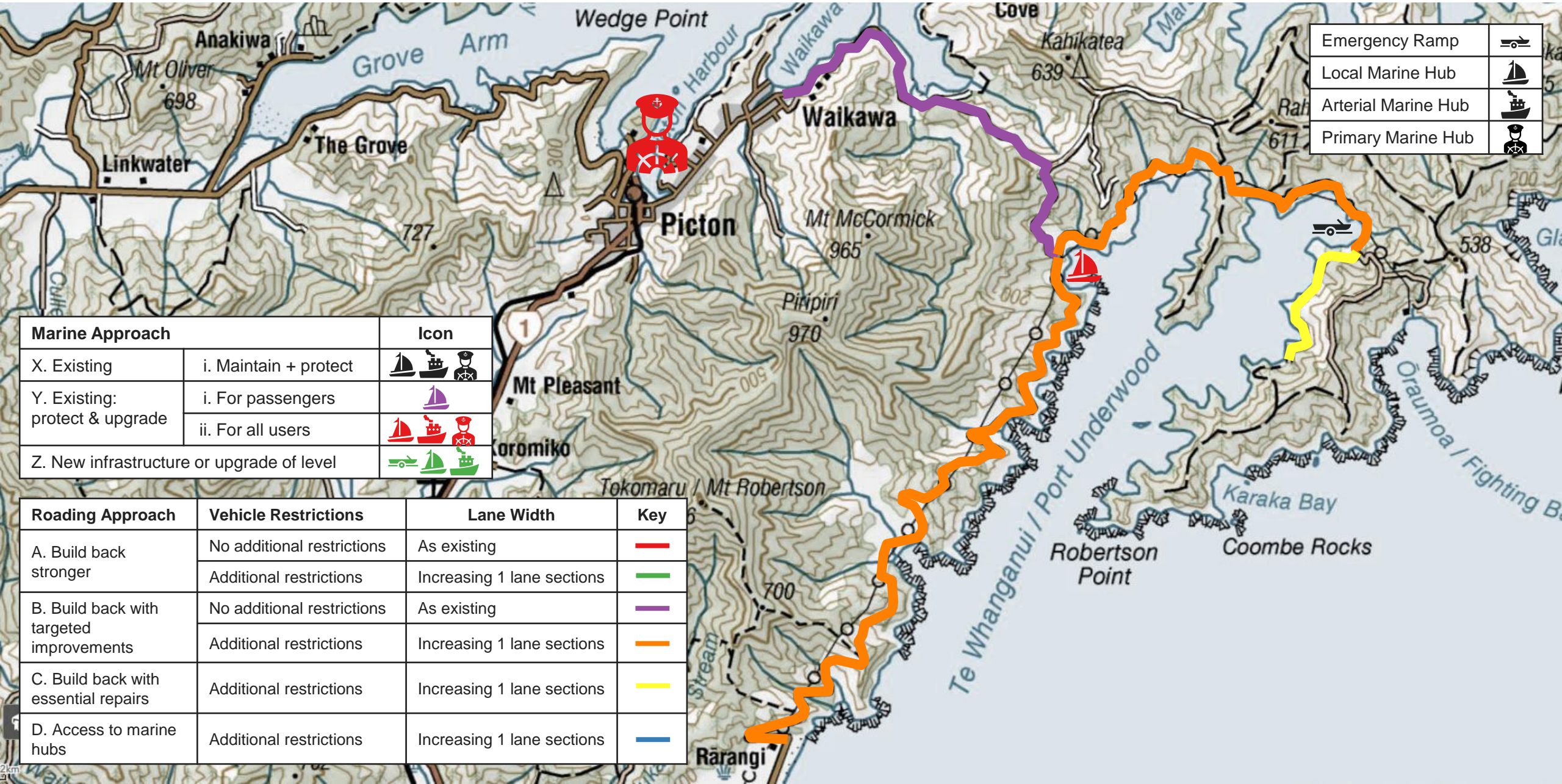
PORT UNDERWOOD: ROAD ACCESS



Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		

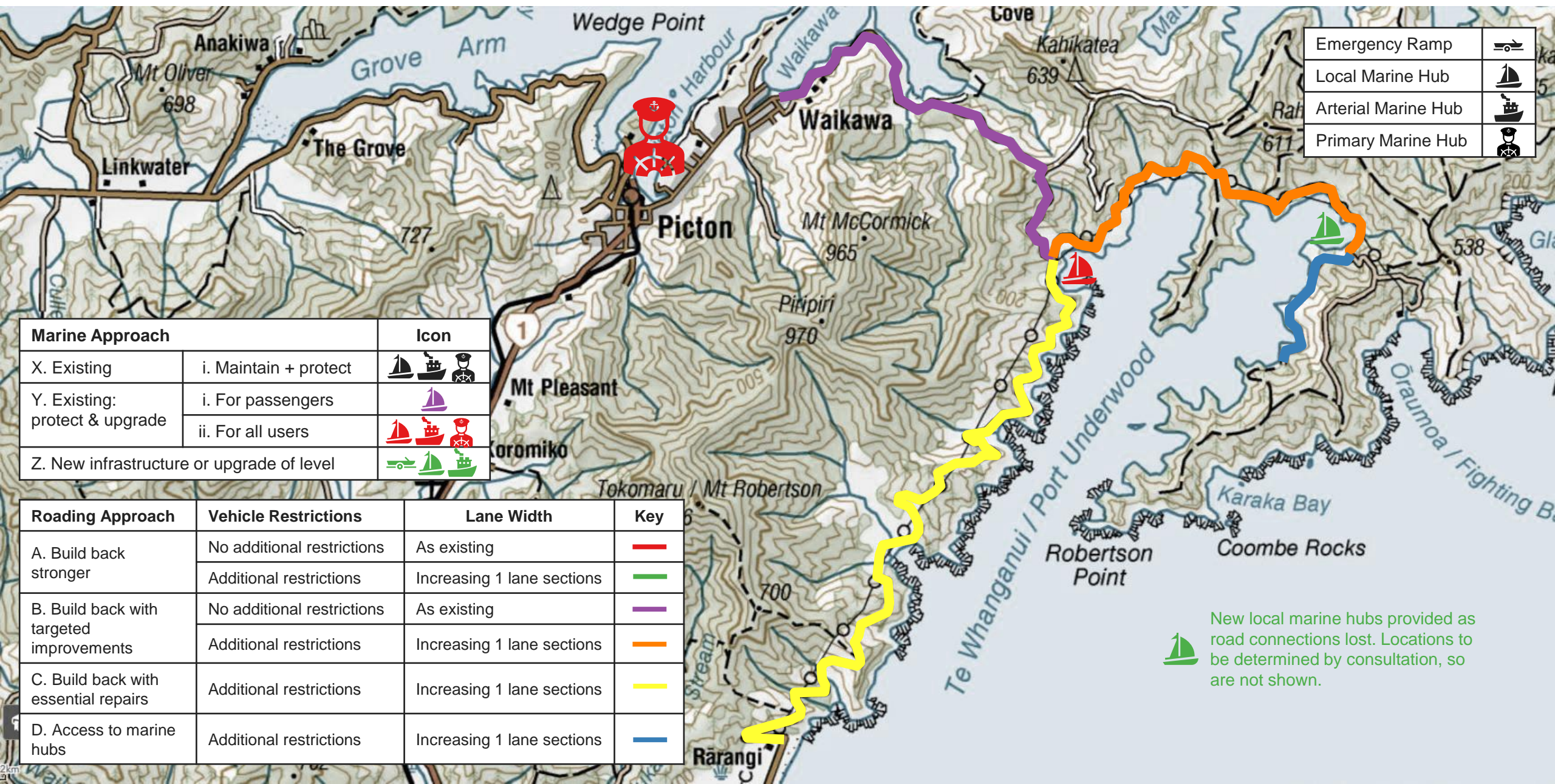
Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	



Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		

Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

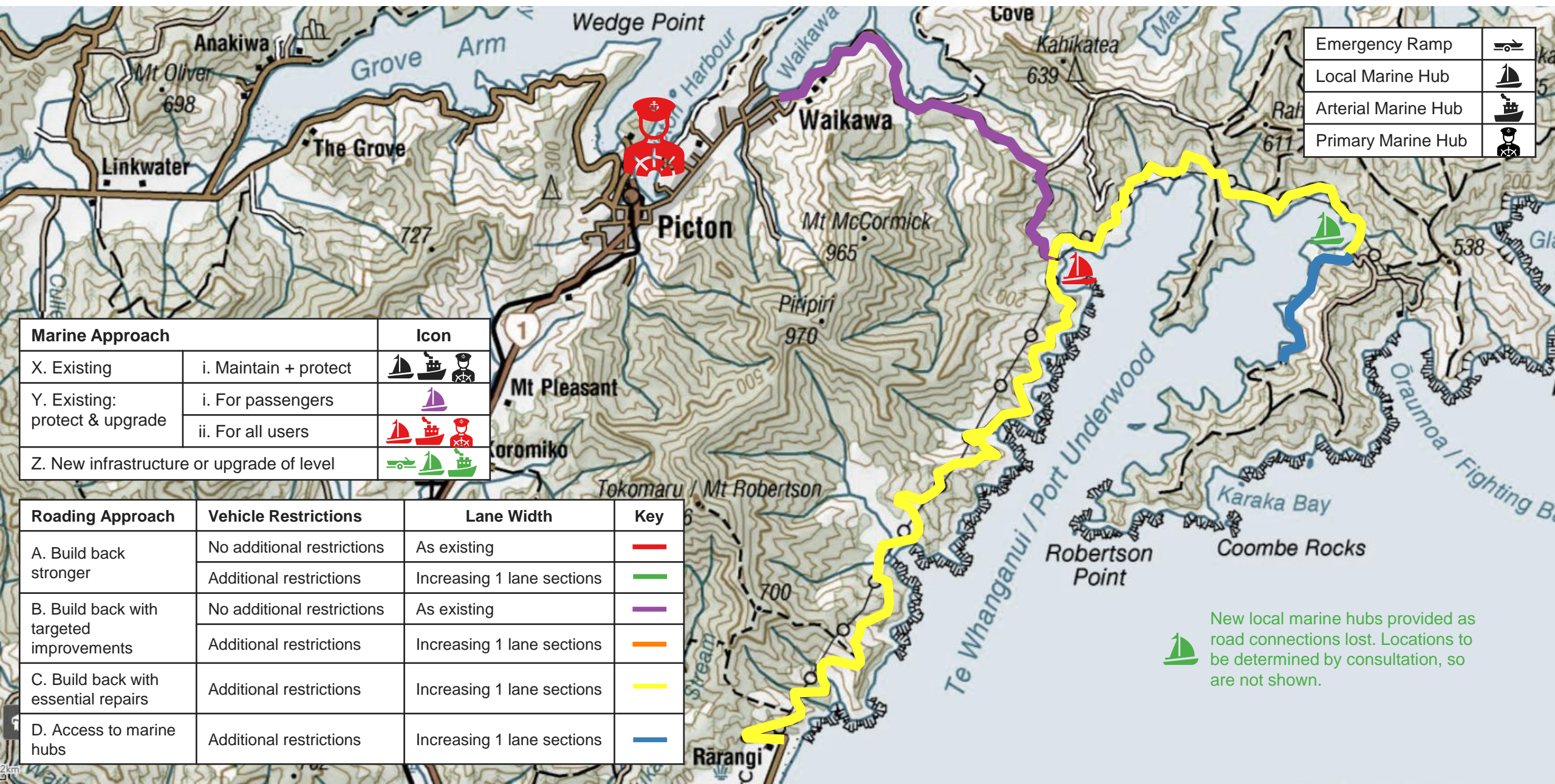


Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		

Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	


New local marine hubs provided as road connections lost. Locations to be determined by consultation, so are not shown.



Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		

Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

 New local marine hubs provided as road connections lost. Locations to be determined by consultation, so are not shown.



1. Travel Alternatives

Improve community and business resilience by providing travel alternatives

Programme	Score	Comments
Do Minimum	-2	routine maint only, limited alt routes, no feasible alternative modes, not futureproof and does not adapt to climate change
Road Focus	0	Build back stronger approach secures future of road (future proof), but does not provide alternative modes and does not adapt to climate change
Road Access	-1	Step down from above
Balanced		Protect and Upgrade of Oyster Bay marine infrastructure provides option for marine modes, but uptake not expected to be high. Programme considers climate change adaptation.
Marine Access	1	
Marine Focus	1	some boat access is an improvements, but not huge if have access over to Ōpua Bay would increase score



2. Disrupted Access

Reduce frequency and duration of disrupted access

Total Weighting		16.0%
Port Underwood	Do Minimum	-2
	Road Focus	2
	Road Access	1
	Balanced	0
	Marine Access	-1
	Marine Focus	-2

Area	Programme option	Comments
Port Underwood	Do Minimum	Events more frequent, and worse If do nothing damage and outages are going to get worse Main thing is overslips, main dodgy bit is segment 4, underslips
	Road Focus	Still segment 4 is a little bit lower level of service, so make it a +2, otherwise +3
	Road Access	Not quite as good as road focus, but still a good option Most places (other than Waikawa to Wanamanga) can generally retreat which makes this option reasonably good Only marginally less than road focus, 1 or 2
	Balanced	Just a step down from road access, never going to be able to fully rely on marine as a transport option
	Marine Access	This not a good alternative, only across to Opuia Bay is reasonable water access option But Opuia Bay is across private land
	Marine Focus	-2, reduces access There is some ability to use marine, but still weather dependent
	General comment	provide public ramp access regardless of option to give an alternative, Oyster Bay is not public



MCA Criteria 3: Resilience

- Would help to have heat map of population/buildings/business-revenue or similar (resilience needs per cluster)
- Tale of two areas:
 - Key roads or lower susceptibility – resilient road has benefits
 - Kenepuru (especially) and French Pass would benefit from marine-led
- Rationale per zone next slide

Port Underwood	Do Minimum	0
	Road Focus	3
	Road Access	1
	Balanced	0
	Marine Access	-1
	Marine Focus	-2
Pelorus	Do Minimum	-1
	Road Focus	2
	Road Access	1
	Balanced	1
	Marine Access	0
	Marine Focus	-1
Queen Charlotte	Do Minimum	-2
	Road Focus	2
	Road Access	2
	Balanced	1
	Marine Access	0
	Marine Focus	-1
French Pass	Do Minimum	-2
	Road Focus	1
	Road Access	1
	Balanced	2
	Marine Access	3
	Marine Focus	1
Kenepuru	Do Minimum	-3
	Road Focus	-2
	Road Access	-1
	Balanced	0
	Marine Access	1
	Marine Focus	3



3. Resilience

Improve resilience of the transport assets

Port Underwood	Do Minimum	0	low natural slope instability but high human slope instability, lane restrictions no vehicle restrictions, slow deterioration
	Road Focus	3	road needed for power, upgrades to address human slope instability
	Road Access	1	
	Balanced	0	
	Marine Access	-1	
	Marine Focus	-2	exposed to swell, road assets would deteriorate further (needed for power)



4. Technical Difficulty

- +3 Simple to achieve from Technical input.
- 0 Nothing to do.
- -3 Serious effort required for investigation , optioneering, design , risk assessment.
- Technical issues to consider with Marine Access. Marshalling areas, stock holding areas, stock effluent disposal, noise/screening

Port Underwood	Do Minimum	0	Not building anything
	Road Focus	2	Straight forward relatively stable
	Road Access	1	
	Balanced	2	
	Marine Access	2	
	Marine Focus	2	



5. Social and Community Impacts

How does the programme impact human health (safety), feelings of community, access to emergency services, impacts on community in relation to jobs, recreation, services and severance, impacts on farming and business?

Programme	Score	Comments
Do Minimum	-2	all indicators will decrease as the road deteriorates, but starting point for Port Underwood is not as bad as places like Kenepuru
Road Focus	2	build back stronger approach has positive impacts for all indicators
Road Access	1	Step down from above
Balanced	1	Improvement on existing situation
Marine Access	-1	community members still able to access opportunities and wider community (apart from end of Tumbledown Road), but some restrictions on vehicles may negatively impact farming and business
Marine Focus	-1	Community impacts are like above



6. Environmental Effects

To assess ‘environment’ a judgement is made based on the following measures:

- Scale, frequency and duration of land disturbance and excavation; temporary stormwater run off and management of erosion and sediment.
- Scale and extent of permanent land recontouring and vegetation clearance.
- Potential effects on receiving environment as a result of slips, land instability, human interventions.
- Likely visual impact of works and integration with the surrounding environment, as viewed by public/residents. Potential impacts on natural character.
- In the absence of noise modelling, noise and vibration effects based on proximity of works to sensitive receivers, and also spatial extent of works.

Analysis, Assumptions & Information Gaps

- Resource consent or approval(s) and relevant application process have not been taken into account.
- Technical assessments and input from experts are not available at this stage in the evaluation.

Area	Option	Score
Port Underwood	Do Minimum	-2
	Road Focus	2
	Road Access	1
	Balanced	1
	Marine Access	-2
	Marine Focus	-3



7. Climate Change Mitigation

Considered three aspects, weighted to give final score:

- Enabled carbon (10%)
- Construction carbon (45%)
- Ops and Maintenance (45%)
- Queen Charlotte 20% for enabled as higher volumes

Score relativity within each zone, not across zones

Criteria		Climate Change Mitigation	Scope for trip diversion / suppression	Construction carbon (materials, transport, equipment)	Operational carbon (maintenance)	*Revisit scores when costs for Marine Access and Marine Focus programmes available and when Maintenance costs available for all programmes.
			10%	45%	45%	Weighted towards construction and O&M carbon, as enabled changes v small due to low volumes.
Port Underwood	Do Minimum	-1	2	0	-3	Trip suppression moderate as road will fail often. O&M lots of emergency works and 42km of seal to maintain.
	Road Focus	-2	0	-3	-2	No change in trips. 59km of build back stronger, ++ material use. Added strength = less
	Road Access	-2	0	-2	-2	No change in trips. 15km of build back stronger, + material use. More failures likely but less
	Balanced	-1	1	-1	-1	Some trip diversion -better facilities and more one lane sections. Material use for roads and upgrade existing marine hub. Less maintenance emissions as one lane and less seal
	Marine Access	-1	2	-2	-1	At least one new marine hub and possibly more. Road repairs much less. More diversion to marine.
	Marine Focus	-1	3	-2	-1	Maintenance less over time as less road.



8. Supplier Capacity and Capability

- This is influenced by the size and duration of the programme
- +3 Nothing to do, therefore no supplier issues
- -3 Specialised resources, limited availability, long lead times to produce the design resources or the construction items

Port Underwood	Do Minimum	3	Nothing to do no supply issues
	Road Focus	2	Straight forward work
	Road Access	2	
	Balanced	2	
	Marine Access	2	
	Marine Focus	2	



Pelorus





PELORUS: SEGMENT OUTLINE

ID	Description
1	Daltons Road to Kaiuma Bay Road/ Te Hoiere Road intersection
2	Kaiuma Bay Road/ Te Hoiere Road intersection to Kaiuma Bay

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

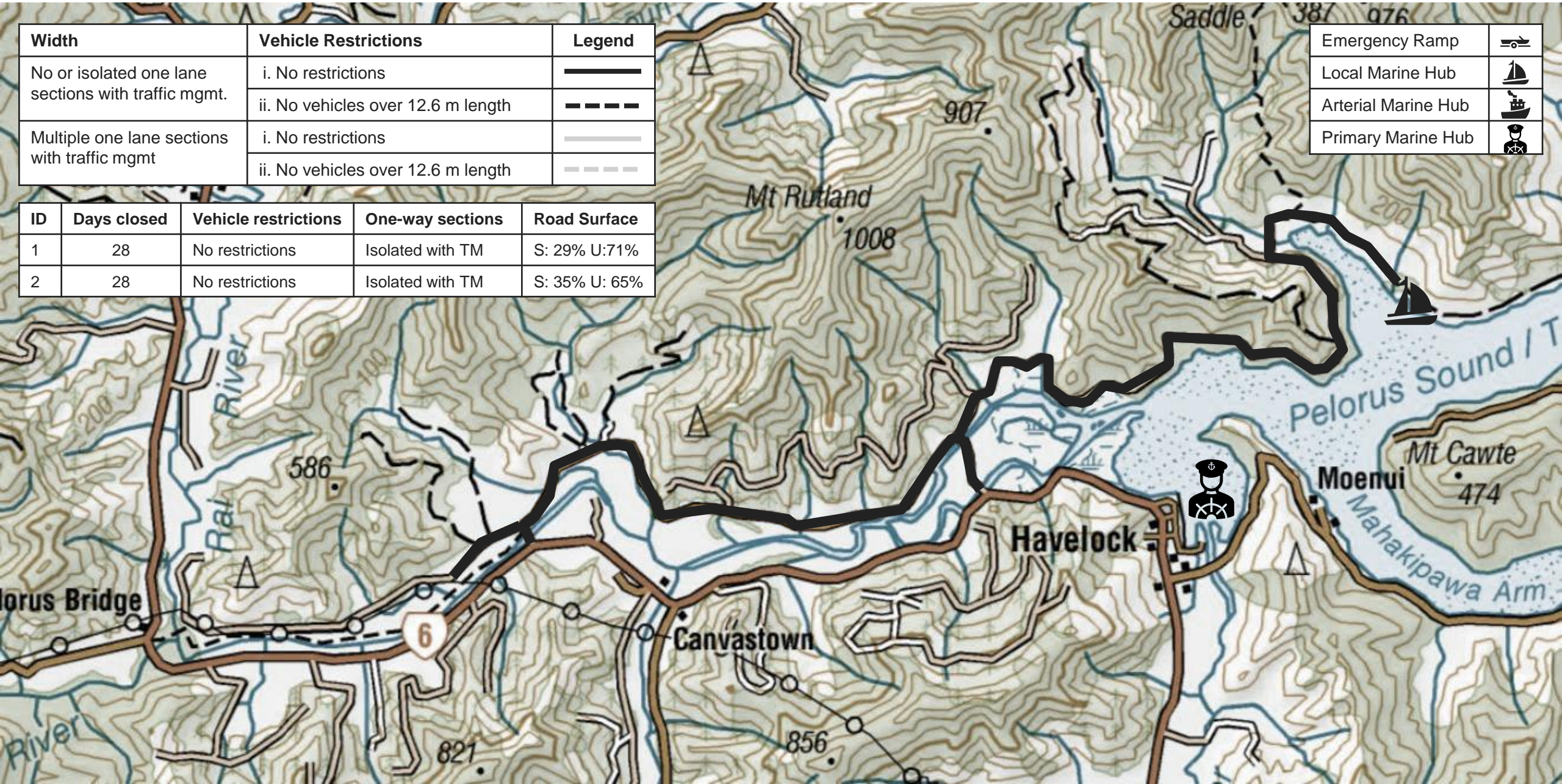




Width	Vehicle Restrictions	Legend
No or isolated one lane sections with traffic mgmt.	i. No restrictions	
	ii. No vehicles over 12.6 m length	
Multiple one lane sections with traffic mgmt	i. No restrictions	
	ii. No vehicles over 12.6 m length	

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

ID	Days closed	Vehicle restrictions	One-way sections	Road Surface
1	28	No restrictions	Isolated with TM	S: 29% U:71%
2	28	No restrictions	Isolated with TM	S: 35% U: 65%

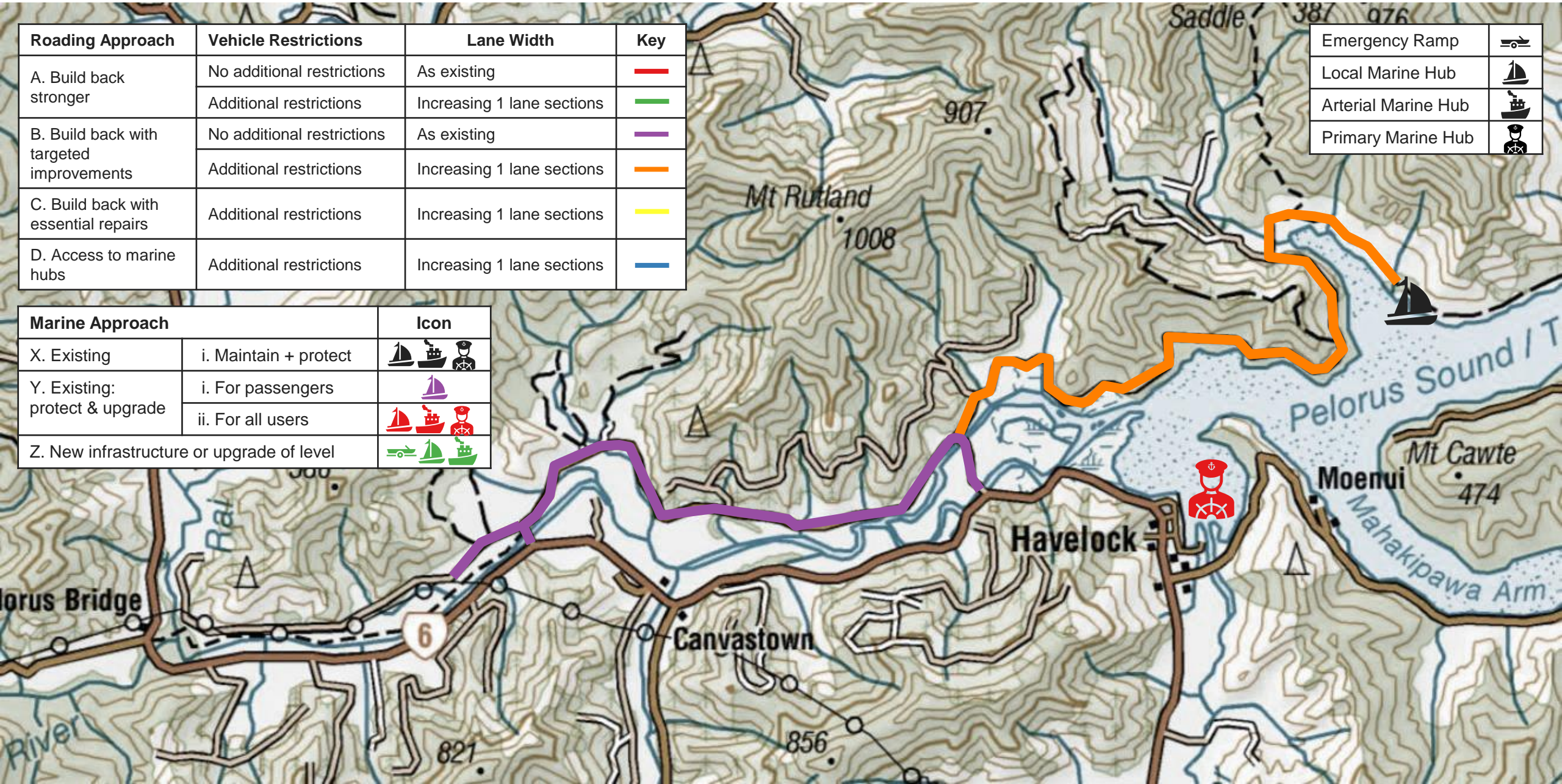




Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		

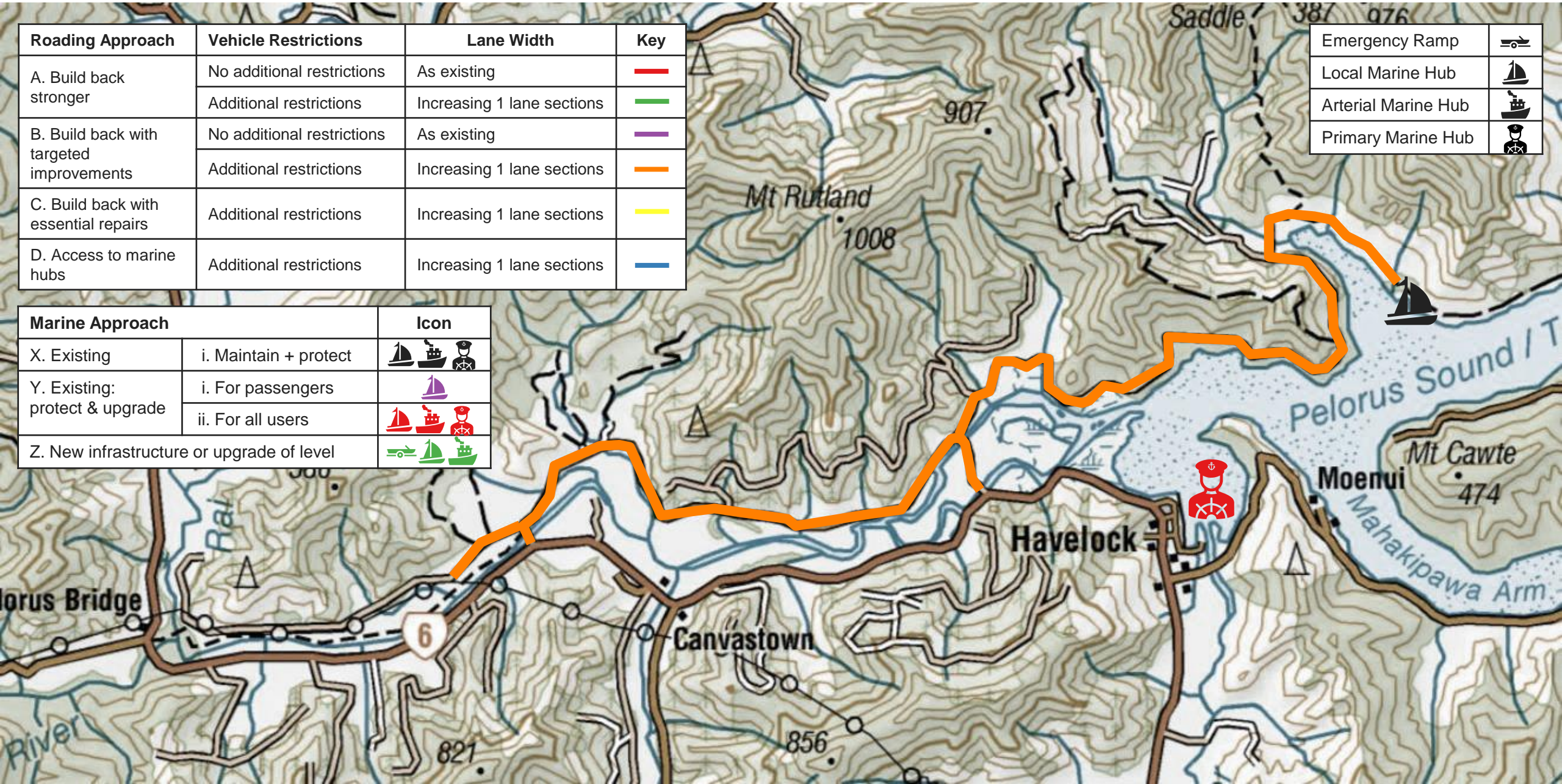




Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		

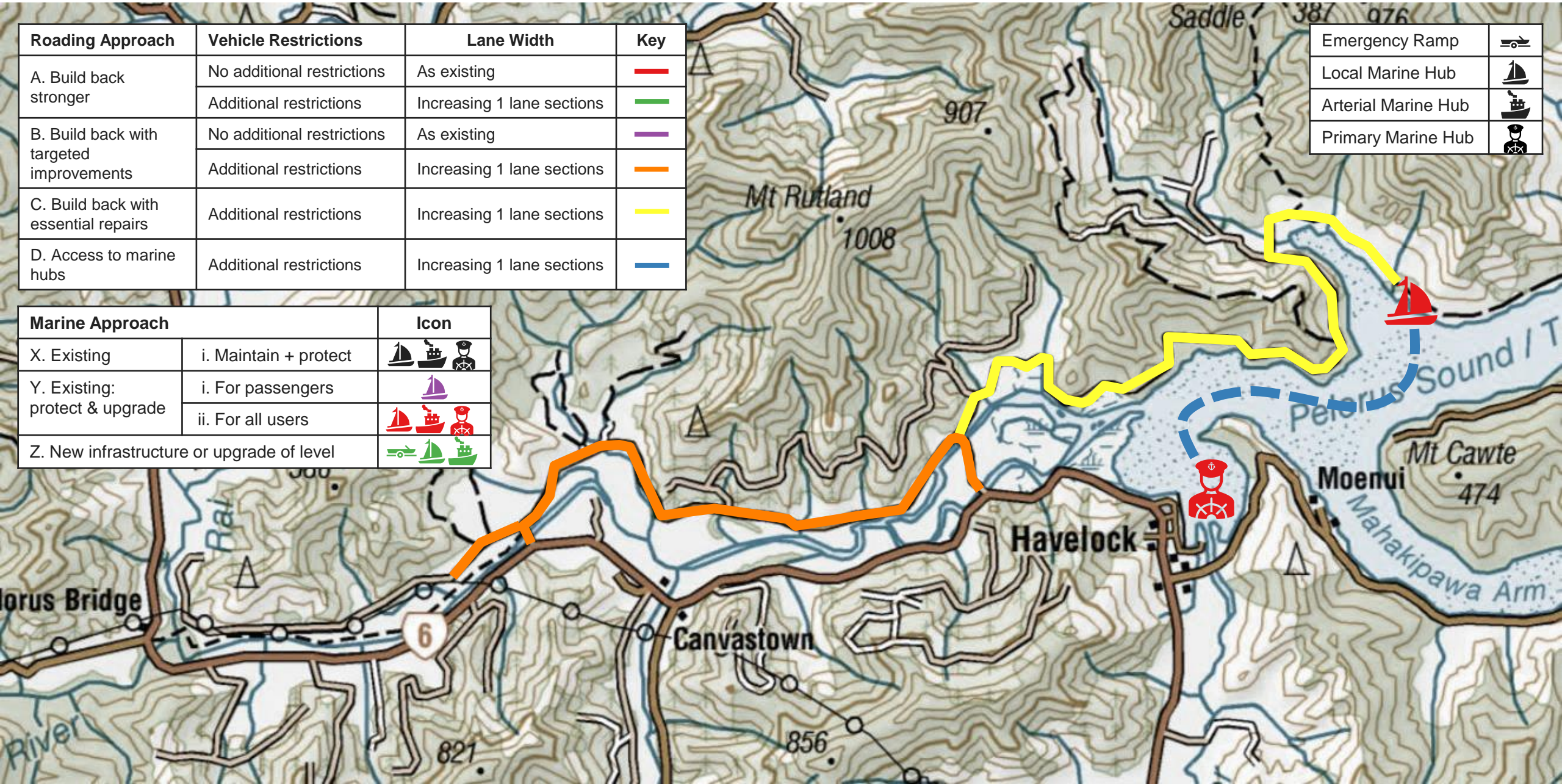




Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		

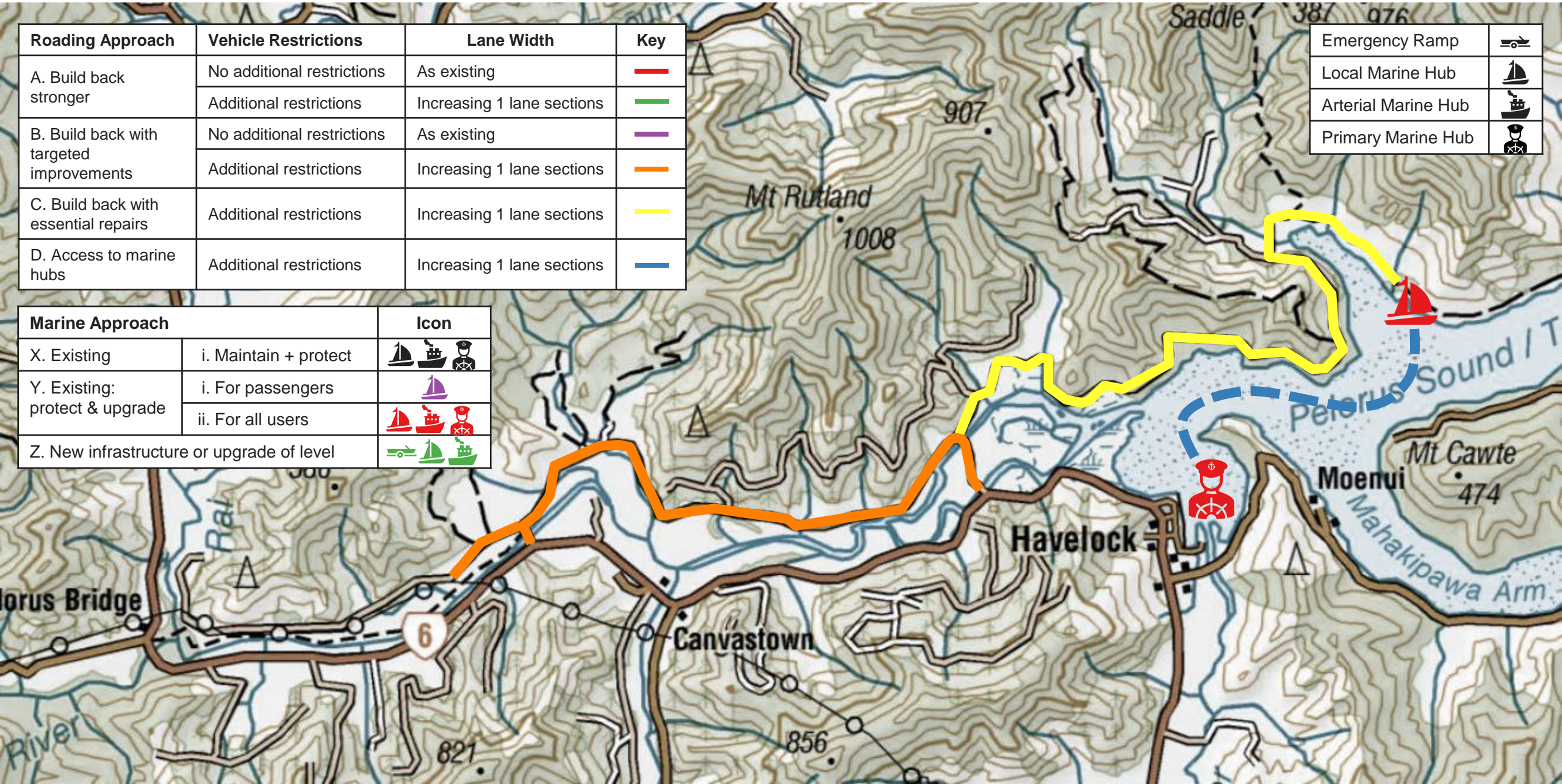




Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		

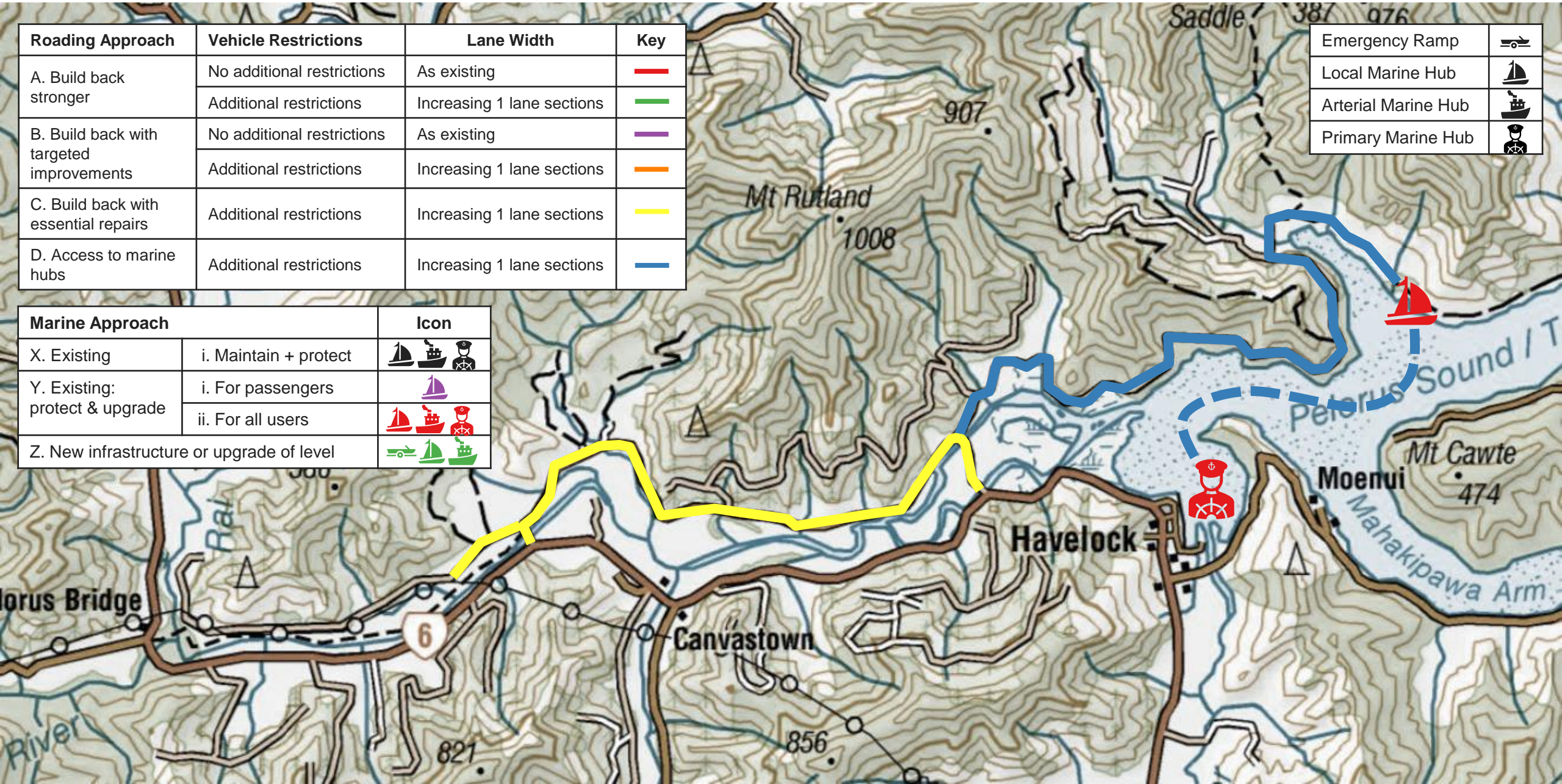




Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		





1. Travel Alternatives

Improve community and business resilience by providing travel alternatives

Programme	Score	Comments
Do Minimum	0	existing situation not that bad, and mostly over slips which are easier to clear. Already have a jetty and launching ramp at Kaiuma Bay
Road Focus	1	route secured, SH6 as alternative for ID1, bridge and ~4% ID2 highly susceptible to coastal inundation
Road Access	0	in line with what is happening now
Balanced	2	1. build back stronger secures route/ SH6 as alternative 2. essential repairs only, P&U Kaiuma Bay/marine alternative
Marine Access	2	As above
Marine Focus	1	Step down



2. Disrupted Access

Reduce frequency and duration of disrupted access

Pelorus	Do Minimum	-1
	Road Focus	2
	Road Access	1
	Balanced	1
	Marine Access	0
	Marine Focus	-1

Area	Programme option	Comments
Pelorus	Do Minimum	Will get more disruption over time, -1 Drainage won't cope with increase storm events, primarily overslips
	Road Focus	Won't resolve flood inundation Disruption will be less, there are multiple bridges so gives an alternative for first section
	Road Access	One section of road, increasing 1 lane sections compared to road focus, still significantly better than do minimum
	Balanced	Still better but not markedly better than road access
	Marine Access	This will still be an increased disruption to people, because of challenge, two cars will be needed if not a barge to transport cars, which will take longer
	Marine Focus	A marine option, will still need road to access properties, but most people near marina Tidal and quite shallow, so limited access points Tidal and weather disruptions, increased disruption to access because of reliance on water



3. Resilience

Improve resilience of the transport assets

Pelorus	Do Minimum	-1	low natural slope instability, high human slope instability, multiple restrictions, some marine options, floodplain issues
	Road Focus	2	benefit but not very high (parallel route, and doesn't resolve flooding issues)
	Road Access	1	
	Balanced	1	
	Marine Access	0	
	Marine Focus	-1	not a key differentiator but roads deteriorate further



4. Technical Difficulty

How difficult will the programme be to design and construct? Are there any material supply constraints that will impact this? What are the technical risks involved in implementing the option? Consider challenges for marine access.

- +3 Simple to achieve from Technical input.
- 0 Nothing to do.
- -3 Serious effort required for investigation , optioneering, design , risk assessment.
- Technical issues to consider with Marine Access. Marshalling areas, stock holding areas, stock effluent disposal, noise/screening

Pelorus	Do Minimum	0	Not building anything
	Road Focus	2	Straight forward relatively stable
	Road Access	1	
	Balanced	2	
	Marine Access	2	
	Marine Focus	2	



5. Social and Community Impacts

How does the programme impact human health (safety), feelings of community, access to emergency services, impacts on community in relation to jobs, recreation, services and severance, impacts on farming and business?

Programme	Score	Comments
Do Minimum	-1	existing situation is not terrible, and there will likely be less of a negative impact than for Port Underwood
Road Focus	2	targeted improvements approach has positive impacts for all indicators, although possible vehicle restrictions to Kaiuma Bay may impact farming and business
Road Access	1	targeted improvements approach has positive impacts for all indicators, although possible vehicle restrictions for the area may impact farming and business.
Balanced	1	improvement on current situation, although 2 is essential repairs only, will still allow access to opportunities and emergency services with marine as back up
Marine Access	1	As above
Marine Focus	-1	Area 2 most at risk of deterioration, area 1 also potentially less resilient Despite investment in marine options, those on road to Kaiuma Bay will likely feel excluded from the wider Marlborough community due to the significant decrease in LOS/ move to marine access. This will also impact emergency access and access to opportunities



6. Environmental Effects

To assess 'environment' a judgement is made based on the following measures:

- Scale, frequency and duration of land disturbance and excavation; temporary stormwater run off and management of erosion and sediment.
- Scale and extent of permanent land recontouring and vegetation clearance.
- Potential effects on receiving environment as a result of slips, land instability, human interventions.
- Likely visual impact of works and integration with the surrounding environment, as viewed by public/residents. Potential impacts on natural character.
- In the absence of noise modelling, noise and vibration effects based on proximity of works to sensitive receivers, and also spatial extent of works.

Analysis, Assumptions & Information Gaps

- Resource consent or approval(s) and relevant application process have not been taken into account.
- Technical assessments and input from experts are not available at this stage in the evaluation.

Pelorus	Do Minimum	-2
	Road Focus	1
	Road Access	1
	Balanced	1
	Marine Access	1
	Marine Focus	-3



7. Climate Change Mitigation

Considered three aspects, weighted to give final score:

- Enabled carbon (10%)
- Construction carbon (45%)
- Ops and Maintenance (45%)
- Queen Charlotte 20% for enabled as higher volumes

Score relativity within each zone, not across zones

Criteria		Climate Change Mitigation	Scope for trip diversion / suppression	Construction carbon (materials, transport, equipment)	Operational carbon (maintenance)	*Revisit scores when costs for Marine Access and Marine Focus programmes available and when Maintenance costs available for all programmes.
			10%	45%	45%	Weighted towards construction and O&M carbon, as enabled changes v small due to low volumes.
Pelorus	Do Minimum	-1	3	0	-2	Trip suppression moderate as road will fail often + marine option. O&M lots of emergency works
	Road Focus	0	0	0	-1	becoming one lane so O&M less.
	Road Access	-1	0	-1	-1	All becoming one lane. No likely to lead to diversion or suppression. Low cost for capital and maintenance.
	Balanced	-1	1	-1	-1	Some diversion as Kaiuma Bay marine hub improved and Seg 2 becomes 1 lane with loss of access more frequent. Same for Road Access re O&M and seal.
	Marine Access	-1	1	-1	-1	Identical to Balanced so scores the same.
	Marine Focus	0	2	0	0	More trip diversion likely as result of road deterioration, assume no seal.



8. Supplier Capacity and Capability

- This is influenced by the size and duration of the programme
- +3 Nothing to do, therefore no supplier issues
- -3 Specialised resources, limited availability, long lead times to produce the design resources or the construction items

Pelorus	Do Minimum	3	Nothing to do no supply issues
	Road Focus	2	Straight forward work
	Road Access	2	
	Balanced	2	
	Marine Access	2	
	Marine Focus	2	



Queen Charlotte

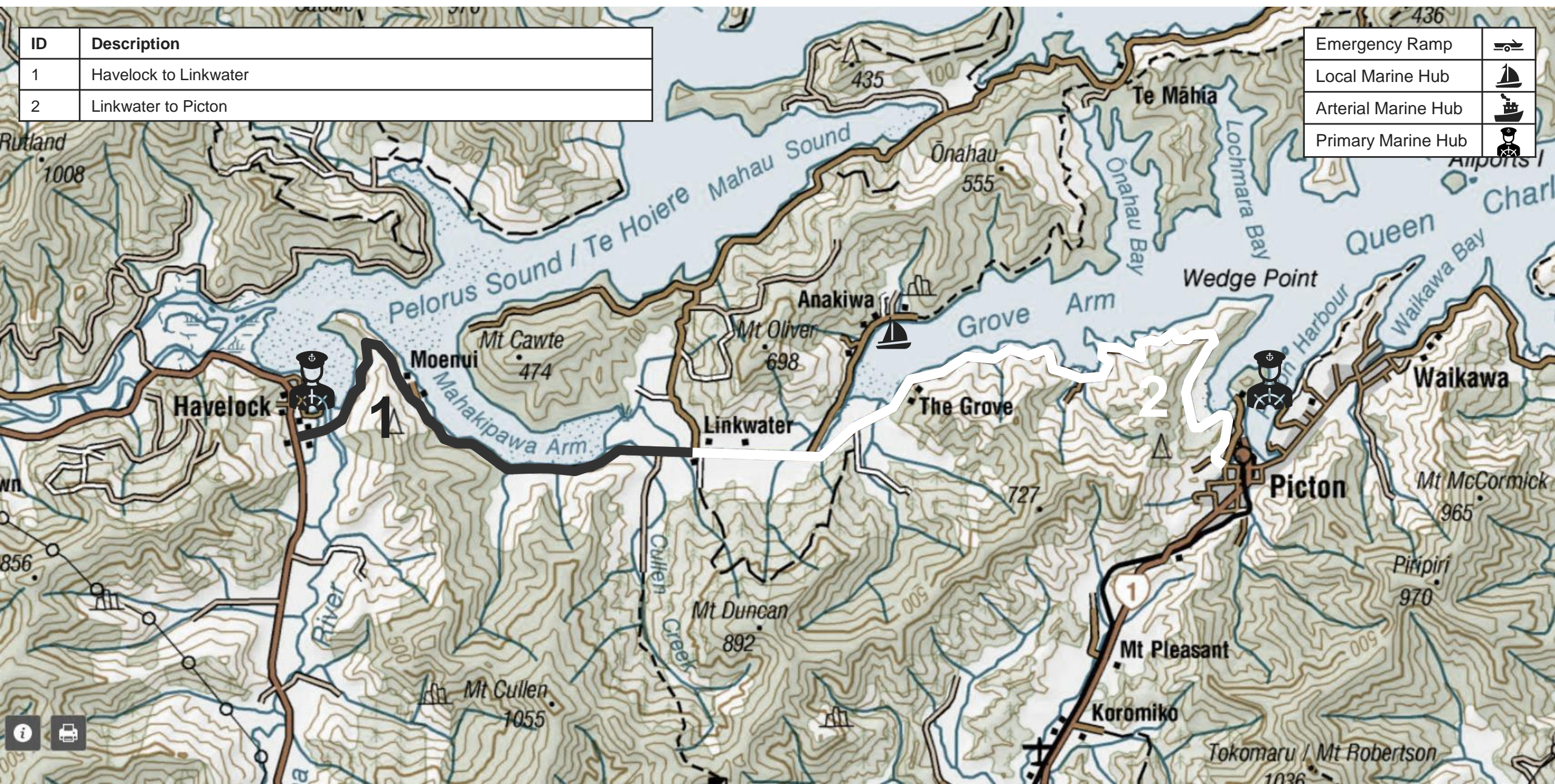




QUEEN CHARLOTTE: SEGMENT OUTLINE

ID	Description
1	Havelock to Linkwater
2	Linkwater to Picton

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

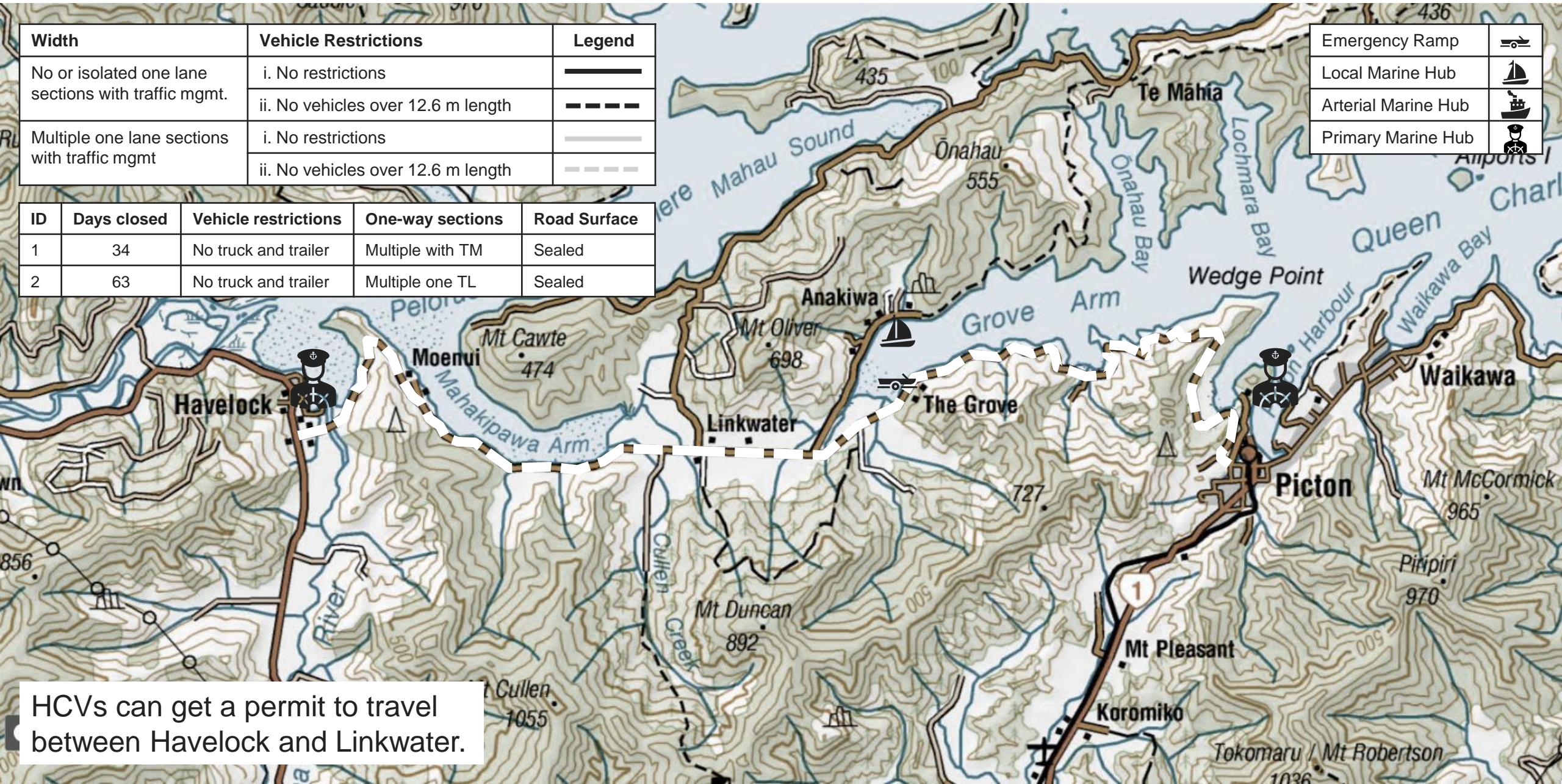




Width	Vehicle Restrictions	Legend
No or isolated one lane sections with traffic mgmt.	i. No restrictions	
	ii. No vehicles over 12.6 m length	
Multiple one lane sections with traffic mgmt	i. No restrictions	
	ii. No vehicles over 12.6 m length	

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

ID	Days closed	Vehicle restrictions	One-way sections	Road Surface
1	34	No truck and trailer	Multiple with TM	Sealed
2	63	No truck and trailer	Multiple one TL	Sealed



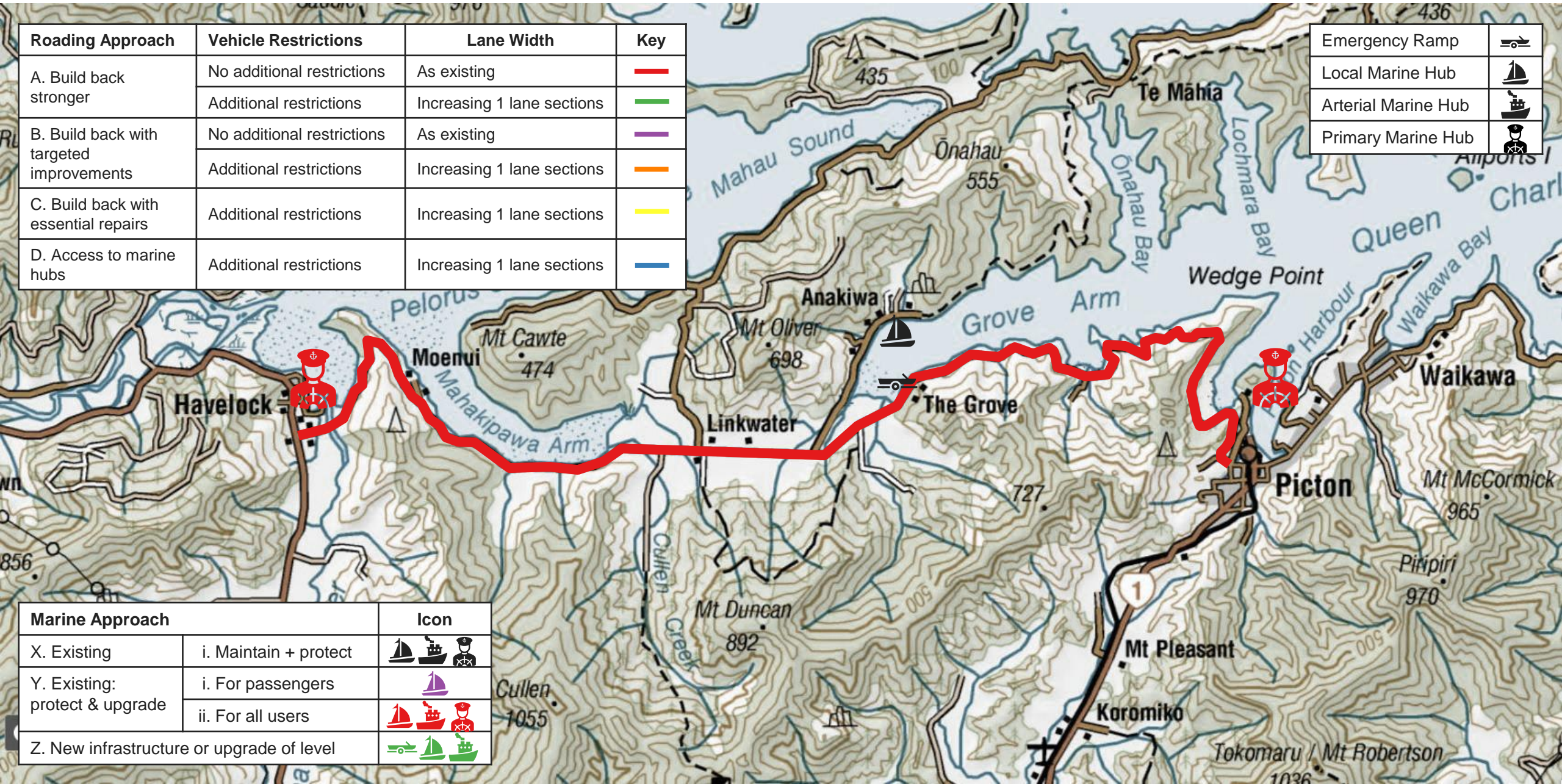
HCVs can get a permit to travel between Havelock and Linkwater.



QUEEN CHARLOTTE: ROAD FOCUS/ ROAD ACCESS

Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	



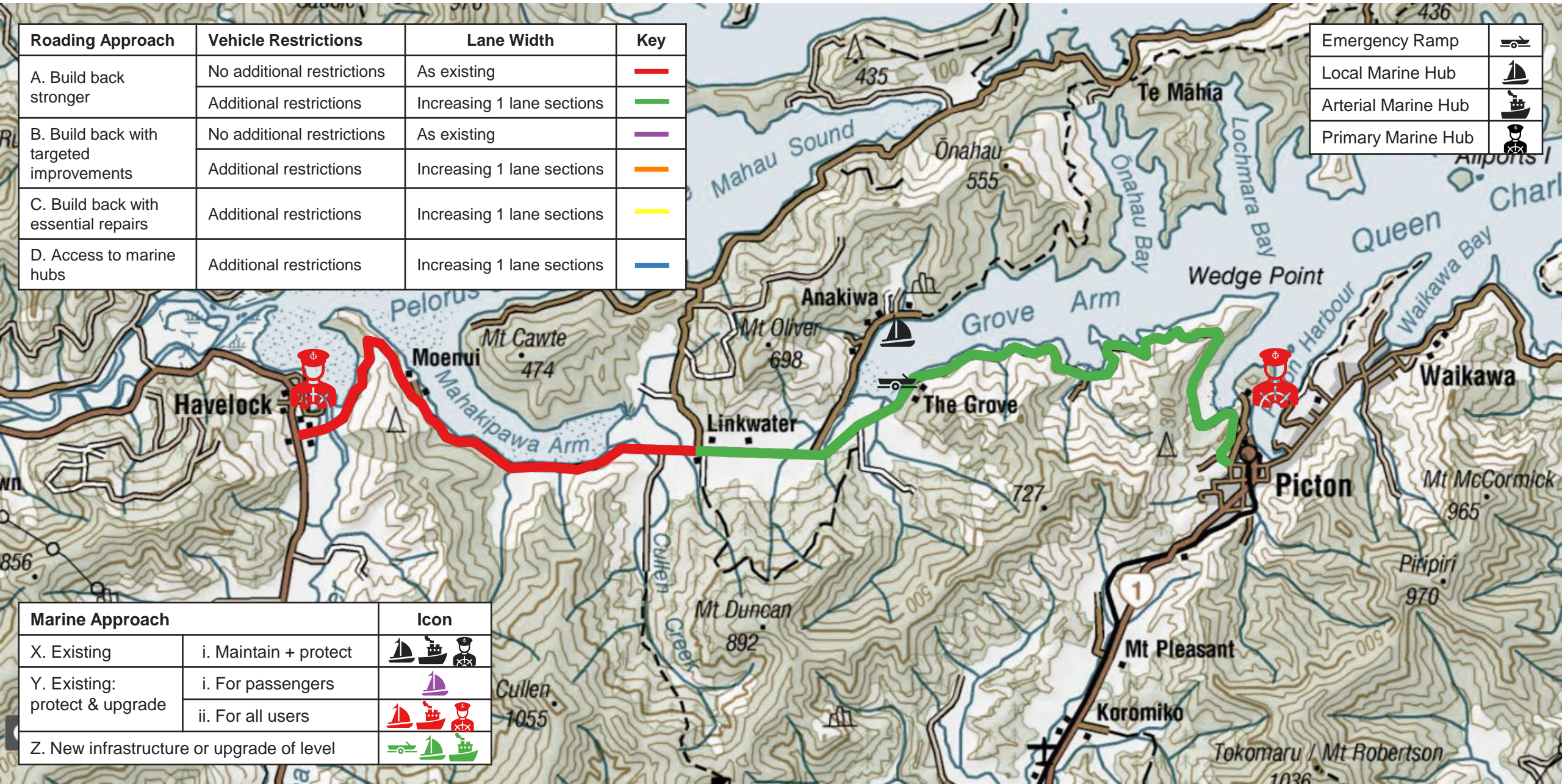
Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		



QUEEN CHARLOTTE: BALANCED

Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	



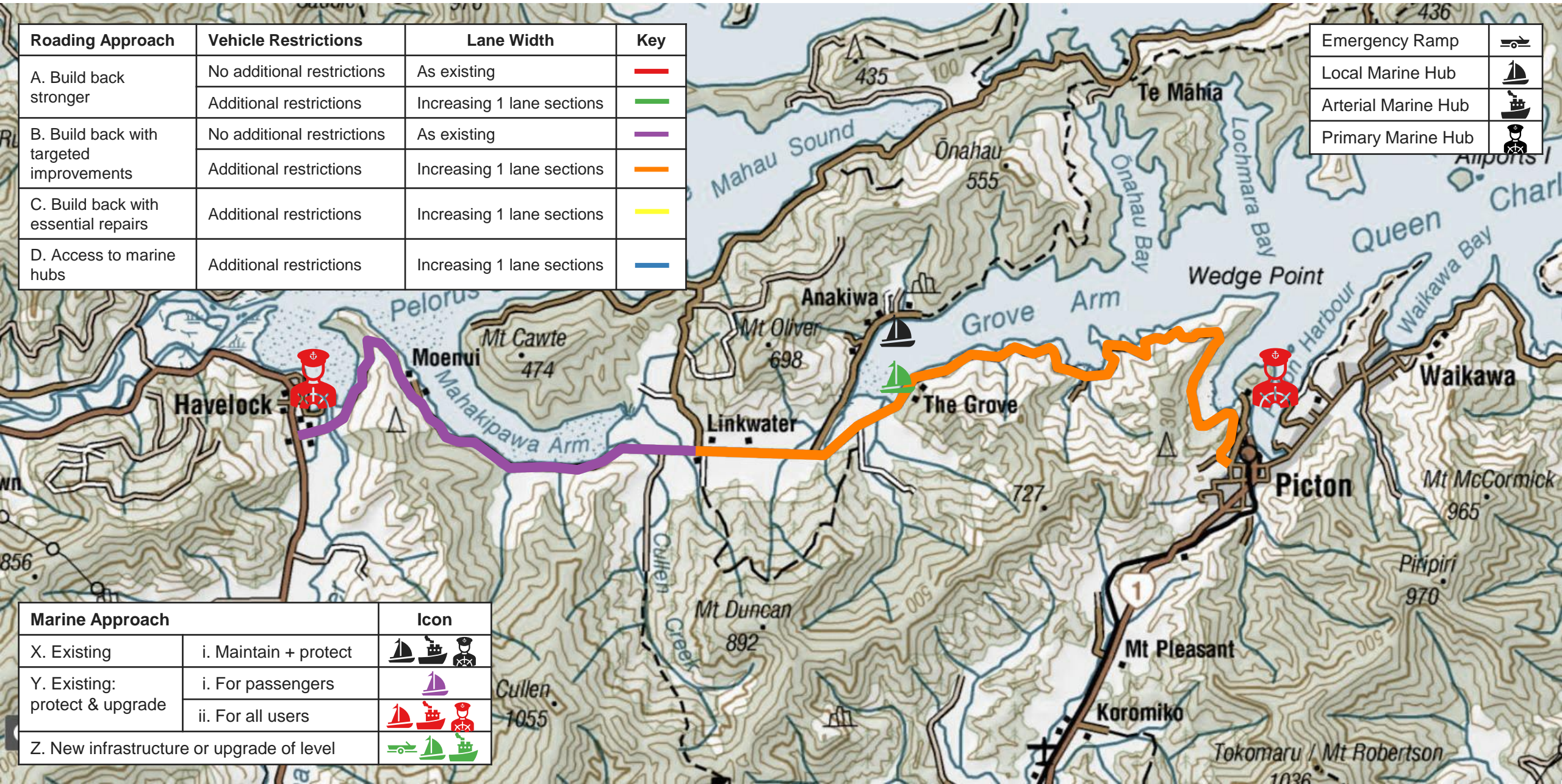
Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		



QUEEN CHARLOTTE: MARINE ACCESS

Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

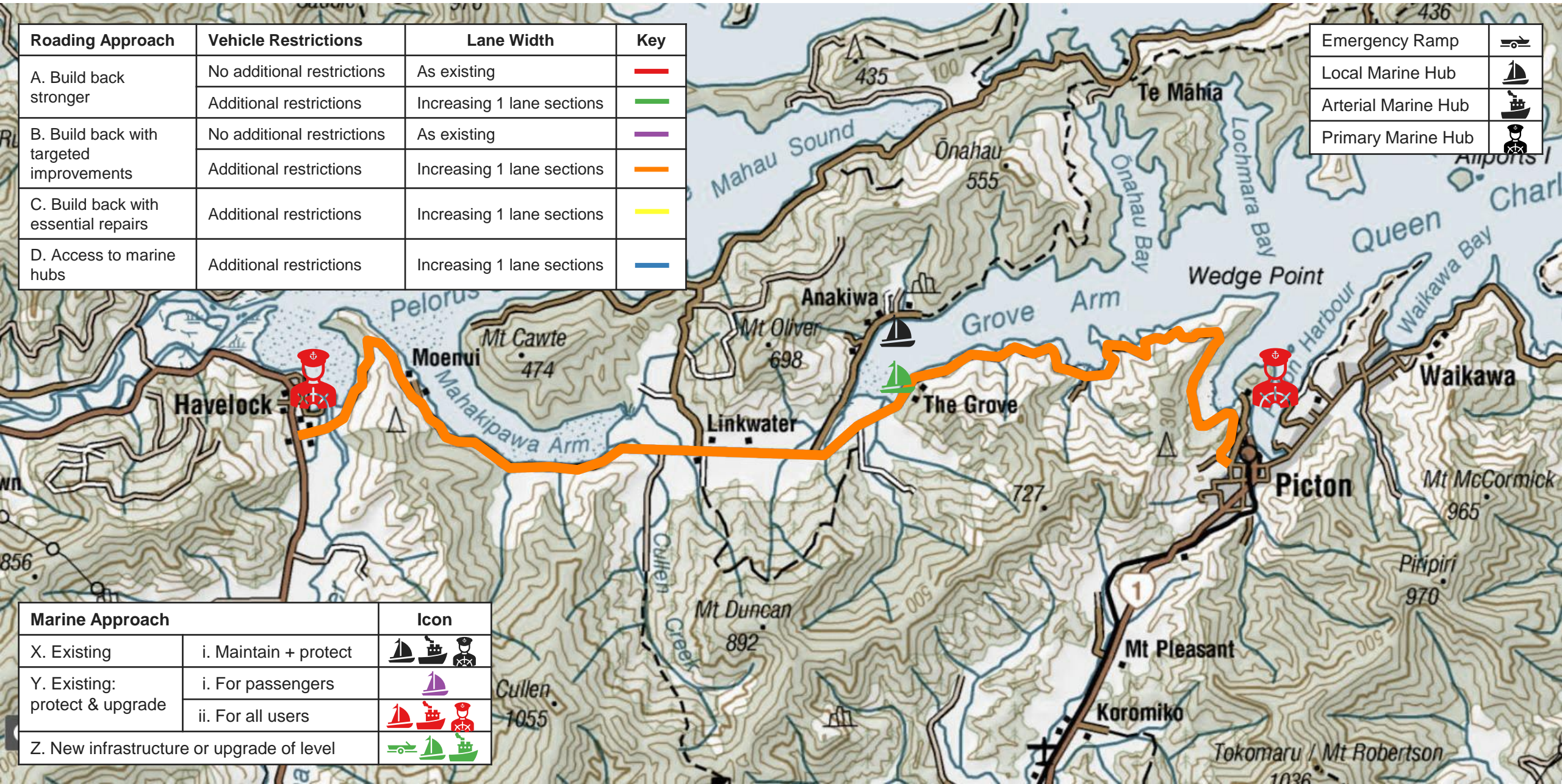


Marine Approach	Icon
X. Existing	i. Maintain + protect
Y. Existing: protect & upgrade	i. For passengers
	ii. For all users
Z. New infrastructure or upgrade of level	



Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	



Marine Approach	Icon
X. Existing	i. Maintain + protect
Y. Existing: protect & upgrade	i. For passengers
	ii. For all users
Z. New infrastructure or upgrade of level	



1. Travel Alternatives

Improve community and business resilience by providing travel alternatives

Programme	Score	Comments
Do Minimum	-1	if left as is route will deteriorate
Road Focus	2	build back stronger secures route, SH6 as alternative, but not climate adaptive
Road Access	2	As above
Balanced	1	targeted improvements secures route, SH6 as alternative, but not climate adaptive
Marine Access	1	due to ID2 being increasing 1 lane sections
Marine Focus	1	



2. Disrupted Access

Reduce frequency and duration of disrupted access

Queen Charlotte	Do Minimum	-2
	Road Focus	1
	Road Access	1
	Balanced	-1
	Marine Access	-2
	Marine Focus	-3

Area	Programme option	Comments
Queen Charlotte	Do Minimum	Will get worse with each storm event
	Road Focus	Too much global instability to be a 3 This is the best we can get because of global Some sections still need marine back up
	Road Access	Too much global instability to be a 3 This is the best we can get because of global Some sections still need marine back up
	Balanced	No marine options for Mahakipawa Arm No marine improvements and unreliable access in Grove section and increasing disruption Should be improving ramp at the Grove, with this improvement to the option would score as a 0 rather than -1
	Marine Access	Increasing disruption because of more frequent damage to roads and the need for road access without marine options, particularly Mahakipawa Arm
	Marine Focus	Increasing disruption because of more frequent damage to roads and the need for road access without marine options, particularly Mahakipawa Arm



3. Resilience

Improve resilience of the transport assets

Queen Charlotte	Do Minimum	-2	some susceptibility (one lane sections with restrictions), marine options exist long way by boat, Linkwater key route, alternatives further, sea level rise risk
	Road Focus	2	upgraded road improves resilience, already some marine options
	Road Access	2	" (same)
	Balanced	1	targeted road improvements, some investment in marine helps offset sea level rise in long term
	Marine Access	0	targeted road improvement but less than above
	Marine Focus	-1	targeted road improvement but less than above



4. Technical Difficulty

How difficult will the programme be to design and construct? Are there any material supply constraints that will impact this? What are the technical risks involved in implementing the option? Consider challenges for marine access.

- +3 Simple to achieve from Technical input.
- 0 Nothing to do.
- -3 Serious effort required for investigation , optioneering, design , risk assessment.
- Technical issues to consider with Marine Access. Marshalling areas, stock holding areas, stock effluent disposal, noise/screening

Queen Charlotte	Do Minimum		0	Not building anything
	Road Focus		-1	High induced slope stability
	Road Access		-1	
	Balanced		1	
	Marine Access		-1	
	Marine Focus		-2	Mahakipawa arm impossible ?



5. Social and Community Impacts

How does the programme impact human health (safety), feelings of community, access to emergency services, impacts on community in relation to jobs, recreation, services and severance, impacts on farming and business?

Programme	Score	Comments
Do Minimum	-3	Do Min not really an option here due to the connection this road provides to Kenepuru and as the SH6 alternative route. Would severely impact safety, feelings of community, emergency access and access to opportunities, and businesses
Road Focus	3	Will improve resilience of this important road and help ensure connectivity for relatively large community. Strengthening of Havelock and Picton port also important.
Road Access	3	As above
Balanced	2	step down for Linkwater to Picton due to possible additional vehicle restrictions for this section. Would negatively impact business and farming, although there would be an alternate route provided SH is open
Marine Access	1	improvement to existing situation, but increase in one lane section could be a problem if route needed as SH alternative
Marine Focus	-2	if for light vehicles only, if some heavies allowed would increase score



6. Environmental Effects

To assess 'environment' a judgement is made based on the following measures:

- Scale, frequency and duration of land disturbance and excavation; temporary stormwater run off and management of erosion and sediment.
- Scale and extent of permanent land recontouring and vegetation clearance.
- Potential effects on receiving environment as a result of slips, land instability, human interventions.
- Likely visual impact of works and integration with the surrounding environment, as viewed by public/residents. Potential impacts on natural character.
- In the absence of noise modelling, noise and vibration effects based on proximity of works to sensitive receivers, and also spatial extent of works.

Analysis, Assumptions & Information Gaps

- Resource consent or approval(s) and relevant application process have not been taken into account.
- Technical assessments and input from experts are not available at this stage in the evaluation.

Queen Charlotte	Do Minimum	-2
	Road Focus/Road Access	2
	Balanced	2
	Marine Access	1
	Marine Focus	0



7. Climate Change Mitigation

Considered three aspects, weighted to give final score:

- Enabled carbon (10%)
- Construction carbon (45%)
- Ops and Maintenance (45%)
- Queen Charlotte 20% for enabled as higher volumes

Score relativity within each zone, not across zones

Criteria		Climate Change Mitigation	Scope for trip diversion / suppression	Construction carbon (materials, transport, equipment)	Operational carbon (maintenance)	*Revisit scores when costs for Marine Access and Marine Focus programmes available and when Maintenance costs available for all programmes.
			10%	45%	45%	Weighted towards construction and O&M carbon, as enabled changes v small due to low volumes.
Queen Charlotte	Do Minimum	-1	2	0	-3	weighting for trip diversion as traffic vols are higher
	Road Focus	-3	0	-3	-3	No reason for trip diversion or suppression. Assume sealed section continues to be sealed.
	Road Access	-3	0	-3	-3	Same programme as Road Focus
	Balanced	-2	0	-2	-2	Slightly less for O&M as more one lane sections in Seg 2
	Marine Access	-2	1	-2	-2	Slightly less for O&M as more one lane sections in Seg 2. Grove Arm upgrade.
	Marine Focus	-1	1	-2	-1	Slightly less for O&M as more one lane sections for whole route. Grove Arm upgrade.



8. Supplier Capacity and Capability

- This is influenced by the size and duration of the programme
- +3 Nothing to do, therefore no supplier issues
- -3 Specialised resources, limited availability, long lead times to produce the design resources or the construction items

Queen Charlotte	Do Minimum	3	Nothing to do no supply issues
	Road Focus	1	
	Road Access	1	
	Balanced	-1	
	Marine Access	-2	
	Marine Focus	-2	Marine options difficult



French Pass

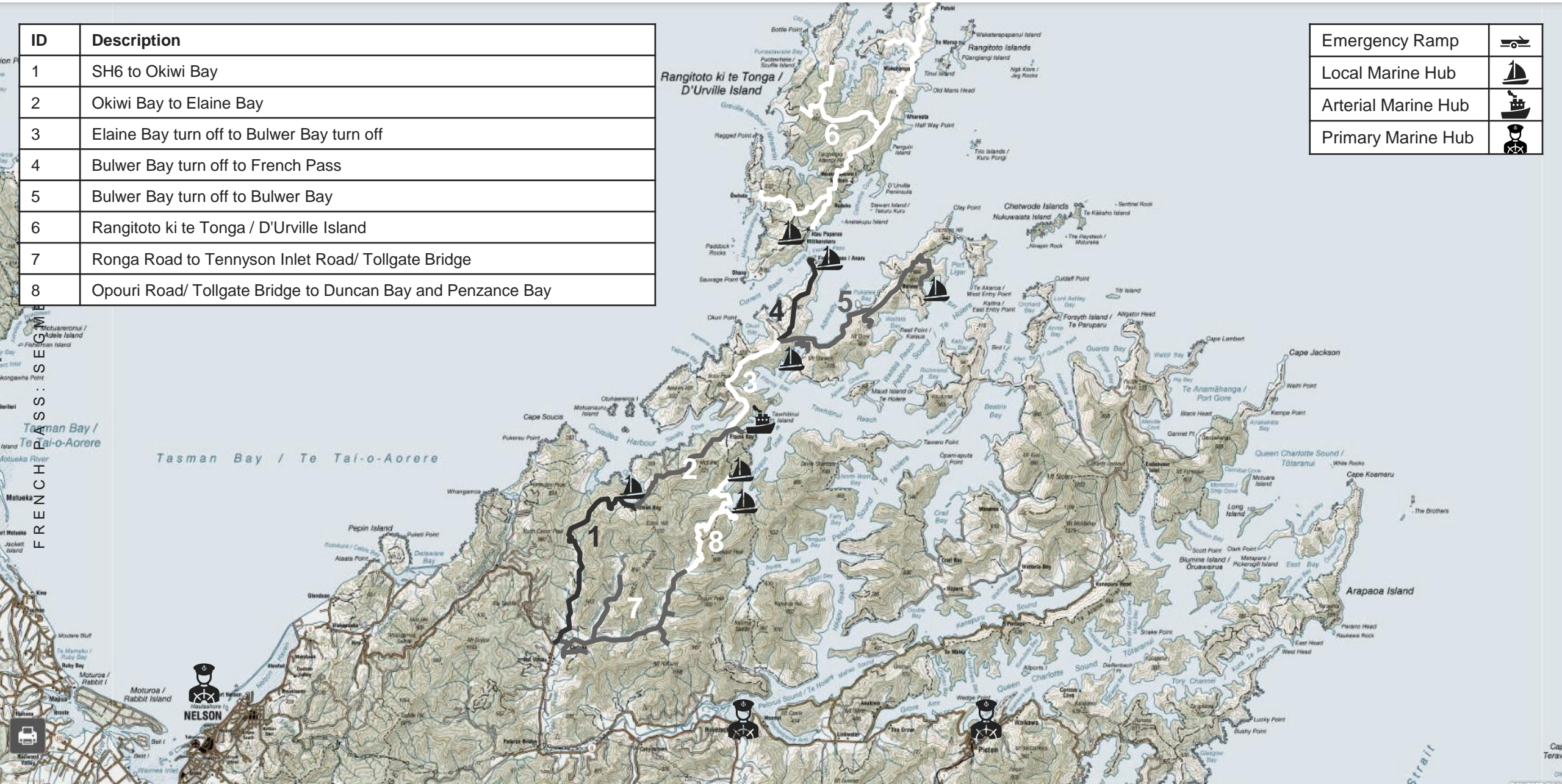




FRENCH PASS: SEGMENT OUTLINE

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

ID	Description
1	SH6 to Okiwi Bay
2	Okiwi Bay to Elaine Bay
3	Elaine Bay turn off to Bulwer Bay turn off
4	Bulwer Bay turn off to French Pass
5	Bulwer Bay turn off to Bulwer Bay
6	Rangitoto ki te Tonga / D'Urville Island
7	Ronga Road to Tennyson Inlet Road/ Tollgate Bridge
8	Opouri Road/ Tollgate Bridge to Duncan Bay and Penzance Bay



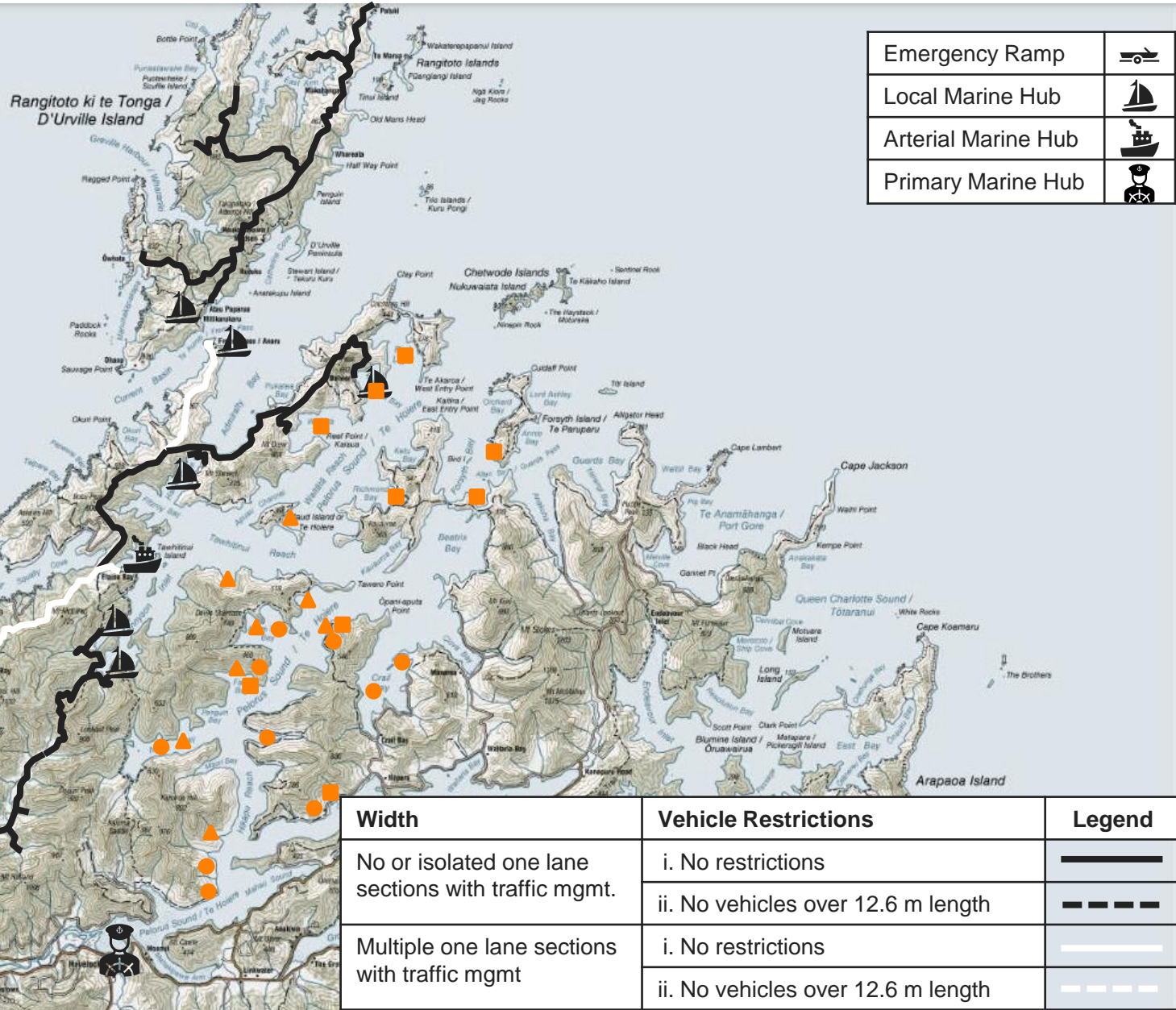


FRENCH PASS: DO MINIMUM

ID	Days closed	Vehicle restrictions	On-way sections	Road Surface
1	46	No restrictions	Multiple with TL	Sealed
2	46	No restrictions	Multiple with TL	Sealed
3	46	No restrictions	Isolated with TM	S: 55% U: 45%
4	61	No restrictions	Multiple with TM	S: 30% U: 70%
5	46	No restrictions	Isolated with TM	S: 2% U: 98%
6	NA	No restrictions	Isolated with TM	Unsealed
7	64	No restrictions	Isolated with TM	S: 66% U: 34%
8	64	No restrictions	Isolated with TM	Sealed

Company	Route	Frequency	Stops
Pelorus Mailboat	Eastern Sounds	Mondays	●
	Western Sounds	Wednesdays	▲
	Outer Sounds	Fridays	■

Only existing scheduled marine transport stops shown.



Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

Width	Vehicle Restrictions	Legend
No or isolated one lane sections with traffic mgmt.	i. No restrictions	
	ii. No vehicles over 12.6 m length	
Multiple one lane sections with traffic mgmt	i. No restrictions	
	ii. No vehicles over 12.6 m length	

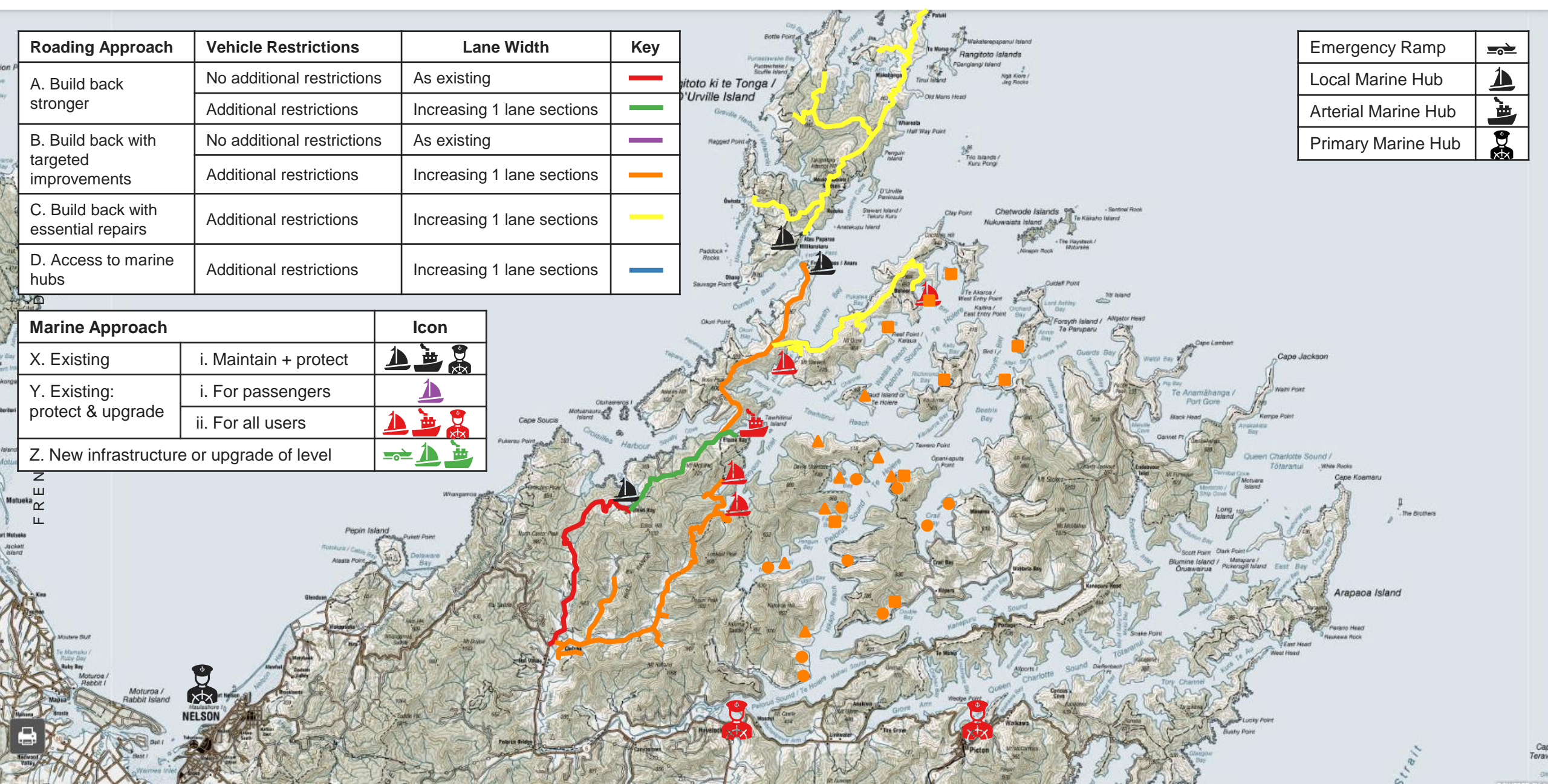


FRENCH PASS: ROAD ACCESS

Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	



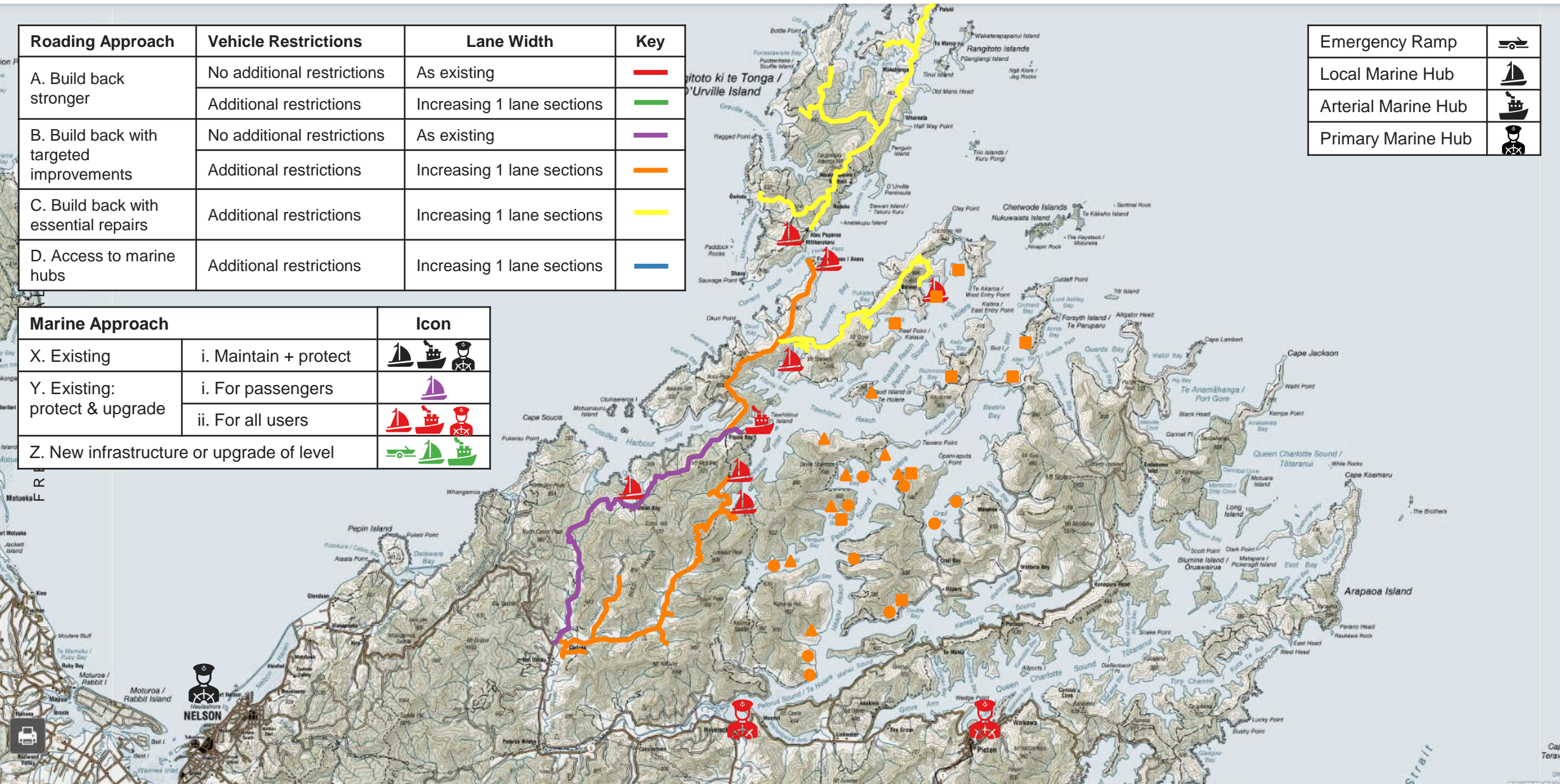


FRENCH PASS: BALANCED

Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	



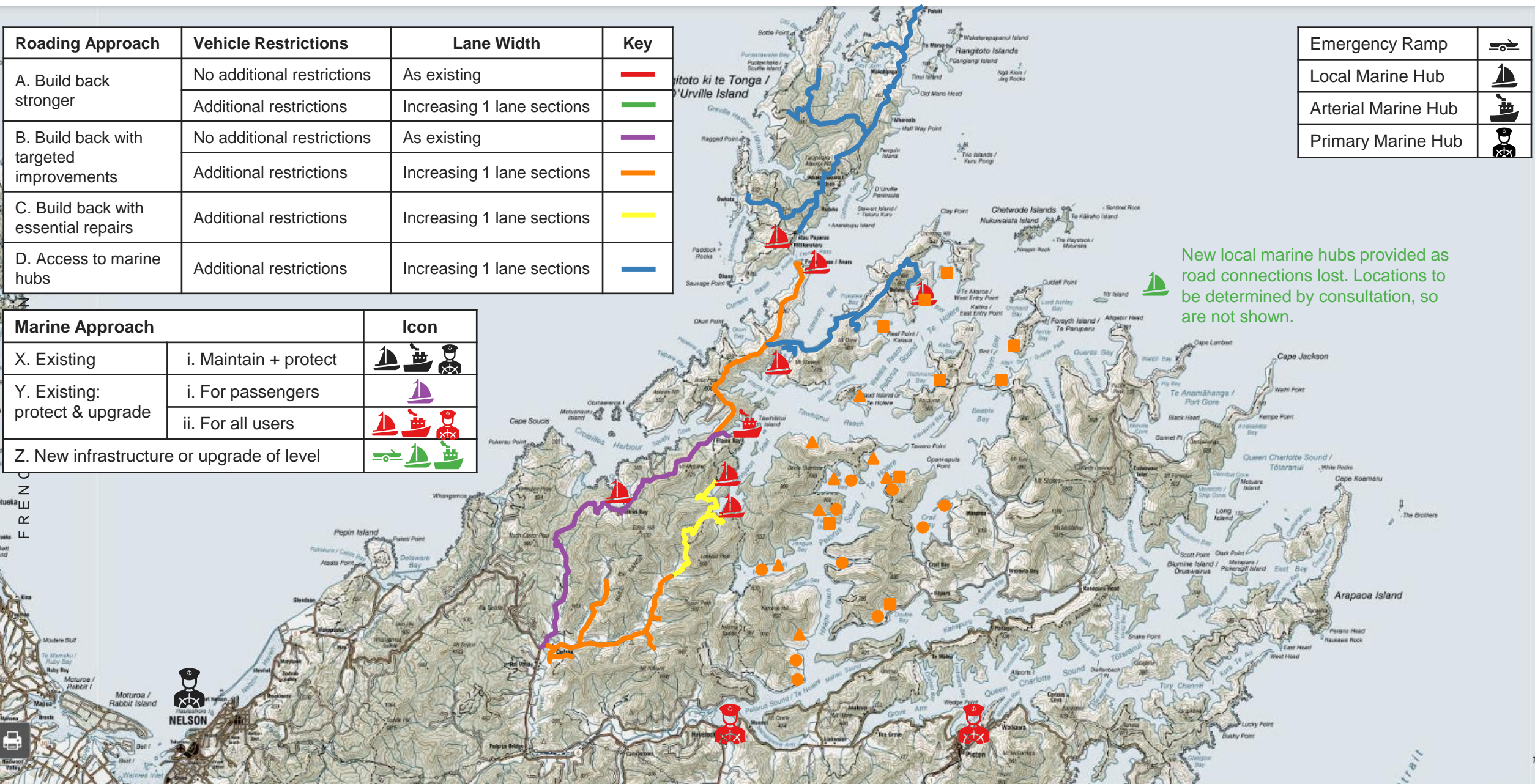


FRENCH PASS: MARINE ACCESS

Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	



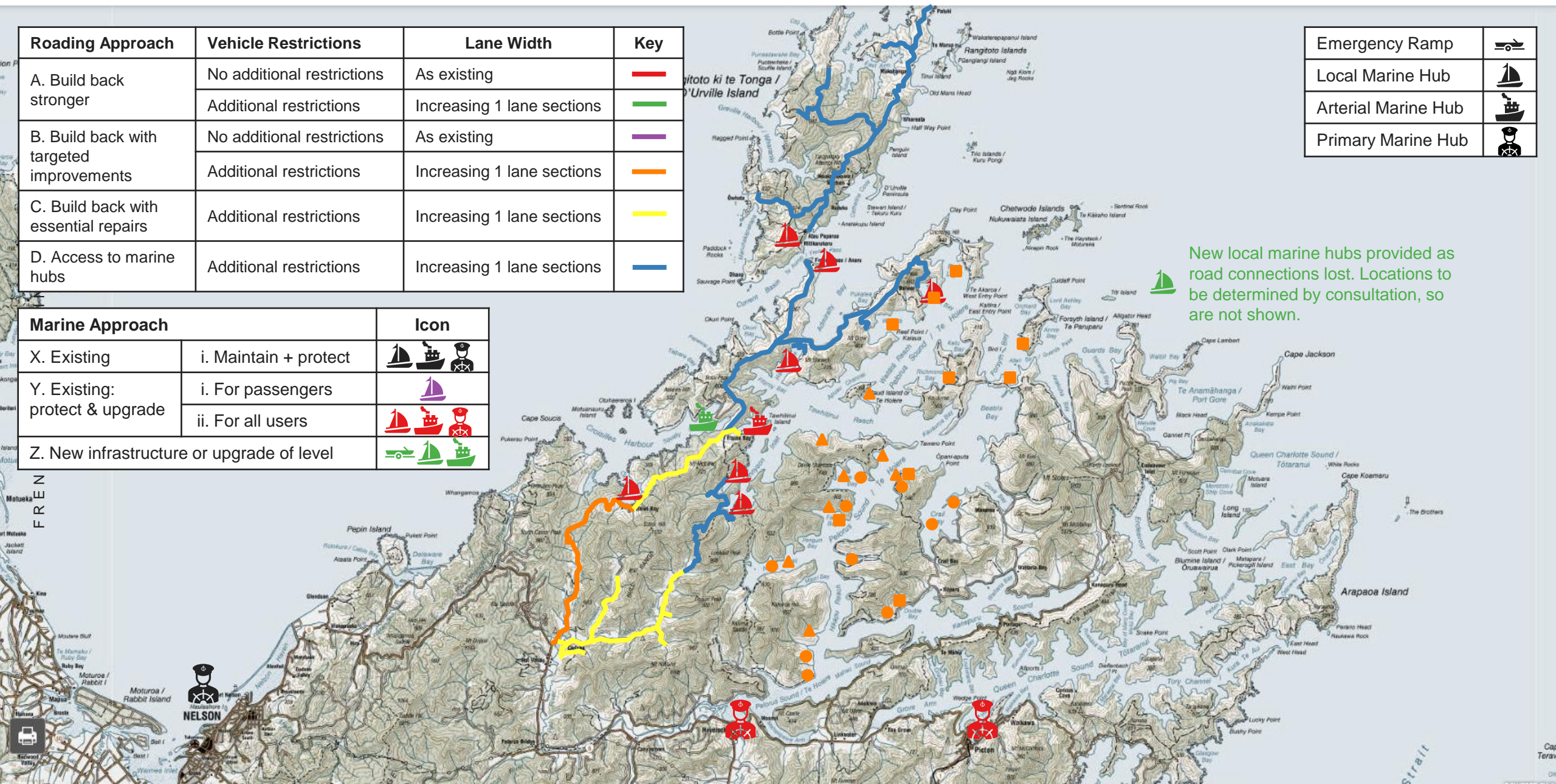


Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

New local marine hubs provided as road connections lost. Locations to be determined by consultation, so are not shown.





1. Travel Alternatives

Improve community and business resilience by providing travel alternatives

Programme	Score	Comments
Do Minimum	-2	Long term impacts from do min
Road Focus	1	secures route for future but no alternatives
Road Access	0	Step down
Balanced	2	Best of both worlds. targeted improvements secures some routes for long term, upgrades of all local marine hubs to facilitate increase in alt mode options
Marine Access	1	Roads into most places, and investment in marine alternative
Marine Focus	-1	marine only option for much of area - not an alternative



2. Disrupted Access

Reduce frequency and duration of disrupted access

French Pass	Do Minimum	-2
	Road Focus	2
	Road Access	0
	Balanced	-1
	Marine Access	-2
	Marine Focus	-3

Area	Programme option	Comments
French Pass	Do Minimum	Will continue to be disrupted and increasing disruptions particularly either side of Okiwi Bay, and this is geese neck
	Road Focus	Reduce frequency and duration of outages over time Elaine Bay resilience is important for resilience of whole of Sounds as back up to Havelock
	Road Access	Same level of disruptions as now
	Balanced	Increased level of disruption
	Marine Access	Further increased level of disruption
	Marine Focus	Very weather dependent, makes marine unreliable



3. Resilience

Improve resilience of the transport assets

French Pass	Do Minimum	-2	low natural slope instability, high human slope instability, some restrictions, some marine options exist, caution tide/climate change
	Road Focus	1	some improvement, not too badly affected yet, caution northerly swell and climate change
	Road Access	1	
	Balanced	2	
	Marine Access	3	more marine is a good for most areas, targeted road maintain
	Marine Focus	1	start to lose some redundancy with road LOS dropping, caution northerly swell



4. Technical Difficulty

How difficult will the programme be to design and construct? Are there any material supply constraints that will impact this? What are the technical risks involved in implementing the option? Consider challenges for marine access.

- +3 Simple to achieve from Technical input.
- 0 Nothing to do.
- -3 Serious effort required for investigation , optioneering, design , risk assessment.
- Technical issues to consider with Marine Access. Marshalling areas, stock holding areas, stock effluent disposal, noise/screening

French Pass	Do Minimum	0	Not building anything
	Road Focus	2	Straight forward relatively stable
	Road Access	1	
	Balanced	2	
	Marine Access	1	
	Marine Focus	-1	Gets difficult with freight, marshall yards etc



5. Social and Community Impacts

How does the programme impact human health (safety), feelings of community, access to emergency services, impacts on community in relation to jobs, recreation, services and severance, impacts on farming and business?

Programme	Score	Comments
Do Minimum	-3	all indicators will decrease as the road deteriorates
Road Focus	2	Improved access with improved resilience for many roads, compared to existing situation. Improved marine access at Elaine Bay. Question mark over long term resilience for some roads.
Road Access	1	similar to above but reduced lane widths/ vehicle restrictions for Okiwi Bay to Elaine Bay reason for score reduction
Balanced	0	not that much of a change from existing
Marine Access	-1	Increased risk to resilience, particularly in the outer roads. Around 200 properties served by road sections 7 and 8 and a further 150 properties by sections 4,5 and 6.
Marine Focus	-2	not a lot of water access points - everyone built near the road on the top of the ridge cant be worse than do min as investment in marine will enable access to opportunities and will facilitate freight but will likely have a heavily negative impact on feelings of community



6. Environmental Effects

To assess 'environment' a judgement is made based on the following measures:

- Scale, frequency and duration of land disturbance and excavation; temporary stormwater run off and management of erosion and sediment.
- Scale and extent of permanent land recontouring and vegetation clearance.
- Potential effects on receiving environment as a result of slips, land instability, human interventions.
- Likely visual impact of works and integration with the surrounding environment, as viewed by public/residents. Potential impacts on natural character.
- In the absence of noise modelling, noise and vibration effects based on proximity of works to sensitive receivers, and also spatial extent of works.

Analysis, Assumptions & Information Gaps

- Resource consent or approval(s) and relevant application process have not been taken into account.
- Technical assessments and input from experts are not available at this stage in the evaluation.

French Pass	'Existing Situation'	-2
	Road Focus	1
	Road Access	1
	Balanced	1
	Marine Access	2
	Marine Focus	-1



7. Climate Change Mitigation

Considered three aspects, weighted to give final score:

- Enabled carbon (10%)
- Construction carbon (45%)
- Ops and Maintenance (45%)
- Queen Charlotte 20% for enabled as higher volumes

Score relativity within each zone, not across zones

Criteria		Climate Change Mitigation	Scope for trip diversion / suppression	Construction carbon (materials, transport, equipment)	Operational carbon (maintenance)	*Revisit scores when costs for Marine Access and Marine Focus programmes available and when Maintenance costs available for all programmes.
			10%	45%	45%	Weighted towards construction and O&M carbon, as enabled changes v small due to low volumes.
French Pass	Do Minimum	-1	2	0	-3	Some roads fragile and likely to fail with no interventions resulting in trip diversion/suppression. All sealed continue to be sealed.
	Road Focus	-3	1	-3	-3	Some trip diversion likely as marine facilities exist already and access losses will continue. High construction cost and seal.
	Road Access	-2	2	-2	-3	More trip diversion with investment in marine hubs and further downgrade of road. Lower construction cost. O&M similar to Road Focus
	Balanced	-2	2	-2	-2	More trip diversion with investment in marine hubs and further down, grade of road.
	Marine Access	-1	3	-2	-1	More trip diversion with investment in marine hubs and further down, grade of road, less seal
	Marine Focus	-2	3	-3	-1	More trip diversion with investment in marine hubs and further down, grade of road.



8. Supplier Capacity and Capability

- This is influenced by the size and duration of the programme
- +3 Nothing to do, therefore no supplier issues
- -3 Specialised resources, limited availability, long lead times to produce the design resources or the construction items

French Pass	Do Minimum	3	Nothing to do no supply issues
	Road Focus	1	
	Road Access	1	
	Balanced	0	
	Marine Access	-1	
	Marine Focus	-1	



Kenepuru

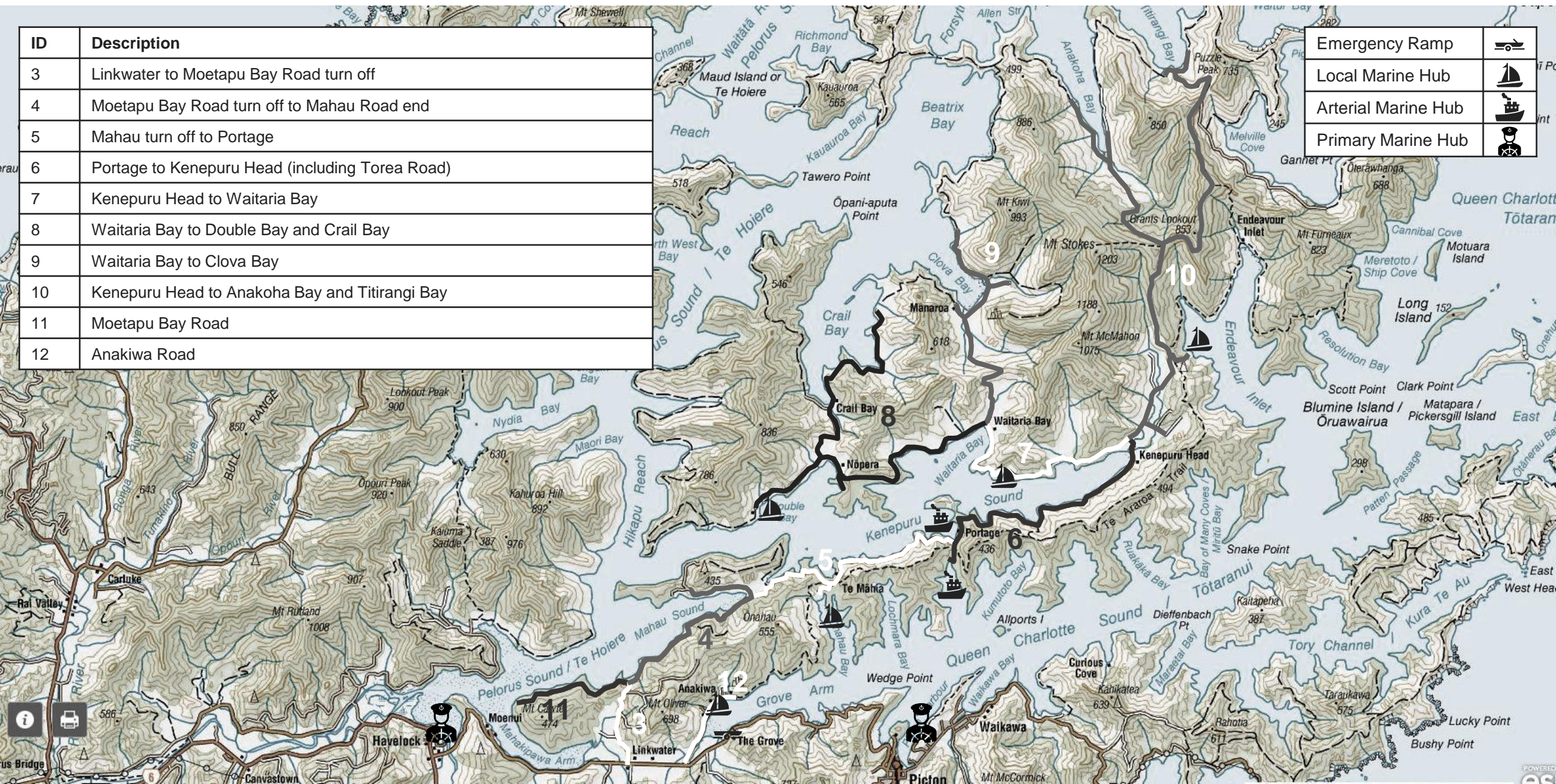




KENEPURU: SEGMENT OUTLINE

ID	Description
3	Linkwater to Moetapu Bay Road turn off
4	Moetapu Bay Road turn off to Mahau Road end
5	Mahau turn off to Portage
6	Portage to Kenepuru Head (including Torea Road)
7	Kenepuru Head to Waitaria Bay
8	Waitaria Bay to Double Bay and Crail Bay
9	Waitaria Bay to Clova Bay
10	Kenepuru Head to Anakoha Bay and Titrangi Bay
11	Moetapu Bay Road
12	Anakiwa Road

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	





KENEPURU: DO MINIMUM

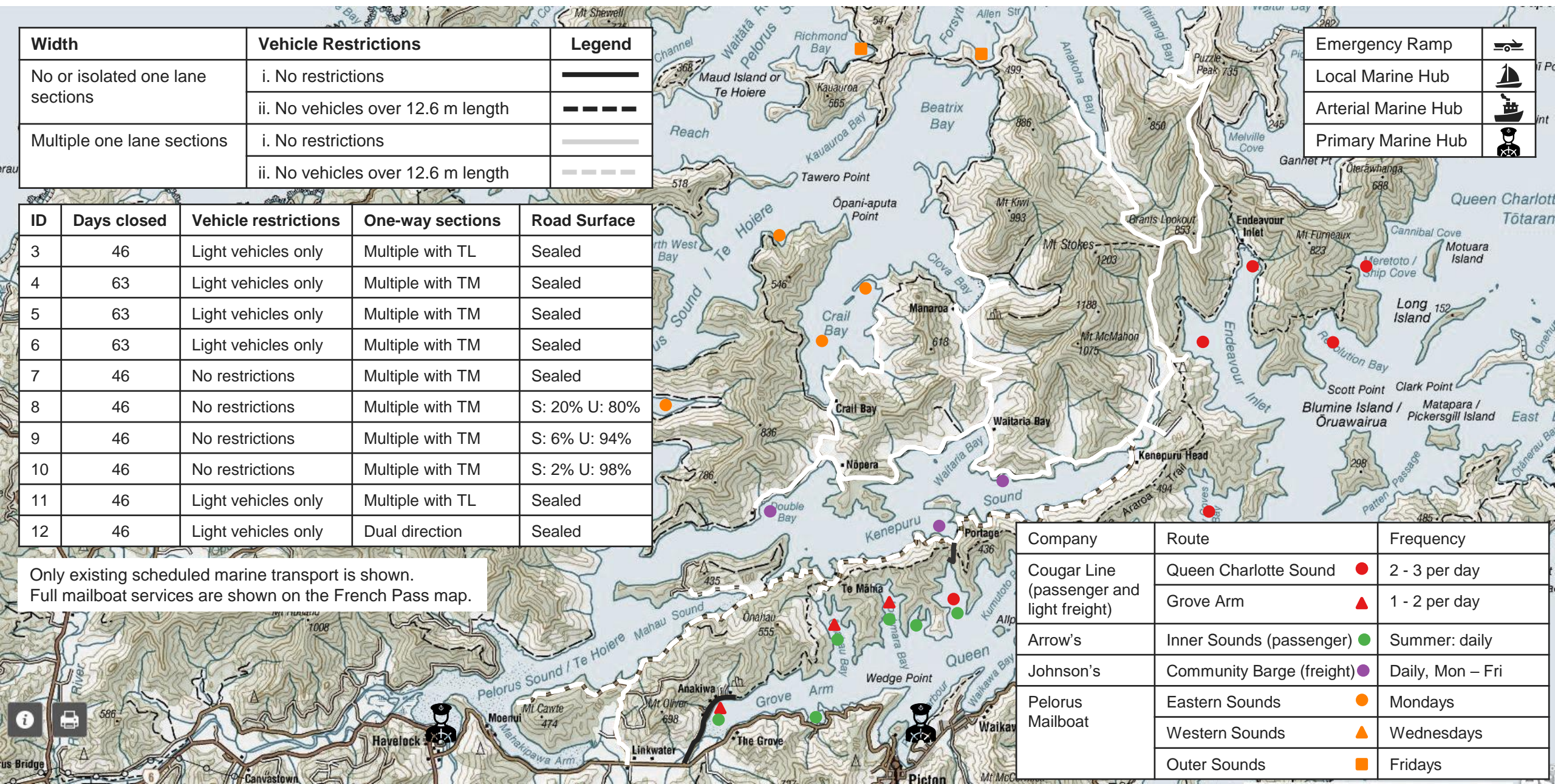
Width	Vehicle Restrictions	Legend
No or isolated one lane sections	i. No restrictions	
	ii. No vehicles over 12.6 m length	
Multiple one lane sections	i. No restrictions	
	ii. No vehicles over 12.6 m length	

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

ID	Days closed	Vehicle restrictions	One-way sections	Road Surface
3	46	Light vehicles only	Multiple with TL	Sealed
4	63	Light vehicles only	Multiple with TM	Sealed
5	63	Light vehicles only	Multiple with TM	Sealed
6	63	Light vehicles only	Multiple with TM	Sealed
7	46	No restrictions	Multiple with TM	Sealed
8	46	No restrictions	Multiple with TM	S: 20% U: 80%
9	46	No restrictions	Multiple with TM	S: 6% U: 94%
10	46	No restrictions	Multiple with TM	S: 2% U: 98%
11	46	Light vehicles only	Multiple with TL	Sealed
12	46	Light vehicles only	Dual direction	Sealed

Only existing scheduled marine transport is shown.
Full mailboat services are shown on the French Pass map.

Company	Route	Frequency
Cougar Line (passenger and light freight)	Queen Charlotte Sound	2 - 3 per day
	Grove Arm	1 - 2 per day
Arrow's	Inner Sounds (passenger)	Summer: daily
Johnson's	Community Barge (freight)	Daily, Mon – Fri
Pelorus Mailboat	Eastern Sounds	Mondays
	Western Sounds	Wednesdays
	Outer Sounds	Fridays



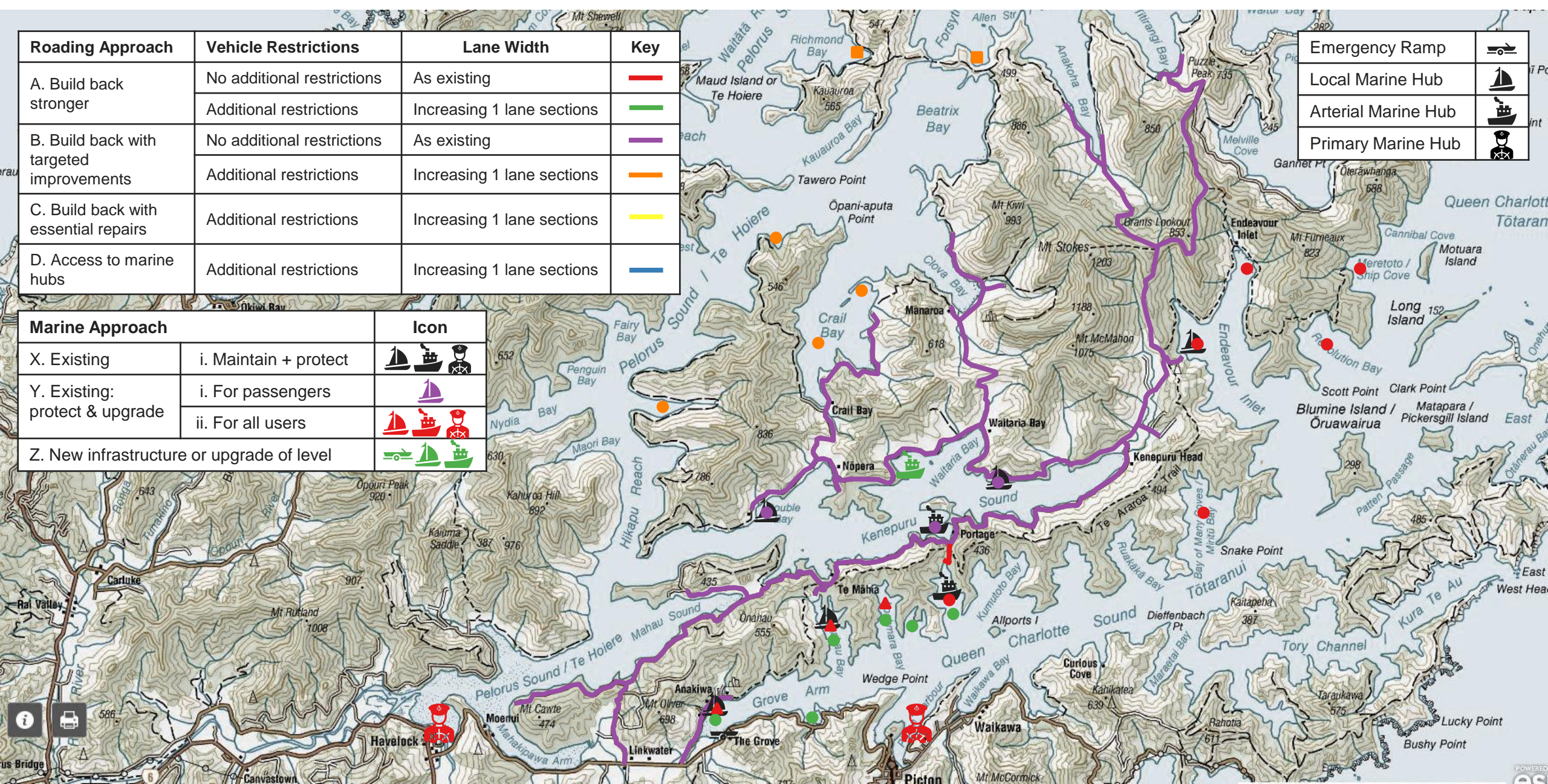


KENEPURU: ROAD FOCUS

Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		



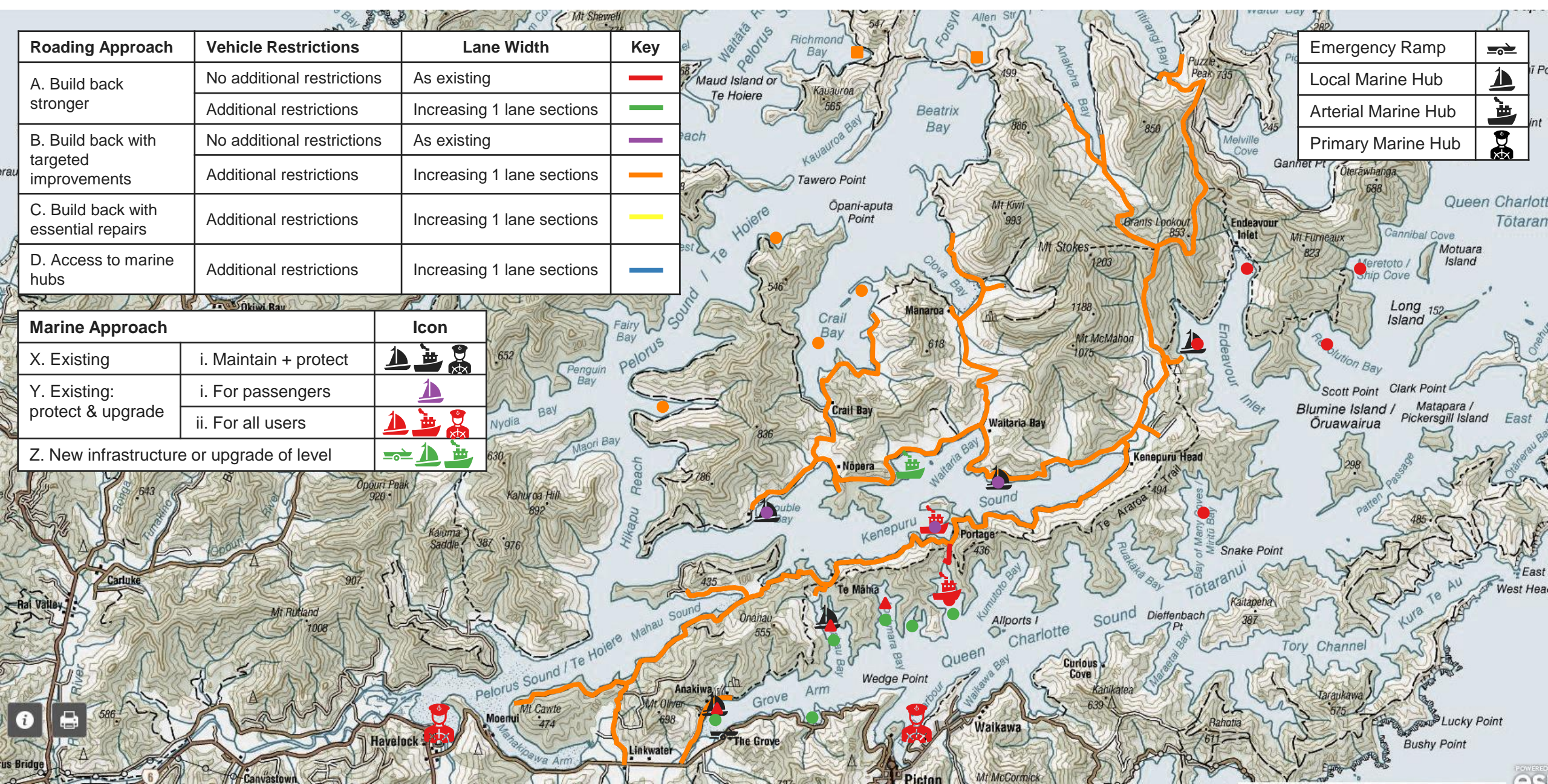


KENEPURU: ROAD ACCESS

Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		



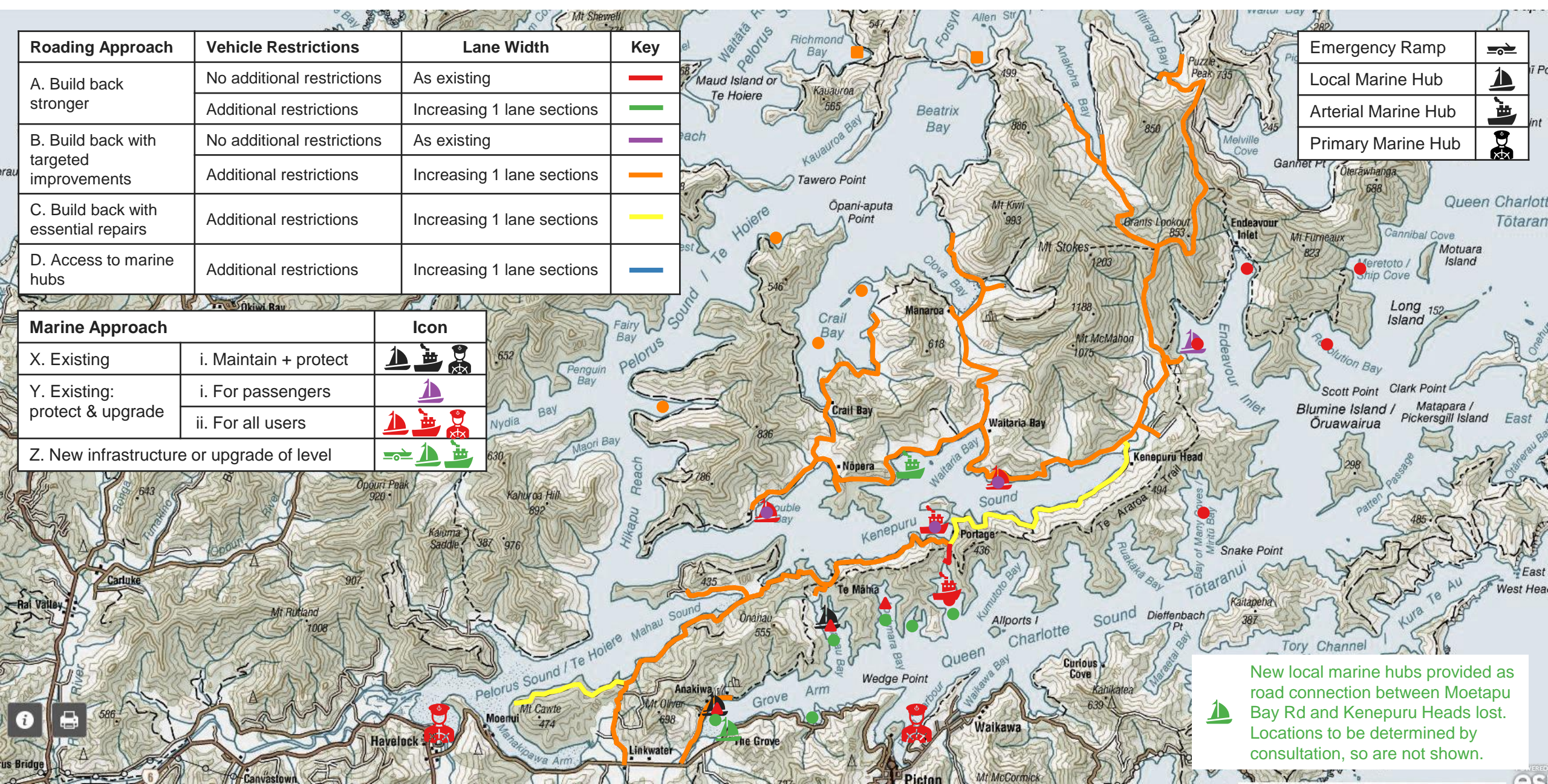


KENEPURU: BALANCED

Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		



New local marine hubs provided as road connection between Moetapu Bay Rd and Kenepuru Heads lost. Locations to be determined by consultation, so are not shown.

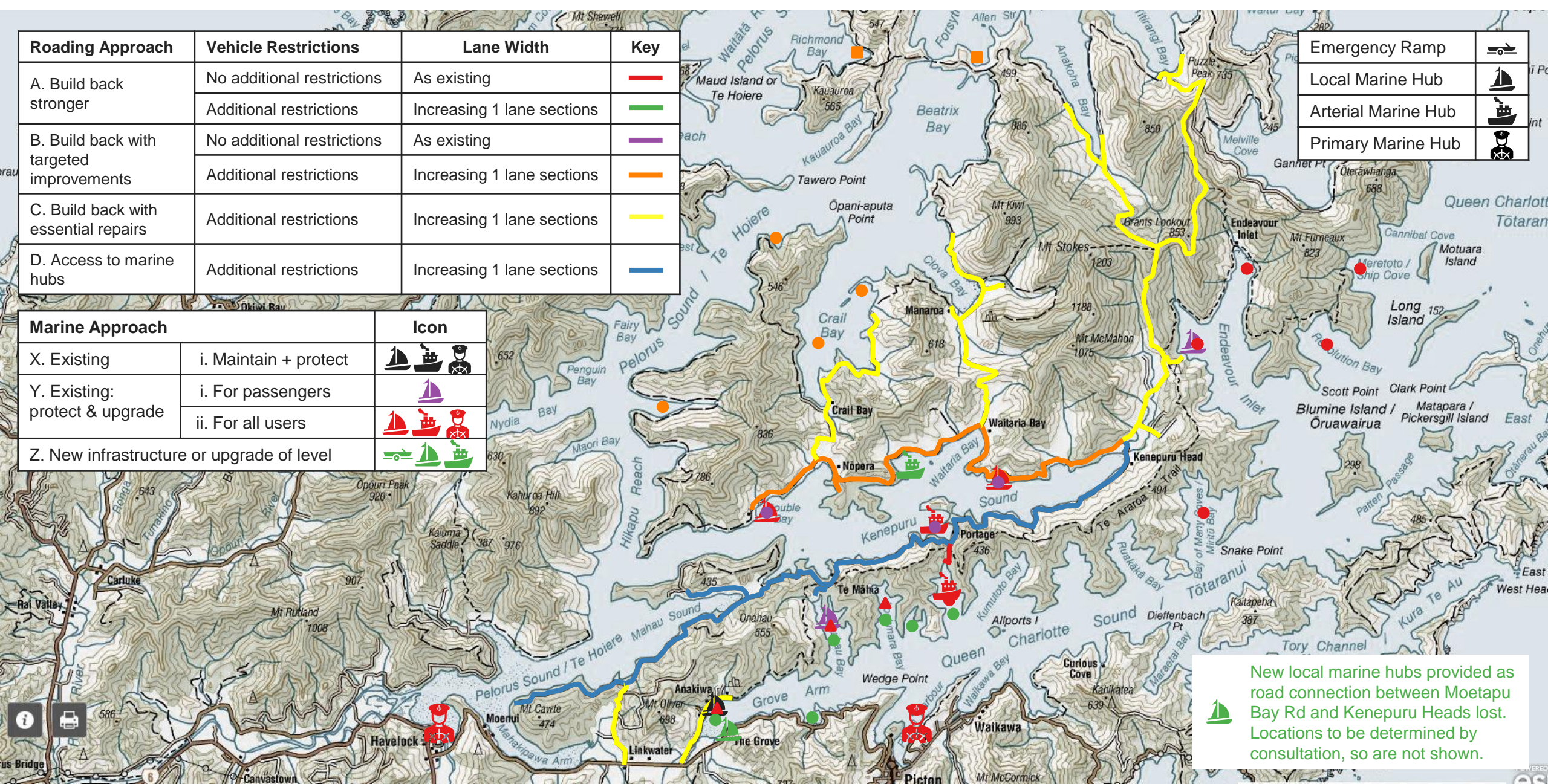


KENEPURU: MARINE ACCESS

Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		



New local marine hubs provided as road connection between Moetapu Bay Rd and Kenepuru Heads lost. Locations to be determined by consultation, so are not shown.

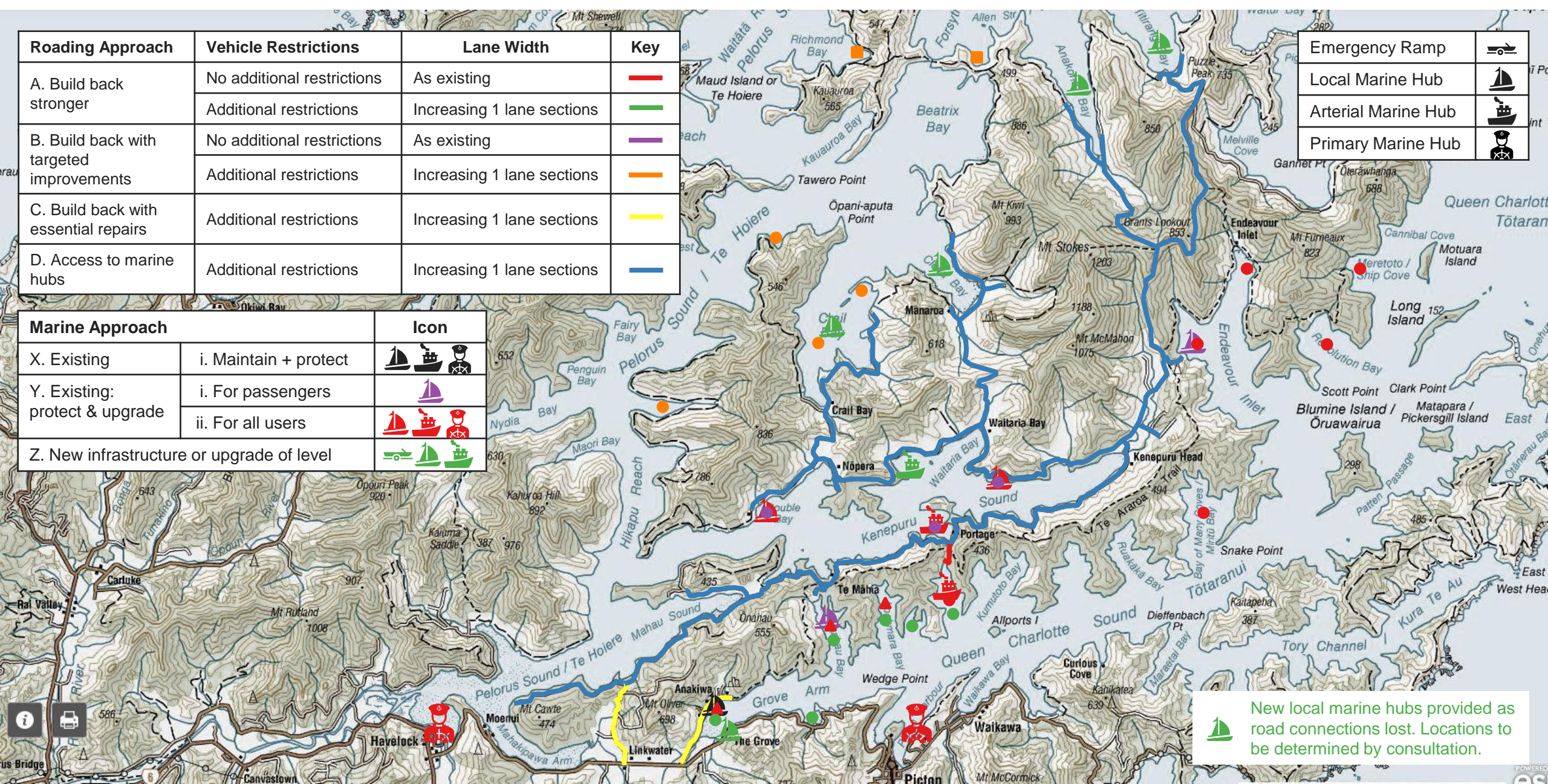


KENEPURU: MARINE FOCUS

Roading Approach	Vehicle Restrictions	Lane Width	Key
A. Build back stronger	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
B. Build back with targeted improvements	No additional restrictions	As existing	
	Additional restrictions	Increasing 1 lane sections	
C. Build back with essential repairs	Additional restrictions	Increasing 1 lane sections	
D. Access to marine hubs	Additional restrictions	Increasing 1 lane sections	

Emergency Ramp	
Local Marine Hub	
Arterial Marine Hub	
Primary Marine Hub	

Marine Approach		Icon
X. Existing	i. Maintain + protect	
Y. Existing: protect & upgrade	i. For passengers	
	ii. For all users	
Z. New infrastructure or upgrade of level		



New local marine hubs provided as road connections lost. Locations to be determined by consultation.



1. Travel Alternatives

Improve community and business resilience by providing travel alternatives

Programme	Score	Comments
Do Minimum	-3	No investment in alternatives, but have have done some work to secure short term future of roads
Road Focus	1	targeted improvements secure future of road, but do not provide alt routes/ modes (other than existing on demand water services)
Road Access	0	future of route secure although potential for more vehicle restrictions, and some water transport options exit, new aerial marine hub at Mills Bay
Balanced	2	road still available for light vehicles (but have the option of water if needed) with freight by water, programme adapts to climate change and targeted improvements secures long term route
Marine Access	1	have to use marine to get to Kenepuru heads, but can use road from that point, although road between the Heads and Double Bay targeted improvements is suseptable to coastal inundation, water options developed
Marine Focus	-2	Marine only, no alternative



2. Disrupted Access

Reduce frequency and duration of disrupted access

Kenepuru	Do Minimum	-3
	Road Focus	1
	Road Access	0
	Balanced	2
	Marine Access	1
	Marine Focus	-1

Area	Programme option	Comments
Kenepuru	Do Minimum	Has not been fully restored since August event Minimum access at the moment Small events will cause disruption
	Road Focus	Repairs of road, because of global hazard, won't reduce hazard and risk of disruption from events No disruption from minor events, but still get smashed by major events
	Road Access	What we had before, still disruptions
	Balanced	More reliable service for freight via marine Disruption same as road access for light vehicles Provides a good back up to maintain reliable freight supply chain
	Marine Access	Road access from Linkwater out is reduced As global slip takes out segment of road, make sure you have a marine hub to support that segment Try to keep road but gradually develop marine as needs
	Marine Focus	Would need significant event to resort to this option, such Alpine / Hikurangi events



3. Resilience

Improve resilience of the transport assets

Kenepuru	Do Minimum	-3	highly susceptible to natural slope instability
	Road Focus	-2	highly susceptible to natural slope instability
	Road Access	-1	
	Balanced	0	
	Marine Access	1	
	Marine Focus	3	Marine is resilient option, still some challenges.



4. Technical Difficulty

How difficult will the programme be to design and construct? Are there any material supply constraints that will impact this? What are the technical risks involved in implementing the option? Consider challenges for marine access.

- +3 Simple to achieve from Technical input.
- 0 Nothing to do.
- -3 Serious effort required for investigation , optioneering, design , risk assessment.
- Technical issues to consider with Marine Access. Marshalling areas, stock holding areas, stock effluent disposal, noise/screening

Kenepuru	Do Minimum	0	Not building anything
	Road Focus	-3	Very unstable land
	Road Access	-2	
	Balanced	-1	
	Marine Access	-2	
	Marine Focus	-3	Space for marshelling, stock effluent



5. Social and Community Impacts

How does the programme impact human health (safety), feelings of community, access to emergency services, impacts on community in relation to jobs, recreation, services and severance, impacts on farming and business?

Programme	Score	Comments
Do Minimum	-3	Very fragile road, will likely deteriorate with minimum intervention. No current access for heavier vehicles. Insufficient marine alternatives. Will lead to increasing difficulty for community to access services and property.
Road Focus	2	will improve all indicators, however area is still very susceptible to natural slope stability and any event will likely trigger failures (despite improvements)
Road Access	1	As 'Road Focus' except more risk of deterioration. Improved marine facilities at Portage/Torea will provide alternative option for marine.
Balanced	0	Still maintaining light vehicle access so community can still access services in Havelock/ Picton/ the wider community, but will impact farming and business
Marine Access	-2	better than do min because investing in providing marine alternative so will provide some options, although they aren't supported by the community
Marine Focus	-2	better than do min because investing in providing marine alternative so will provide some options, although they aren't supported by the community



6. Environmental Effects

To assess 'environment' a judgement is made based on the following measures:

- Scale, frequency and duration of land disturbance and excavation; temporary stormwater run off and management of erosion and sediment.
- Scale and extent of permanent land recontouring and vegetation clearance.
- Potential effects on receiving environment as a result of slips, land instability, human interventions.
- Likely visual impact of works and integration with the surrounding environment, as viewed by public/residents. Potential impacts on natural character.
- In the absence of noise modelling, noise and vibration effects based on proximity of works to sensitive receivers, and also spatial extent of works.

Analysis, Assumptions & Information Gaps

- Resource consent or approval(s) and relevant application process have not been taken into account.
- Technical assessments and input from experts are not available at this stage in the evaluation.

Kenepuru	Do Minimum	-2
	Road Focus	2
	Road Access	2
	Balanced	1
	Marine Access	-2
	Marine Focus	-2



7. Climate Change Mitigation

Considered three aspects, weighted to give final score:

- Enabled carbon (10%)
- Construction carbon (45%)
- Ops and Maintenance (45%)
- Queen Charlotte 20% for enabled as higher volumes

Score relativity within each zone, not across zones

Criteria		Climate Change Mitigation	Scope for trip diversion / suppression	Construction carbon (materials, transport, equipment)	Operational carbon (maintenance)	*Revisit scores when costs for Marine Access and Marine Focus programmes available and when Maintenance costs available for all programmes.
			10%	45%	45%	Weighted towards construction and O&M carbon, as enabled changes v small due to low volumes.
Kenepuru	Do Minimum	-1	3	0	-3	Roads v fragile and will fail with no intervention resulting in trip diversion/suppression. Significant lengths of seal = high O&M emissions.
	Road Focus	-2	1	-3	-2	Trip diversion will start at Mills Bay is built and roads have targeted improvements only. Assume reduction in length of seal
	Road Access	-2	2	-2	-2	Trip diversion will start at Mills Bay is built and roads have targeted improvements only. Assume reduction in length of seal
	Balanced	-2	2	-2	-2	Trip diversion will start at Mills Bay is built and roads have targeted improvements only. Assume reduction in length of seal
	Marine Access	-1	3	-2	-1	Significant trip diversion as hub and spoke model, assume that all roads are gravel, but maintenance still generates some emissions.
	Marine Focus	-2	3	-3	-1	Significant trip diversion as hub and spoke model, assume all roads are gravel, 6 new marine hubs at least



8. Supplier Capacity and Capability

- This is influenced by the size and duration of the programme
- +3 Nothing to do, therefore no supplier issues
- -3 Specialised resources, limited availability, long lead times to produce the design resources or the construction items

Kenepuru	Do Minimum	3	Nothing to do no supply issues
	Road Focus	-3	Specialist required in design and construction
	Road Access	-2	
	Balanced	-2	
	Marine Access	-3	
	Marine Focus	-3	

Attachment 4 Emerging Preferred Option



Considerations	Rai Valley to Te Aumiti / French Pass	Te Hoiere/Pelorus
Emerging preferred option	Road Access	Road Focus
Investment objectives	Some improvement to transport alternatives and resilience, provides similar level of disruption into the future as is experienced now.	Contributes the most benefit against each of the investment objectives: reduced disruption, improved alternatives and improved resilience.
MCA (qualitative assessment)	Rated positively for technical achievability, social and community impact, environmental effects and market capacity to deliver. Rated negatively for climate change mitigation. Overall rated third on qualitative assessment, however, first- and second-rated options did not deliver positive outcomes on all investment objectives, and were less likely to meet local business needs.	Rated positively for social and community impacts, environmental effects and capacity of market to deliver. Was considered technically achievable. Rated negatively for climate change mitigation. Was the highest-ranked option overall in qualitative assessment.
Cost estimate (quantitative assessment)	Was second-highest cost estimate of the proposed options. Lower cost options did not do as well in achieving investment objectives and were not as readily deliverable by local market capacity, and higher cost options were demanding to achieve technically.	Was the highest cost estimate, however, the overall cost is not high and there are opportunities for cost savings and rationalisation in delivery. If these cost savings are not realised, a lower level of service or reduced number of improvements may need to be considered through implementation.
Transport efficiency (quantitative assessment)	The low volume of traffic on this network means no options receive a positive transport benefit cost ratio from a transport investment efficiency perspective. The preferred option was one of the higher-rated options for this criterion.	The low volume of traffic on this network means most options receive a negative transport benefit cost ratio from a transport investment efficiency perspective, including this option.
Economic impact (quantitative assessment)	The estimated likelihood of restoring pre-storm economic activity is almost certain. The primary reason for continuing to invest to this level is the importance of this area from an economic perspective in the Sounds, relative to the level of investment needed to achieve this outcome.	The estimated likelihood of restoring pre-storm economic activity is almost certain for this option. A primary reason to invest in this level of service is the economic activity at the western end of Kaiuma Bay Road. Long-term alternative access for eastern communities can be supported by marine infrastructure because of proximity to Havelock.
Conclusion	Restoring road access is justified, as are targeted improvements in resilience, particularly at the southern end of the study area around State Highway 6 to Elaine Bay. However, marine access is likely to become increasingly important over time in the outer reaches beyond Elaine Bay due to the susceptibility of the road corridor in this area.	Restoring road access is justified as is targeted improvements in resilience, particularly at the western end of the study area. However, marine access could become increasingly important over time at the eastern end of the study area due to the susceptibility of the road corridor to this point.

Queen Charlotte	Kenepuru	Te Whanganui/Port Underwood
Road Focus	Balanced	Road Access
Contributes the most benefit against each of the investment objectives: reduced disruption, improved alternatives and most improved resilience.	Improves travel alternatives and is the best option to reduce future disruption for similar events, but resilience of the route is similar to what is in place now.	Maintains existing travel alternatives. Marine alternatives are of limited benefit relative to road. Some reduction in disruption to access and improved resilience of transport assets.
Rated most positively for social and community impacts. The option is also rated positively for environmental effects and capacity of market to deliver. Rated negatively for climate change mitigation. Was the highest-ranked option overall in qualitative assessment.	It rates positively for community impacts and environmental effects, and it delivers a serviceable road network and improvements to marine infrastructure. However, although not unique to this option, it is challenging technically, potentially adversely impacts future local commercial outcomes, does not mitigate climate change and there is a risk it will challenge the local market capacity to deliver.	Rated positively for technical achievability, social and community impacts, environmental effects and capacity of market to deliver. Rated negatively for climate change mitigation. This option was the second-highest ranked option overall in qualitative assessment.
Was the highest cost option. Opportunities for cost savings while still delivering resilience outcomes need to be explored through implementation, which may mean a reduced level of service, such as reduced lane widths, is delivered in some areas over time.	Was the third-lowest cost of the six options for Kenepuru. It is nearly a third of the highest cost option, but is still a substantial cost. It is still the most expensive of the emerging preferred options.	Was the second-highest cost estimate of the proposed options. Road focus rated higher qualitatively, but was roughly twice the cost.
The higher volume of traffic for this area means there is an opportunity for a positive return on investment from a transport investment efficiency perspective for this option.	The volume of traffic on this network means there is an opportunity for a positive return on investment from a transport investment efficiency perspective for this option.	The low volume of traffic on this network means no options receive a positive transport benefit cost ratio from a transport investment efficiency perspective.
The estimated likelihood of restoring pre-storm economic activity is almost certain for this option. A primary reason to invest in this level of service is the regional importance of this route as an alternative for State Highway 1 or State Highway 6 outages. It is also a key link for the Kenepuru community to the rest of Marlborough.	Restoring pre-storm economic activity longer term is considered likely for this option. The primary reason for investing in this level of service is the size of the community and diversity of activity. However, the road network is highly vulnerable and costly to repair.	The estimated likelihood of restoring pre-storm economic activity is almost certain. However, a primary reason for continuing to invest is because of the maintenance access for the national linkage between the South and North islands of transmission and communications infrastructure.
While there are marine transport alternatives for the eastern end of the study area, the regional importance of the link between Picton and Havelock means a focus on restoring a reasonable and more resilient level of service is important.	Restoring some form of road access is warranted, and there is merit in some improvements such as to stormwater and maintenance. However, over time the area will become more dependent on the need for a robust adaptation plan and marine infrastructure to be in place because of the likelihood of future severe disruption due to a wide range of possible / probable events.	Restoring full levels of service do not appear justified if costs are high, however, road access is preferred to marine access particularly to support access for maintenance of interisland transmission and communications infrastructure. Compromises can be made on road width and type (sealed, unsealed) in areas over time to save money, and improved resilience is justified with improved stormwater, and regular maintenance of fit-for-purpose roadway levels of service.

Stantec New Zealand
Level 1, 66 Oxford Street, Richmond 7020

PO Box 13-052, Armagh, Christchurch 8141
Tel +64 3 546 8728



Connect with us



[stantec.com/nz](https://www.stantec.com/nz)

Appendix S Engagement Summary Report



An aerial photograph of a coastal town and harbor. In the foreground, a large body of water is filled with many white birds. A ferry boat is moving across the water, leaving a white wake. In the middle ground, there is a marina with many boats docked, and a large building complex on a small island. The background features a large, forested mountain under a clear blue sky.

Marlborough Sounds Future Access Study Engagement Summary Report

PREPARED FOR MARLBOROUGH DISTRICT COUNCIL | JULY 2023

Contents

1	Purpose of this report	1
1.1	Previous engagement.....	1
1.2	Mana whenua engagement	1
2	Workshops	2
3	Collateral	3
3.1	Stakeholder presentation	3
3.2	Videos	3
3.3	Booklets.....	3
3.4	Posters	4
3.5	FAQs	5
3.6	Newsletter	5
3.7	Website	5
3.8	Feedback channels	6
3.9	Ratepayer letter	6
3.10	Facebook and Antenno.....	6
4	Media	7
4.1	Briefing	7
4.2	Media releases	7
4.3	Advertising.....	7
5	Public engagement.....	8
5.1	Blenheim	8
5.1.1	Summary of conversations	9
5.2	Waitaria Bay	9
5.2.1	Summary of conversations	10
5.3	French Pass	11
5.3.1	Summary of conversations	11
5.4	Linkwater.....	11
5.4.1	Summary of conversations	12
5.5	Zoom Online	12
5.5.1	Comment:.....	13
5.6	Rai Valley	13
5.6.1	Summary of conversations	13
5.7	Nelson	13
5.7.1	Summary of conversations	14
5.8	Picton	14
5.8.1	Summary of conversations	15



6	Survey	16
6.1	Results	16
6.2	Additional key comment themes per area:	18
6.3	Helpline	18

List of appendices

Appendices

List of figures

Figure 1: Blenheim workshop	2
Figure 2: Collateral design	3
Figure 3: Courtney McCrostie explains the options	4
Figure 4: Discussion at the Rai Valley meeting	5
Figure 5: Attendance at the briefing	7
Figure 6: Kenepuru map for the HAP option	8
Figure 7: Blenheim public event.....	9
Figure 8: Water taxi to the public event.....	10
Figure 9: Waitaria Bay public event	10
Figure 10: French Pass public event.....	11
Figure 11: Linkwater public event	12
Figure 12: Rai Valley public event.....	13
Figure 13: Nelson public event	14
Figure 14: Picton public event.....	15
Figure 15: Design of online promotion	16
Figure 16: Respondents Preferred Option for all areas	17
Figure 17: Emerging Preferred Option for all areas.....	17
Figure 18: Hazard Adaptation Pathway for all areas	17



1 Purpose of this report

The Marlborough Sounds Future Access Study is looking to provide long-term access certainty for residents, homeowners and businesses in the storm affected areas of the Sounds. This document summarises discussions with Marlborough stakeholders, ratepayers and residents after the Emerging Preferred Options (EPO) and Hazard Adaptation Pathways (HAP) were prepared for Marlborough District Council (MDC) and put forward for public engagement. The five storm-damaged areas of the Sounds being considered in this study are:

- Rai Valley to Te Aumiti/French Pass
- Te Hoiere/Pelorus
- Queen Charlotte
- Kenepuru
- Te Whanganui/Port Underwood

The information gathered will be used in the Programme Business Case (PBC) being prepared for MDC approval before it is issued to Waka Kotahi for endorsement and funding consideration. To date all stakeholder engagement has been tracked in the Stakeholder Registry.

Appendix A: Stakeholder registry

1.1 Previous engagement

After the January stakeholder workshop, six public engagement meetings and one Zoom webinar were held from 31 January and 8 February 2023. In total, well over 500 people attended the public events that were held across the Sounds. The events outlined the project objectives, gave an update on the latest information on the study and expected timelines. The participants were encouraged to be involved through active participation during the surveys, public events, feedback channels and to sign up to receive further information by email.

The main survey was available electronically on the Marlborough District Council (MDC) website from 31 January to 22 February 2023. A total of 919 surveys were completed during this period. The survey was delivered online and promoted through multiple channels that directed people to the website, phone helpline and designated email address to collate feedback.

1.2 Mana whenua engagement

MDC recognises tangata whenua as having the role of kaitiakitanga of Marlborough's coastal environment. Iwi have been invited to attend all stakeholder workshops and public drop-in sessions. They have been made aware of the survey and the importance of their contribution.

Two separate hui have been scheduled. The first was held 14 March and the second - the General Manager forum - will be held in August 2023. The GM forum will consist of the eight manawhenua iwi at which time the Study will be discussed in further detail. The hui and forum engagement will ensure the feedback is properly considered in the business case. We have been advised that iwi engagement for this early stage is not as impactful as when the project progresses through to the next stages where Iwi would want to be more involved.

The iwi partners are:

- Te Atiawa o Te Waka-a-Māui
- Te Rūnanga a Rangitāne o Wairau
- Ngāti Toa Rangatira Ki Wairau
- Ngāti Apa Ki Te Rā Tō
- Te Rūnanga o Ngāti Kuia
- Ngāti Kōata
- Te Rūnanga o Ngāti Rārua
- Te Rūnanga o Kaikōura



2 Workshops

A stakeholder workshop was held on Tuesday, 20 June from 1 – 3 pm at the Lansdowne Sports Hub in Blenheim. It was by invitation only and attended by approximately 32 key stakeholders and partners.



Figure 1: Blenheim workshop

Representation/invitees included various Sounds businesses, representatives from emergency services, community associations, central government, Waka Kotahi, mana whenua and MDC.

The purpose of the workshop was to present all options, while identifying the EPO and HAP options along with the underlying technical information that have helped shape these options. A reading package was sent prior for participants to review and prepare any questions. The pre-reading package included a presentation and two booklets.

Invited key stakeholders/partners were also participants in the first workshop that took place back in January 2023, and were asked to provide follow-up feedback on the options and the technical information that was used to help validate the work prior for consideration in the final PBC. The completed PBC will be presented to MDC and Waka Kotahi as part of the decision-making process.

Links to the presentation, videos and booklets can be found under the Collateral section of this report.

For the list of attendees go to Appendix A: Stakeholder Registry – Stakeholder workshop sheet.

3 Collateral

New collateral was developed for the second phase of engagement that included a presentation used for the workshop and media briefing, two videos, two booklets, a poster series, FAQs, and newsletters. The website was updated accordingly as were all other channels used to disseminate information.



Figure 2: Collateral design

3.1 Stakeholder presentation

A PowerPoint presentation was prepared for the workshop and media briefing to provide a comprehensive overview of the Study and ensure participants had adequate information to ask informed questions and learned conversation.

Link to presentation: [20 June 2023 Stakeholder Presentation \(PDF, 2.4MB\)](#)

3.2 Videos

An introductory video was produced featuring the Mayor of Marlborough Nadine Taylor and Strategic Planning and Economic Development Manager Neil Henry. In this video the mayor set the scene as to what the Marlborough Sounds Future Access Study was all about and the importance for people to participate in developing a future-proofed transport system that would work for them.

The second video was separated into five parts so people could review the area most important to them. It explained how and why the study has arrived at an EPO for each of the five areas. It also explained what a longer term, HAP for each of the five areas could look like. The estimated cost of the repairs for the five EPOs is \$160 million. This video was played on a loop at each of the drop-in sessions and the Zoom webinar.

The videos were posted to the website and Facebook. The introductory video reach was 5,370 with 914 engagements on Facebook. The second video reach was 4,734 with 1,229 engagements.

Link to videos: [Engagement Videos - Marlborough District Council](#)

3.3 Booklets

Two booklets were developed, and 1000 printed copies of each and made available at each of the drop-in sessions. In addition, people could pick up copies at council offices in both Blenheim and Picton, and the Havelock Charity shop.



Figure 3: Courtney McCrostie explains the options

The Marlborough Sounds Future Access Study considered 28 options across the five storm-damaged areas of the Sounds. From the 28 options considered, five have been identified as the EPO options and five as the HAP.

The main booklet called the **Engagement Document** was developed to assist people to further understand the depth of issues and potential solutions. It also acted as a reference when completing the survey. It included information on:

- The emerging preferred options
- The hazard adaptation pathways
- Financial and rating implications
- The study background and evidence.

This booklet included 10 maps that provided detail to the EPO and HAP for each of the five areas.

The second booklet called the **Other Options Booklet** showed all the options. It consisted of 18 maps of the other possibilities that were not chosen as an EPO or HAP for various reasons outlined further in the booklets. People were encouraged to use both documents as reference when learning about what was being proposed and when filling in the survey.

Link to booklets: [Engagement Documents - Marlborough District Council](#)

3.4 Posters

There were 11 wall and table map posters produced showing each areas EPO and the HAP.



Figure 4: Discussion at the Rai Valley meeting

Eight tabletop maps and posters explaining rating implications and slope instability were provided. People were encouraged to put sticky notes with comments or questions on each map. All the poster images were included in the booklets.

For each of the drop-in session's large posters of the impacted areas and the maps of the EPO and HAP for each area were placed around the room. A main poster showing all EPO maps was also provided so people could see the entire area's EPO network. Additional paper copies were placed on tables and people were asked to move around and review the various options. Sticky notes were provided so they could add comments or ask questions. All of the sticky notes were collected, and the questions and comments recorded for input into the FAQs.

3.5 FAQs

During the drop-in sessions several questions came up that needed some clarification. A set of FAQs were posted after the last drop-in session and addressed more specific questions that had arisen during the engagement that would have been of interest to a broader audience.

[Engagement frequently asked questions](#)

3.6 Newsletter

Three existing newsletters were used to share information – Marlborough Roading Recovery Newsletter, MDC Recovery Updates, and the Marlborough Sounds Future Access Study which has developed a contact list of 491 subscribers. Distribution of these newsletters was weekly or fortnightly.

[Link to MDC recovery updates](#)

3.7 Website

The project pages on the MDC website are regularly updated with current information on the study and key project milestones. During the engagement phase, the site hosted the engagement booklets, area maps, videos, FAQs, links to the survey, sign up for the newsletter, news on public consultations dates and times and links to technical reports.

It encouraged people to fill out the survey and use the designated email address to provide feedback. The email address is managed by MDC and all feedback is directed to the Communications and Engagement team for response as required.

[Link to main project page](#)

Link to engagement section: [2023 Public Engagement Overview - MSFAS - Marlborough District Council](#)

3.8 Feedback channels

For the second engagement period from March – July 2023, over 260 questions, comments and suggestions have been tracked from the drop-in sessions and emails.

All the information that was relevant to the options was collected, collated and entered into the website, FAQs, newsletters and as applicable, consideration for the business case to ensure all voices were heard and responses were accounted for. All feedback received has been shared with MDC for response or consideration.

Email address - soundsfutureaccess@marlborough.govt.nz

3.9 Ratepayer letter

On 9 June, a ratepayer letter was sent to 4,264 properties.

The letter outlined that MDC and Stantec were seeking the public's views on a number of transport options evaluated as part of the study, in particular the EPO and HAP options for each of the five storm-damaged areas of the Sounds. Ratepayers were encouraged to complete the survey and provide feedback to gain a full understanding of issues, concerns and potential solutions.

Appendix B: Ratepayer letter

3.10 Facebook and Antenno

Both Facebook and Antenno were used to promote the drop-in sessions, Zoom webinar and the importance for people to fill out the survey. There were six Facebook posts made during the course of the engagement period. Six Antenno alerts were posted to run consecutively throughout the entire engagement period.



4 Media

Media coverage for the second round of engagement started 25 May with a release. To date 15 stories have been printed or aired. Coverage has been national in reach and started on the 19 May.

See Appendix A – Stakeholder registry - Media sheet

4.1 Briefing

Prior to launching the workshops and public engagement drop-in sessions, local and national media were briefed on Friday 16 June. Eight representatives from print and broadcast media attended. TV One covered the story that night on the evening news.



Figure 5: Attendance at the briefing

A pre-reading package was provided in advance of the media briefing under a 24-hour embargo to allow them to be able to ask informed questions. It included a booklet of all preferred options, a second booklet that provided details on the other options that were considered but not selected for various reasons, and a media release. Links to the materials provided can be found in the Collateral section of this report.

All documents were made publicly available following the media briefing at midday Friday 16 June via MDC channels.

4.2 Media releases

Four media releases were issued to inform the public about key project milestones. These included:

- 18 May - Engagement on options for future Marlborough Sounds transport network to start on 20 June.
- 16 June - Marlborough Sounds' transport options released for public feedback.
- 5 July - One week left to have your say on Sounds' future transport survey.
- 12 July - Marlborough-wide engagement on Sounds' transport network delivers over 1700 responses.

4.3 Advertising

MDC placed three paid advertisements prior to and during the public events, in local media as a supplementary call-to-action for the survey. The last advertisement coincided with a final push before the deadline for survey submissions.

5 Public engagement

From 16 to 28 June, approximately 500 people participated in the public engagement sessions. These were comprised of seven public drop-in sessions held in various locations across the Sounds, Blenheim, Picton and Nelson, and one Zoom webinar (52 participants). Over 261 questions were tracked and responded to either directly or through information provided in the FAQs, website, newsletters, survey helpline and other channels.

A summary of the drop-in sessions feedback received can be viewed in Appendix C.

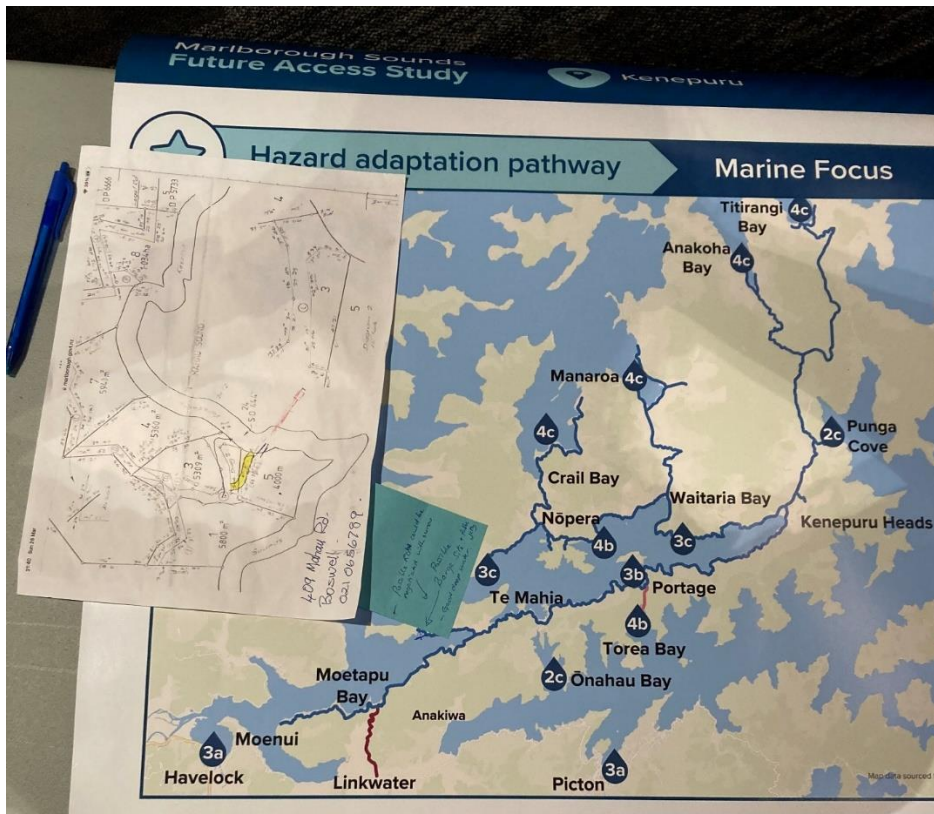


Figure 6: Kenepuru map for the HAP option

The intention was to provide a variety of locations, dates and times to ensure all who wanted to participate could do so. In addition, consideration was given to engaging with people beyond the Sounds as decisions could also impact the wider Marlborough community.

The drop-in sessions' format allowed for attendees to walk through the venue, while reviewing the maps of the affected areas, which were posted on the walls and placed on tables. This format enabled open conversations and a more relaxed atmosphere, which was important as the information being provided was quite sensitive and personal for the attendees. Facilitators from MDC and the technical team made themselves available to answer questions and encourage people to write down their thoughts or ideas on sticky notes or add their feedback to the survey. There were also other partners including Waka Kotahi present.

Appendix C: Drop in feedback

5.1 Blenheim

On Tuesday 20 June, from 5:00– 7:00 pm, approximately 48 people attended.



Figure 7: Blenheim public event

5.1.1 Summary of conversations

- The project team attending this session considered it to have been a very good meeting.
- Many conversations were Kenepuru focused.
- People were very happy the road was going to be repaired/ maintained.
- There was some discussion around speed limit reductions.
- There was a suggestion that local crews should also be considered for hire for road maintenance.
- People were happy to have single lane/unsealed sections, as long as they have a road.
- There was some confusion about the HAP vs EPO. It was explained that the HAP is a journey – a series of steps. The EPO is what is proposed now. The EPO was also outlined in the booklet that had been provided.
- There were some questions around why Portage to the Heads will get essential repairs only, when the rest of the road is targeted improvements.
- It was explained that while the section between the Mahau turn off and Portage has a similar percentage of the road length highly susceptible to natural slope instability as the section between Portage and the Heads, the section before Portage is a higher classification of road under the ONRC and ONF.
- There was some discussion around feasibility of the marine hub locations and what would be provided at each level.
- People from Duncan Bay (French Pass) seemed happy with the presented proposed options.
- There were some questions about the marine hub upgrades in Double Bay.

5.2 Waitaria Bay

On Wednesday 21 June, from 10:00 am – 12:00 pm, approximately 80 people attended.



Figure 8: Water taxi to the public event

MDC arranged for a water taxi to pick up (and return) people from Portage and take them to the venue in Waitaria Bay. There were approximately 20 people who took advantage of the water taxi. This was to ensure people could have access to attend without needing to use the road.



Figure 9: Waitaria Bay public event

5.2.1 Summary of conversations

- People like the drop-in/conversation format used.
- Positive comments around the repair work that has been done to date.
- Passenger ferry services and water taxis need to be reliable and more regular from multiple locations.
- Waitaria Bay wharf needs investment (a walkway out to a floating jetty) and repairs because if it is damaged, people would have no access.

- There was a request to extend the carpark at Punga Cove.
- Torea Road boat access needs to be upgraded.
- The road from Kenepuru Heads to Torea Road is the essential link and should not be relegated to accommodate this protect.
- A common question was: Why was Portage to the Heads essential repairs only, and not targeted improvements?
 - It was explained that while the section between the Mahau turn off and Portage has a similar percentage of the road length highly susceptible to natural slope instability as the section between Portage and the Heads, the section before Portage is a higher classification of road under the ONRC and ONF.
- Most people at this session accepted there would be possible rate increases.
- There were several questions around whether stock trucks and trailers would be able to use the road. The response was:
 - In any instance where we say there may be length restrictions, most vehicles longer than the length restrictions would be able to get through but are not able to remain in their own lane, there is also going to be more single lane sections. It is likely they will require a pilot vehicle. There is also likely to be weight restrictions on some sections of road.

5.3 French Pass

On Thursday 22 June from 10:00 am – 12:00 pm, approximately 10 people attended.



Figure 10: French Pass public event

5.3.1 Summary of conversations

- Generally, people seemed happy with the EPO.
- There was some discussion on the possibility of charging non-locals to use the road. It was explained that MDC doesn't have the power to do this, but Central Government does.
- One question that came up several times at this drop-in session was: What does targeted improvements mean?
 - Improvements are focused on improving resilience of the transport system.
 - Targeted improvements are targeting investment in improvements where there is a good return on investment in doing so. For example, if there is a large instability issue, a small, localised improvement is unlikely to improve the resilience of that area.

5.4 Linkwater

On Friday 23 June, from 2:00 pm – 4:00 pm, approximately 120 people attended.





Figure 11: Linkwater public event

5.4.1 Summary of conversations

- Many people were interested in knowing more about the impact on their rates and how all the repairs and suggested options would be paid for.
- People from Moetapu Bay were generally quite concerned, but overall, everyone seemed reasonably on board with the EPO.
- Moetapu Bay residents also voiced their concern about access for emergency services and fire engines if roads were inaccessible or not maintained, especially during summer.
- ***Would a fire engine be able to access properties on Moetapu Bay road if road is not replaced?***
 - The strategy is to repair the road. All essential services will have access in this case.
 - If the HAP is implemented this will likely be as a result of a significant event and an extended period without full road access should be expected. In this instance essential services may need to be provided via water access. This will need to be worked through as part of the HAP planning. The current proposal is the reinstatement of roads, improved risk mitigation and response planning.
- People were interested in the marine infrastructure and thought it needed to be made so people could easily set up/ install private marine access going forward.
- People felt that improvements were needed at Havelock, and the Waitaria Bay wharf needed to be fixed.
- There was a suggestion to make Waitaria a local marine hub.
- People on Queen Charlotte Drive seemed happy with the session and information provided.
- It was raised that Marine Focus would not work for those who did not live close to the water.
- Road safety concerns were raised, and it was noted that the repairs needed to be emphasised as a priority.

5.5 Zoom Online

On Monday 26 June, from 5:30 pm – 7:00 pm, approximately 52 people attended and roughly 53 questions and comments were responded to.

The Zoom webinar was led by Council with Stantec technical experts available to answer questions. The session included a brief overview of the drop-in sessions to date, an overview of the importance of their contribution and filling out the survey. The video that outlines all the options was shown and questions taken afterwards. All questions asked during the session were answered within the session. The session was recorded, and the link is below.

5.5.1 Comment:

Thank you to Council and Stantec representatives for arranging this webinar, staying late and answering our Qs :)

[Link to recording](#)

5.6 Rai Valley

On Tuesday 27 June, from 10:00 am – 12:00 pm, approximately 60 people attended.



Figure 12: Rai Valley public event

5.6.1 Summary of conversations

- Road maintenance was a key topic of several conversations.
- Maintenance (or lack thereof) came through strongly.
- A suggestion came in that the culverts should be numbered.
- It was noted that there was no mechanism to charge aquaculture trucks for using the roads.
- Generally, people seemed on board with the EPO.

5.7 Nelson

On Tuesday 27 June, from 3:00 pm – 5:00 pm, approximately 80 people attended.



Figure 13: Nelson public event

5.7.1 Summary of conversations

- The need for maintenance came through strongly again.
- Most people were satisfied with the EPO.
- Some suggestions about adding a local marine hub at Te Mahia.
- Lots of comments on the safety of some of the roads in French Pass, particularly the road out to Port Ligar.
 - There was a request for better delineation through edge marker posts, barrier or something similar.
- Several questions were around vehicle restrictions.
- **When there are length restrictions on vehicles does that mean no access for stock trucks or other longer trucks?**
 - In any instance where we say there may be length restrictions, most vehicles longer than the length restrictions would be able to get through but are not able to remain in their own lane, there is also going to be more single lane sections. It is likely they will require a pilot vehicle. There is also likely to be weight restrictions on some sections of road.

5.8 Picton

On Wednesday 28 June 12:00 pm – 2:00 pm, approximately 50 people attended.



Figure 14: Picton public event

5.8.1 Summary of conversations

- Several people had questions about targeted rates and funding.
- There were conversations around restricting logging vehicles.
- There was some discussion around final location of the proposed new marine hub under HAP and some people thought this would be needed sooner rather than later.
- Generally, people seemed onboard with the EPO.

6 Survey

The online survey was available on the website from midday 16 June to 5:00 pm 11 July 2023. A total of 1742 surveys were completed in which there were 719 open-ended responses received, 43 written submissions provided to MDC. All of which were read, tracked and included in the evaluation for consideration in the PBC. The open-ended questions and written submissions can be reviewed in the appendices.



Figure 15: Design of online promotion

The first three questions were general with the third being the one that directed people to the specific area they would want to respond to. People could respond to one study area or all, or they had the option to go straight to the rates section. All questions for each area were the same. The last four questions were about the impacts on rates and the last question was open-ended asking if they had anything further to add.

Appendix D: Survey questions

6.1 Results

The open-ended question was the last one in the survey where respondents were asked if there was anything further on which they would like to elaborate. The themes that ranked the highest were where people felt they wanted to provide further information were roads, rates marine access and toll/user pays.

- 332 - respondents elaborated on road infrastructure, access and maintenance requirements. There were comments around using local contractors and sourcing local dump sites. There were several comments around heavy vehicles using the roads including how to have more restriction on forestry/aquaculture businesses.
- 276 – on impacts to rates.
- 146 - on marine infrastructure/marine access/maintenance. There were suggestions for additional local marine hubs, and concerns raised around the existing limited capacity at Havelock. Several comments were made around moving to HAP more rapidly.
- 130 - on tolls. How heavy vehicles users and forestry/aquaculture businesses can contribute to road maintenance.

These comments provided personal impact statements, ideas, and concerns that will be reflected in the PBC. In addition, for each of the areas the key themes have been categorised and the information that was gathered will provide for refinement of the EPO and HAP in most areas. These refinements will be worthy of discussion with MDC and Waka Kotahi once the economic assessment have been done alongside a deeper analysis of the community feedback.

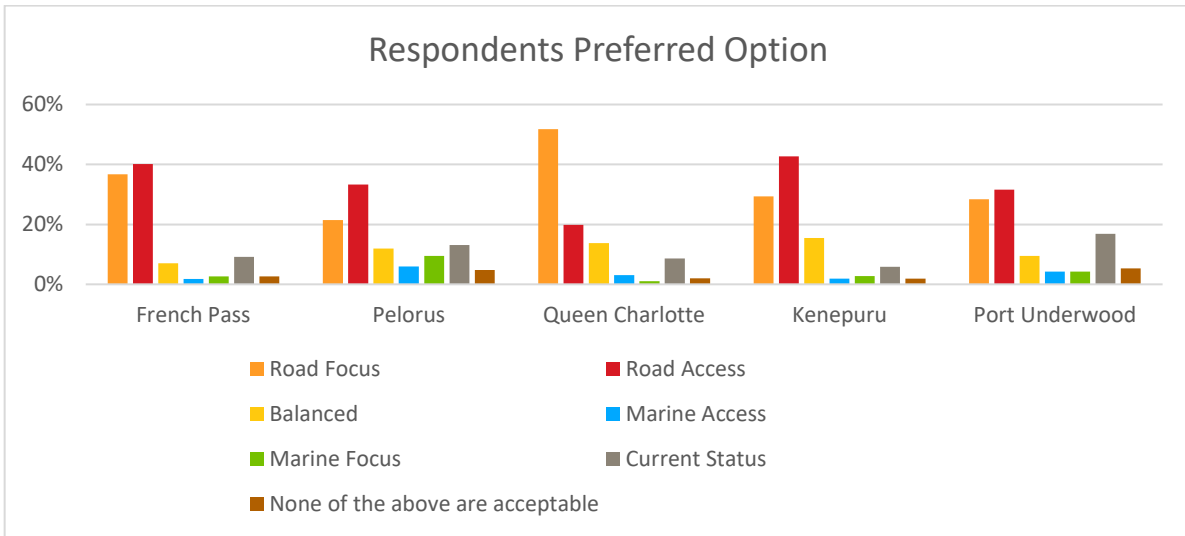


Figure 16: Respondents Preferred Option for all areas

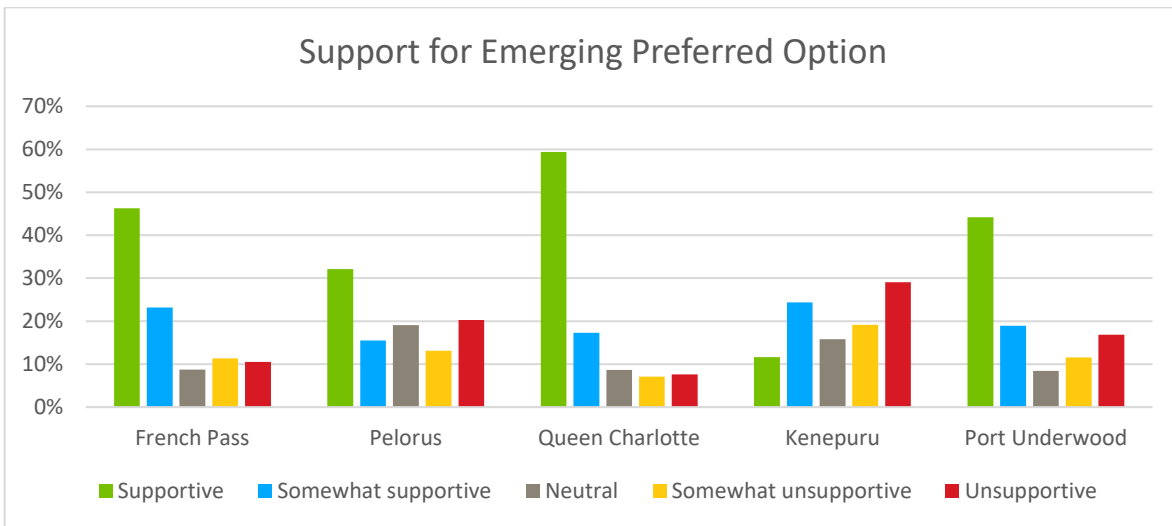


Figure 17: Emerging Preferred Option for all areas

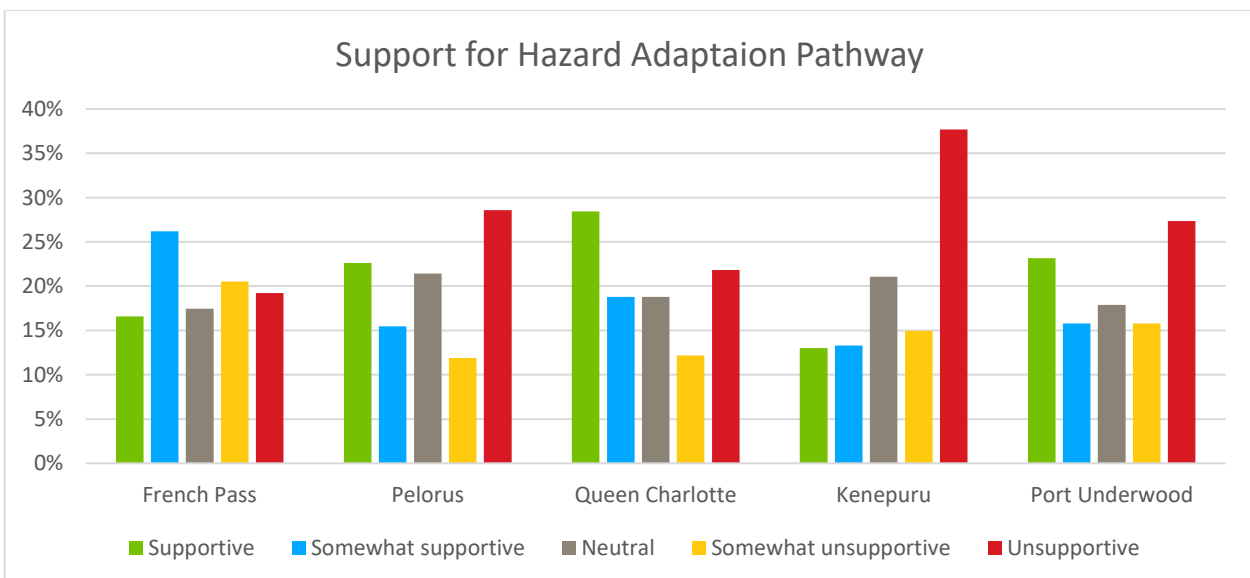


Figure 18: Hazard Adaption Pathway for all areas

6.2 Additional key comment themes per area:

French Pass

- Improving the safety of Port Ligar Road (delineation, EMPs, etc).
- Improving the fuel pump and boat ramp at Elaine Bay.

Pelorus

- There was considerable mention of Te Araroa walkers and to ensure they are considered.
- A few requests to seal the remainder of the road.

Queen Charlotte

- There were mentions of Te Araroa walkers and Link Pathway users and to ensure they are considered in the PBC.
- There were requests for a jetty at Moenui under the HAP.
- Concerns were identified regarding the existing lack of mooring/ berthing space at Havelock.

Kenepuru

- The bulk of comments on requests for the Road Access option to be progressed for the Kenepuru area, or that the section of road between Portage and the Heads be increased from 'essential repairs' to 'targeted improvements.'
- Conversely some respondents believed that Kenepuru should move to more marine focused transport options now, with the road only maintained between Linkwater and Portage.
- There were many requests for Moetapu Bay Road to be increased from 'essential repairs' to "targeted Improvements" (at least for the section between Kenepuru Rd and the jetty). There were a similar number of requests about including Moetapu Bay as a local marine hub.
- Regarding marine infrastructure, there was an approximate 50/50 split on support/ opposition of marine hubs particularly Torea and the proposed new arterial hub around Goulter Bay. Some suggestions were a marine hub at Broughton Bay would be better than the Torea option.
- It was suggested that additional local marine hubs or improvements to existing infrastructure be considered at:
 - Mahau Sound - ensure they are able to access the Moetapu jetty
 - Nopera
 - Waitaria
 - Te Mahia.

Port Underwood

- The need to control wilding pines.
- There was a request that some of funding requirement comes from Transpower and other utilities services for cable access.
- The impacts of logging trucks and other large vehicles crossing the lane and damaging roads was mentioned several times.

Appendix E: Survey results

Appendix F: Written submissions

The raw results are available upon request.

6.3 Helpline

To date, eight people have called the survey help line.

People could call 03 520 7400 if they needed help with the survey or if they had any questions. One person requested a printed version, and it was provided.

Appendix G – Calls summary



Appendices



Appendices

NOTE: All appendices have been saved to the Stantec One Drive. Please immediately download this report and appendices to an MDC folder.

Appendix A: Stakeholder register

Appendix B: Ratepayer letter

Appendix C: Drop-in feedback

Appendix D: Survey questions

Appendix E: Survey results

Appendix F: Written submissions

Appendix G: Calls summary



DESIGN WITH COMMUNITY IN MIND

Communities are fundamental. Whether around the corner or across the globe, they provide a foundation, a sense of place and of belonging. That's why at Stantec, we always design with community in mind.

We care about the communities we serve—because they're our communities too. This allows us to assess what's needed and connect our expertise, to appreciate nuances and envision what's never been considered, to bring together diverse perspectives so we can collaborate toward a shared success.

We're designers, engineers, scientists, and project managers, innovating together at the intersection of community, creativity, and client relationships. Balancing these priorities results in projects that advance the quality of life in communities across the globe.

Stantec trades on the TSX and the NYSE under the symbol STN.
Visit us at stantec.com or find us on social media.

Stantec New Zealand
Level 1, 66 Oxford Street, Richmond, Nelson, 7020
PO Box 13052, Armagh, Christchurch, 8141
Tel 03 546 8728 | www.stantec.com



Appendix T Appraisal Summary Tables



Appraisal Summary Table Template

Date:	Evaluation Period: (baseline and forecast year) e.g. 2020 - 2060	2022 - 2052	Option Name:	French Pass: Road Access	This is the preferred option <input checked="" type="checkbox"/>
Problem/opportunity statement:	Investment objectives:	How project gives effect to GPS:	How project gives effect to local community outcomes:		
P1 - Disrupted Access: The impacts of climate change are increasing the frequency and duration of disrupted access (30%) P2 - Lack of Alternatives: Reliance on roads for access to services and lack of alternatives has led to increased vulnerability to the community during road closures (20%) P3 - Asset Vulnerability: Poor construction standard and unstable geology means the Marlborough Sounds roads have a high maintenance cost and safety risk (50%).	Improve community and business resilience by providing travel alternatives (20%) Reduce frequency and duration of disrupted access (30%) Improve resilience of the transport assets (50%)	2021 GPS: - Adapts to climate change by providing alternate modes - Improves freight connections by strengthening existing key routes, and providing alternative modes Draft 2024 GPS: - maintaining and operating the system by ensuring that future maintenance is at a suitable level to meet the community's needs - Increasing resilience by improving resilience of key routes, and investing in alternative mode infrastructure - hub and spoke marine network will allow for integrated freight systems that are resilient to extended road closures	The outcome expected by the community is to have the roads repaired and more proactive maintenance going forward, as well as ensuring there is marine infrastructure available as a back up. The Road Access programme provides this, as well as addressing the three problem statements.		

1. Summary of Non-Monetised Impacts (Description)	2. Summary of Financial Impacts (nominal, non-discounted)	3. Summary of Monetised Option Impacts (present value, discounted)
1.1.3: DSIs*: no change 4.1.1: alternative routes: no change Asset Resilience: approx. 34% reduction in faults for similar sized event to July 2022 IPM: duration road closures/ service disruptions*: 36% reduction 5.2.2: Freight mode share*: no change - no investment in marine services ONRC: Freight Network availability: no change (maintaining pre-weather event access) 8.1.1: CO2 emissions*: no change to operational carbon expected IPM Climate Change adaptation*: yes, the work will address a known climate change issue 12.1.1: Te Ao Māori*: see below * mandatory measures, * IPM high/ very high criteria	Capital Costs (Includes \$2M of study cost)	Total Monetised Benefits, excluding Wider Economic Benefits (WEBs)
		Total Monetised Benefits, including Wider Economic Benefits (WEBs)
	Operating Costs	Total Economic Costs (NPV)
		BCR (excluding WEBs)
	Total Financial Costs	BCR (including WEBs)

Transport Outcomes	Non-Monetised Impact: (description in numerical or narrative terms)				Monetised Impact: (description in dollar terms in real terms, non-discounted)	
	Name of Measure:	Baseline:	Do Minimum Impact:	Option Impact:	Do Minimum Impact:	Option Impact:

Healthy and safe people						
1.1 Impact on social cost and incidents of crashes	1.1.3 Deaths and serious injuries	2018-2022 2 x Fatal (2020, 2021) 3 x Serious (2019, 2021, 2022)	no change	no change	NA	NA

Resilience and security						
4.1 Impact on system vulnerabilities and redundancies	4.1.1 Availability of a viable alternative to high-risk and high-impact route	HR, HI route: Rai Valley to Elaine Bay (1 hour drive) Alternate Route: - boat from Elaine to Havelock (2 hours, plus loading/unloading), drive to Rai Valley (25 minutes) - boat from Okiwi to Nelson (2 hours, plus loading/unloading), drive to Rai Valley (1 hour) Viable: No, There are no scheduled marine services between Elaine Bay and Havelock, or Okiwi and Nelson. Percentage: 0%	No change (although less resilient road and marine infrastructure over time)	No change (although more resilient road and marine infrastructure)	NA	NA
4.1 Impact on system vulnerabilities and redundancies	adapted from 4.1.2: Resilience of the network to weather event induced faults	2022 event: - culvert issues: 137 - Scour: 58 - under slips: 94	increase in the number of faults experienced over time	For a similar sized event: - culvert issues: 34% reduction - Scour: 35% reduction - underslips: 33% reduction	NA	NA

Economic prosperity						
Improving freight connections and climate change (IPM21 very high alignment criteria)	duration of unplanned road closures/ service disruptions	Annual average closure duration: 3.74 days	Annual Average Closure duration: 5.67 days	Annual average closure duration (at year 20): 2.4 days (36% reduction)	Annual Total Disruption Cost: \$923,063	Annual Total Disruption Cost (year 20): \$187,816
5.2 Impact on network productivity and utilisation	5.2.2 Freight - mode share value	2023 ADT estimates Ronga Road: 387vpd, 14% heavy = 54 freight vehicles	no change	potential increase in the freight by marine	NA	NA
ONRC Accessibility Customer Outcome	Percentage of network not available to HCV and 50MAX vehicles	HCV: 0% 50MAX: 10%	increasing percentage of the network unavailable to HCV and 50MAX vehicles over time	no change (maintaining pre-event heavy vehicle access)	NA	NA
5.1 Impact on system reliability	5.1.3 Travel time delay	Average: 0.77 hours	Average: 0.77 hours	Average: 0.77 hours	Annual Travel Time Costs: \$15,525,230	Annual Travel Time Costs: \$15,306,919
	Vehicle Operating Costs	Annual Average: \$5,692,129	Annual Average: \$5,701,882	Annual Average: \$5,692,129	Annual Average: \$5,701,882	Annual Average: \$5,692,129

Environmental sustainability						
8.1 Impact on greenhouse gas emissions	8.1.1 CO2 emissions	operational carbon	operational carbon	carbon from construction and vehicle operation	NA	NA
Climate Change (IPM21 high alignment criteria)	Addressing a known climate change adaptation issue that is forecast to occur by 2040	No	no change	increasing the resilience along key road routes, and investing in protecting key marine infrastructure are important to ensure appropriate adaption to the changing climate	NA	NA

Inclusive access						
12.1 Impact on Te Ao Māori	12.1.1 Te Ao Māori	Iwi unable to access or fully utilise some land	May lose road access to more land, businesses, or important sites	maintains or improves existing access, and opportunity to improve wider communities understanding of the cultural importance of the Sounds	NA	NA

Rationale for option selection decision	Refer to Section 10.1 of the PBC					
--	----------------------------------	--	--	--	--	--

Appraisal Summary Table Template

Date:	Evaluation Period: (baseline and forecast year) e.g 2020 - 2060	2022 - 2052	Option Name:	Pelorus: Road Focus	This is the preferred option <input checked="" type="checkbox"/>
Problem/opportunity statement: P1 - Disrupted Access: The impacts of climate change are increasing the frequency and duration of disrupted access (30%) P2 - Lack of Alternatives: Reliance on roads for access to services and lack of alternatives has led to increased vulnerability to the community during road closures (20%) P3 - Asset Vulnerability: Poor construction standard and unstable geology means the Marlborough Sounds roads have a high maintenance cost and safety risk (50%).	Investment objectives: Improve community and business resilience by providing travel alternatives (20%) Reduce frequency and duration of disrupted access (30%) Improve resilience of the transport assets (50%)	How project gives effect to GPS: 2021 GPS: - Adapts to climate change by providing alternate modes - Improves freight connections by strengthening existing key routes, and providing alternative modes Draft 2024 GPS: - maintaining and operating the system by ensuring that future maintenance is at a suitable level to meet the community's needs - Increasing resilience by improving resilience of key routes, and investing in alternative mode infrastructure - hub and spoke marine network will allow for integrated freight systems that are resilient to extended road closures		How project gives effect to local community outcomes: The outcome expected by the community is to have the roads repaired and more proactive maintenance going forward, as well as ensuring there is marine infrastructure available as a back up. The Road Focus programme provides this, as well as addressing the three problem statements.	

1. Summary of Non-Monetised Impacts (Description)	2. Summary of Financial Impacts (nominal, non-discounted)	3. Summary of Monetised Option Impacts (present value, discounted)
1.1.3: DSIs*: no change 4.1.1: Alternative routes: NA - no HR, HI routes Asset Resilience: approx 15% reduction in faults for similar sized event to July 2022 IPM: Average duration road closures/ service disruptions*: 30% reduction 5.2.2: Freight mode share*: no change - no investment in marine services ONRC: Freight Network availability: xxxxxx 8.1.1: CO2 emissions*: no change to operational carbon expected IPM Climate Change adaptation*: yes, the work will address a known climate change issue 12.1.1: Te Ao Māori*: see below * mandatory measures, * IPM high/ very high criteria	Capital Costs (Includes \$2M of study cost)	Total Monetised Benefits, excluding Wider Economic Benefits (WEBs) \$0
	Operating Costs	Total Monetised Benefits, including Wider Economic Benefits (WEBs) NA
	Total Financial Costs	Total Economic Costs (NPV) \$3,000,000
		BCR (excluding WEBs) 0.1
		BCR (including WEBs) NA

Transport Outcomes	Non-Monetised Impact: (description in numerical or narrative terms)			Monetised Impact: (description in dollar terms in real terms, non-discounted)	
	Name of Measure:	Baseline:	Do Minimum Impact:	Option Impact:	Do Minimum Impact:

Healthy and safe people						
1.1 Impact on social cost and incidents of crashes	1.1.3 Deaths and serious injuries	2018-2022 1 x Fatal (2018-2022) 0 x Serious	no change	no change	NA	NA

Resilience and security						
4.1 Impact on system vulnerabilities and redundancies	4.1.1 Availability of a viable alternative to high-risk and high-impact route	NA - no HR, HI routes	NA	NA	NA	NA
4.1 Impact on system vulnerabilities and redundancies	Adapted from 4.1.2: Resilience of the network to weather event induced faults	2022 event: - culvert issues: 24 - Scour: 13 - under slips: 2	Increase in the number of faults experienced over time	For a similar sized event: - culvert issues: 30% reduction - Scour: 30% reduction - underslips: 30% reduction	NA	NA

Economic prosperity						
Improving freight connections and climate change (IPM21 very high alignment criteria)	Average duration of unplanned road closures/ service disruptions	Annual average closure duration: 3.33 days	Annual Average Closure duration: 6.62 days	Annual average closure duration (at year 20): 2.3 days (30% reduction)	Annual Total Disruption Cost: \$17,430	Annual Total Disruption Cost (year 20): \$2,754
5.2 Impact on network productivity and utilisation	5.2.2 Freight - mode share value	2023 ADT estimates Kaiuma Bay Road: 166vpd, 35% heavy = 58 freight vehicles	no change	No change - no investment in marine services	NA	NA
ONRC Accessibility Customer Outcome	Percentage of network not available to HCV and 50MAX vehicles	2023 HCV: 0% 50MAX: 0%	Increasing percentage of the network unavailable to HCV and 50MAX vehicles over time	No change (maintaining pre-event heavy vehicle access)	NA	NA
5.1 Impact on system reliability	5.1.3 Travel time delay	Average: 0.56 hours	Average: 0.56 hours	Average: 0.56 hours	Annual Travel Time Costs: \$3,592,841	Annual Travel Time Costs: \$3,592,841
	Vehicle Operating Costs	Annual Average: \$952,210	Annual Average: \$952,210	Annual Average: \$952,210	Annual Average: \$952,210	Annual Average: \$952,210

Environmental sustainability						
8.1 Impact on greenhouse gas emissions	8.1.1 CO2 emissions	operational carbon	operational carbon	carbon from construction and vehicle operation	NA	NA
Climate Change (IPM21 high alignment criteria)	Addressing a known climate change adaptation issue that is forecast to occur by 2040	No	no change	Increasing the resilience along key road routes, and investing in protecting key marine infrastructure are important to ensure appropriate adaptation to the changing climate	NA	NA

Inclusive access						
12.1 Impact on Te Ao Māori	12.1.1 Te Ao Māori	Iwi unable to access or fully utilise some land	May lose road access to more land, businesses, or important sites	Maintains or improves existing access, and opportunity to improve wider communities understanding of the cultural importance of the Sounds	NA	NA

Rationale for option selection decision
Refer to Section 10.1 of the PBC

Appraisal Summary Table Template

Date:	Evaluation Period: (baseline and forecast year) e.g 2020 - 2060	2022 - 2052	Option Name:	Queen Charlotte: Road Focus/ Road Access	This is the preferred option <input checked="" type="checkbox"/>
Problem/opportunity statement:	Investment objectives:	How project gives effect to GPS:	How project gives effect to local community outcomes:		
P1 - Disrupted Access: The impacts of climate change are increasing the frequency and duration of disrupted access (30%) P2 - Lack of Alternatives: Reliance on roads for access to services and lack of alternatives has led to increased vulnerability to the community during road closures (20%) P3 - Asset Vulnerability: Poor construction standard and unstable geology means the Marlborough Sounds roads have a high maintenance cost and safety risk (50%).	Improve community and business resilience by providing travel alternatives (20%) Reduce frequency and duration of disrupted access (30%) Improve resilience of the transport assets (50%)	2021 GPS: - Adapts to climate change by providing alternate modes - Improves freight connections by strengthening existing key routes, and providing alternative modes Draft 2024 GPS: - maintaining and operating the system by ensuring that future maintenance is at a suitable level to meet the community's needs - Increasing resilience by improving resilience of key routes, and investing in alternative mode infrastructure - hub and spoke marine network will allow for integrated freight systems that are resilient to extended road closures	The outcome expected by the community is to have the roads repaired and more proactive maintenance going forward, as well as ensuring there is marine infrastructure available as a back up. The Road Focus programme provides this, as well as addressing the three problem statements.		

1. Summary of Non-Monetised Impacts (Description)	2. Summary of Financial Impacts (nominal, non-discounted)	3. Summary of Monetised Option Impacts (present value, discounted)
1.1.3: DSIs*: no change 4.1.1: alternative routes: no change Asset Resilience: approx 43% reduction in faults for similar sized event IPM: average duration road closures/ service disruptions*: 44% reduction 5.2.2: Freight mode share*: no change - no investment in marine services ONRC: Freight Network availability: no change (maintaining pre weather event access) 8.1.1: CO2 emissions*: no change to operational carbon expected IPM Climate Change adaptation*: yes, the work will address a known climate change issue 12.1.1: Te Ao Māori*: see below * mandatory measures, * IPM high/ very high criteria	Capital Costs (Includes \$2M of study cost)	Total Monetised Benefits, excluding Wider Economic Benefits (WEBs) \$17,000,000
		Total Monetised Benefits, including Wider Economic Benefits (WEBs) -
	Operating Costs	Total Economic Costs (NPV) -\$5,000,000
		BCR (excluding WEBs) - Present Value
	Total Financial Costs	BCR (including WEBs) -

Transport Outcomes	Non-Monetised Impact: (description in numerical or narrative terms)				Monetised Impact: (description in dollar terms in real terms, non-discounted)	
	Name of Measure:	Baseline:	Do Minimum Impact:	Option Impact:	Do Minimum Impact:	Option Impact:

Healthy and safe people						
1.1 Impact on social cost and incidents of crashes	1.1.3 Deaths and serious injuries	2018-2022 1 x Fatal (2021) 6 x Serious (3 x 2020, 2021, 2 x 2022)	no change	no change	NA	NA

Resilience and security						
4.1 Impact on system vulnerabilities and redundancies	4.1.1 Availability of a viable alternative to high-risk and high-impact route	HR, HI route: Havelock to Picton (50 minute drive) Alternate Route: SH1 and SH6 (45 minute drive) Viable: Yes Percentage: 100%	no change	no change	NA	NA
4.1 Impact on system vulnerabilities and redundancies	adapted from 4.1.2: Resilience of the network to weather event induced faults	2022 event: - culvert issues: 46 - Scour: 11 - under slips: 62	increase in the number of faults experienced over time	For a similar sized event: - culvert issues: 45% reduction - Scour: 35% reduction - underslips: 49% reduction	NA	NA

Economic prosperity						
Improving freight connections and climate change (IPM21 very high alignment criteria)	average duration of unplanned road closures/ service disruptions	Annual average closure duration: 5.52 days	Annual Average Closure duration: 10.99 days	Annual average closure duration (at year 20): 3.1 days (44% reduction)	Annual Total Disruption Cost: \$479,886	Annual Total Disruption Cost (year 20): \$113,957
5.2 Impact on network productivity and utilisation	5.2.2 Freight - mode share value	2023 ADT estimates Mahakipawa Hill: 1,261vpd, 8% heavy = 101 freight vehicles Grove Track: 863vpd, 12% heavy = 104 freight vehicles Queen Charlotte: 911vpd, 31% heavy = 282 freight vehicles	no change	No change - marine not a viable alternative mode for these trips	NA	NA
ONRC Accessibility Customer Outcome	Percentage of network not available to HCV and 50MAX vehicles	HCV: 0% 50MAX: 49%	Increasing percentage of the network unavailable to HCV and 50MAX vehicles over time	No change (maintaining pre-event heavy vehicle access)	NA	NA
5.1 Impact on system reliability	5.1.3 Travel time delay	Average: 0.29 hours	Average: 0.30 hours	Average: 0.29 hours	Annual Travel Time Costs: \$16,333,153	Annual Travel Time Costs: \$15,905,094
	Vehicle Operating Costs	Annual Average: \$6,986,852	Annual Average: \$7,000,530	Annual Average: \$6,986,852	Annual Average: \$7,000,530	Annual Average: \$6,986,852

Environmental sustainability						
8.1 Impact on greenhouse gas emissions	8.1.1 CO2 emissions	operational carbon	operational carbon	carbon from construction and vehicle operation	NA	NA
Climate Change (IPM21 high alignment criteria)	Addressing a known climate change adaptation issue that is forecast to occur by 2040	No	no change	Increasing the resilience along key road routes, and investing in protecting key marine infrastructure are important to ensure appropriate adaptation to the changing climate	NA	NA

Inclusive access						
12.1 Impact on Te Ao Māori	12.1.1 Te Ao Māori	Iwi unable to access or fully utilise some land	May lose road access to more land, businesses, or important sites	Maintains or improves existing access, and opportunity to improve wider communities understanding of the cultural importance of the Sounds	NA	NA

Rationale for option selection decision
Refer to Section 10.1 of the PBC

Appraisal Summary Table Template

Date:	Evaluation Period: (baseline and forecast year) e.g 2020 - 2060	2022 - 2052	Option Name:	Kenepuru: Balanced	This is the preferred option <input checked="" type="checkbox"/>
Problem/opportunity statement: P1 - Disrupted Access: The impacts of climate change are increasing the frequency and duration of disrupted access (30%) P2 - Lack of Alternatives: Reliance on roads for access to services and lack of alternatives has led to increased vulnerability to the community during road closures (20%) P3 - Asset Vulnerability: Poor construction standard and unstable geology means the Marlborough Sounds roads have a high maintenance cost and safety risk (50%).	Investment objectives: Improve community and business resilience by providing travel alternatives (20%) Reduce frequency and duration of disrupted access (30%) Improve resilience of the transport assets (50%)	How project gives effect to GPS: 2021 GPS: - Adapts to climate change by providing alternate modes - Improves freight connections by strengthening existing key routes, and providing alternative modes Draft 2024 GPS: - maintaining and operating the system by ensuring that future maintenance is at a suitable level to meet the community's needs - Increasing resilience by improving resilience of key routes, and investing in alternative mode infrastructure - hub and spoke marine network will allow for integrated freight systems that are resilient to extended road closures		How project gives effect to local community outcomes: The outcome expected by the community is to have the roads repaired and more proactive maintenance going forward, as well as ensuring there is marine infrastructure available as a back up. Xxxxxx	

1. Summary of Non-Monetised Impacts (Description)	2. Summary of Financial Impacts (nominal, non-discounted)	3. Summary of Monetised Option Impacts (present value, discounted)
1.1.3: DSIs*: no change 4.1.1: alternative routes: 85%. Scheduled passenger and freight services between Havelock and Portage available 3 days / week, plus a Torea to Picton route on alternating days (6 days per week) Asset Resilience: approx 26% reduction in faults for similar sized event to July 2022 IPM: average duration road closures/ service disruptions*: 27% reduction 5.2.2: Freight mode share*: return to pre storm event levels ONRC: Freight Network availability: return to pre weather event vehicle access 8.1.1: CO2 emissions*: no change to operational carbon expected IPM Climate Change adaptation*: yes, the work will address a known climate change issue 12.1.1: Te Ao Māori*: see below * mandatory measures, + IPM high/ very high criteria	Capital Costs (Includes \$2M of study cost)	\$125,607,000
	Operating Costs	No new road maintenance New Marine Maintenance: \$500k/ annum in year 5-11, increasing to \$950k/ annum in 2023
	Total Financial Costs	BCR (including WEBs)
		Total Monetised Benefits, excluding Wider Economic Benefits (WEBs)
		\$55,000,000
		Total Monetised Benefits, including Wider Economic Benefits (WEBs)
		-
		Total Economic Costs (NPV)
		\$30,000,000
		BCR (excluding WEBs)
		1.8
		BCR (including WEBs)
		-

Transport Outcomes	Non-Monetised Impact:			Monetised Impact:		
	(description in numerical or narrative terms)			(description in dollar terms in real terms, non-discounted)		
Name of Benefit	Name of Measure:	Baseline:	Do Minimum Impact:	Option Impact:	Do Minimum Impact:	Option Impact:

Healthy and safe people

1.1 Impact on social cost and incidents of crashes	1.1.3 Deaths and serious injuries	2018-2022 0 x Fatal 0 x Serious	no change	no change	NA	NA
--	-----------------------------------	---------------------------------------	-----------	-----------	----	----

Resilience and security

4.1 Impact on system vulnerabilities and redundancies	4.1.1 Availability of a viable alternative to high-risk and high-impact route	HR, HI route: Havelock to Portage (1 hour drive) Alternate Route: Boat from Havelock to Portage (1 hour, 15 minutes, plus loading/unloading) Viable: Partially, there is a scheduled freight service but it only operates 3 days/ week, and there is no passenger capacity Percentage: 6% (freight accounts for 6% of ADT for road)	Percentage: 0% Once subsidy runs out, it is uncertain if this route will continue	Percentage: 85% Scheduled passenger and freight services between Havelock and Portage available 3 days / week, plus a Torea to Picton route on alternating days (6 days per week)	NA	NA
4.1 Impact on system vulnerabilities and redundancies	Adapted from 4.1.2: Resilience of the network to weather event induced faults	2022 event: - culvert issues: 301 - Scour: 156 - under slips: 323	Increase in the number of faults experienced over time	For a similar sized event: - culvert issues: 27% reduction - Scour: 28% reduction - underslips: 23% reduction	NA	NA

Economic prosperity

Improving freight connections and climate change (IPM21 very high alignment criteria)	Average duration of unplanned road closures/ service disruptions	Annual average closure duration: 4.5 days	Annual Average Closure duration: 8.94 days	Annual average closure duration (at year 20): 3.3 days (27% reduction)	Annual Total Disruption Cost: \$680,299	Annual Total Disruption Cost (year 20): \$104,167
5.2 Impact on network productivity and utilisation	5.2.2 Freight - mode share value	2023 ADT estimates Kenepuru Road (L-H): 340vpd, 6% heavy = 20 freight vehicles	Increase in freight by marine		NA	NA
ONRC Accessibility Customer Outcome	Percentage of network not available to HCV and 50MAX vehicles	2023 HCV: 38% 50MAX: 38%	Increasing percentage of the network unavailable to HCV and 50MAX vehicles over time	Return to pre weather event heavy vehicle access levels	NA	NA
5.1 Impact on system reliability	5.1.3 Travel time delay	Average: 0.55 hours	Average: 0.59 hours	Average: 0.55 hours	Annual Travel Time Costs: \$18,719,997	Annual Travel Time Costs: \$16,760,395
	Vehicle Operating Costs	Annual Average: \$5,320,165	Annual Average: \$5,447,457	Annual Average: \$5,320,165	Annual Average: \$5,447,457	Annual Average: \$5,320,165

Environmental sustainability

8.1 Impact on greenhouse gas emissions	8.1.1 CO2 emissions	operational carbon	operational carbon	carbon from construction and vehicle operation	NA	NA
Climate Change (IPM21 high alignment criteria)	Addressing a known climate change adaptation issue that is forecast to occur by 2040	No	no change	Increasing the resilience along key road routes, and investing in protecting key marine infrastructure are important to ensure appropriate adaptation to the changing climate	NA	NA

Inclusive access

12.1 Impact on Te Ao Māori	12.1.1 Te Ao Māori	Iwi unable to access or fully utilise some land	May lose road access to more land, businesses, or important sites	Maintains or improves existing access, and opportunity to improve wider community's understanding of the cultural importance of the Sounds	NA	NA
----------------------------	--------------------	---	---	--	----	----

Rationale for option selection decision

Refer to Section 10.1 of the PBC

Appraisal Summary Table Template

Date:	Evaluation Period: (baseline and forecast year) e.g 2020 - 2060	2022 - 2052	Option Name:	Port Underwood: Road Access	This is the preferred option <input checked="" type="checkbox"/>
Problem/opportunity statement:	Investment objectives:	How project gives effect to GPS:	How project gives effect to local community outcomes:		
P1 - Disrupted Access: The impacts of climate change are increasing the frequency and duration of disrupted access (30%) P2 - Lack of Alternatives: Reliance on roads for access to services and lack of alternatives has led to increased vulnerability to the community during road closures (20%) P3 - Asset Vulnerability: Poor construction standard and unstable geology means the Marlborough Sounds roads have a high maintenance cost and safety risk (50%).	Improve community and business resilience by providing travel alternatives (20%) Reduce frequency and duration of disrupted access (30%) Improve resilience of the transport assets (50%)	2021 GPS: - Adapts to climate change by providing alternate modes - Improves freight connections by strengthening existing key routes, and providing alternative modes Draft 2024 GPS: - maintaining and operating the system by ensuring that future maintenance is at a suitable level to meet the community's needs - Increasing resilience by improving resilience of key routes, and investing in alternative mode infrastructure - hub and spoke marine network will allow for integrated freight systems that are resilient to extended road closures	The outcome expected by the community is to have the roads repaired and more proactive maintenance going forward, as well as ensuring there is marine infrastructure available as a back up. The Road Access programme provides this, as well as addressing the three problem statements.		

1. Summary of Non-Monetised Impacts (Description)	2. Summary of Financial Impacts (nominal, non-discounted)	3. Summary of Monetised Option Impacts (present value, discounted)
1.1.3: DSIs*: no change 4.1.1: alternative routes: no change (although more resilient road infrastructure) Asset Resilience: approx 35% reduction in faults for similar sized event IPM: average duration road closures/ service disruptions*: 34% reduction 5.2.2: Freight mode share*: no change - no investment in marine services ONRC: Freight Network availability: no change (maintaining pre weather event access) 8.1.1: CO2 emissions*: no change to operational carbon expected IPM Climate Change adaptation*: yes, the work will address a known climate change issue 12.1.1: Te Ao Māori*: see below * mandatory measures, * IPM high/ very high criteria	Capital Costs (Includes \$2M of study cost)	Total Monetised Benefits, excluding Wider Economic Benefits (WEBs) \$4,000,000
	Operating Costs	Total Monetised Benefits, including Wider Economic Benefits (WEBs) NA
	Total Financial Costs	Total Economic Costs (NPV) \$2,000,000
		BCR (excluding WEBs) 2.7
		BCR (including WEBs) NA

Transport Outcomes	Non-Monetised Impact: (description in numerical or narrative terms)			Monetised Impact: (description in dollar terms in real terms, non-discounted)		
	Name of Measure:	Baseline:	Do Minimum Impact:	Option Impact:	Do Minimum Impact:	Option Impact:
Healthy and safe people						
1.1 Impact on social cost and incidents of crashes	1.1.3 Deaths and serious injuries	2018-2022 0 x Fatal 1 x Serious (2021)	no change	no change	NA	NA

Resilience and security						
Name of Measure:	Baseline:	Do Minimum Impact:	Option Impact:	Do Minimum Impact:	Option Impact:	
4.1 Impact on system vulnerabilities and redundancies	4.1.1 Availability of a viable alternative to high-risk and high-impact route	HR, HI route: Waikawa to Ōraimoa/ Fighting Bay entrance (1 hour drive) Alternate Route: - Waikawa to Oyster Bay via Rārangī (1 hour 30 min drive) - Oyster Bay to Hakahak Bay (40 minutes by boat, plus loading/ unloading) Viable: Partially. Route to Oyster Bay is viable, but the marine route from Oyster Bay to Ōraimoa/ Fighting Bay is not as there are no marine services. Percentage: 50%	No change (although less resilient road and marine infrastructure over time)	No change (although more resilient road infrastructure)	NA	NA
4.1 Impact on system vulnerabilities and redundancies	Adapted from 4.1.2: Resilience of the network to weather event induced faults	2022 event: - culvert issues: 57 - Scour: 12 - under slips: 52	Increase in the number of faults experienced over time	For a similar sized event: - culvert issues: 41% reduction - Scour: 30% reduction - underslips: 33% reduction	NA	NA

Economic prosperity						
Name of Measure:	Baseline:	Do Minimum Impact:	Option Impact:	Do Minimum Impact:	Option Impact:	
Improving freight connections and climate change (IPM21 very high alignment criteria)	Average duration of unplanned road closures/ service disruptions	Annual average closure duration: 9.84 days	Annual Average Closure duration: 19.63 days	Annual average closure duration (at year 20): 6.5 days (34% reduction)	Annual Total Disruption Cost: \$306,411	Annual Total Disruption Cost (year 20): \$58,660
5.2 Impact on network productivity and utilisation	5.2.2 Freight - mode share value	2023 ADT estimates Port Underwood Road: 492vpd, 8% heavy = 39 freight vehicles Tumbledown Bay Rd (start): 124vpd, 16% heavy = 20 freight vehicles	no change	no change - no investment in marine services	NA	NA
ONRC Accessibility Customer Outcome	Percentage of network not available to HCV and 50MAX vehicles	2023 HCV: 0% 50MAX: 6%	Increasing percentage of the network unavailable to HCV and 50MAX vehicles over time	no change (maintaining pre-event heavy vehicle access)	NA	NA
5.1 Impact on system reliability	5.1.3 Travel time delay	Average: 0.48 hours	Average: 0.48 hours	Average: 0.48 hours	Annual Travel Time Costs: \$3,475,829	Annual Travel Time Costs: \$3,475,829
	Vehicle Operating Costs	Annual Average: \$1,205,439	Annual Average: \$1,205,439	Annual Average: \$1,205,439	Annual Average: \$1,205,439	Annual Average: \$1,205,439

Environmental sustainability						
Name of Measure:	Baseline:	Do Minimum Impact:	Option Impact:	Do Minimum Impact:	Option Impact:	
8.1 Impact on greenhouse gas emissions	8.1.1 CO2 emissions	operational carbon	operational carbon	carbon from construction and vehicle operation	NA	NA
Climate Change (IPM21 high alignment criteria)	Addressing a known climate change adaptation issue that is forecast to occur by 2040	No	No change	Increasing the resilience along key road routes, and investing in protecting key marine infrastructure are important to ensure appropriate adaptation to the changing climate	NA	NA

Inclusive access						
Name of Measure:	Baseline:	Do Minimum Impact:	Option Impact:	Do Minimum Impact:	Option Impact:	
12.1 Impact on Te Ao Māori	12.1.1 Te Ao Māori	Iwi unable to access or fully utilise some land	May lose road access to more land, businesses, or important sites	Maintains or improves existing access, and opportunity to improve wider communities understanding of the cultural importance of the Sounds	NA	NA

Rationale for option selection decision						
Refer to Section 10.1 of the PBC						

Appendix U Preferred Programme Cost Estimate

U.1 Notes and Assumptions

Notes and assumptions for the estimate are as follows:

1. For description of approach Ai to D refer to Section 8.3.1.
2. Bi is taken as the base case with other categories taken from this using a percentage multiplier.
3. Ai is a 20% uplift on Bi; Aii is a 15 % uplift on Bi for repairs and Improvements. This is to reflect an increased LoS, Build Back Stronger.
4. Maintenance is taken to be the same for cases Ai, Aii, Bi, Bii. C is 90% of Bi and D is 70% of Bi. This is to reflect a proposed lower LoS.
5. A multiplier of 1.3 is used from calculated costs as this project is at a programme business case level. This multiplier applies to Repairs and Improvements, but not Maintenance.
6. All Improvements are costed on upgrading the stormwater network with new or replacement culverts, inlet structures and outlet discharge scour protection.
7. A new culvert is assessed as having an average cost of \$20,000. Five iterations of culvert improvements are allowed for.
8. For Bi, allowance is for a new culvert at a rate of 1 culvert /km. For Bii it is 0.6 culverts / km and for C it is 0.2 culverts/km.
9. No improvements allowed on the road network for approach D.
10. Repair costs are based on representative costs that are being incurred on the MRRT project.
11. Professional services, investigation geotechnical, boreholes, survey, concept, preliminary detailed design, IFC drawings, MSQA are approximately 21% of physical construction cost.
12. Temporary traffic management, P&G and head contractors' margin are approximately 53% of physical construction costs.
13. For a complex site cost is averaged as \$513,000 per site.
14. For a Simple Site cost is averaged as \$325,000 per site.
15. For a Structures (bridges) fault, typically abutments, physical repair cost is \$91,000 per site. No Full bridge replacements allowed for.
16. For roads within each zone refer to Appendix N
17. For reduced LoS (1 step down) Bii, will only require 25% of complex and simple to be walls, 75% retreats. Retreat cost \$544,000, simple u/slip and simple complex other \$181,000.
18. For reduced LoS (2 steps down) C, will only require 10% of complex and simple to be walls. Balance complex at \$272,000, simple and other at \$121,000, structural same and minor at 70%.
19. The August 22 event is the standard event to base costs on. Future events will have the same degree of faults in different location along the segment.
20. Response/minor costs will be the same for each event, contra between improved drainage and increased costs.
21. Bi uses retaining walls on the outside edge - higher LoS/improved geometrics.
22. Savings from increased productivity by closing road for repair negated by loss of amenity and conflicts with community.
23. Structures costs stay the same for all events and all scenarios - the bridge needs to be useable under all events.
26. Capital cost and maintenance is an allowance, not based on any design or construction cost. A local jetty can cost \$250k. You either have the marine structure or not. No 1/2 a jetty.
27. Emergency Ramp Capital \$200k, maintenance pa \$5k.
28. Local Marine Hub: Requires a good jetty (\$500k) and nearby ramp (\$200k), other infrastructure (\$300k), total \$1M, maintenance \$50k pa.
29. Arterial Marine Hub: Requires a wharf, secondary jetty, ramp and Marshalling areas for stock and log. Expect some difficulty in establishing flat land for marshalling areas. Capital \$3m. Maintenance \$500k pa, largely for the marshalling areas, including stormwater/effluent management.



30. Primary Marine Hub: Allow \$1m for customisation, additional parking/storage establishment, maintenance as \$100k pa as the extra over cost (Picton, Havelock).

Option	Improvements	Comments ⁹³
Do Minimum	50% minor repair costs	Just reopen the road, clear the over slips, clear the water tables, no sealing, limited culvert works. Bunding only at under slips
Bi	Improved geometrics as part of repair, improved sightlines and safety, improve drainage at repair sites	The minor faults will continue at a similar level as the capital works do not generally address these faults. Some reduction in maintenance over time as the more susceptible areas are fixed first and as culverts are replaced and upsized. Road is at a higher standard and taking increased HCV so pavement maintenance can be expected to increase, as will safety delineation signs and marking. Allow a culvert improvement/replacement programme to improve stormwater control
Bii	Use retreats, geometrics and sightlines not targeted for improvement. Road width same	more retreats results in increased over slips, so minor faults increase in cost over time. Walls not as extensive, some existing wall failures occur in large events, pavement not as strong so HCV cause more damage and increased maintenance costs. Safety becomes increased issue with increasing HCV. Limited culvert improvement prog
C	Use lower cost walls, narrow sections of road to reduce wall height, one way in places	Gradual regression of road standard, revert some sealed sections, decreased maintenance, one new culvert every 5 km
D	New LMH + ER, + 1/3 road access costs	Further regression, decreased maintenance costs. No new culverts
E	New LMH + ER, + 1/3 balanced costs	As per marine access

⁹³ Comment on assumptions about impact on capital, maintenance and operating costs over time, e.g. do minimum, capital can be assumed to get worse because with climate change storm event scales increasing, maintenance and operating cost increasing due to more small events causing damage with climate change. Assume a percentage change to impact per event, therefore if large events more frequent damage escalating over time for do minimum.



U.2 Road Repairs and Improvements

Zone		Approach	Repairs		Improvements	
			P50 estimate	Timeframe	P50 estimate	Timeframe
Sounds wide		Improvements Strategy	NA	NA	\$3.0M	1-4 years
Te Aumiti / French Pass (Road Access)	1	A(i): Build Back Stronger	\$6.8M	0-3 years	\$4.4M	5-19 years
	2	A(ii): Build Back Stronger	\$5.8M	0-3 years	\$2.8M	5-19 years
	3	B(ii): Targeted Improvements	\$1.2M	0-3 years	\$1.1M	5-19 years
	4	B(ii): Targeted Improvements	\$0.5M	0-3 years	\$0.9M	5-19 years
	5	C: Essential Repairs	\$4.4M	0-3 years	\$0.9M	5-19 years
	6	C: Essential Repairs	-	-	-	-
	7	B(ii): Targeted Improvements	\$2.3M	0-3 years	\$2.5M	5-19 years
	8	B(ii): Targeted Improvements	\$3.7M	0-3 years	\$1.8M	5-19 years
	All other side roads	C: Essential Repairs	\$1.6M	0-3 years	\$0.0M	5-19 years
Te Hoiere / Pelorus (Road Focus)	1	B(i): Targeted Improvements	\$1.6M	0-3 years	\$1.7M	5-19 years
	2	B(ii): Targeted Improvements	\$0.5M	0-3 years	\$1.8M	5-19 years
Queen Charlotte (Road Focus / Road Access)	1	A(i): Build Back Stronger	\$3.2M	0-3 years	\$2.4M	5-19 years
	2	A(i): Build Back Stronger	\$7.8M	0-3 years	\$3.4M	5-19 years
	3	B(ii): Targeted Improvements	\$2.2M	0-3 years	0.5M	5-19 years
	All other side roads	C: Essential Repairs	\$0.7M	0-3 years	\$0.0M	5-19 years
Kenepuru (Balanced)	1	B(ii): Targeted Improvements	\$0	0-3 years	\$0.4M	5-19 years
	2	B(ii): Targeted Improvements	\$6.1M	0-3 years	\$1.0M	5-19 years
	3	B(ii): Targeted Improvements	\$36.5M	0-3 years	\$1.6M	5-19 years
	4a	A(i): Build Back Stronger	\$2.3M	0-3 years	\$0.3M	5-19 years
	4b	C: Essential Repairs	\$24.8M	0-3 years	\$0.4M	5-19 years
	5	B(ii): Targeted Improvements	\$6.4M	0-3 years	\$1.2M	5-19 years
	6a	B(ii): Targeted Improvements	\$3.6M	0-3 years	\$2.5M	5-19 years
	6b	B(ii): Targeted Improvements	Included in above	As above	Included in above	As above
	7	B(ii): Targeted Improvements	\$0.1M	0-3 years	\$1.3M	5-19 years



Zone		Approach	Repairs		Improvements	
			P50 estimate	Timeframe	P50 estimate	Timeframe
	8	B(ii): Targeted Improvements	\$1.2M	0-3 years	\$3.2M	5-19 years
	9	C: Essential Repairs	\$4.6M	0-3 years	\$0.2M	5-19 years
	All other side roads	C: Essential Repairs	\$7.8M	0-3 years	-	-
Te Whanganui / Port Underwood (Road Access)	1	A(i): Build Back Stronger	\$2.3M	0-3 years	\$2.5M	5-19 years
	2	B(i): Targeted Improvements	\$4.7M	0-3 years	\$3.6M	5-19 years
	3	B(i): Targeted Improvements	\$3.2M	0-3 years	\$1.8M	5-19 years
	4	B(ii): Targeted Improvements	\$0.3M	0-3 years	\$0.3M	5-19 years
	All other side roads	C: Essential Repairs	\$0.1M	0-3 years	-	-



U.3 Marine Improvements

The estimates provided below are for infrastructure only and include contingencies. The costs of any marine transport services has not been included.

Zone	Item	P50 estimate	Timeframe
Sounds wide	Marine Study	\$3.0M	0-3 years
	Marine Plan Change	\$3.5M	0-3 years
Te Aumiti/French Pass	Elaine Bay upgrade	\$3.0M	11-15 years
	Duncan Bay upgrade	\$1.5M	16+ years
	Penzance Bay upgrade	\$1.5M	16+ years
	Cissy Bay upgrade	\$1.5M	16+ years
	Bulwer Bay upgrade	\$1.5M	16+ years
Te Hoiere/Pelorus	NA	NA	NA
Queen Charlotte	Havelock resilience and upgrade	\$3.0M	4-15 years
	Picton resilience and upgrade	\$3.0M	4-15 years
Kenepuru	Goulter arterial hub	\$4.5M	4-5 years
	Torea upgrade	\$3.0M	11-15 years
	Portage upgrade	\$3.0M	11-15 years
	Double Bay upgrade	\$1.5M	16+ years
	Fish Bay upgrade	\$1.5M	16+ years
	Punga Cove upgrade	\$1.5M	16+ years
	Moetapu upgrade	\$1.5M	16+ years
	Te Mahia upgrade	\$1.5M	16+ years
Te Whanganui/Port Underwood	NA	NA	NA



Appendix V Revised Programme Benefits Assessment



Sounds Future Access Study

Revised Programme Benefits and Cost Assessment

	Name	Position	Signature	Date
Prepared by:	Yadi Wang	Economist		09/08/2023
Reviewed by:	Dhimantha Ranatunga	Principal Transportation Planner		14/09/2023

Revision	Date	Description	Prepared	Reviewed	Approved
Draft					

1 Introduction

A revised Present Value Cost and benefits analysis was completed for the preferred programme, consistent with the MBCM for a 40 year analysis period.

The purpose of this technical note is to outline the overall methodology and is organised as follows:

- Section 2 describes the primary cost inputs used in the assessment.
- Section 3 outlines the event risks and their impacts and explains how they are approached in the assessment.
- Section 4 demonstrates the effectiveness of the proposed programmes in mitigating the impacts of future event risks.
- Section 5 outlines the conventional road user benefits (Travel Time and VOC)
- Section 6 outlines the road user benefits resulting from disruption (Resilience)
- Section 7 presents the outputs of the assessment for the preferred programme, including the results from a range of sensitivity tests across key variables
- Section 8 presents an overall summary of the analysis

1.1 Assessment of Transport Costs and Benefits

The revised programme assessment considered the following cost and benefit streams:

- Direct costs
 - Capital costs relating to repairs and improvements
 - On-going maintenance
 - Disruption event cost savings from improved resilience compared to the Do Minimum.
- Road user costs
 - Travel time and vehicle operating costs resulting from the lifting of speed restrictions.
 - Travel time savings resulting from reduced closure duration and impacts following a disruption event as a result of improved resilience.

Other benefit streams not considered at the PBC stage include:

- Vehicle operating costs for disruption events, due to the difficulties in estimating marine VOC based on the MBCM.
- Marine benefits have not been assessed due to the uncertainty around specific interventions. This can be explored during future SSBC phases. Indirectly, the marine costs included as part of the programme allow for the viability of marine as an alternate route.
- Road safety benefits have also not been explored due to the relatively low volumes and types of interventions included in the preferred programme. These can be explored further in any future improvements SSBCs.
- Road freight impacts due to restrictions, due to the difficulties in estimating the freight barging costs. These impacts can be explored further as part of future SSBC phases.

Exclusion of these benefits at the PBC phase is considered to be conservative.

2 Cost inputs

To enable a comparison of the relevant cost advantages of the proposed intervention programmes, this assessment investigates the following cost categories:

- **Capital repair costs** that will incur as a result of repairing the damaged road network. This cost stream is projected at road-segment level for each intervention programme. This cost is split equally across a 3-year repair duration.
- **Capital improvement costs** that will incur as a result of undertaking critical improvements of the damaged local road network. This cost stream is projected at road-segment level for each intervention programmes. This cost is split equally over a 20-year construction duration.
- **Road annual maintenance and operation costs** that will incur to ensure that the local road network provides reasonable level of services. This cost stream is projected at road-segment level for each intervention programme. This cost spreads evenly over the specified analysis period.
- **Marine improvement costs** and associated maintenance that will incur as a result of undertaking marine interventions across the sounds. This cost stream is projected at an area level for each of the intervention programmes. This cost is phased over a 24-year duration.
- **Event risk costs** that will incur as a result of emergency responses to future disruptive events. This cost stream is projected at study-area level and with reference to either historical RAMM cost data or the actual emergency response costs of the 2021/2022 benchmark storm events. This cost is annualised subject to event probability and intensity and aggregated over the specified analysis period.

The detailed information are shown in Table 2-1.

Table 2-1 An overview of the cost inputs

Cost Categories	Abbr.	Sources	Granularity
Capital repair costs	Cap_Repa	Capital repairs estimates based on the actual faults database.	
Capital improvement costs	Cap_C	Capital road improvements estimated based on the proportion of road segment exposed per natural hazard susceptibility (i.e., underslips, overslips, etc.) and human induced slope instability	Road-segment level
Annual maintenance & operation costs	Pa_OM_C	Annual maintenance and operations based on RAMM Estimates adjusted depending on the segment level intervention strategies	
Marine Capital Improvements	M_Cap_C	Marine capital interventions	Area level
Marine annual maintenance	M_pa_OM	Marine maintenance and operations	Area level
Event Risk cost	ER_C	<p>Depends on the damage impacts of climate events:</p> <ul style="list-style-type: none"> • For events with a 1 in 5 years annual recurrence interval (ARI), the 10-year average historical annual emergency costs from the RAMM database is used. • For larger events (with ARIs of 1 in 10, 1 in 40, 1 in 50, and 1 in 100 years), the costs are calculated as a proportion of the actual emergency response costs of the 2021/22 benchmark event (1 in 40 ARI). 	Study-area level

3 Disruption Event Risk

Acknowledging the importance of assessing the relative advantages of the proposed intervention programmes through the lens of resilience, the approach prescribed in the Waka Kotahi Research Report 670 (McWha & Tooth, 2020) has been adopted to measure the programmes' ability to proactively resist, respond, adapt to future disruption events.

The hazard events are categorized by their Annual Recurrence Interval (ARI). ARI indicates the average or expected period of time between hazard events that exceed a given magnitude. The severity of a hazard event increase with its ARI. The inverse of the ARI is the Annual Exceedance Probability (AEP), which shows the probability that the hazard event of at least that magnitude occurs in any given year. In this assessment, five categories of hazard events with different ARIs have been considered, which are shown in Table 3-1.

Table 3-1 An overview of Hazard Events per ARI and AEP

Annual Recurrence Intervals (ARI) and Annual Exceedance Probability (AEP)							Source
ARI in years	AEP	ARI ranges	AEP Differences	Rainfall	Damage impacts (%)		
1 in 5 years	20.0%	up to 5 ARI	80.00%	-	N/A		RAMM – emergency costs
1 in 10 years	10.0%	5 to 10 ARI	10.00%	75% of benchmark	50% of benchmark		Estimated on 1/40 and expert judgement
1 in 40 years	2.5%	10 to 40 ARI	7.50%	100% of benchmark	100% of benchmark		Actual 21/22 event repair and response costs (~45M)
1 in 50 years	2.0%	40 to 50 ARI	0.50%	105% of benchmark	110% of benchmark		Estimated on 1/40 and expert judgement
1 in 100 years	0.0%	50 to 100 ARI	1.99%	117% of benchmark	150% of benchmark		Estimated on 1/40 and expert judgement

Hazard events with an ARI of 5 years are deemed frequent events. The damage impacts associated with these events are calculated as the 10-year annual average emergency costs from RAMM database.

Hazard events with an ARI exceeding 5 years are larger events. The damage impacts associated with these larger events are estimated based on the recent 2021/2022 events which are designated to be the baseline event¹. The damage impact factors and the intensity of rainfall for these larger events (shown in the last two columns of Table 3-1) are estimated and provided by Flooding and Geotechnical expert inputs.

The damage impacts, expressed in dollar terms, are the total event risk costs incurred as a result of a hazard event with a specific ARI. The total emergency costs are then annualised (following the annualization method in Research Report 670) as annual average event risk costs and take into account in the assessment as the baseline estimates.

The baseline annual average event risk cost was estimated separately for each area within the Sounds and was found to range from \$150,000 p.a. for Te Hoiere/ Pelorus to \$4.8M p.a. for Kenepuru.

¹ The probability of the 21/22 events were estimated as 1/40 based on the long term cumulative and daily rainfall data from the Linkwater site (1938-2022). Refer Appendix A of the MSFAS Hazard Report https://www.marlborough.govt.nz/repository/libraries/id:2ifzri1o01cxbymxkvwz/hierarchy/documents/services/Roads-and-transport/msfas-background-list/MSFAS_Geology_hazard_report_15062023%20WEB.pdf

4 Strategy effectiveness of event risk mitigation

Given the various improvement and repair strategies, the proposed intervention programmes will outperform the do-minimum option in terms of the effectiveness of mitigating, absorbing, and recovering from the impacts of future damage events.

4.1 Do-minimum

The Do Minimum is outlined in Section 7 of the PBC. For the purposes of economic evaluation it is assumed that:

- There will be no further investment/capital works.
- There are speed restrictions in place on sections of the Kenepuru road network with temporary signals spread across Te Aumiti/ French Pass and Queen Charlotte
- Existing annual road maintenance will continue at \$4.4M
- Existing annual marine maintenance will continue at \$60,000 p.a., spread across the areas with the exception of Te Hoiere/ Pelorus.
- The costs of future events will increase (outlined below)

Under the do-minimum case, it is assumed that no further (capital) repairs or improvements will be carried out, and that ongoing maintenance cost that are of similar scale to the historical maintenance costs recorded in RAMM database will continue. Given these assumptions, the previous damage (caused by the 21/22 benchmark disruptive events) will not have been fully repaired and will reactivate, plus additional areas will be damaged. E.g. any future events under the do-minimum case which lacks repairs and improvements are likely to result in more damage than what has been observed to date, requiring event risk costs higher than the baseline estimates.

The actual costs data recorded in the 2021 versus 2022 events corroborated this:

- the number of repairs needed increased by three times,
- the overall cost of response to open roads increased by more than three times,
- the increase of cost of existing damage examples factor ranging between 1.1 to 4.8, with an average of over 2.

Based on these observations, do-minimum multiplication factors of 1.5x (or 150%) for small and for large events were conservatively adopted. Sensitivity testing on other multiplication factors of 125%, 150% and 200% has also been considered.

4.2 Intervention programmes with treatment strategies

As all the proposed intervention programmes include treatment strategies like repairs and improvements, the starting point, following completion of repairs is the baseline event risk estimates (explained in Section 3), which is lower than that in the do-minimum case scenario.

The programmes is based on a range of segment level strategies that differ from segment to segment and by area. The segment strategies, outlined in Section 8.5, range from Ai (Build back stronger) to D (Retreat).

Each of these segment strategies had an effectiveness factor assigned based on geotechnical and flooding expert input on the potential changes to the key underlying resilience risk across the Sounds – human induced slope instability.

The effectiveness factors were then applied to reducing the event cost as a result of improved resilience. The factors are summarised in Table 13-2 for year 20, with Figure 13-1 showing the change over time. For example, a segment with a Bi strategy would see a 30% reduction in event cost by year 20.

There are three types of improvements included in the programme – roading repairs, roading improvements and marine improvements. The effectiveness relates to the roading repairs and improvements only. Marine costs are therefore included in the capital costs, but do not directly result in any event cost savings.

Once the repairs are complete by year 4, event costs will revert from the 'Do Minimum' costs to the lower 'Baseline' costs. It is also assumed that any repairs will be undertaken to a higher standard, resulting in resilience improvements, and therefore would account for 20% of the segment level strategy effectiveness.

The improvements account for the remainder of the effectiveness and gradually build over the 20 year programme. Beyond the 20 year improvement programme, as events occur and repairs are made, further improvements in effectiveness are anticipated up to the residual risk cap set by Ai strategy (i.e. there is a limit to the impact that resilience improvements can have). For the lower intervention strategies, this residual risk cap may not be reached during the analysis period.

A range of sensitivity testing on the event cost risk assumptions has been undertaken and summarised in Section 13.5 below.

Table 4-1: An Overview of Strategy Effectiveness

Strategy	Effectiveness (Year 20)			Split of Effectiveness	
	Base	Low Sensitivity	High Sensitivity	Repairs (% of Base)	Improvements (% of Base)
Ai	50%	40%	70%	20%	80%
Aii	50%	40%	70%	20%	80%
Bi	30%	25%	45%	20%	80%
Bii	30%	25%	45%	20%	80%
C	10%	0%	20%	20%	80%
D	0%	0%	0%	0%	0%

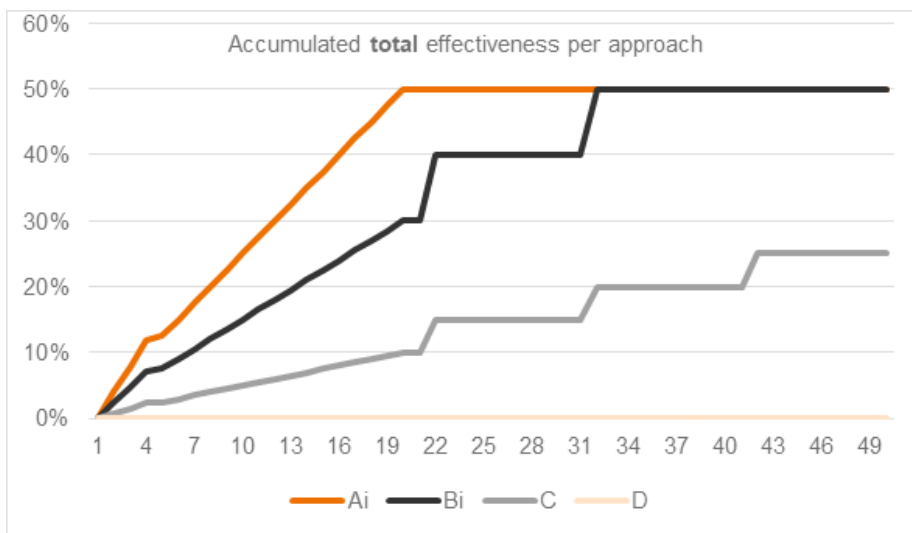


Figure 4-1: Total effectiveness over time

5 Travel Time and Vehicle Operating Costs

Conventional travel time and vehicle operating costs relating to the restrictions in the Do Minimum have been assessed for each area at a segment level.

Existing volumes have been adopted from RAMM based on 2022/2023 ADT estimates while 'baseline' speeds have been determined from Waka Kotahi's MegaMaps tool. The Do Minimum speeds have been assumed to be 30 km/h for segments within Kenepuru with speed restrictions (Refer Section 7) while temporary signals are assumed to have a 30 second impact for affected segments (eight sites spread across Te Aumiti/ French Pass and Queen Charlotte).

Travel time benefits relate to the segment travel times with the Do Minimum restrictions compared to the 'baseline' travel times, based on a Rural Other value of time of \$48.61 per hour.

Similarly, vehicle operating costs relate to the difference in speeds and speed change cycles (e.g. temporary signals) between the 'baseline' and Do Minimum restrictions. Base running costs and additional vehicle operating costs due to speed change cycles have been based on the Rural Other values in line with the MBCM.

It is assumed that following the repairs, these restrictions will be lifted, allowing the speeds to return to the 'baseline' levels, resulting in travel time and vehicle operating cost savings. Any further improvements would not impact these conventional benefits, and therefore there is assumed to be minimal difference between the programmes in terms of conventional travel time and vehicle operating savings.

Travel time and vehicle operating costs are assumed to grow at a nominal 1% over the analysis period. As there are no permanent count sites within the Sounds, comparison of historic traffic counts to obtain a reliable estimate over a long period is not possible; however, comparison of 2015/16 counts to 2022/23 does show growth of varying levels across the Sounds.

6 Road user costs from Disruption Events

In addition to conventional travel time and VOC outlined above, there are further probability based road user benefits relating to reduced impacts from a future event (e.g. reduced road closure duration due to improved resilience). The overall disruption cost would be a function of the incremental road user cost (e.g. additional cost of a detour) and the probability of such an event.

6.1 Average Annual Closure Duration

Detailed closure information at a segment level for each area was available for the benchmark 1/40 event from 21/22. The average closure duration at an area level varied from 28 days for Pelorus to 89 days for Port Underwood. However, prior to 21/22, there was no formal incident/event database (e.g. such as Traffic Road Event Information System (TREIS) for the State Highway network).

As a result, estimation of future average annual closure duration was undertaken using the same probability based annualisation process as for the Event Costs (refer Section 3 and 4 above). This was based on Research Report 670 and used data at a segment level using the 21/22 closure data for the 1/40 event and an assumed 2 hour annual closure. It was assumed that the percentages for damage used in the disruption cost assessment would also apply to the closure duration – e.g. a 1/100 year event would have 150% of the damage and closure duration as the benchmark 1/40 event (refer Table 3-1).

This process resulted in baseline average annual closure durations ranging from 4 days (French Pass, Pelorus) to 10 days (Port Underwood). It is important to note that the overall disruption cost is a function of the probability and the detour cost; therefore, a high closure duration for segment with a viable alternate route may not result in significant road user costs.

		Avg Closure Duration(s) - days					21/22	
		10year annual average	1 in 10 years	1 in 40 years	1 in 50 years	1 in 100 years	Average Annual Closure Duration (days)	Average Annual Closure Duration (Hours)
FRENCH PASS	Do-minimumFRENCH PASS	0.2	18	36	40	54	4	107
QUEEN CHARLOTTE	Do-minimumQUEEN CHARLOTTE	0.2	24	47	52	71	6	137
KENEPURU	Do-minimumKENEPURU	0.2	19	38	42	57	5	113
PELORUS	Do-minimumPELORUS	0.2	14	28	31	42	4	86
PORT UNDERWOOD	Do-minimumPORT UNDERWOOD	0.2	44	87	96	131	10	245

As for the disruption event costs, in the Do Minimum, without repairs, the future event duration would be higher by a factor of 1.5x (or 150%).

6.2 Road User Costs

Road user costs relating to disrupted trips have been split into diverted trips, waiting trips, cancelled trips or those or trips which would be unaffected, based on Research Report 670. For the Sounds, due to the length of likely closures and the lack of viable roading alternate routes 'waiting trips' have been adopted as 0% of ADT.

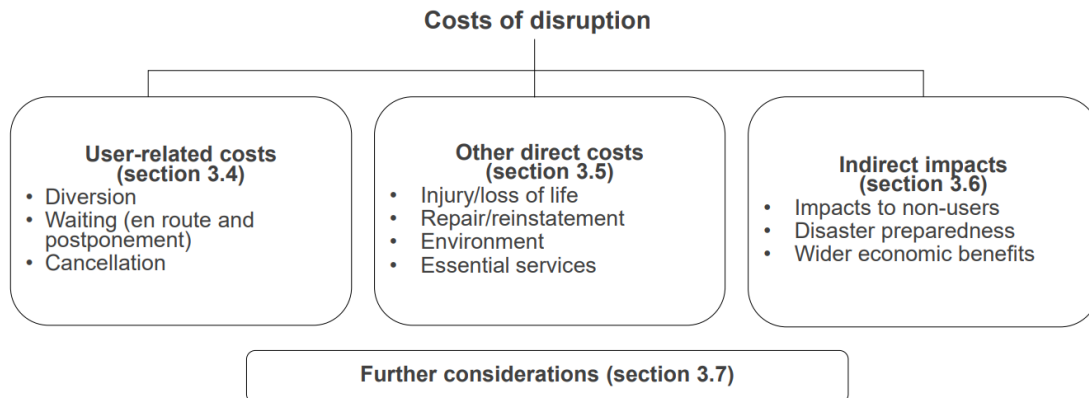


Figure 6-1 : Costs of Disruption (Source: Waka Kotahi Research Report 670)

The remaining trips assumed the following split:

- Diverted trips: 37.5% of ADT (sensitivity at 25% and 60%)
- Cancelled trips: 37.5% of ADT (Sensitivity at 25% and 30%)
- Unaffected trips: 25% of ADT (sensitivity at 50% and 10%)

Diverted trips were costed based on the incremental travel time of the detour route (either by marine or by road) compared to the existing trip. The majority of the segments within the sounds do not have a viable roading alternate route (with the exception of Queen Charlotte and some parts of Port Underwood and Pelorus). This means that in a disruptive event, access would need to be via marine services/boat. An estimate of marine detour travel time was based on the travel time from the segment midpoint to the closest marine hub and then travelling by boat at 30km/h to the closest key destination with State Highway access (e.g. destinations of Nelson, Havelock, Picton etc).

A marine travel time penalty of 2 was applied to the travel time to account for the reduced attractiveness, frequency limitations and other restrictions (e.g. infrastructure, loading/unloading). This is considered to be conservative and likely to underestimate the true cost of marine as a detour, primarily due to the service limitations limited viability (e.g. frequency) and sensitivity testing with factors of 1 and 4 was therefore undertaken to gauge the impact of this assumption (Refer Section 7.1 below).

While some trips can be cancelled with minimal cost, others can be delayed but not cancelled. Where trips are cancelled, these do have a cost. Research Report 670 identifies that cancelled trips can be assumed to have a cost equal to the rule of half – an average between no cost and the minimum diversion cost. A further proportion of trips could be unaffected – these could be short local trips or trips that already used marine services and therefore would have minimal incremental cost in an event.

The total diversion cost was estimated as a sum of the trip types above, based on the Rural Other value of time and the segment ADT. This is then multiplied by the annual average closure duration by segment.

Benefits of the preferred programme relate to the intervention strategies effectiveness (refer PBC, Section 13.3.1) reducing the duration of future closures. It is assumed that repairs are complete by year 4, the average closure duration will revert from the 'Do Minimum' costs to the lower 'Baseline' duration. It is also assumed that any repairs will be undertaken to a higher standard, resulting in resilience improvements, and therefore would account for 20% of the segment level strategy effectiveness. The improvements account for the remainder of the effectiveness and gradually build over the 20 year programme.

7 Cost Benefit Analysis

Table 7-1 provides a summary of the cost benefit analysis and BCR for the preferred programme² based on a 40-year evaluation period with a 4% discount rate and the expected cost estimate (P50) for the base and two key sensitivity tests. In **Table 7-1** green cells indicate BCRs greater than one or PV cost savings, and red cells indicate BCR less than one.

Table 7-2 overleaf provides a detailed breakdown of the different cost and benefit elements for each area.

Overall, the programme BCR is **1.8** resulting in a 'Low' efficiency rating with a BCR between 1 and 3. Under the base scenario, the only areas with a BCR less than one are Pelorus (0.1) and French Pass (0.7).

The BCR of the Preferred Programme has increased from the previous stage due to the review and reduction in marine intervention costs coupled with updated phasing of marine interventions to occur over a longer time period.

Key sensitivity tests show the Preferred Programme BCR ranges from 0.8 to a PV cost saving of \$12M (a present value cost saving means that regardless of the benefits, the programme approach provides a cost saving compared to the Do Minimum). A full suite of sensitivity tests are outlined in Section 8 below.

Table 7-1: Refined Preferred Programme NPV (\$M), NPV Benefits (\$M) and BCR

Zone	Do Minimum Factor: 150% / 200%			150% / 150% (Base)			125% / 125%		
	NPV	Benefits	BCR	NPV	Benefits	BCR	NPV	Benefits	BCR
Te Aumiti/ French Pass (Road Access)	\$11	\$25	2.2	\$24	\$18	0.7	\$31	\$14	0.4
Te Hoiere/ Pelorus (Road Focus)	\$2	\$0	0.2	\$3	\$0	0.1	\$4	\$0	0.0
Queen Charlotte (Road Focus/ Road Access)	-\$18	\$20	-PV	-\$5	\$17	-PV	\$4	\$15	3.4
Kenepuru (Balanced)	-\$2	\$60	-PV	\$30	\$55	1.8	\$61	\$52	0.9
Te Whanganui/ Port Underwood (Road Access)	-\$4	\$7	-PV	\$2	\$4	2.7	\$7	\$3	0.4
Total	-\$12	\$112	-PV	\$53	\$94	1.8	\$107	\$83	0.8

² Refer PBC Section 10.6 for a comparison of the different programmes by area.

Table 7-2: Detailed Benefit Costs Preferred Programme

Area	PV Costs (\$M)							PV Benefits				BCR
	PV Repair	PV Improvements	PV Road Maintenance	PV Marine Capital	PV Marine Mtce	PV Disruption Risk (Repair and Improvement)	PV Total (Cost)	PV TTC	PV VOC	PV Disruption TTC	PV Benefits (total)	
FRENCH PASS	\$25.4	\$11.0	-\$0.2	\$6.1	\$3.2	-\$22.0	\$23.5	\$4.8	\$0.2	\$13.0	\$18.0	0.7
QUEEN CHARLOTTE	\$13.9	\$5.4	\$0.0	\$5.7	\$2.5	-\$32.9	-\$5.3	\$9.4	\$0.3	\$7.0	\$16.8	-PV
KENEPURU	\$87.5	\$9.4	\$0.2	\$12.1	\$14.3	-\$93.4	\$30.2	\$43.1	\$2.8	\$8.8	\$54.8	1.8
PELORUS	\$2.9	\$3.0	\$0.3	\$0.0	\$0.0	-\$2.9	\$3.2	\$0.0	\$0.0	\$0.2	\$0.2	0.1
PORT UNDERWOOD	\$10.7	\$6.8	\$0.0	\$1.8	\$0.0	-\$17.8	\$1.5	\$0.0	\$0.0	\$4.2	\$4.2	2.7
Total	\$140.4	\$35.6	\$0.3	\$25.7	\$20.0	-\$168.9	\$53.1	\$57.4	\$3.3	\$33.3	\$94.0	1.8

7.1 Sensitivity Testing

Sensitivity analysis plays an important role in understanding the impact of key assumptions on the overall case for investment, particularly during the development of a PBC. It involves defining a range of potential values for an uncertain variable in the evaluation and reviewing the variation in the evaluation as the variable changes within the range.

The following tests have been undertaken, by varying the factors which are the most influential to the overall BCR, focusing on cost, programme and benefit variables.

Table 7-3: Refined Preferred Programme Sensitivity Analysis (red shading indicates BCR less than 1, light green BCR 1-3 and dark green BCR 3+)

Variable	Sensitivity	Item	PV Cost	BCR
Cost Variability	Low	100% Contingency (Repairs and Improvements) – P95	\$126M	0.7
	Base	50% Contingency Improvements 30% Contingency Repairs – P50	\$53M	1.8
	High	30% Contingency (Repairs and Improvements)	\$34M	2.7
Do-Min Event Factor (Impacts damage and closure duration)	Low	125% small events, 125% large events	\$107M	0.8
	Base	150% small events, 150% large events	\$53M	1.8
	High	150% small events, 200% large events	-\$12M	N/A as PV Cost Saving
Discount Rate	Low	6%	\$82M	0.8
	Base	4%	\$53M	1.8
	High	3%	\$30M	3.8
Climate Change Growth (Impacts future event cost and closures)	Low	1%	\$75M	1.2
	Base	2%	\$53M	1.8
	High	3%	\$31M	3.2
Segment Strategy Effectiveness (Resilience Improvement %)	Low	-20% from base segment strategy (e.g. Ai 30% by year 20)	\$63M	1.4
	Base	Base segment strategy % (e.g. Ai 50% by year 20)	\$53M	1.8
	High	+20% to the base segment strategy (e.g. Ai 70% by year 20)	\$28M	3.5
Repairs and Improvements	Low	30% effectiveness from Repairs, 70% from Improvements	\$51M	1.8
	Base	20% effectiveness from Repairs, 80% Improvements	\$53M	1.8
	High	10% effectiveness from Repairs, 90% Improvements	\$55M	1.7
Marine Costs	Low	N/A		
	Base	Include Marine Costs	\$53M	1.8
	High	Exclude Marine Costs	\$7M	12.8
Travel Time and VOC Do-Min restrictions	Low	N/A		
	Base	Do-Minimum current restrictions only (e.g. 30km/h along parts of Kenepuru)	\$53M	1.8
	High	Do-Minimum includes further 30km/h restrictions across the Sounds	\$53M	8.4
Traffic Growth Rate	Low	0%	\$49M	1.7
	Base	1%	\$53M	1.8
	High	2%	\$57M	1.8
Disruption Diversion Assumptions	Low	25% trips diverted 25% cancelled 50% trips unaffected	\$53M	1.5
	Base	37.5% trips diverted and cancelled	\$53M	1.8

Variable	Sensitivity	Item	PV Cost	BCR
		25% trips unaffected		
	High	60% trips diverted 30% trips cancelled 10% trips unaffected	\$53M	2.0
Marine Travel Time Penalty (to account for frequency and other limitations)	Low	No penalty – factor of 1	\$53M	1.4
	Base	Penalty factor of 2	\$53M	1.8
	High	Penalty factor of 4	\$53M	2.4

The sensitivity analysis identified the following:

- Overall, the Preferred Programme has a BCR which is robust in the ‘Low BCR 1-2.9’ range across the majority of sensitivity tests.
- The exceptions include the 95th percentile cost (BCR 0.7), which assumes that events under the Do Minimum would only be 25% worse than the baseline (BCR 0.8) and a higher 6% discount rate (BCR 0.8).
- Sensitivity tests that would result in the programme BCR resulting in having a “Medium BCR 3-5.9” or higher include:
 - Excluding marine intervention costs increases the BCR to 12.8. This is because while costs for the marine interventions have been included, no benefits have been estimated at the PBC phase.
 - If further speed restrictions were in place across the Sounds as a result of the Do Minimum approach being adopted the BCR would increase to 8.4.
 - If 3% p.a. climate change growth is assumed the BCR increases to 3.2.
 - Strategy effectiveness – if a higher potential resilience improvement percentage is assumed (the strategy is more effective), the BCR increases to 3.5.

8 Summary

The Preferred Programme has been assessed to have a base BCR of 1.8 based on the expected cost estimate and the consideration of a range of costs and benefits relating to conventional travel time and vehicle operating costs through to resilience based disruption costs. Under the base scenario, the Preferred Programmes for Queen Charlotte, Kenepuru and Port Underwood areas all result in BCRs above 1 or present value cost savings. The French Pass and Pelorus areas have area level BCRs less than 1.0; however, these areas are balanced by considering the Preferred Programme as a package of investment across the Sounds.

Table 8-1: Preferred Programme Summary BCR

Area	Strategy	Do-min Factor: 150/150% (Base)		
		NPV Cost	NPV Benefits	BCR
FRENCH PASS	Road Access	\$24	\$18	0.7
QUEEN CHARLOTTE	Road Focus	-\$5	\$17	-PV
KENEPURU	Balanced	\$30	\$55	1.8
PELORUS	Road Focus	\$3	\$0	0.1
PORT UNDERWOOD	Road Access	\$2	\$4	2.7
Total		\$53	\$93	1.8

Sensitivity analysis plays an important role in understanding the impact of key assumptions on the overall case for investment, particularly during the development of a PBC. A suite of sensitivity testing shows that the BCR is robust in the ‘Low BCR 1-2.9’ range. The exceptions include the 95th percentile cost (BCR 0.7), assuming events under the Do-minimum would only be 25% worse than the baseline (BCR 0.8) and a higher 6% discount rate (BCR 0.8). Sensitivity tests that would result in the programme BCR having a “Medium BCR 3-5.9” or higher rating involve excluding marine investment (BCR 12.8), including higher climate change growth, further speed restrictions in the Do-Minimum or higher strategy effectiveness values.

Appendix W Funding Cashflow Tables

W.1 Capital cost by line item, funding source, and year to the nearest \$1,000

Year	Studies (Road: 51% FAR, Marine: 0% FAR)			Road Repairs (71% FAR)			Road Improvements (51% FAR)			Marine Improvements (0% FAR)			Total Cost		
	Rates	NLTF	TOTAL	Rates	NLTF	TOTAL	Rates	NLTF	TOTAL	Rates	NLTF	TOTAL	Rates	NLTF	TOTAL
0	-	-	-	\$1,450,000	\$3,550,000	\$5,000,000	-	-	-	-	-	-	\$1,450,000	\$3,550,000	\$5,000,000
1	\$2,617,000	\$383,000	\$3,000,000	\$13,670,000	\$33,467,000	\$47,137,000	\$341,000	\$355,000	\$696,000	-	-	-	\$16,628,000	\$34,205,000	\$50,833,000
2	\$2,617,000	\$383,000	\$3,000,000	\$13,670,000	\$33,467,000	\$47,137,000	\$341,000	\$355,000	\$696,000	-	-	-	\$16,628,000	\$34,205,000	\$50,833,000
3	\$2,617,000	\$383,000	\$3,000,000	\$13,670,000	\$33,467,000	\$47,137,000	\$341,000	\$355,000	\$696,000	-	-	-	\$16,628,000	\$34,205,000	\$50,833,000
4	\$367,000	\$383,000	\$750,000	-	-	-	\$341,000	\$355,000	\$696,000	\$2,700,000	-	\$2,700,000	\$3,408,000	\$738,000	\$4,146,000
5	-	-	-	-	-	-	\$1,365,000	\$1,420,000	\$2,785,000	\$2,700,000	-	\$2,700,000	\$4,065,000	\$1,420,000	\$5,485,000
6	-	-	-	-	-	-	\$1,365,000	\$1,420,000	\$2,785,000	\$345,000	-	\$345,000	\$1,710,000	\$1,420,000	\$3,130,000
7	-	-	-	-	-	-	\$1,365,000	\$1,420,000	\$2,785,000	\$345,000	-	\$345,000	\$1,710,000	\$1,420,000	\$3,130,000
8	-	-	-	-	-	-	\$1,365,000	\$1,420,000	\$2,785,000	\$345,000	-	\$345,000	\$1,710,000	\$1,420,000	\$3,130,000
9	-	-	-	-	-	-	\$1,365,000	\$1,420,000	\$2,785,000	\$345,000	-	\$345,000	\$1,710,000	\$1,420,000	\$3,130,000
10	-	-	-	-	-	-	\$1,365,000	\$1,420,000	\$2,785,000	\$345,000	-	\$345,000	\$1,710,000	\$1,420,000	\$3,130,000
11	-	-	-	-	-	-	\$1,365,000	\$1,420,000	\$2,785,000	\$2,574,000	-	\$2,574,000	\$3,939,000	\$1,420,000	\$5,359,000
12	-	-	-	-	-	-	\$1,365,000	\$1,420,000	\$2,785,000	\$2,574,000	-	\$2,574,000	\$3,939,000	\$1,420,000	\$5,359,000
13	-	-	-	-	-	-	\$1,365,000	\$1,420,000	\$2,785,000	\$2,574,000	-	\$2,574,000	\$3,939,000	\$1,420,000	\$5,359,000
14	-	-	-	-	-	-	\$1,365,000	\$1,420,000	\$2,785,000	\$2,574,000	-	\$2,574,000	\$3,939,000	\$1,420,000	\$5,359,000
15	-	-	-	-	-	-	\$1,365,000	\$1,420,000	\$2,785,000	\$2,574,000	-	\$2,574,000	\$3,939,000	\$1,420,000	\$5,359,000
16	-	-	-	-	-	-	\$1,365,000	\$1,420,000	\$2,785,000	\$1,500,000	-	\$1,500,000	\$2,865,000	\$1,420,000	\$4,285,000
17	-	-	-	-	-	-	\$1,365,000	\$1,420,000	\$2,785,000	\$1,500,000	-	\$1,500,000	\$2,865,000	\$1,420,000	\$4,285,000
18	-	-	-	-	-	-	\$1,365,000	\$1,420,000	\$2,785,000	\$1,500,000	-	\$1,500,000	\$2,865,000	\$1,420,000	\$4,285,000
19	-	-	-	-	-	-	\$1,365,000	\$1,420,000	\$2,785,000	\$1,500,000	-	\$1,500,000	\$2,865,000	\$1,420,000	\$4,285,000
20	-	-	-	-	-	-	-	-	-	\$1,500,000	-	\$1,500,000	\$1,500,000	-	\$1,500,000
21	-	-	-	-	-	-	-	-	-	\$1,500,000	-	\$1,500,000	\$1,500,000	-	\$1,500,000
22	-	-	-	-	-	-	-	-	-	\$1,500,000	-	\$1,500,000	\$1,500,000	-	\$1,500,000
23	-	-	-	-	-	-	-	-	-	\$1,500,000	-	\$1,500,000	\$1,500,000	-	\$1,500,000
24	-	-	-	-	-	-	-	-	-	\$1,500,000	-	\$1,500,000	\$1,500,000	-	\$1,500,000
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	\$8,218,000	\$1,532,000	\$9,750,000	\$42,460,000	\$103,951,000	\$146,411,000	\$21,836,000	\$22,720,000	\$44,559,000	\$33,495,000	-	\$33,495,000	\$106,012,000	\$128,203,000	\$234,215,000



W.2 Operating costs by line item, funding source, and year to the nearest \$1,000

Year	Existing Road Maintenance (51% FAR)			Existing Marine Maintenance (0% FAR)			New Marine Maintenance (0% FAR)			Total		
	Rates	NLTF	TOTAL	Rates	NLTF	TOTAL	Rates	NLTF	TOTAL	Rates	NLTF	TOTAL
0	-	-	-	-	-	-	-	-	-	-	-	-
1	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	-	-	-	\$2,247,000	\$2,276,000	\$4,523,000
2	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	-	-	-	\$2,247,000	\$2,276,000	\$4,523,000
3	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	-	-	-	\$2,247,000	\$2,276,000	\$4,523,000
4	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	-	-	-	\$2,247,000	\$2,276,000	\$4,523,000
5	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$500,000	-	\$500,000	\$2,747,000	\$2,276,000	\$5,023,000
6	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$500,000	-	\$500,000	\$2,747,000	\$2,276,000	\$5,023,000
7	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$500,000	-	\$500,000	\$2,747,000	\$2,276,000	\$5,023,000
8	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$500,000	-	\$500,000	\$2,747,000	\$2,276,000	\$5,023,000
9	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$500,000	-	\$500,000	\$2,747,000	\$2,276,000	\$5,023,000
10	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$500,000	-	\$500,000	\$2,747,000	\$2,276,000	\$5,023,000
11	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$500,000	-	\$500,000	\$2,747,000	\$2,276,000	\$5,023,000
12	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$600,000	-	\$600,000	\$2,847,000	\$2,276,000	\$5,123,000
13	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$700,000	-	\$700,000	\$2,947,000	\$2,276,000	\$5,223,000
14	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$800,000	-	\$800,000	\$3,047,000	\$2,276,000	\$5,323,000
15	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$900,000	-	\$900,000	\$3,147,000	\$2,276,000	\$5,423,000
16	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$1,000,000	-	\$1,000,000	\$3,247,000	\$2,276,000	\$5,523,000
17	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$1,050,000	-	\$1,050,000	\$3,297,000	\$2,276,000	\$5,573,000
18	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$1,100,000	-	\$1,100,000	\$3,347,000	\$2,276,000	\$5,623,000
19	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$1,150,000	-	\$1,150,000	\$3,397,000	\$2,276,000	\$5,673,000
20	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$1,200,000	-	\$1,200,000	\$3,447,000	\$2,276,000	\$5,723,000
21	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$1,250,000	-	\$1,250,000	\$3,497,000	\$2,276,000	\$5,773,000
22	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$1,300,000	-	\$1,300,000	\$3,547,000	\$2,276,000	\$5,823,000
23	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$1,350,000	-	\$1,350,000	\$3,597,000	\$2,276,000	\$5,873,000
24	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$1,400,000	-	\$1,400,000	\$3,647,000	\$2,276,000	\$5,923,000
25	\$2,187,000	\$2,276,000	\$4,463,000	\$60,000	-	\$60,000	\$1,450,000	-	\$1,450,000	\$3,697,000	\$2,276,000	\$5,973,000
Total	\$54,672,000	\$56,903,000	\$111,575,000	\$1,500,000	-	\$1,500,000	\$18,750,000	-	\$18,750,000	\$74,922,000	\$56,903,000	\$131,825,000



Appendix X Risk Register

Category		Description	Cause	Consequence	Risk		
					Likelihood	Consequence	Level
Stakeholders and Funding	1	Heritage and Iwi rights and interests not adequately included or addressed.	Heritage NZ and Iwi have not been significantly involved in PBC consultation/engagement.	May not support preferred programme, risk of challenges in consenting and delivering leading to delays and adding costs, outcomes not achieved.	Likely	Severe	Critical
	2	KSCRA have political power and may manoeuvre to reduce support for preferred programme	KSCRA submission asking for many clarifications.	May impact support for preferred programme, lead to changes, add delay	Likely	Moderate	High
	3	MDC cannot afford to fund preferred programme without significant help from central government	Small ratepayer base, costly programme. There is uncertainty about ability to access other (new) funding streams.	May not be able to afford to deliver the preferred programme. May need to deliver less, affecting project outcomes.	Almost Certain	Severe	Critical
	4	The project will need to compete against other MDC priorities for limited funding	Preferred programme may not be affordable, or a priority compared to other Council projects.	May not be able to afford to deliver the preferred programme. May need to deliver less, affecting project outcomes.	Almost Certain	Severe	Critical
	5	Reduced funding nationally	The FAR may be reduced.	May not be able to afford to deliver the preferred programme. May need to deliver less, affecting project outcomes.	Likely	Severe	Critical
Public/Media	6	SCP/LTP consultation yet to happen, and ratepayers may not support higher rate meaning less scope can be delivered (Assume a targeted rate is consulted on)	SCP consultation yet to happen	Will lead to reduced scope and affect outcomes	Possible	Moderate	Medium
Legal / Compliance	7	There may be litigation if stakeholders do not support the preferred option	Some stakeholders may take a legal route if there is disagreement	Project is delayed or not delivered; project outcomes not realised	Likely	Moderate	High



Category		Description	Cause	Consequence	Risk		
					Likelihood	Consequence	Level
Legal / Compliance cont.	8	Assumption is that Council and WK are legally required to provide access to all properties, but this is under review following cyclone Gabrielle	NZ is at an early stage in deciding where liability lies for private property access	If responsibility for providing access to all properties (even red stickered) changes the PBC will have to be rescoped leading to delays, etc	Possible	Minor	Medium
Delivery	9	Public dwellings are involved at some sites	Potential for confusion/adding delay where private and public contractors need to work side by side	May lead to delay	Almost Certain	Minor	Medium
	10	May not be able to secure a contractor, or contractor may be lower capability	Lack of capacity within contractor / consultant market as many working on NI due to Cyclone Gabrielle response, huge demand currently and lack of resources.	Costs may increase meaning less can be delivered, poorer outcomes, and may slow delivery, or lower quality contractors with flow on effects	Likely	Extreme	Critical
	11	Highly complex programme which also includes maintenance	Five different workstreams which are all significant	May lead to fragmentation and add delays, and make it harder to achieve outcomes, and add to cost	Possible	Moderate	Medium
	12	Minor event may occur such as moderate storm	Contractors will stop work	May lead to delay	Likely	Minor	Medium
	13	External decision making is slow or poor	Decision making with Waka Kotahi and MDC may be slower than desirable	May lead to delay	Likely	Moderate	High
	14	Further significant storm event before repairs completed (including outside MDC)	A further storm may lead to more damage, and some options may no longer be technically achievable	May add to costs and delay, need to review preferred option, negative impact on morale of ratepayers, judicial review	Possible	Moderate	Medium
	15	May be challenging to get consents for marine infrastructure	There may be opposition to marine infrastructure on environmental grounds.	Process might add delay or marine programme may be unachievable, affecting project outcomes.	Likely	Extreme	Critical



Category		Description	Cause	Consequence	Risk		
					Likelihood	Consequence	Level
Delivery cont.	16	Adaptation Planning approach may change	This PBC is at an early stage for Adaptation Planning in New Zealand and guidance/examples are limited. The approach taken may be superseded by alternative approach	May lead to delays, rework and added cost	Possible	Minor	Medium
Cost	17	Improvements have been decided at a PBC level	May require more detailed work / subsequent business cases	Might be unpalatable and lead to delay in implementing improvements and increase costs to complete work required	Almost Certain	Moderate	High
	18	Costs may be underestimated	May be based on incorrect cost assumptions	Costs may increase, which may affect outcomes	Possible	Severe	High
Health and Safety	19	Remote work, unstable sites	Safety risk to contractor personnel due to remote locations and unstable sites	An incident would lead to delays and add to costs	Unlikely	Extreme	High
	20	Increased crashes and injuries to public on the network after repairs	Solutions compromise safety to save money and have inadequate permanent traffic controls to compensate	Project safety outcomes not delivered	Unlikely	Extreme	High
Health and Safety cont.	21	The public is currently using a damaged roading network, with known safety issues	delays in emergency works due to BC process being required	potential for injuries to road users at specific sites	Unlikely	Extreme	High
Environmental	22	Construction event results in plant/other machinery ending up in the Sounds		Plant/machinery in Sounds, fuel, oils, etc in marine environment	Unlikely	Moderate	Medium
	23	Private vehicle enters the Sounds	Repairs are delayed due to BC process. Preferred Programme includes more one-way sections increasing risk of vehicles off road	Vehicle in Sounds, fuel, oils, etc in marine environment	Unlikely	Moderate	Medium
	24	Construction works destabilises existing slopes	modifications required to repair existing unstable land may trigger another slip	More material in the Sounds	Possible	Moderate	Medium



Category		Description	Cause	Consequence	Risk		
					Likelihood	Consequence	Level
Environmental cont.	25	Some of construction may impact ecologically sensitive areas (eg Te Hoiere/Pelorus)	Some areas of the Sounds are ecologically/environmentally sensitive. Construction work will impact these areas	negative impacts on important areas/flora and fauna	Unlikely	Moderate	Medium
	26	Construction of marine infrastructure	Construction works in the marine environment	Will impact on local marine environment	Almost Certain	Moderate	High
	27	Increased need for dredging	Marine based infrastructure may lead to increased siltation and more boats.	Increased sedimentation, and pollution.	Almost Certain	Severe	Critical
	28	embodied and construction carbon emissions	road repair and improvement work, marine works	contributing CO ₂ to the atmosphere	Almost Certain	Minor	Medium



DESIGN WITH **COMMUNITY** IN MIND

Communities are fundamental. Whether around the corner or across the globe, they provide a foundation, a sense of place and of belonging. That's why at Stantec, we always design with community in mind.

We care about the communities we serve—because they're our communities too. This allows us to assess what's needed and connect our expertise, to appreciate nuances and envision what's never been considered, to bring together diverse perspectives so we can collaborate toward a shared success.

We're designers, engineers, scientists, and project managers, innovating together at the intersection of community, creativity, and client relationships. Balancing these priorities results in projects that advance the quality of life in communities across the globe.

Stantec trades on the TSX and the NYSE under the symbol STN.
Visit us at stantec.com or find us on social media.

Stantec New Zealand
Level 1, 66 Oxford Street, Richmond, Nelson, 7020
PO Box 13052, Christchurch 8141
Tel +64 3 546 8728 | www.stantec.com

