

# Infrastructure Resilience and Pā/Marae Adaptations

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**UNIVERSITY OF  
AUCKLAND**  
Waipapa Taumata Rau  
NEW ZEALAND

**ENGINEERING**  
DEPARTMENT OF CIVIL AND  
ENVIRONMENTAL ENGINEERING

RESILIENCE  
TO NATURE'S  
CHALLENGES

Kia manawaroa  
– Ngā Ākina o  
Te Ao Tūroa

National  
**Science**  
Challenges

# Aims

- Understand hazard, exposure and vulnerability of pā/marae and their infrastructure
- Explore current and traditional practices for hazard management and response
- Work with communities to identify potential adaptations
- Inform decision making for marae regarding natural hazards and alignment with Civil Defence policy

# Status

- Students:
  - Solomon Fifita & Phoenix Manukau - UG
  - Akuhata Bailey-Winiata – PhD
  - Haukapuanui Vercoe – PhD
- Marae Database – Partial dataset complete
  - Additional work to be done by post-doc Dr Amelia Lin
- Marae/hapū engagement
  - Te Arawa marae engaged in Research
  - Support from Te Arawa climate change working group, Te Puni Kōkiri

# UG student work

*Solomon Fifita & Phoenix Manukau*

- Data set contributed to by many students
- Point locations of marae plotted
- Inaccuracies in data rectified
- Building footprints and land parcels for marae added
- Site attribute descriptions added to marae sites



The screenshot displays a GIS application interface. The main map area shows an aerial view of a residential area with several buildings highlighted in purple. The interface includes a toolbar at the top, a browser panel on the left, a layers panel on the left, and an identify results panel on the right.

**Browser Panel:**

- Favorites
- Spatial Bookmarks
  - Project Bookmarks
  - User Bookmarks
- Project Home

**Layers Panel:**

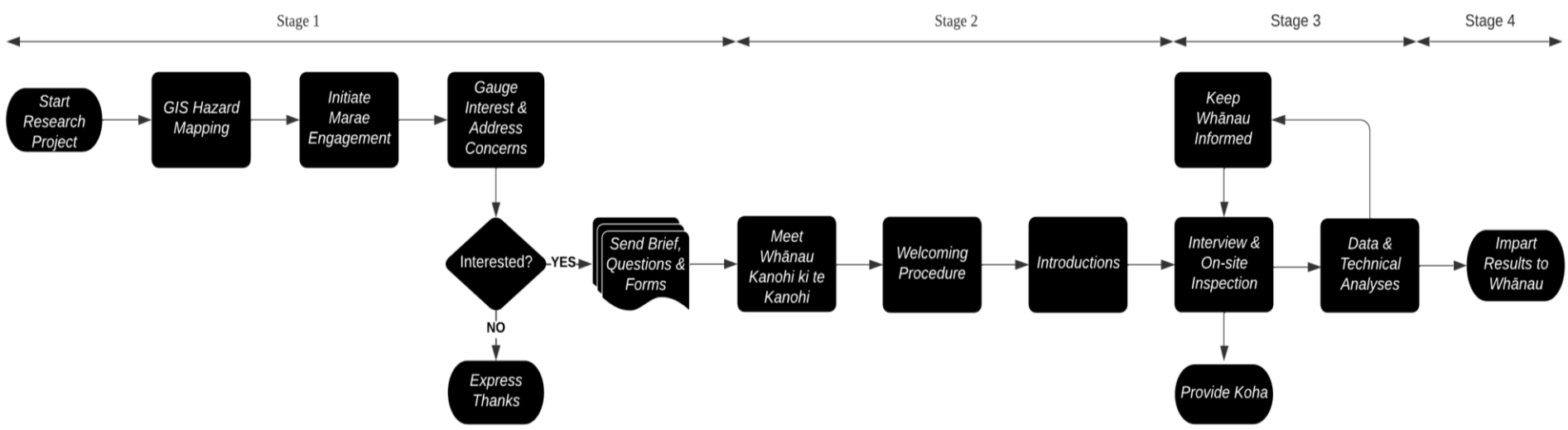
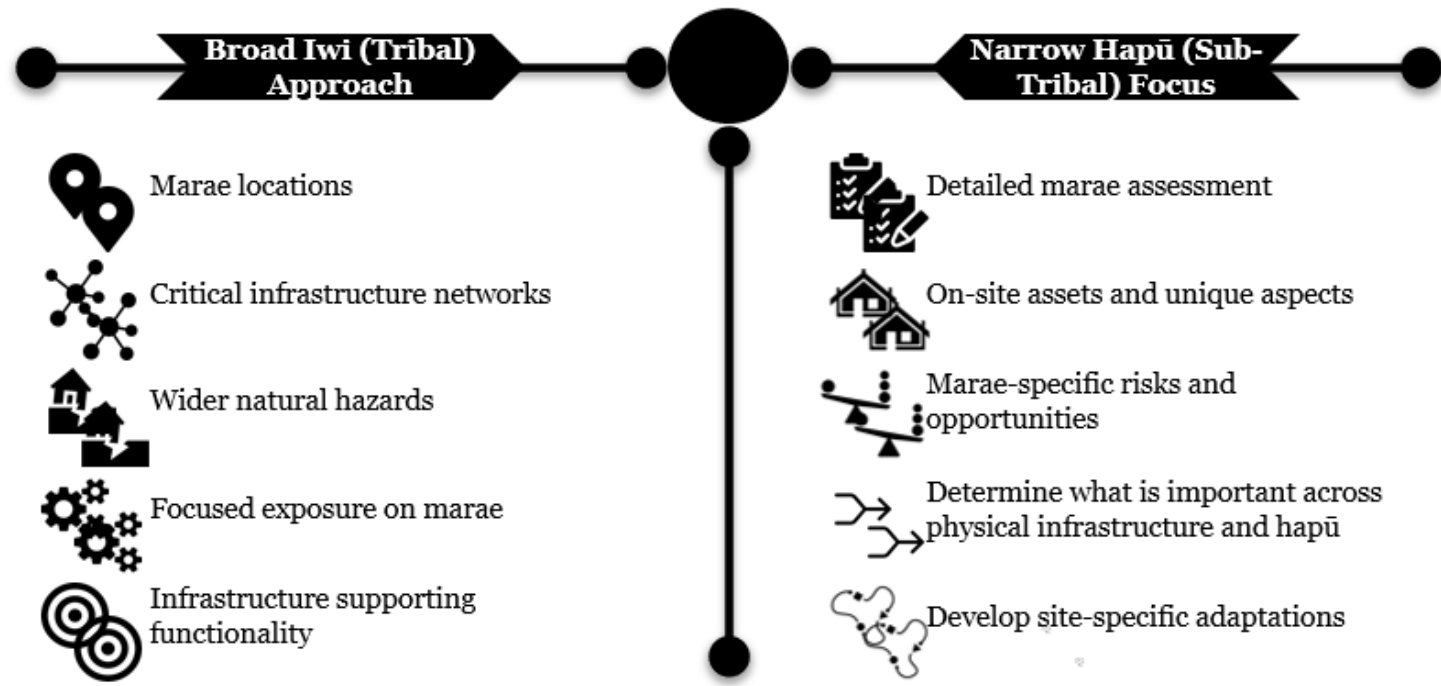
- Marae
- points\_only
- historic\_marae
- community\_marae\_...
- Papakainga
- accessways
- highway\_motorway
- highway\_motorw...
- highway\_motorw...
- access\_road\_line
- NorthIsland
- buildings
- land\_parcels

**Identify Results Panel:**

Feature	Value
<b>Marae</b>	
Title	931
(Derived)	
(Actions)	
fid	931
GIS_MID	780
Name	Waahi Pa
Alternate	NULL
Wharenui	Tane i te Pupuke
Type	Tribal
X	175.153047
Y	-37.55023
Location	177 Harris Road, Huntly
Iwi	Waikato
Hapu	Ngāti Kuiaarangi, Ngāti Mahut...
Comments	Waikato DC
Source	MFish, TKM
TPK_Region	Waikato-Waiariki
TKM_MD	5090
Search	Waahi   Tane i te Pupuke   Waik...
Feedback	<a href="mailto:tpkmaps@tpk.govt.nz?subject=Fe">tpkmaps@tpk.govt.nz?subject=Fe</a>
GoogleMaps	<a href="https://www.google.com/maps/p">https://www.google.com/maps/p</a>

# Vulnerability & Resilience of Marae Infrastructure in Natural Hazard Events

*H. Vercoe, T. Fa'au, L. Wotherspoon*



# Codevelop a decolonized managed retreat strategy for Aotearoa NZ

*A. Bailey-Winiata, S. Gallop, I. White, L. Wotherspoon, T. Fa'au, M. Dickson, J. Ellis*

**“He whakatōmuri te haere whakamua – I walk backwards into the future with my eyes fixed on my past”**

Chapter 1: Explore and collate examples of historical relocations of pā in response to natural hazards

Chapter 2: Systematically review global Indigenous communities and their adaptation to climate change impacts

Chapter 3: What role does sea level rise have in the susceptibility of coastal pā to coastal flooding and erosion

Chapter 4: Identify aspects required for a decolonized managed retreat for Aotearoa New Zealand

Chapter 5: Codevelop and refine a framework of decolonized managed retreat in Aotearoa New Zealand



# **A multi-hazard scenario approach for developing network-based infrastructure criticality metrics across spatial scales**

*C. Zorn, T. Fa'aui, A. Lin, A. Stolte, M. Kieu, L. Wotherspoon*

- In partnership with iwi and local authorities, perform a higher-resolution regional-scale assessment of infrastructure networks
- This will include a focussed assessment of the infrastructure networks supporting marae
- This will identify both regional priority sites and inform decision making related to alternate on-site redundant sources to support community and hapū aspirations

# Kai mō te whakaaro – food for thought

- Breadth vs depth
  - Kaupapa Māori research
- Complex legislative context
  - Reforms, strategies and plans
- Data sovereignty
  - Māori data sovereignty
- Future looking
  - Climate change considerations



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