# Dynamic site characterisation for the Nelson-Tasman region

Overview and Update

24 March 2016

McMahon, Wotherspoon (UoA), Bradley (UoC), Nelson/Tasman consultants and authorities

# Overview

- Geotechnical and geophysical characterisation of Nelson Tasman region soil profiles
  - Strong motion stations, critical infrastructure and beyond

- Characterise sites using range of metrics

- Develop 1st generation maps of the region

- Feed into development of regional velocity model for GM simulation

# Background

- Currently little data relating to $V_S$ and $T_0$ in the Nelson-Tasman Region

- Geotechnical characterisation predominantly based on borehole data

- 9th largest urban area (Nelson-Stoke-Richmond, rapid growth), 4 other areas with larger population and seismic hazard (other studies in these areas)

# Setting

- Number of faults in close proximity
  - Alpine, Flaxmore, Waimea

- Located on deep basin edge
  - Edge effects

- 6 SMS in region (incl 1 building array)

- Busiest regional airport in NZ, busiest fishing port in Southern Hemisphere
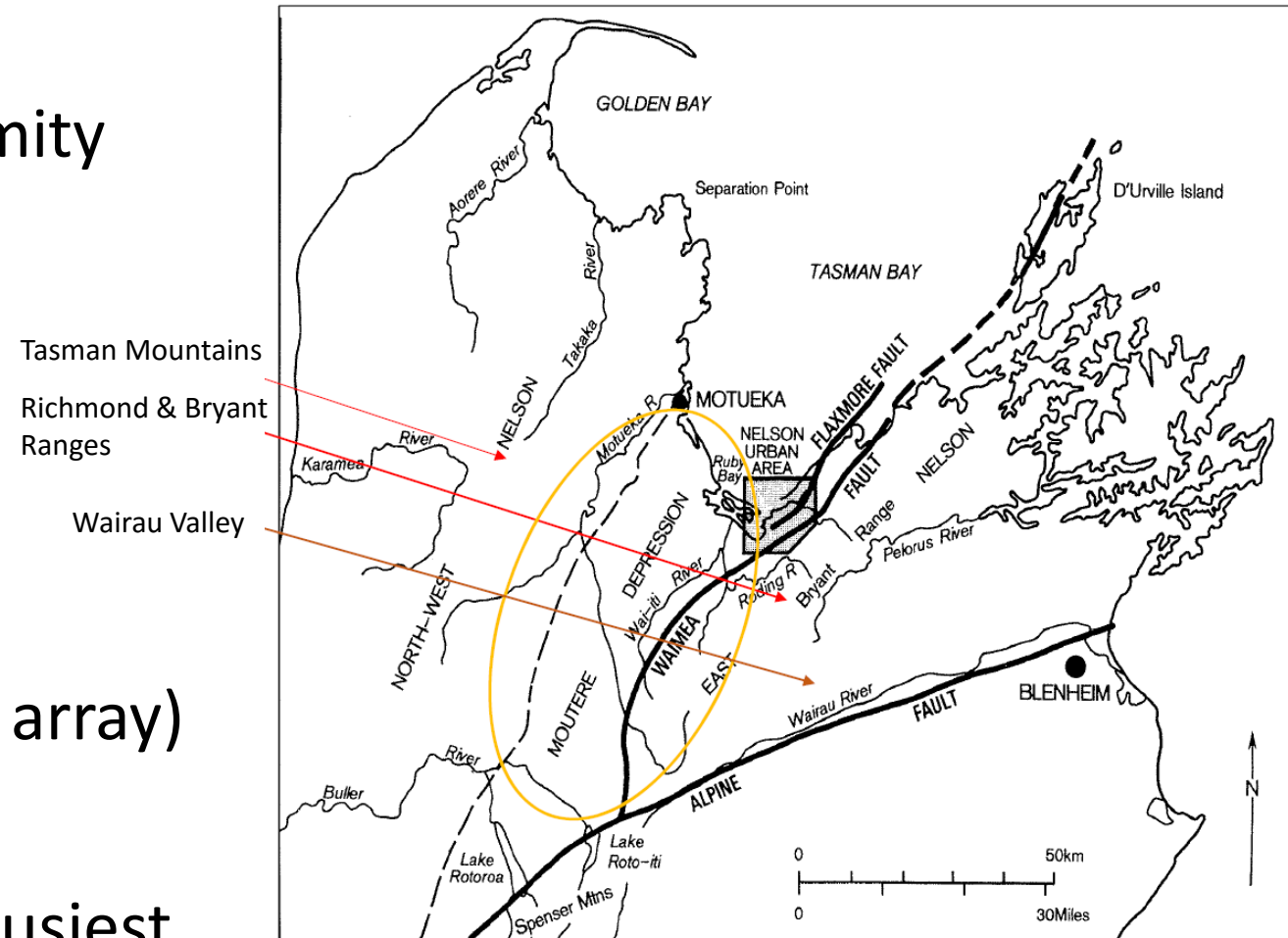
# Methodology

- Collate existing subsurface geotechnical investigation and seismic reflection data

- Carry out additional subsurface investigations at locations with a paucity of data
  - Strong motion stations, critical facilities, and locations near the site subsoil class C-D border

- Define shallow shear wave velocity profiles and site periods across region

- At a small number of sites deep shear wave velocity profiles will be defined to characterise the deep structure of basins in the area

- Develop 1st stage regional maps/models representing a range of dynamic site characterisation metrics
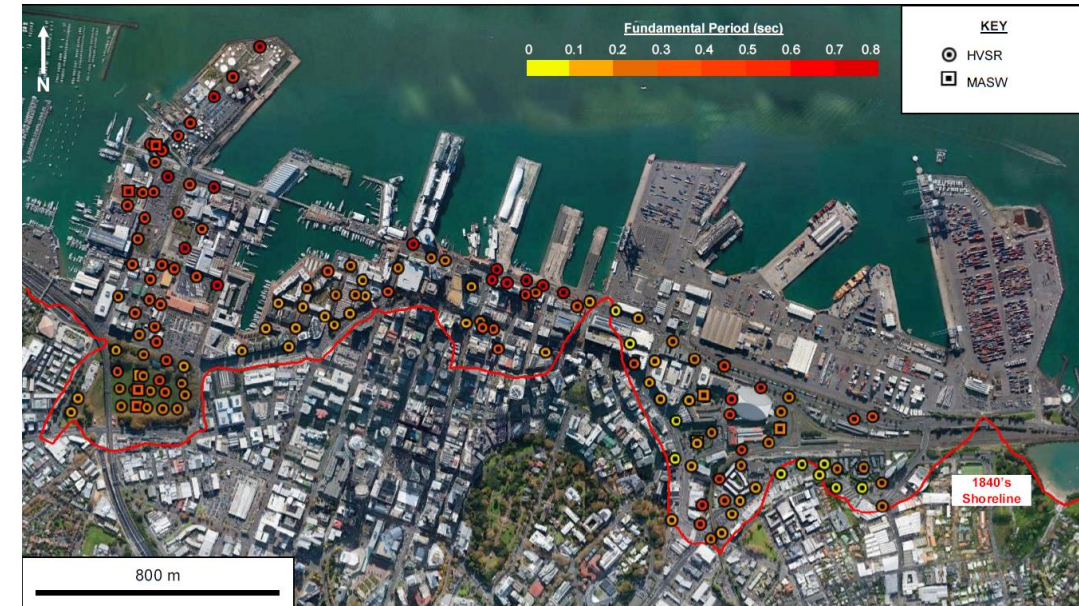
# Geotechnical Database

- Collation of existing subsurface geotechnical investigation data

- Define locations for further subsurface testing and constrain geophysical investigations

- Status at Feb 2016 (500 points)
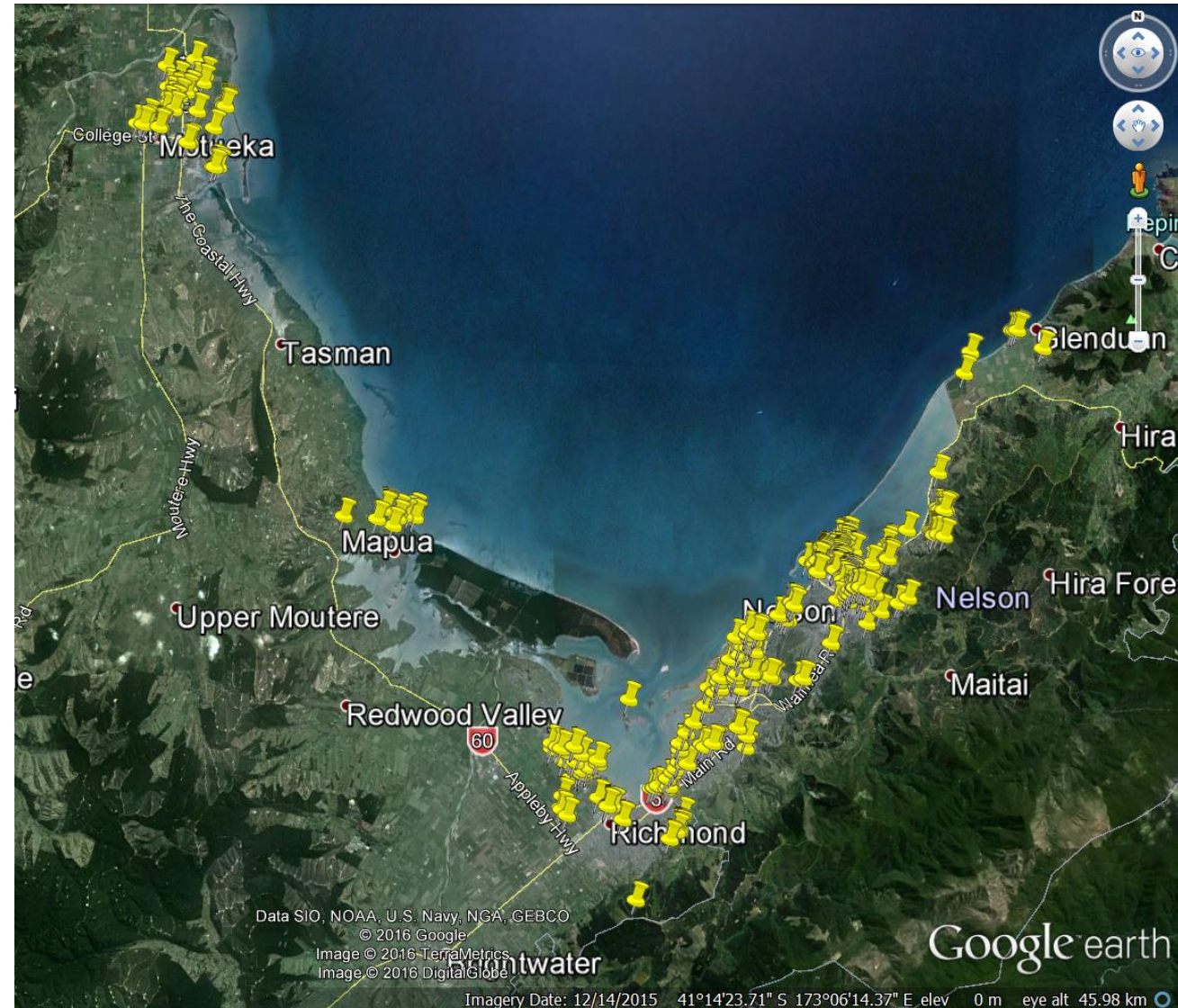
# Geophysical Investigations



- Active Surface Wave testing
  - Sledgehammer/Dropweight source
  - Detailed near surface characterisation
  - 10 locations to date

- Passive surface wave testing
  - HVSR
    - Large number of sites across region – planning stage (15 locations to date)
  - 2D array methods
    - Deep characterisation at reduced number of sites - TBD

# Questions