Resilient access for the Marlborough Sounds

Transport Group Conference 2024

Outline

- Context
- Hazard Assessment
- Programme Development
- Programme Assessment
- Preferred Programme
- Where to from here?

Context

Trigger:

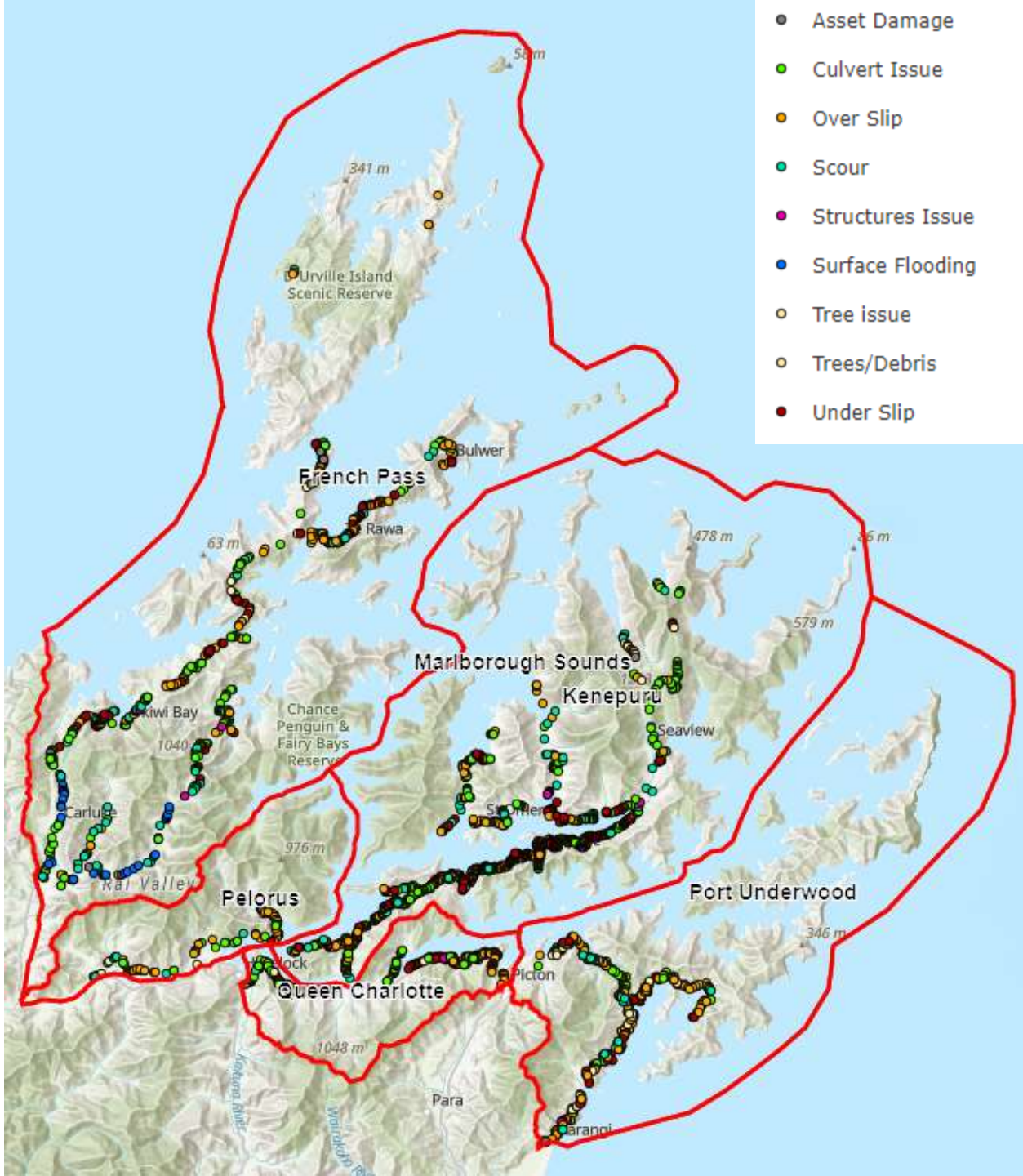
- Four high intensity rain events in just over a year
- ~3,650 faults recorded across 500 km of road

Social:

- 2,100 usually resident
- Over 4,000 visitors/ day at peak
- Over 150 businesses

Transport:

- Roads closed for months
- Existing marine offering is limited/ geared towards visitors



Recovery Approach

Why a business case?

- Determine level of service for immediate recovery taking into account future adaptation
- Provide certainty about future access to the Marlborough Sounds
- Confirm approach for outstanding ~1,800 faults

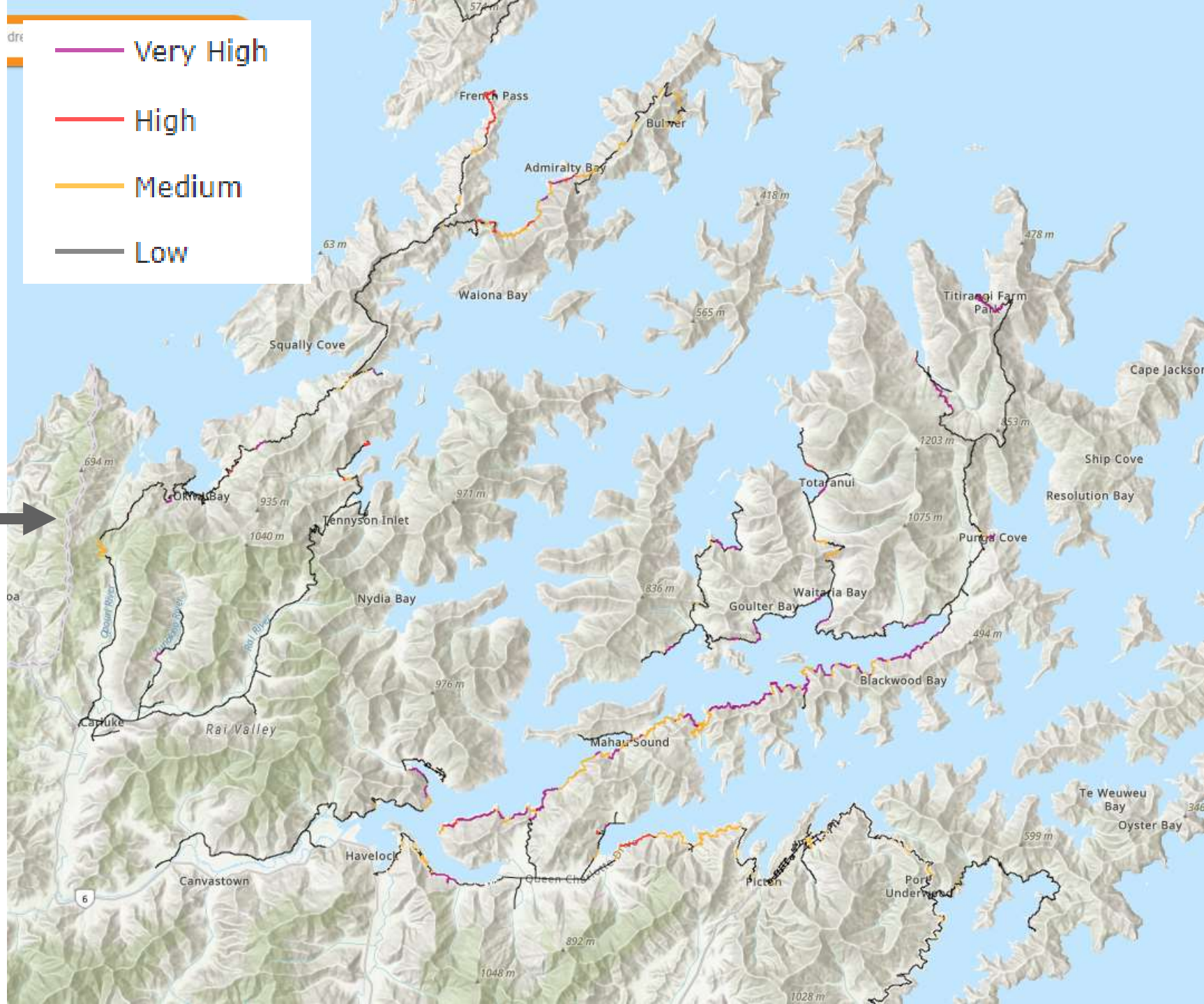
Problems:

- **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

Natural Hazard Assessment

Seven assessments completed:

- Natural slope instability
- Human induced slope instability
- Liquefaction
- Flood inundation
- Coastal inundation and erosion
- Tsunami
- Debris flow



Programme Development: Road Responses

Road Segment Approach			Capital Works	
Approach	**Vehicle Restrictions**	**Lane Width**	**Storm-water**	**Geotech**
Build back stronger	No additional restrictions	As existing	Whole route upgrades	Targeted: existing failures and improvements
Build back stronger	Additional restrictions	More one lane sections	Whole route upgrades	Targeted: existing failures and improvements
Targeted improvements	No additional restrictions	As existing	Targeted upgrades	Essential: address existing failures
Targeted improvements	Additional restrictions	More one lane sections	Targeted upgrades	Essential: address existing failures
Essential repairs	Additional restrictions	More one lane sections	Essential: address existing failures	Essential: address existing failures
Marine Access	Additional restrictions	More one lane sections	Essential: address existing failures	None

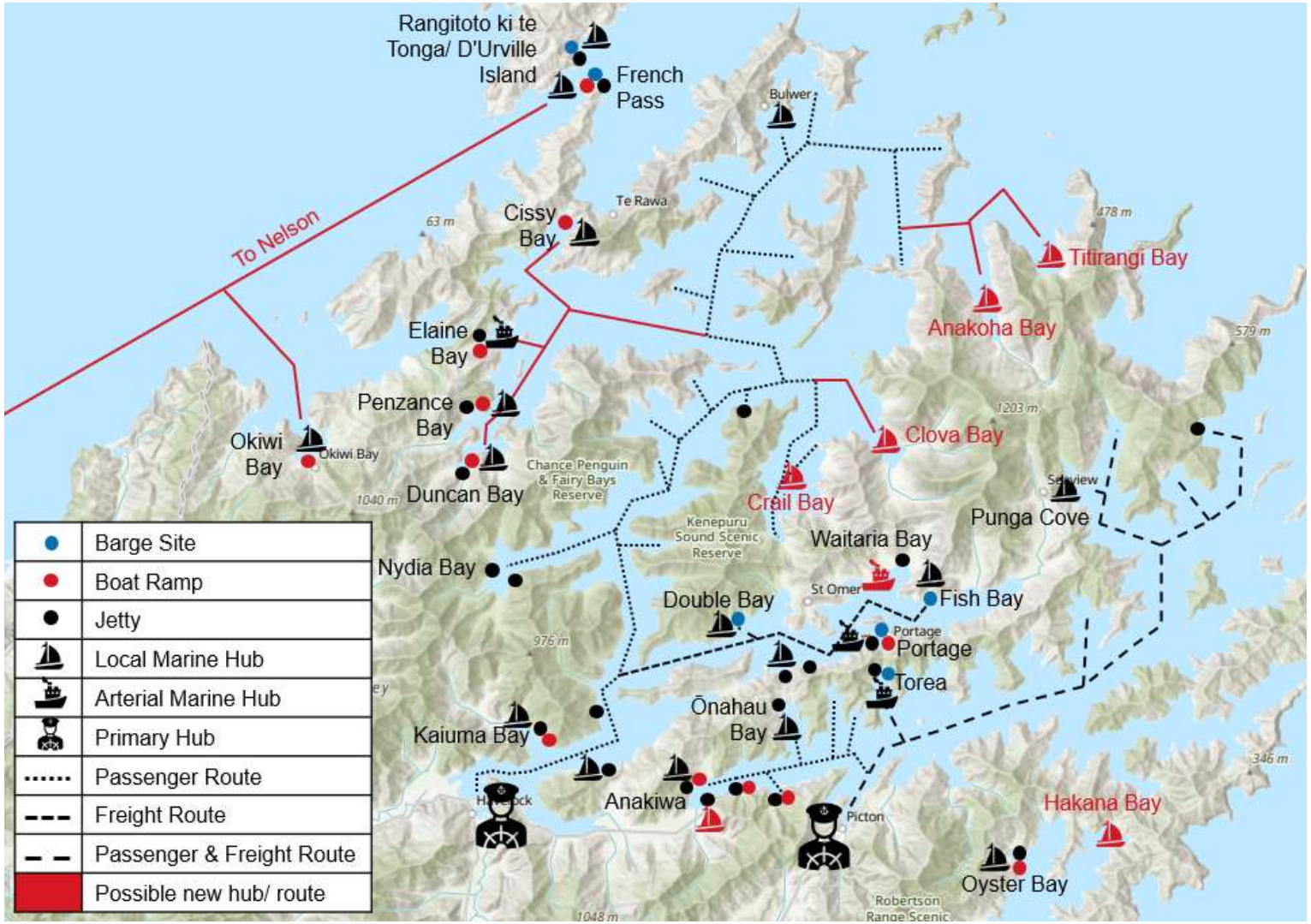
Programme Development: Marine Responses

Identified existing infrastructure

- Primary hubs
- Arterial hubs
- Local hubs

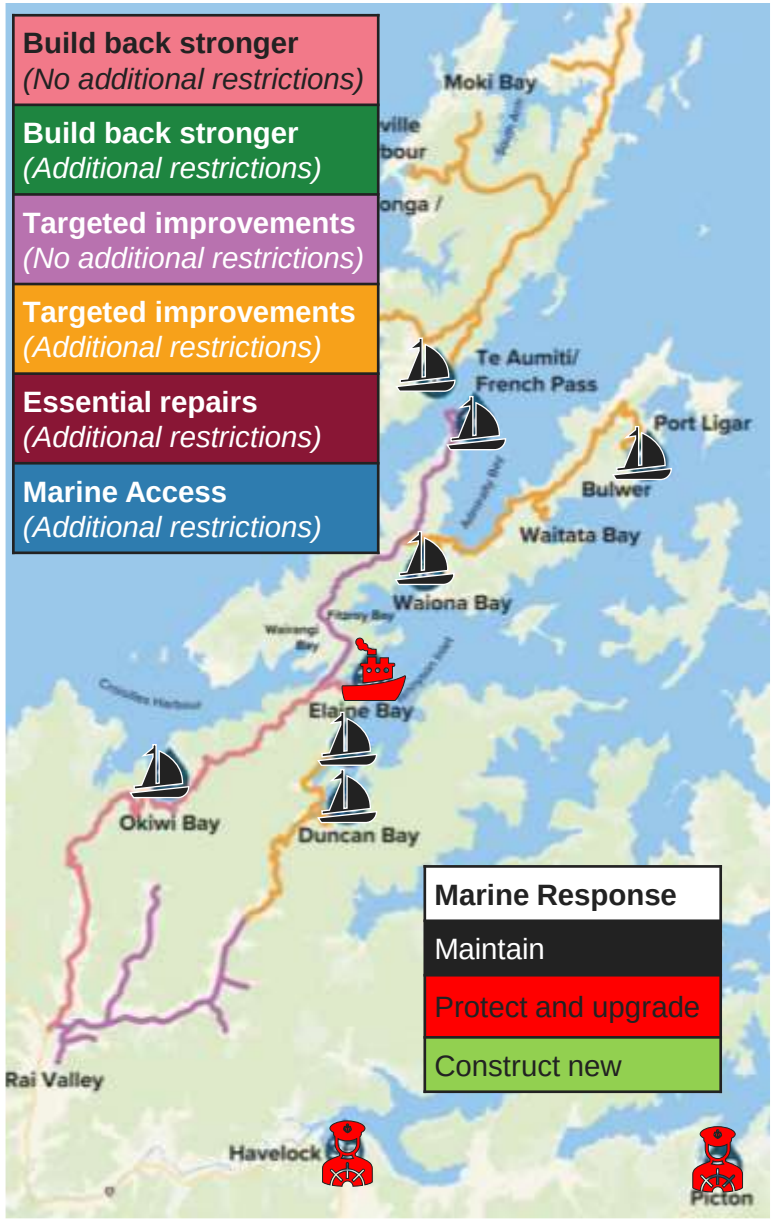
Recovery strategy

- Maintain and protect (BAU)
- Protect and upgrade
- Build new infrastructure



Te Aumiti/French Pass Example Programmes

Road Focus



Balanced

Marine Focus

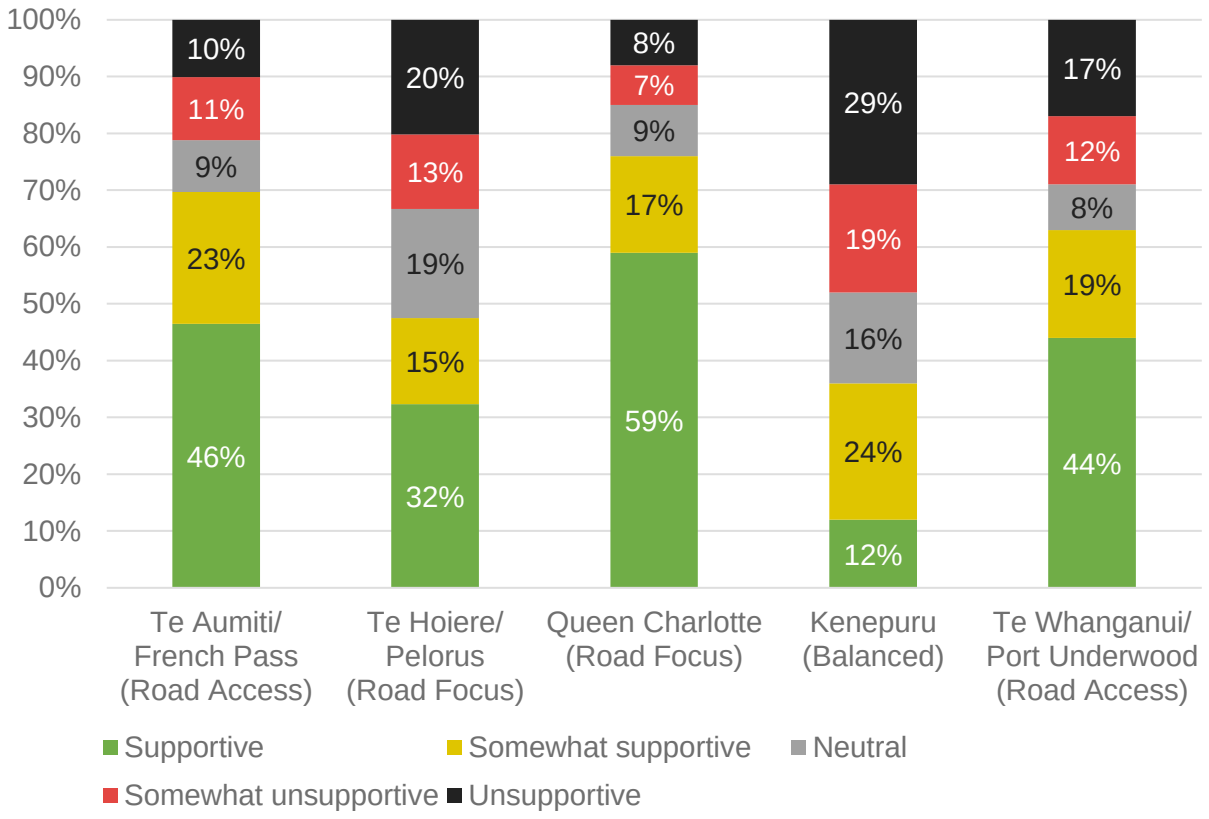
* Initial BCR and cost estimate.

These were recalculated following confirmation of the Emerging Preferred Option

Assessment Method

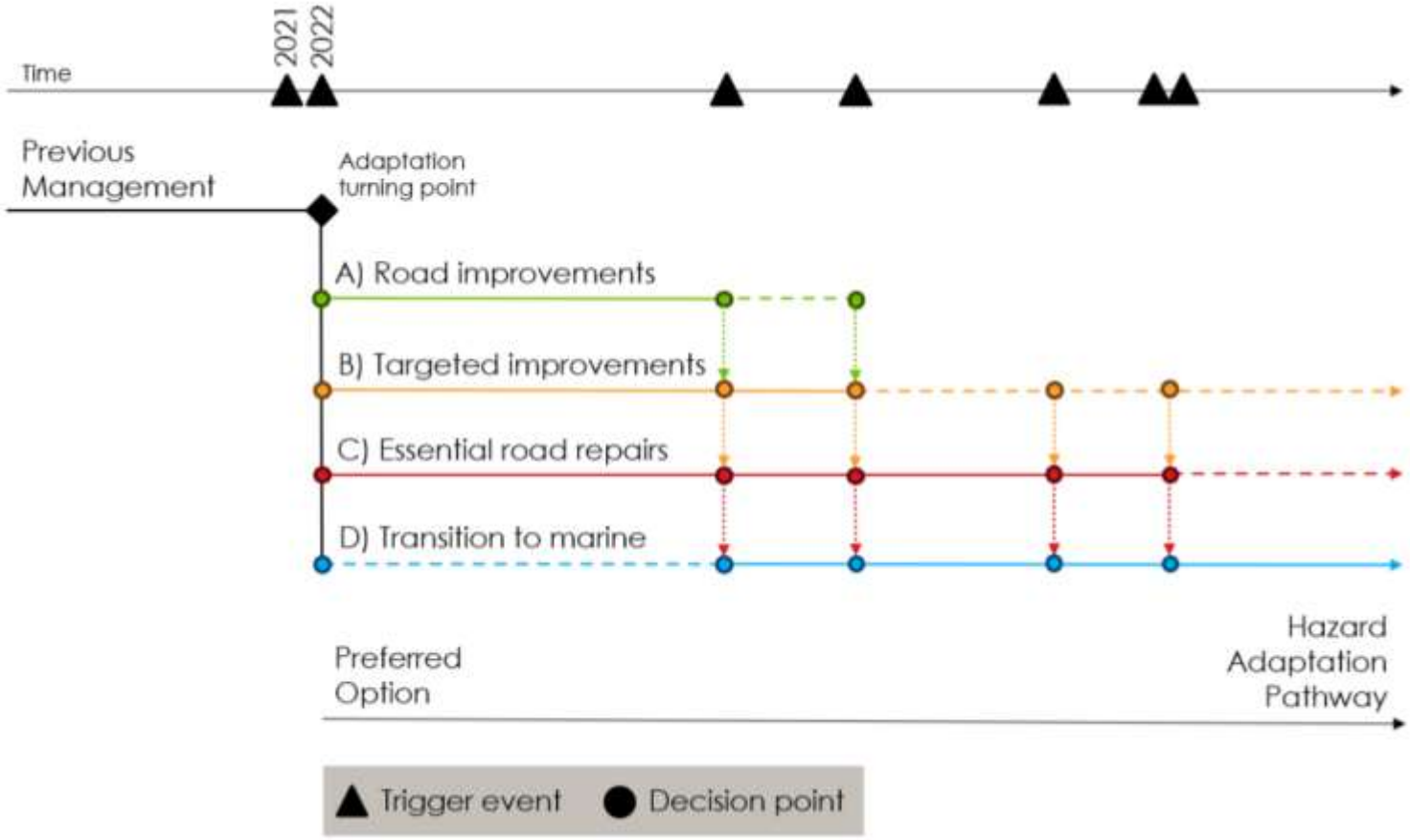
	Consideration	Do Minimum	Road Focus	Road Access	Balanced	Marine Access	Marine Focus
Te Aumiti/ French Pass	Multi Criteria Analysis	-0.36	0.40	0.70	0.88	0.87	-0.16
	Benefit Cost Ratio*	0.30	0.57	0.76	0.83	0.61	0.49
	Wider Economic Impact	2.33	4.06	5.46	5.35	4.1	3.44
	Cost Estimate*	$4.1M	$75.4M	$43.1M	$27.0M	$22.0M	$20.2M
	Likelihood of restoring economic activity	Unlikely	Almost Certain	Almost Certain	Likely	Likely	Possible
	Decision			**EPO**		**HAP**	
Kenepuru	Multi Criteria Analysis	-0.52	-1.06	-0.67	0.07	-0.24	-0.38
	Benefit Cost Ratio*	0.57	0.86	1.07	1.12	0.59	0.53
	Wider Economic Impact	5.57	7.72	9.56	10.2	5.81	5.56
	Cost Estimate*	$8.6M	$145.2M	$81.9M	$57.6M	$46.5M	$41.6M
	Likelihood of restoring economic activity	Unlikely	Almost Certain	Likely	Likely	Possible	Possible
	Decision				**EPO**		**HAP**

Preferred Option



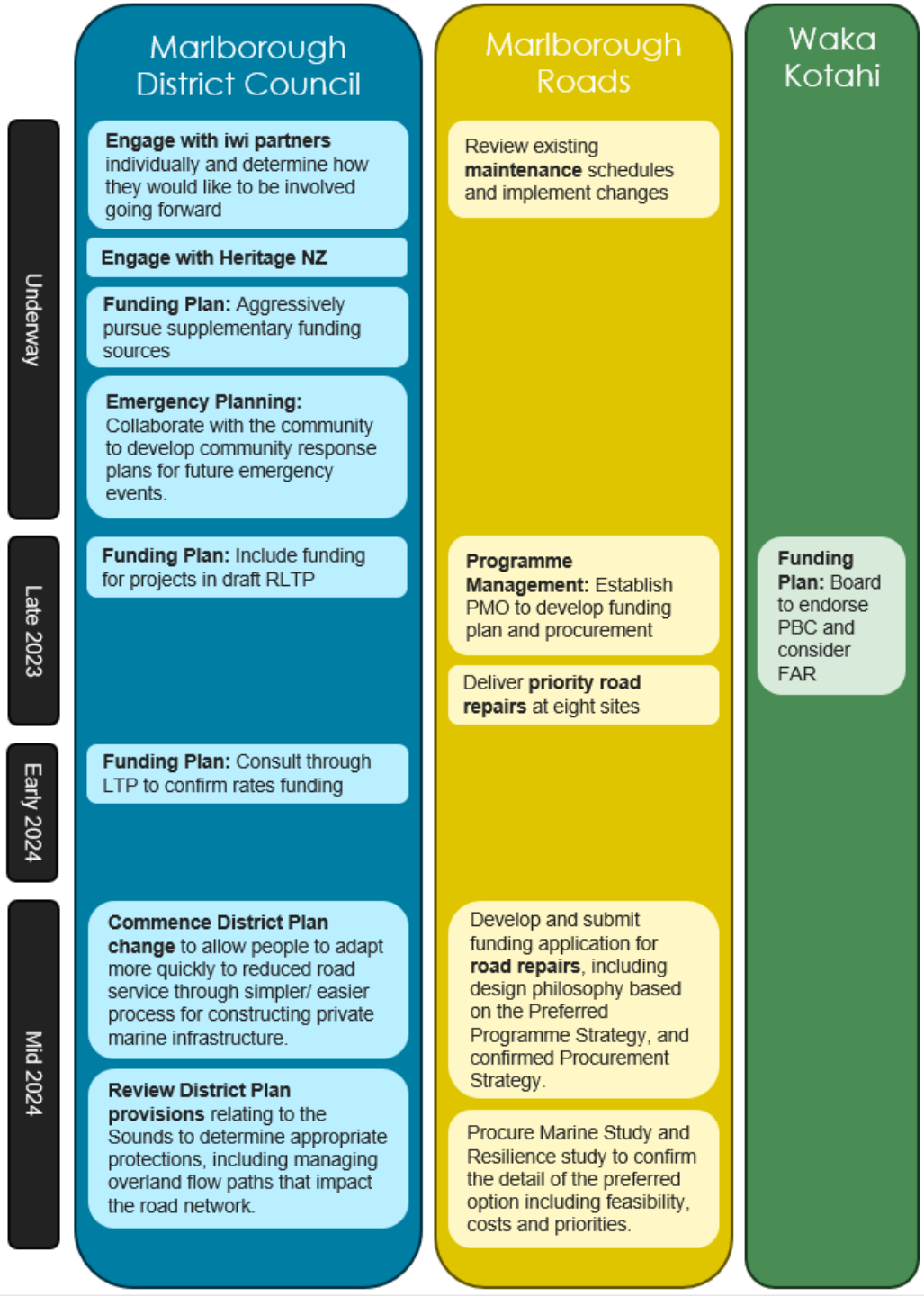
Hazard Adaptation Pathway

	Road Focus	Road Access	Balanced	Marine Access	Marine Focus
Te Aumiti/ French Pass					
Te Hoiere/ Pelorus					
Queen Charlotte					
Kenepuru					
Te Whanganui/ Port Under					



Where to now?

- NZTA Board accepted the business case in December 2023
- Estimated cost of preferred programme $234M. Council share is $128M
  - 100% of marine studies and improvements
  - 49% of road studies and improvements
  - 29% of road repairs
- Council are currently consulting on the Long Term Plan, which will inform the way that they will secure funds through rates
- Marine improvements will need a more detailed study to be completed to confirm best plan for the future.
- A funding application has been made to NZTA for the repair programme



Conclusions

- First time a business case has been completed to secure funding for local road repairs following storm damage.
- Set vision for how repairs and improvements will be approached, considering:
    - Corridor strategies vs solely site driven solutions
    - Scale of damage, and uncertainty of future levels of risk and costs
    - Various funding schemes
    - The need for community support
- Preferred programme estimate ($234M) for improvements and repairs is just over half of the initial repair estimate of $400M

Working together

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. We're designers, planners, 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 Toronto Stock Exchange (TSX) and the New York Stock Exchange (NYSE) under the symbol STN.

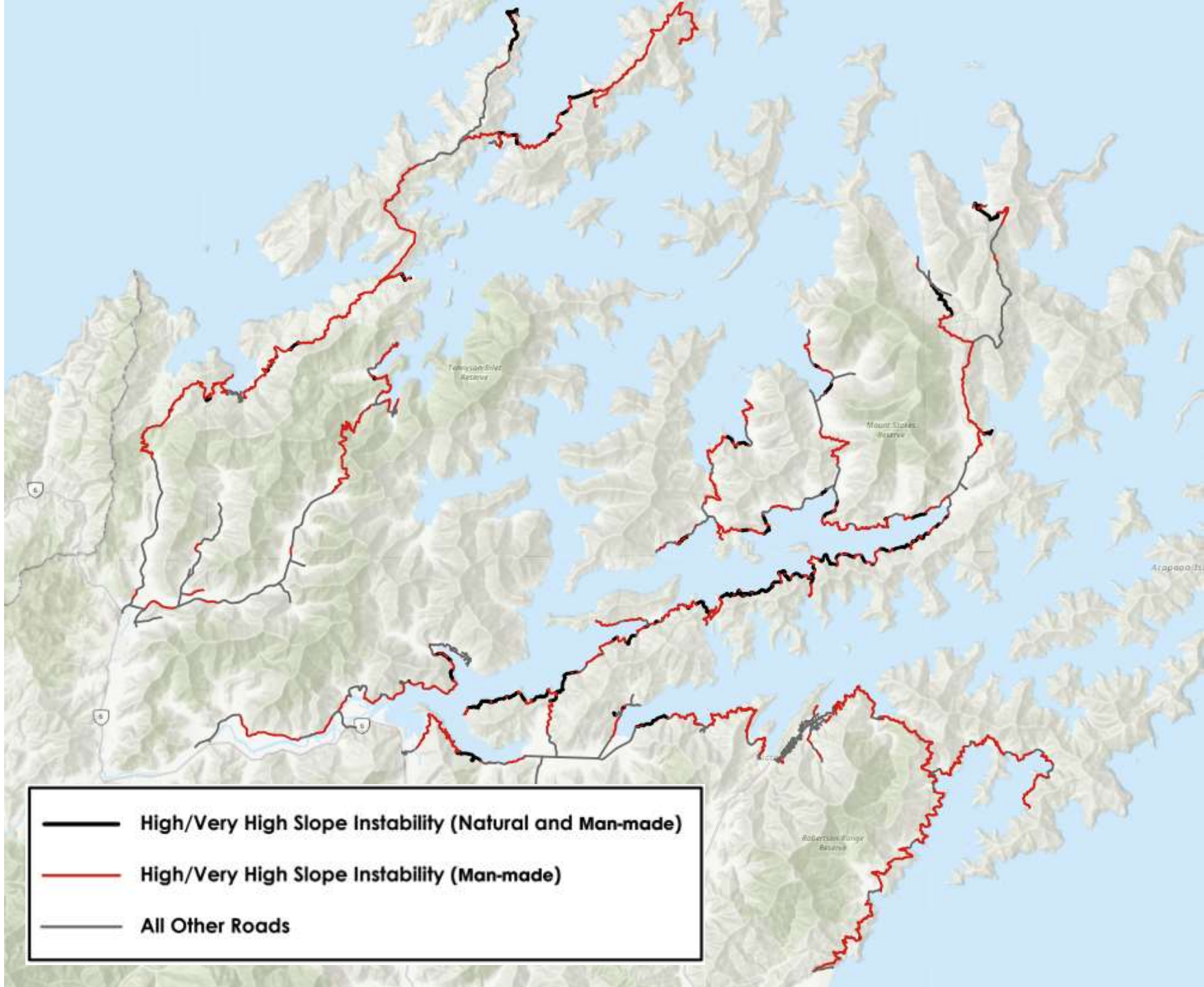
Australian offices:
Adelaide, Albany, Brisbane, Busselton, Gold Coast, Melbourne, Perth, Rockhampton, Sydney

New Zealand offices:
Alexandra, Auckland, Balclutha, Christchurch, Dunedin, Gisborne, Greymouth, Hamilton, Hastings, Napier, Nelson, Palmerston North, Queenstown, Tauranga, Wellington, Whangārei

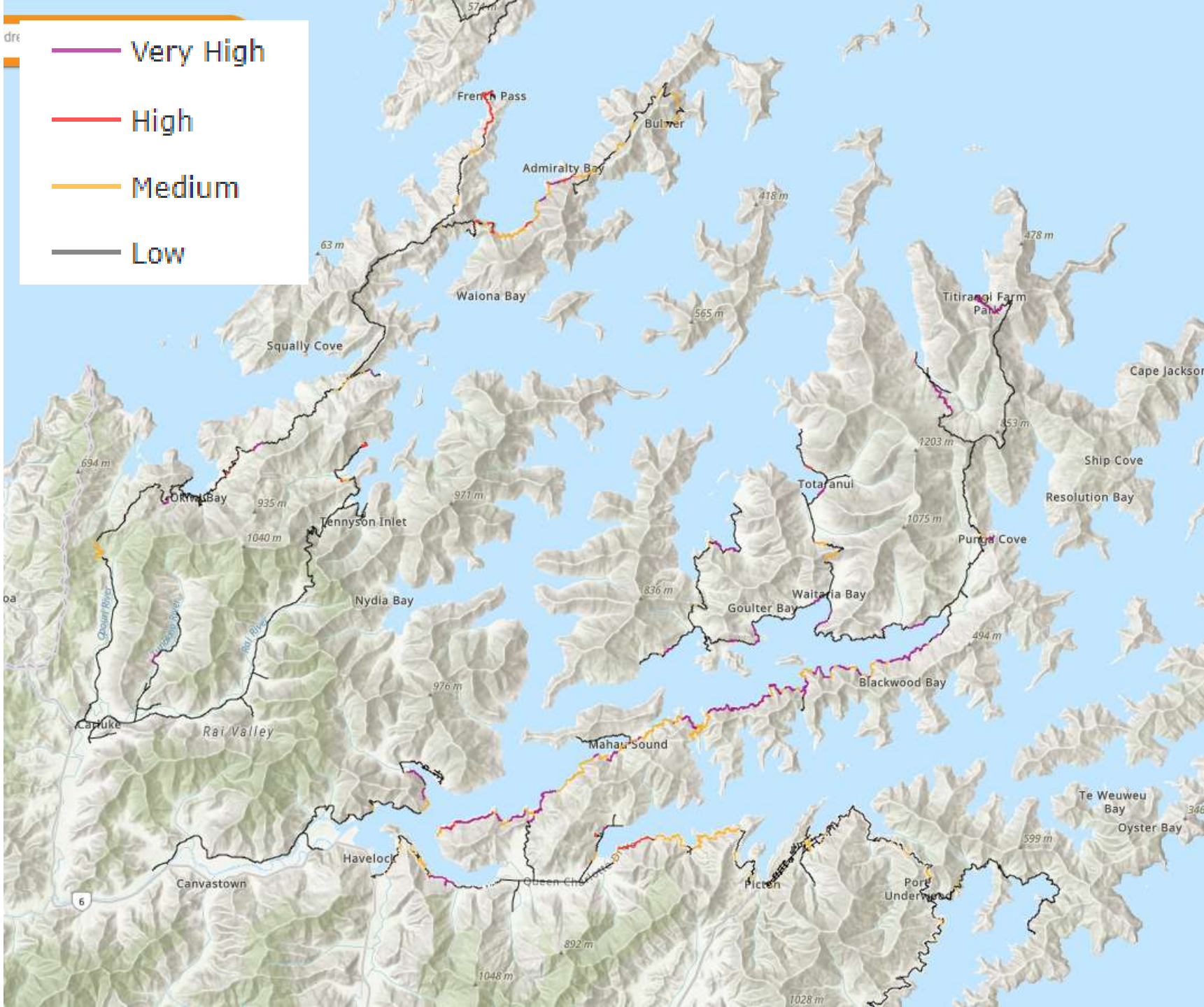
Connect with us

Stantec.com

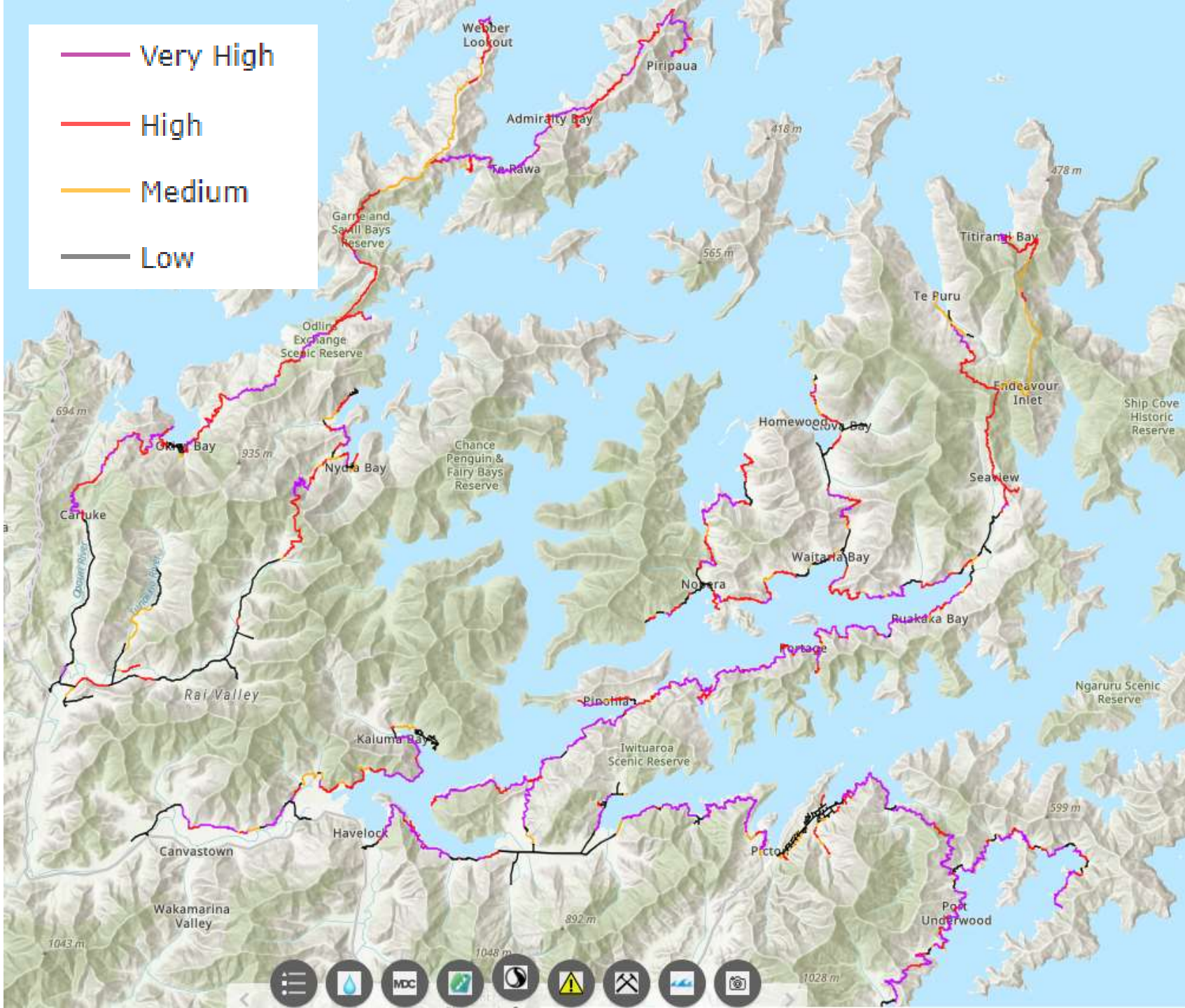
High and Very High Natural and Human Induced Slope Instability



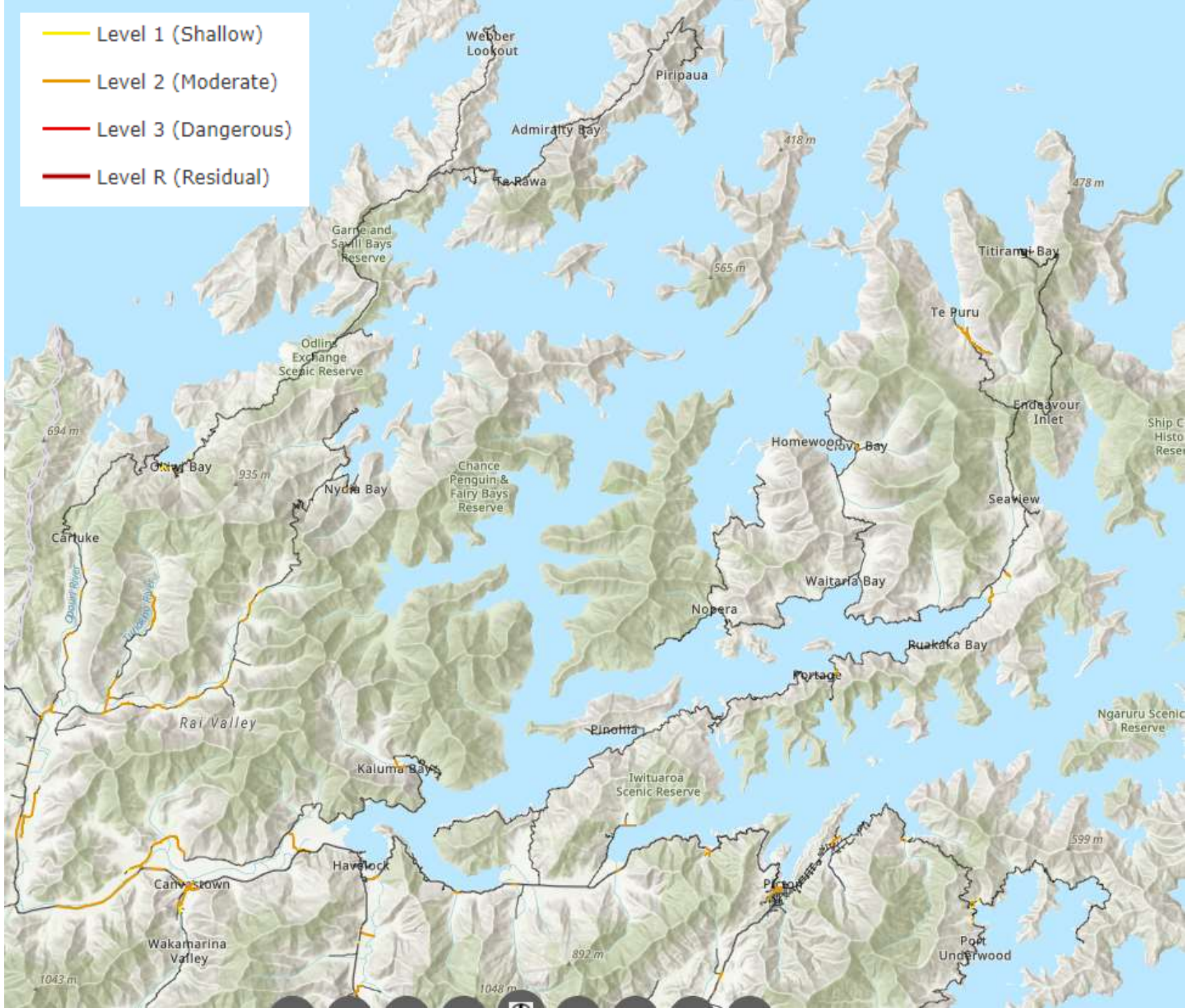
Natural Slope Instability



Human Induced Slope Instability

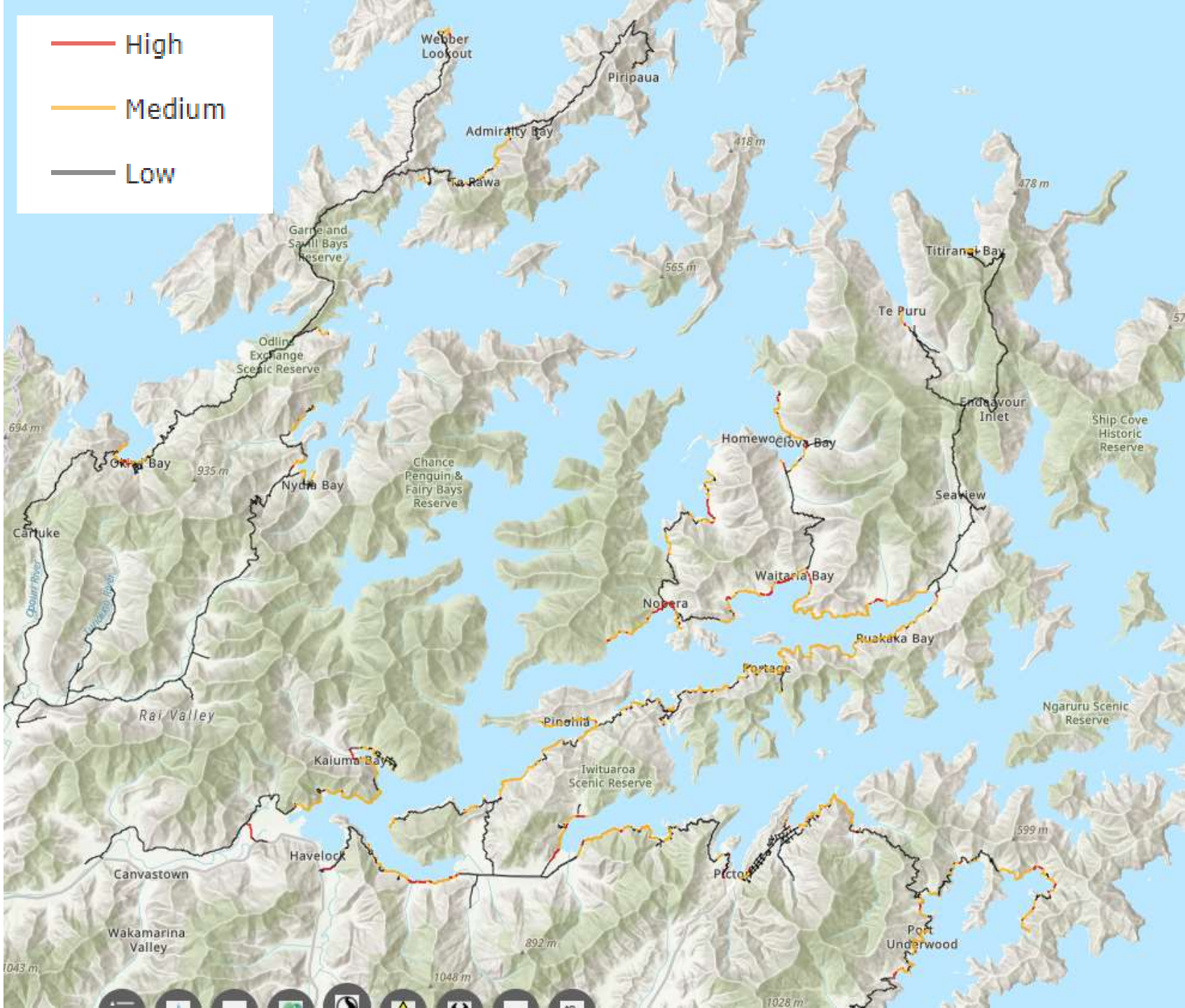


Flood Inundation

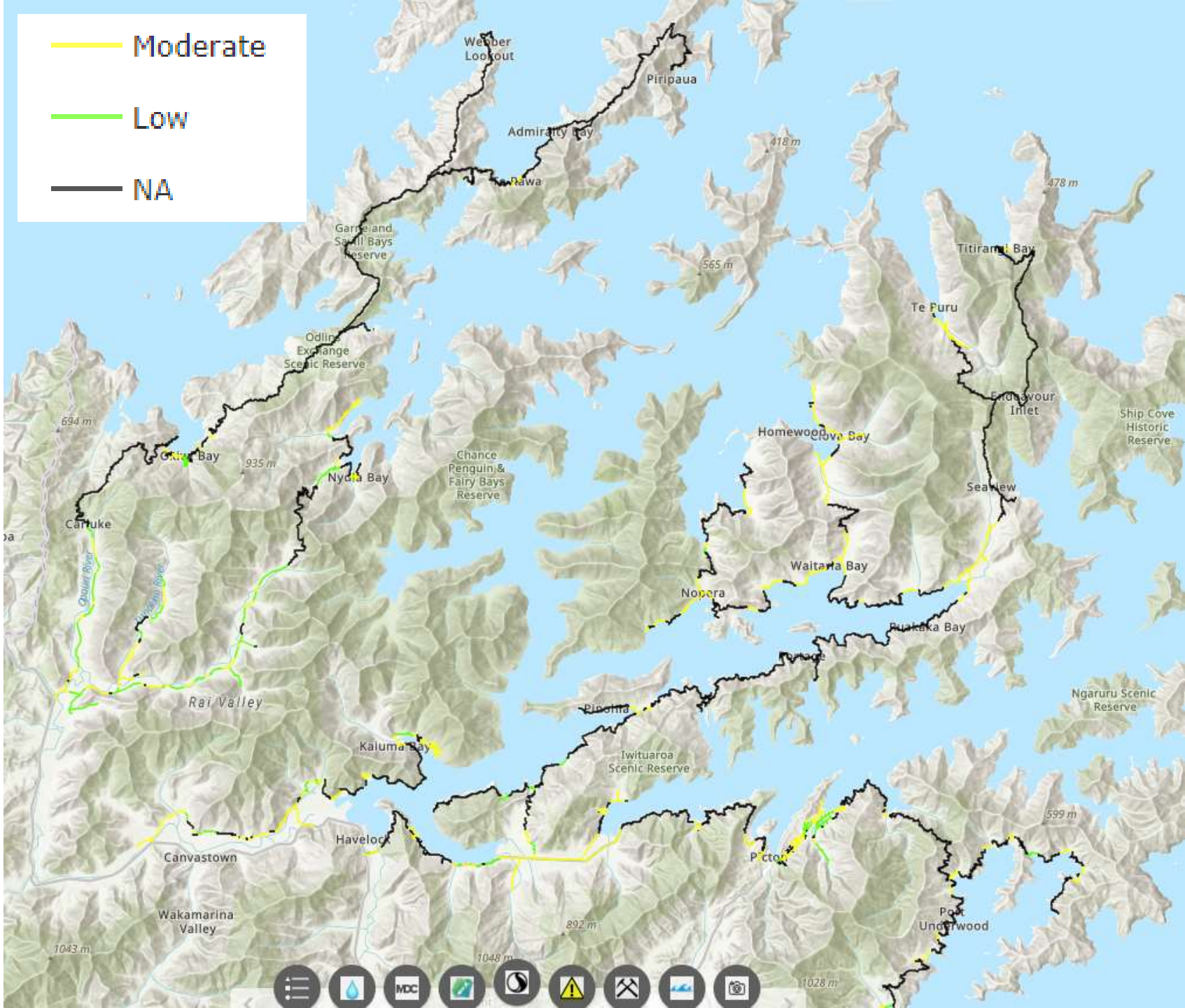


Debris Flows

Coastal Inundation and Erosion

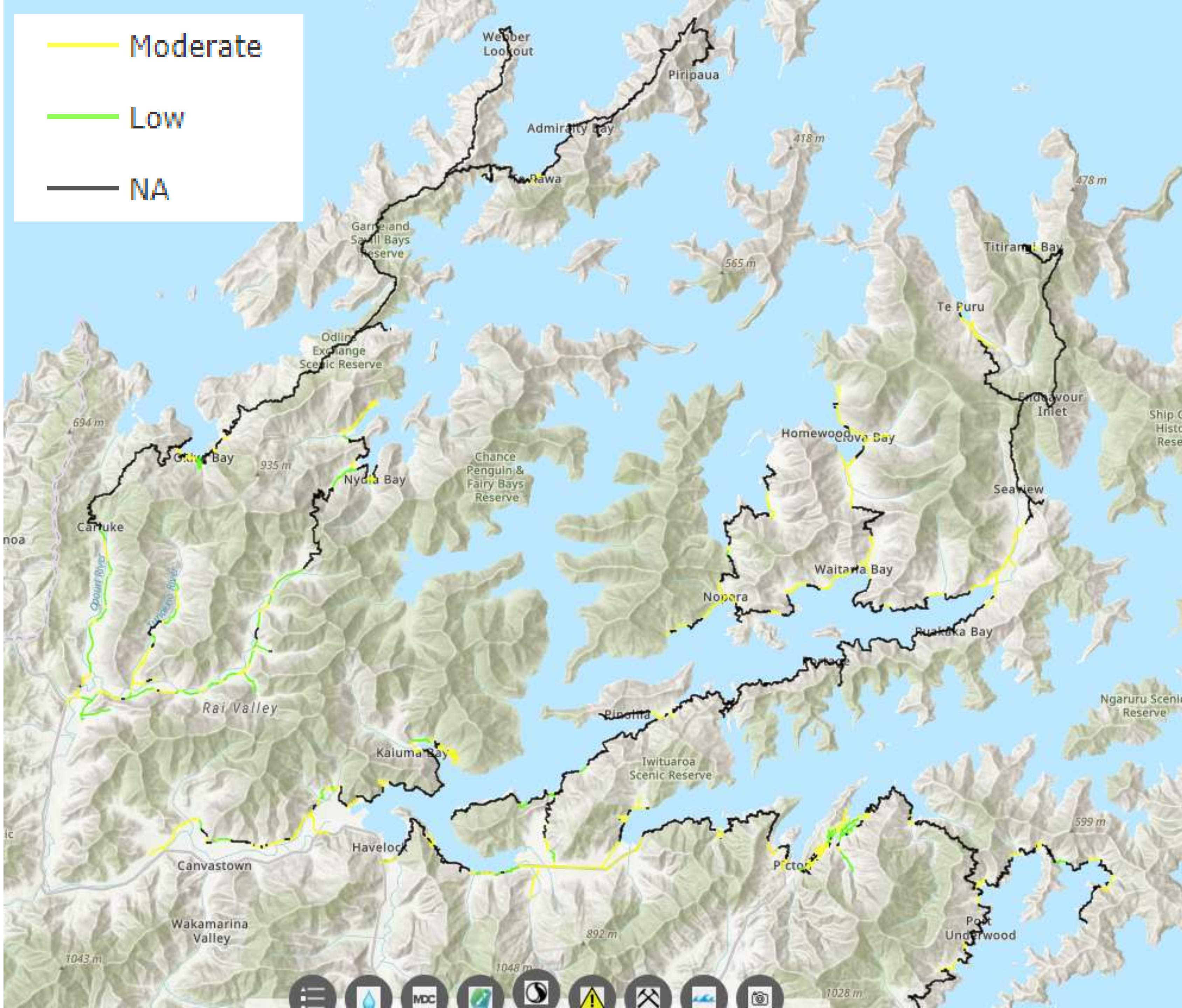


Liquefaction



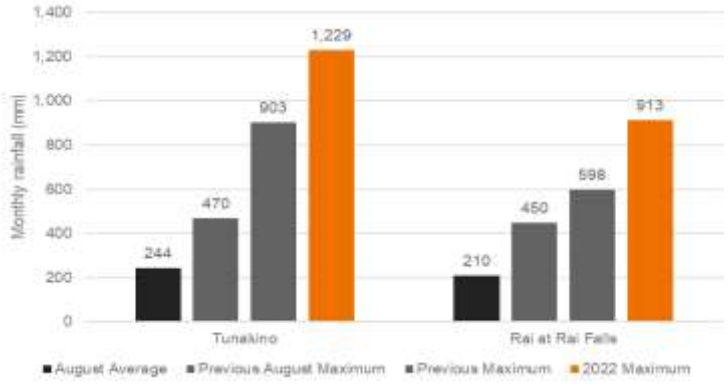
MARLBOROUGH SOUNDS FUTURE ACCESS

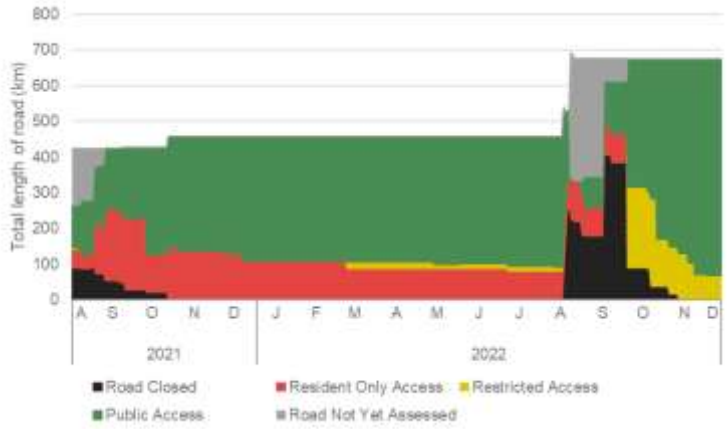
Tsunami


Moderate
Low
NA
Piripaua
418 m
478 m
565 m
Te Puru
Homewood
Seaview
Chance Penguin & Fairy Bays Reserve
694 m
935 m
Nydia Bay
Rai Valley
Waitaria Bay
Ruakaka Bay
Ngaruru Scenic Reserve
Iwituaroa Scenic Reserve
Havelock
Canvastown
Wakamarina Valley
599 m
892 m
1043 m
1028 m

4. Strategic Context

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