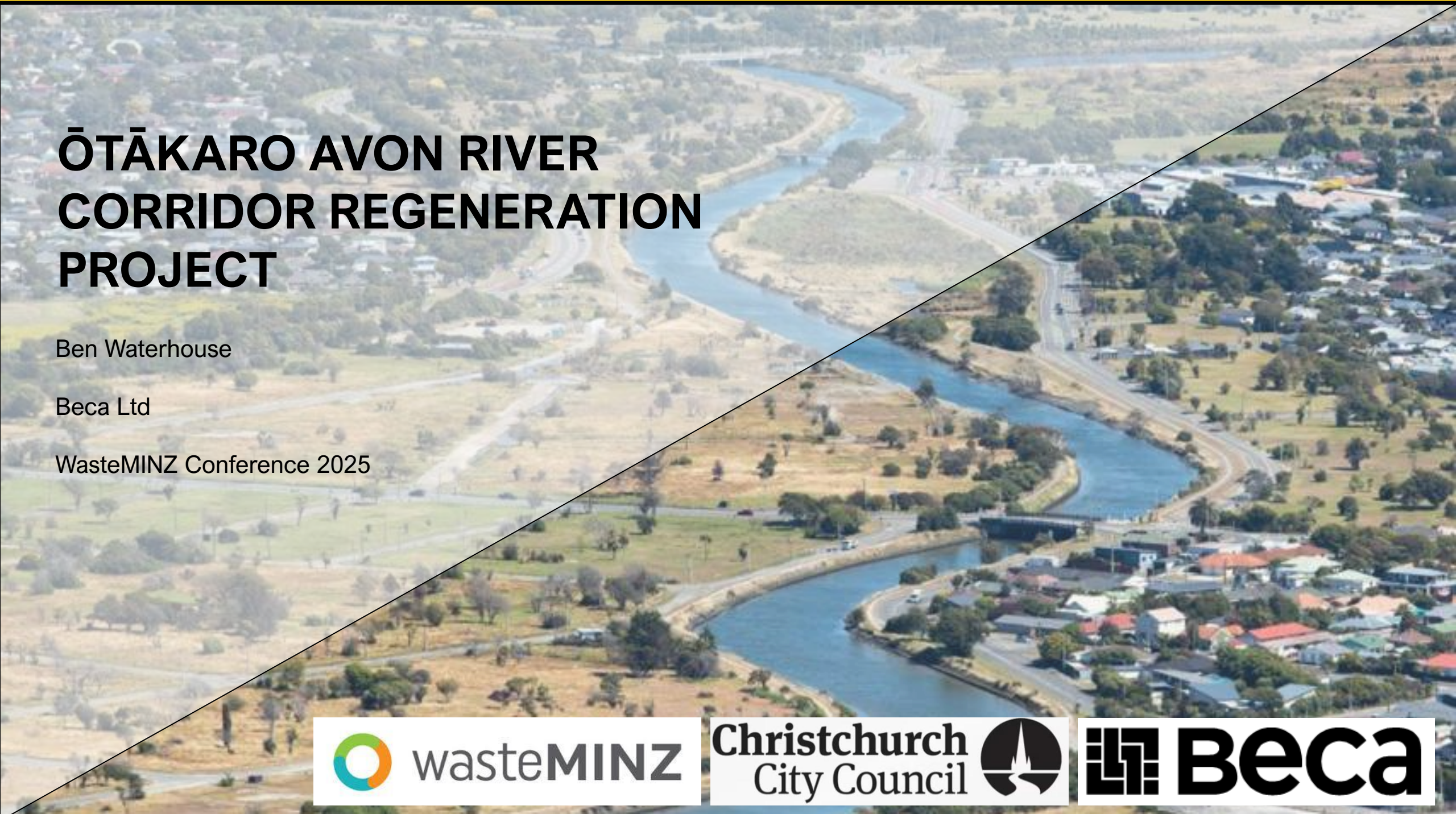
ŌTĀKARO AVON RIVER CORRIDOR REGENERATION PROJECT

Ben Waterhouse

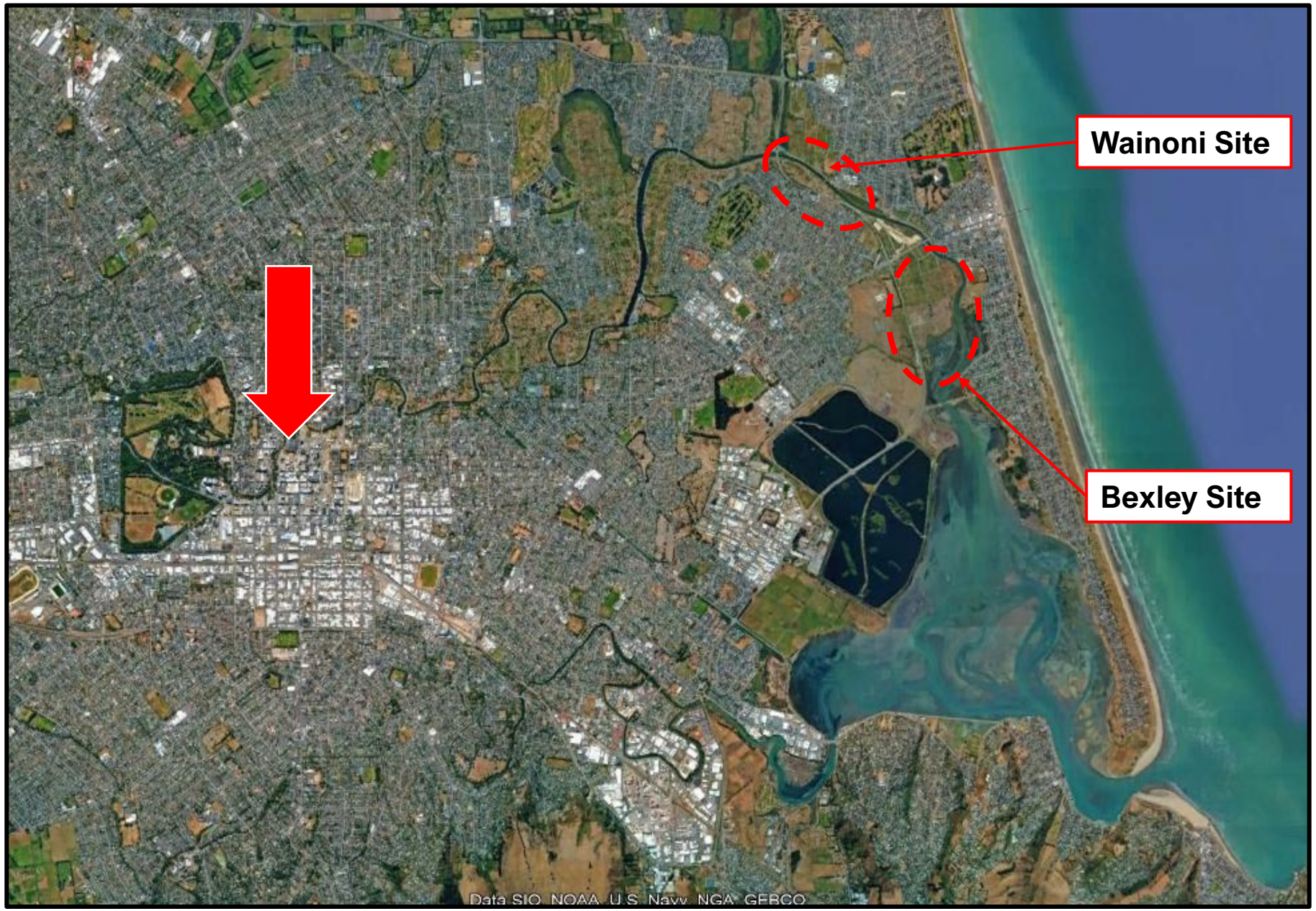
Beca Ltd

WasteMINZ Conference 2025



Introduction

- ŌARC Regeneration Project Context
- Environmental Investigations
- Project Implications
- Next Steps
- Lessons Learned



wasteMINZ Christchurch City Council Beca

ŌARC Project Background

2010-2011 Canterbury Earthquake Sequence

602 ha of Red Zoned land

Land damage due to:

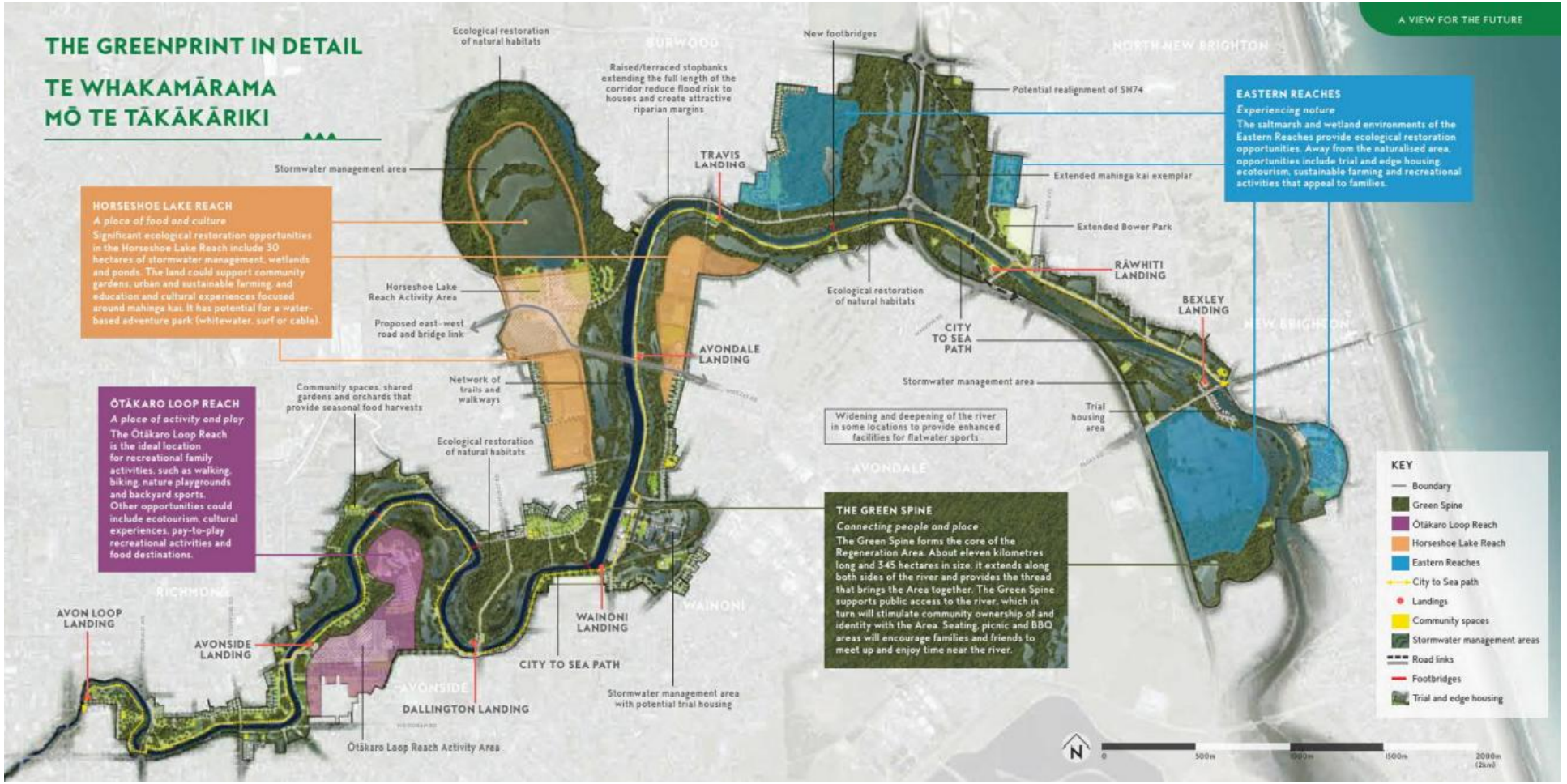
- Liquefaction
- Lateral spread
- Ground cracking
- Settlement

wasteMINZ Christchurch City Council Beca

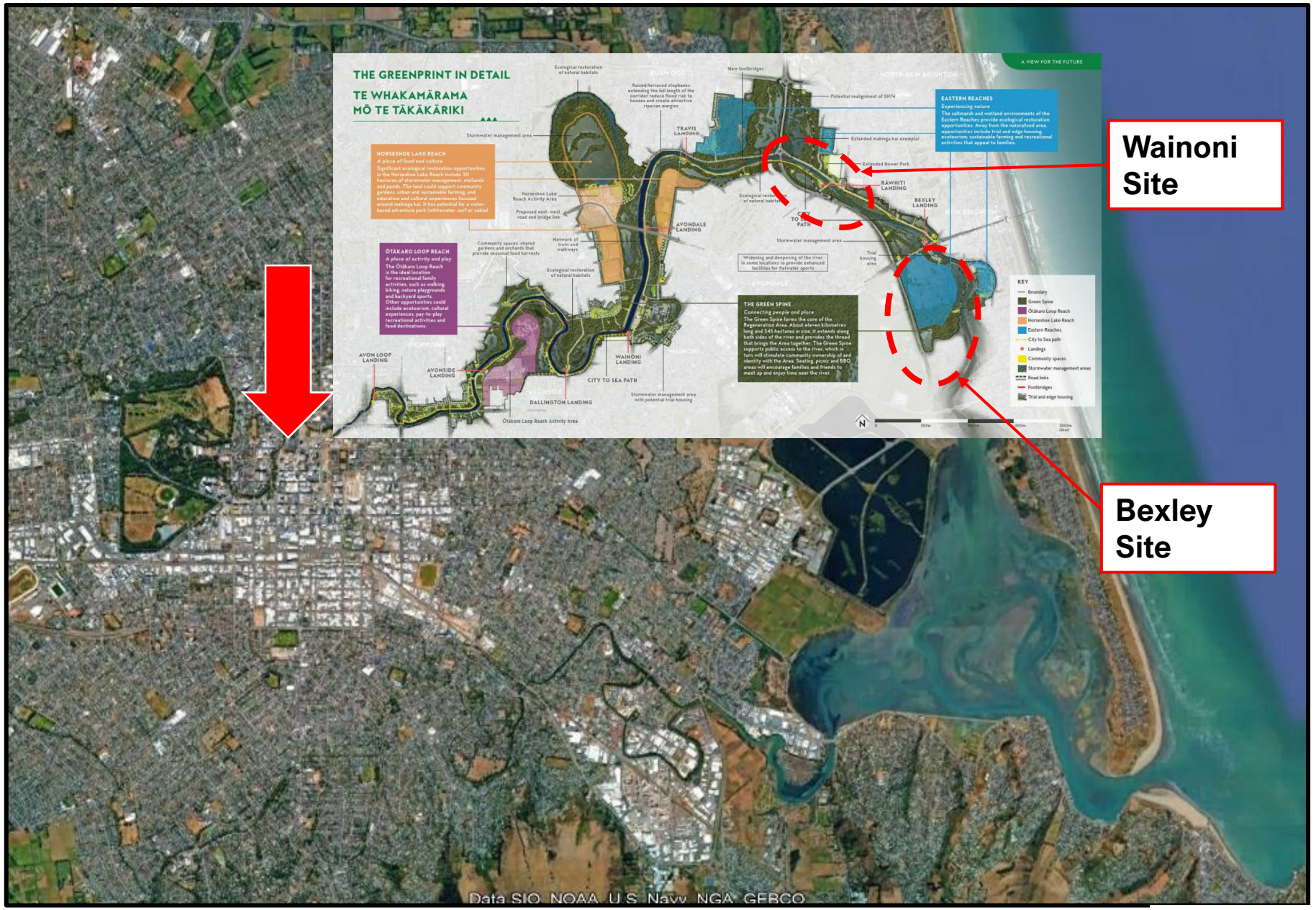
ŌARC Project Background

Aims:

- Restored native habitat with good water quality
- Safe, strong and healthy communities
- Opportunities for enhanced community participation, recreation and leisure



wasteMINZ Christchurch City Council Beca



Wainoni Site

Bexley Site

wasteMINZ

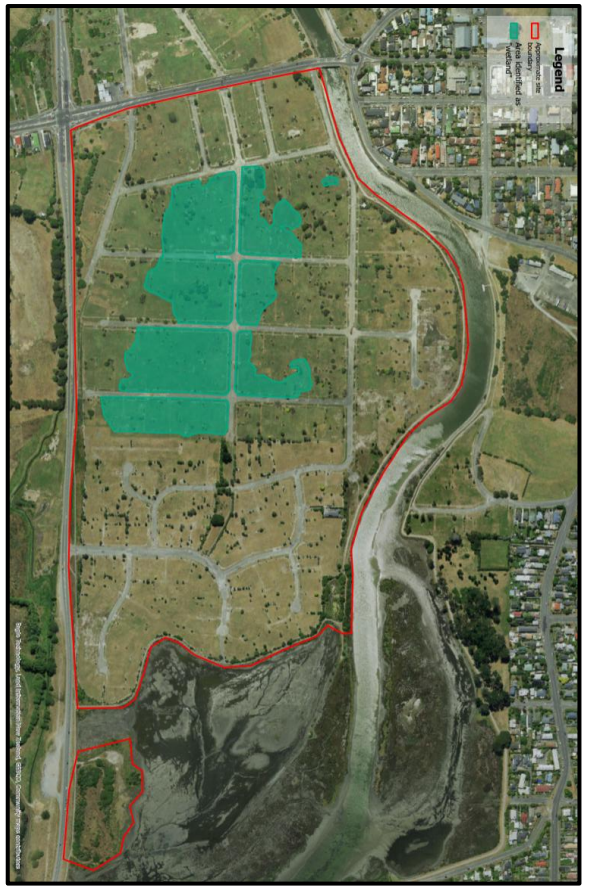
Christchurch City Council

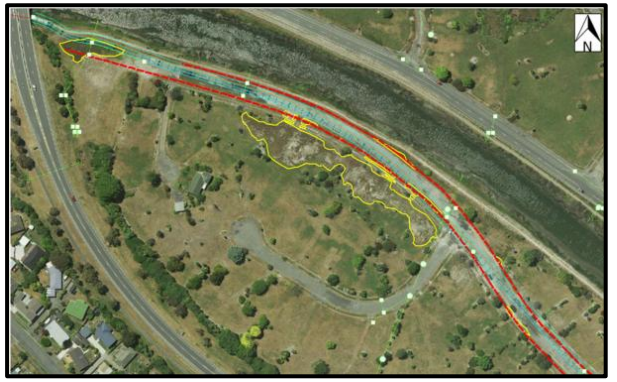
Beca

Environmental Setting

- Former residential sites (Bexley ~85 ha, Wainoni ~12 ha)
- Shallow groundwater ~ Surface to 0.7m bgl, seasonal
- Ihutai Avon-Heathcote Estuary south, Ōtākaro Avon River east

2010 **2022**

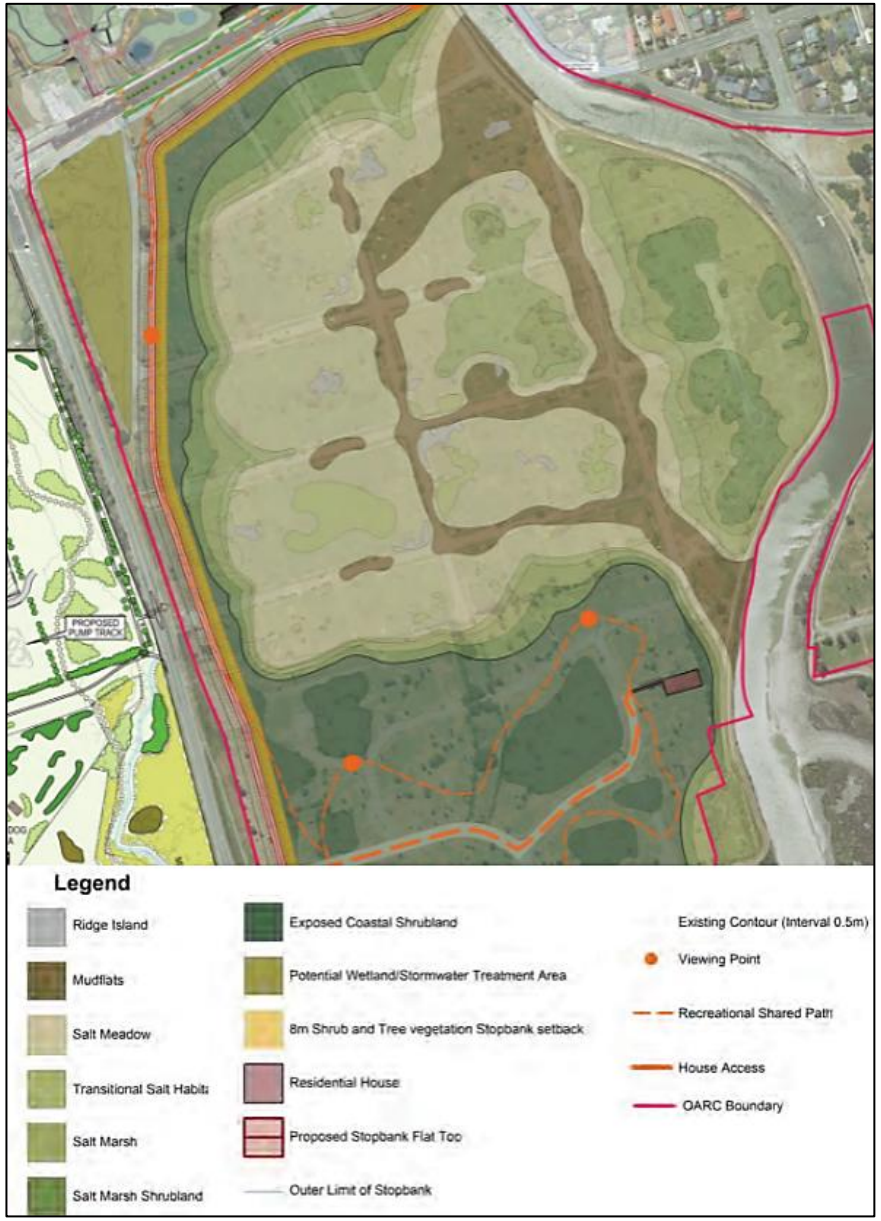




wasteMINZ Christchurch City Council Beca

Bexley and Wainoni Project Goals

- Construct flood protection stopbank inland of the existing
- Open existing stopbank to the Ōtākaro Avon River
- Create a tidal wetland
- Discharge stormwater
- Reuse, ideally, 100% of surplus soils on site

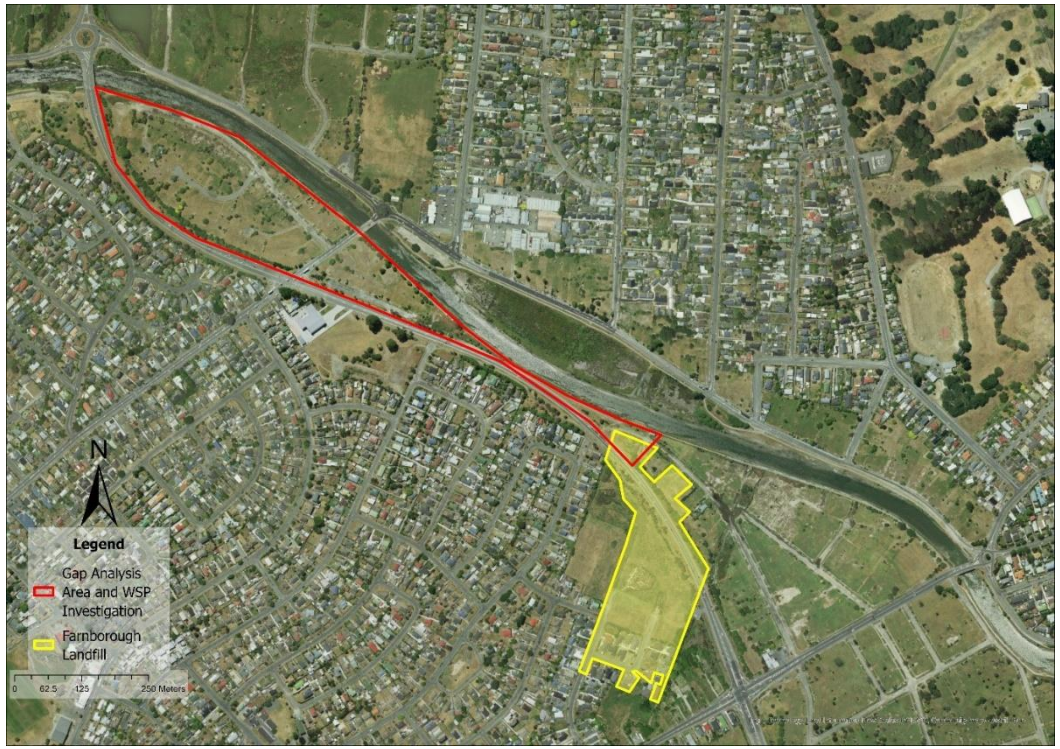


wasteMINZ Christchurch City Council Beca

Preliminary Site Investigations

Key findings:

- Various HAIL activities (landfills, poultry farm, industrial sites, fuel storage, substation, vehicle workshop)
- Residential developments from 1960s (Bexley), 1980s (Wainoni)
- Potential for Coal tar
- AC pipes



Wainoni Site

Bexley Site

wasteMINZ Christchurch City Council Beca

Detailed Site Investigations

October 2022 – April 2023
- 928 Hand pits
- 70 Test pits
- 55 Coal tar investigation pits
- 12 Groundwater monitoring wells

November 2022 – January 2023
- 241 Hand pits
- 10 Test pits
- 11 Coal tar investigation pits
- 4 Groundwater monitoring wells

wasteMINZ Christchurch City Council Beca

Detailed Site Investigations – Results Summary (Bexley)

Surface soils (~0.01 m bgl)

Deeper soils (~0.3 to 1 m bgl)

wasteMINZ Christchurch City Council Beca

Detailed Site Investigations – Results Summary (Wainoni)

Surface soils (~0.01 m bgl)

Deeper soils (~0.3 to 1 m bgl)

wasteMINZ Christchurch City Council Beca

Detailed Site Investigation Results

Two very different sites despite similar history

Bexley

- Landfill influence across the site – soil and groundwater
- Evidence of coal tar use
- Consistent with asbestos and lead paint construction eras
- Tier 1 Screening showed large volumes of soil unsuitable for submerging, but suitable for terrestrial use (e.g., raised fill within flood protection stopbank)
- Reuse on land side of new stop bank
- More investigation required

Wainoni

- Handful of properties soil unsuitable for submerging
- Fewer lead and asbestos issues
- Most samples were at or below background concentrations or ANZG sediment criteria
- No evidence of coal tar use in road areas to be submerged
- Deal with hotspots individually, and soils can be reused in terrestrial setting

Bexley Ecotoxity – Tidal Wetland 2023

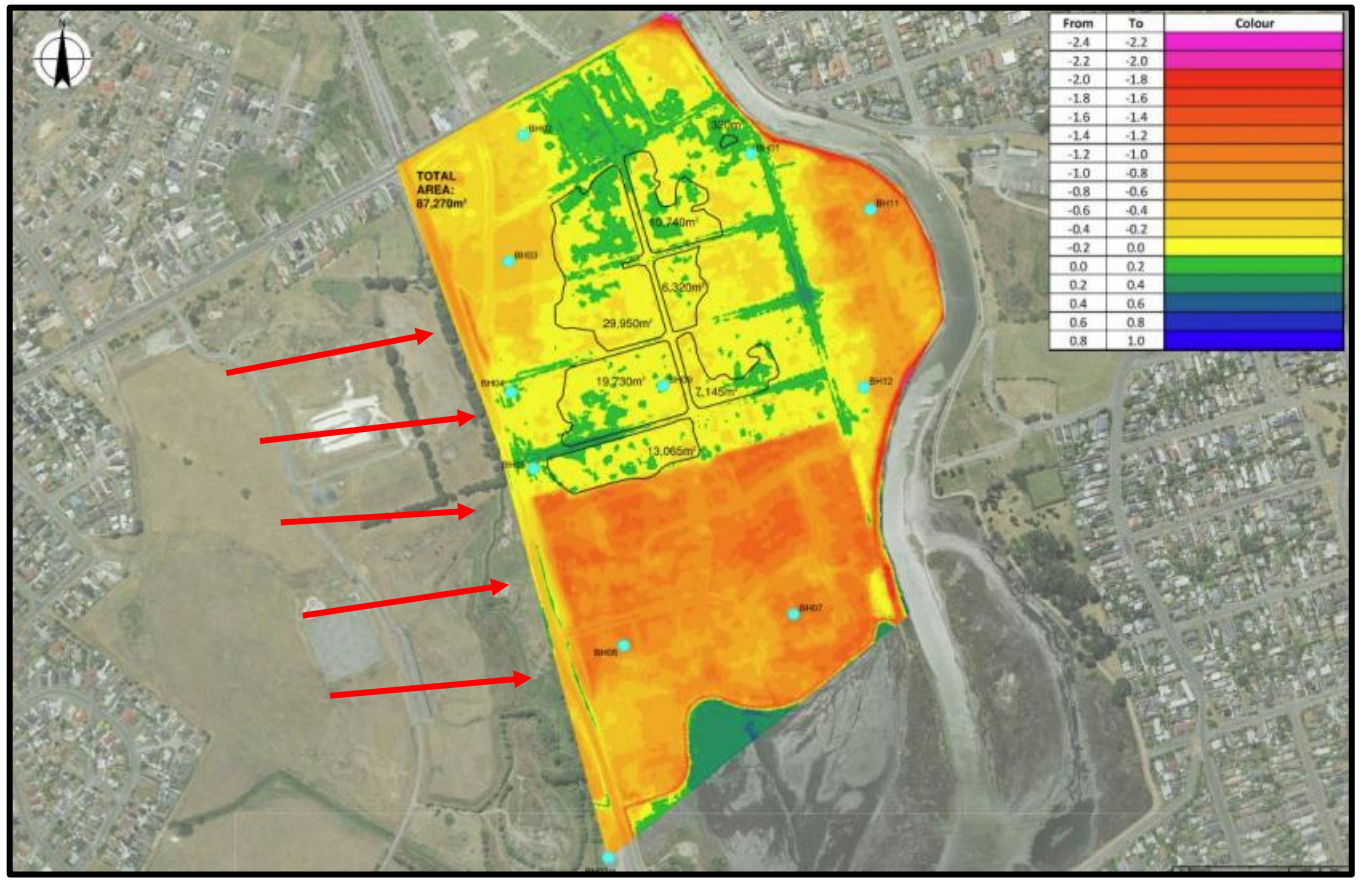
Sampling and testing for specific tidal wetland design:

- Mobilisation of contamination from soils to water
- Wetland and River water quality
- Groundwater influences
- Bioaccumulation risks (weak acid extraction)
- Elutriation testing
- Synthetic Precipitation Leaching Procedure (SPLP)
- River water used

- Bioaccumulation for PAH was the highest risk – linked to HAIL
- Landfill indicators (again)

wasteMINZ Christchurch City Council Beca

Bexley Ecotoxity – Design Options 2024



Assessment to inform undefined design options

- Former/broken infrastructure as preferential pathways
- Testing for landfill indicators
- Backflow from river

- Groundwater/surface water interactions
- Moderate to High Ecological risks identified depending on design option
  - Bioaccumulation
  - Eutrophication

wasteMINZ Christchurch City Council Beca

Next Steps

- Continue works with engineers for onsite soil reuse in terrestrial setting
  - Finalise stopbank design and soil disturbance/opportunities
- Inform (and finalise) tidal wetland (if any)
- Undertake dilution and contaminant load modelling based on opening stopbank and river flows
- Investigate possible in situ soil remediation options to prevent offsite disposal

Lessons Learned

- Investigation and Design feedback loop is critical
  - Continual improvement
  - Disposal costs

- Field trial your method
  - Accumulative effects across long timeframes

- Software choices can help save data pain

- Understand external influences (Site)

- Understand external influences (Project)

Acknowledgements

Christchurch City Council

GHD

RMM Landscape Architects

Beca team:

Jessica Green
Raymond Chang
Sarah Shepherd
Danika Ferguson
Mike Thorley
Maisie Hopkins