



# Update on Northland Natural Hazards Programme

**Toby Kay – Natural Hazards Advisor**  
**29 October 2015**

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# NRC Natural Hazards Management Work Programme

- HAZARD IDENTIFICATION

- River flood mapping
- coastal flooding
- coastal erosion



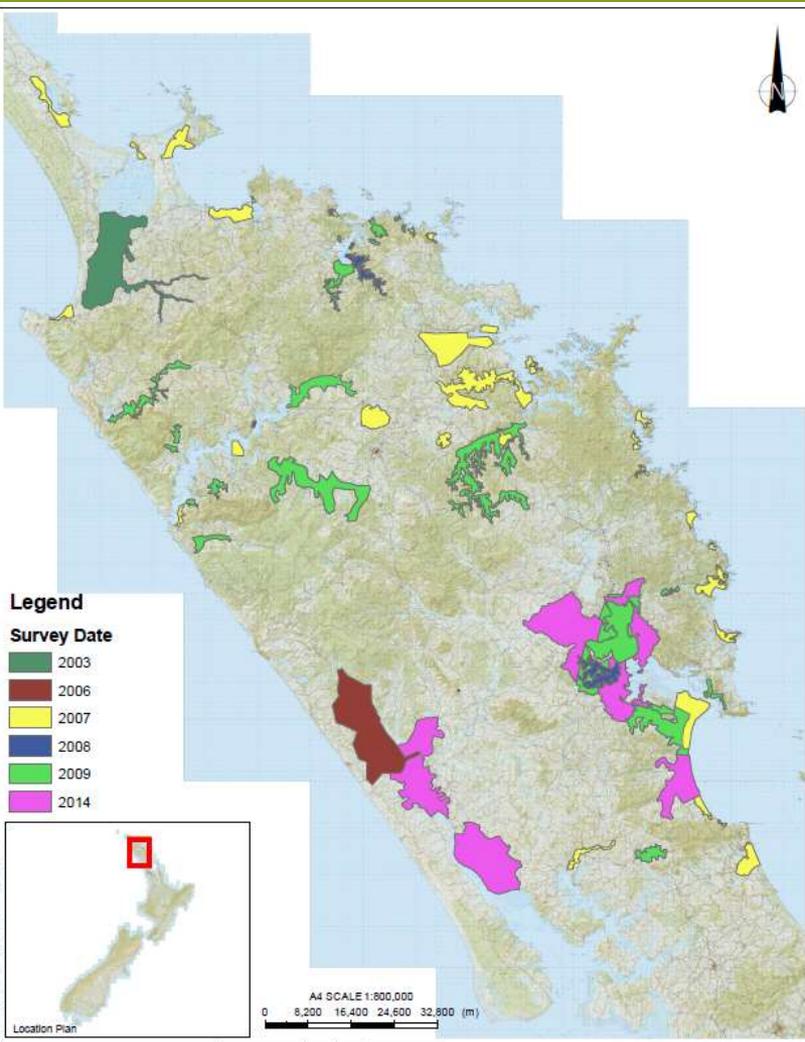
- RISK REDUCTION

- RPS policies re: subdivision, development and land use in hazard areas
- River Management Plans
- Flood Schemes



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# Use of LIDAR in Hazard Mapping



Objective:

Regional  
LIDAR  
survey for  
Northland

~ \$1.5M –  
\$1.7M



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# Hazard Assessment Approach

- River flood hazard assessed by hydraulic modelling & based on LiDAR & HIRDS v3 data. Tidal boundary condition incorporates SLR at 0.5m.
- Coastal flood hazard assessed by determining storm surge, wave runup/overtopping & SLR, & based on LiDAR
- Coastal erosion hazard assessed by determining trends in shoreline position, beach response to SLR & other factors

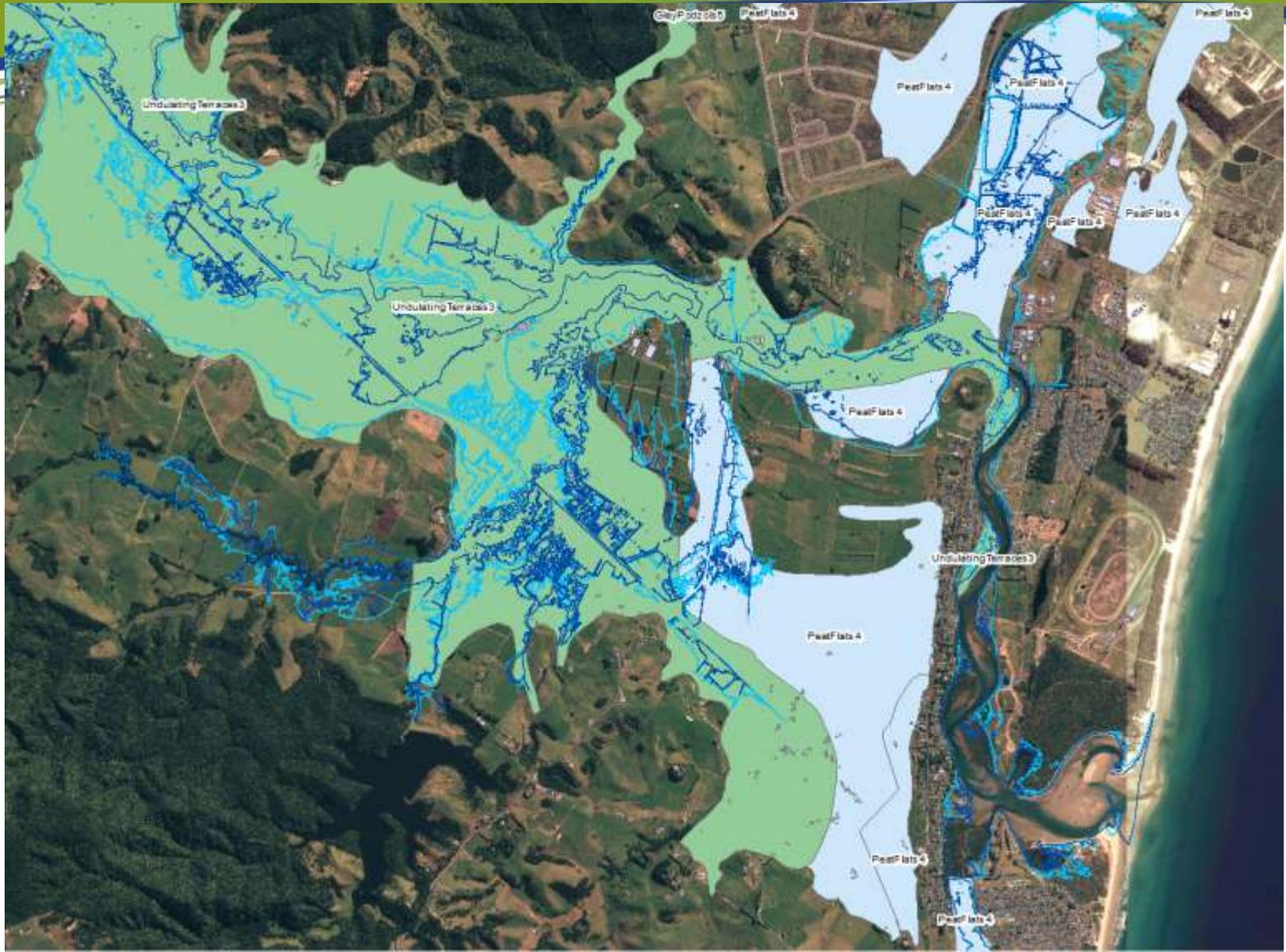
Event Based 10%, 2%,  
1%, 1% AEP CC

CFHZ 0 = 1% AEP current  
CFHZ 1 = 2% AEP (2065)  
CFHZ 2 = 1% AEP (2115)

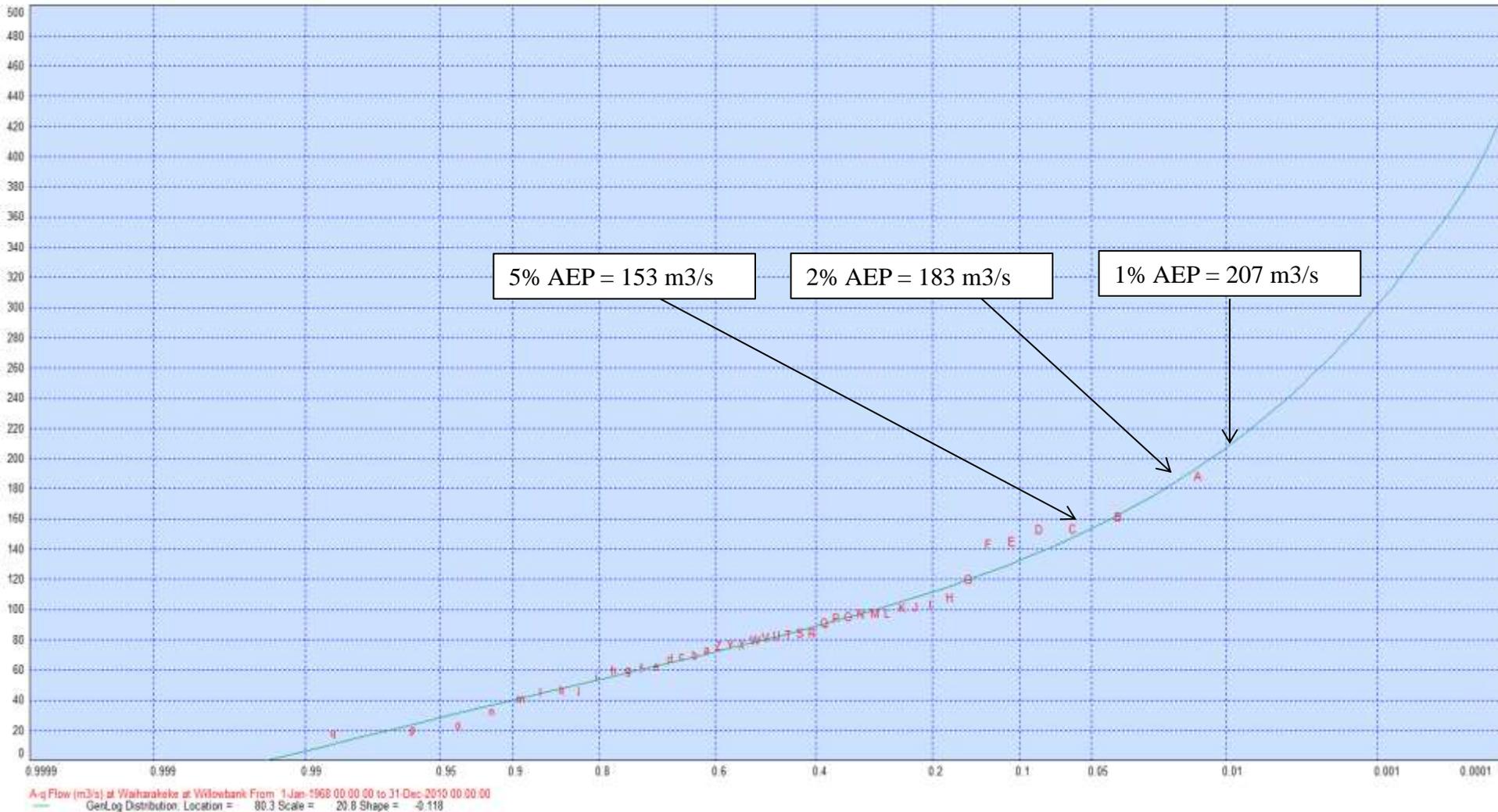
Long term change over  
defined time lines 50 and 100  
years



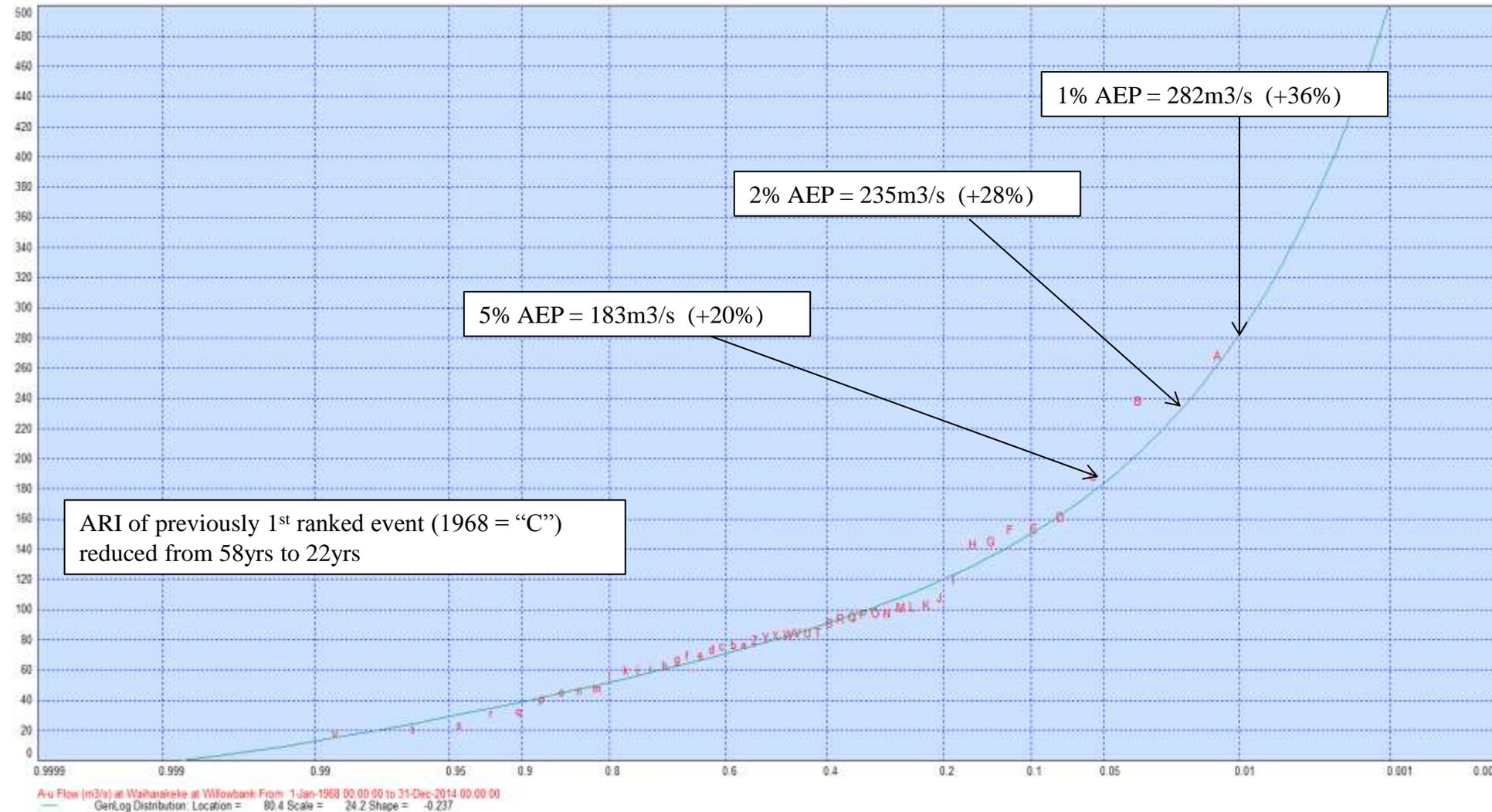
# Comparison of Flood Mapping Priority Rivers vs Flood Susceptibility Mapping (Soil Based)



# Shifting probabilities in Flood Analysis Moerewa (Willowbank) 1968 - 2010

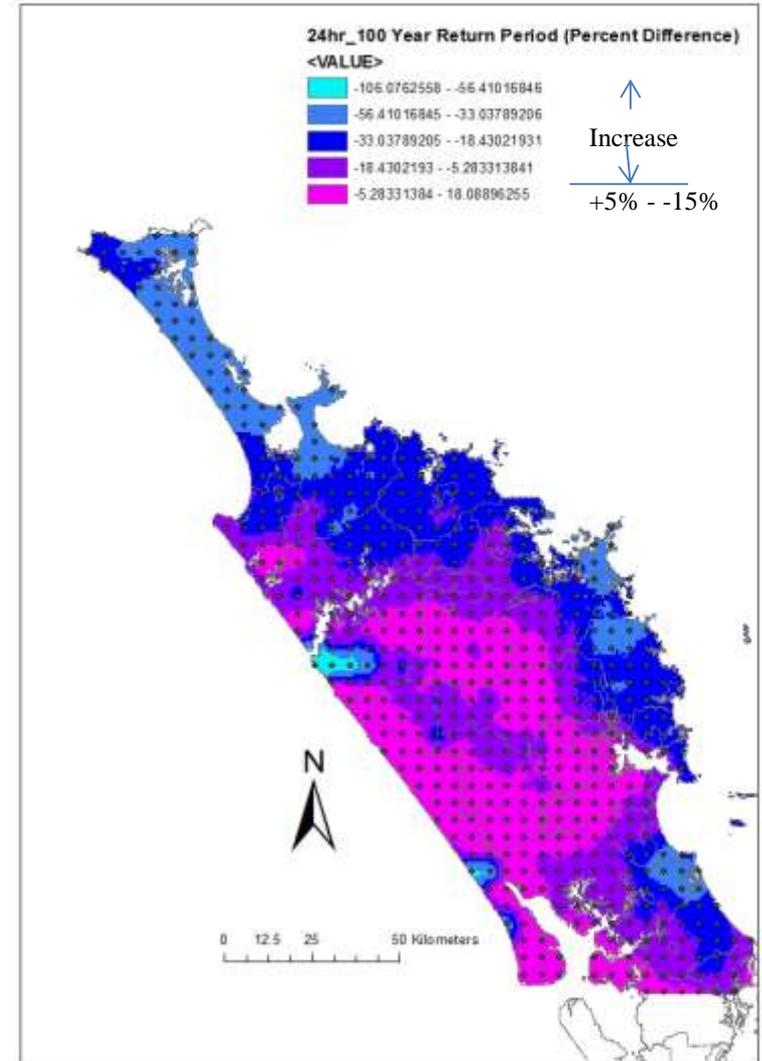
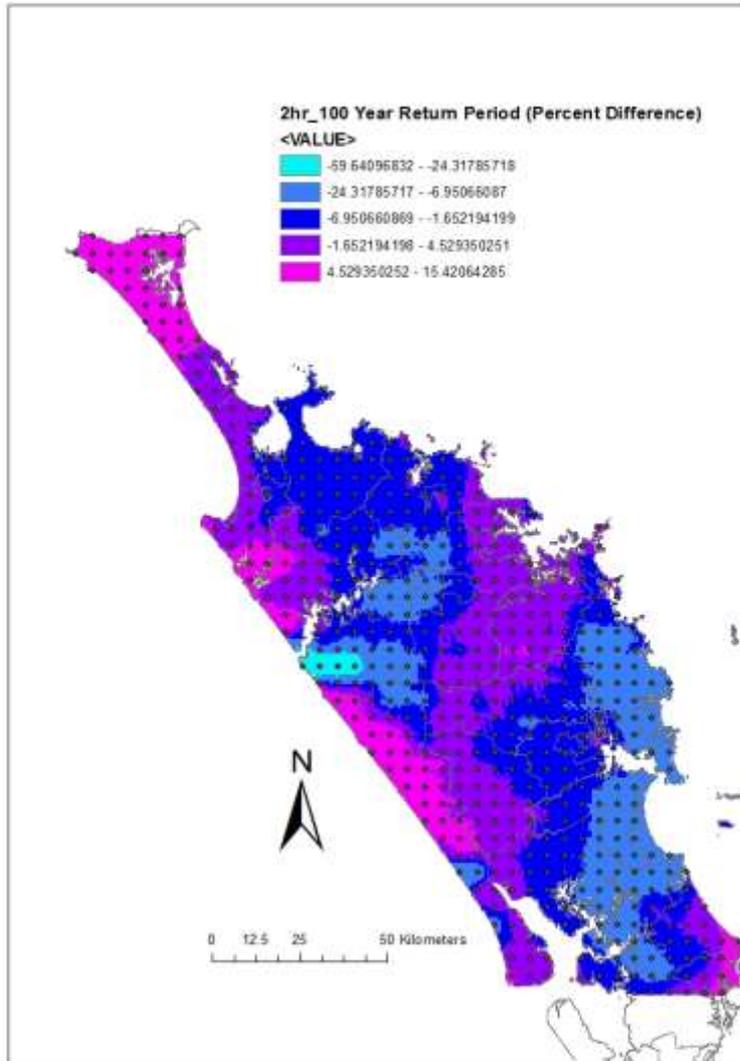


# Shifting probabilities in Flood Analysis Moerewa (Willowbank) 1968 - 2014



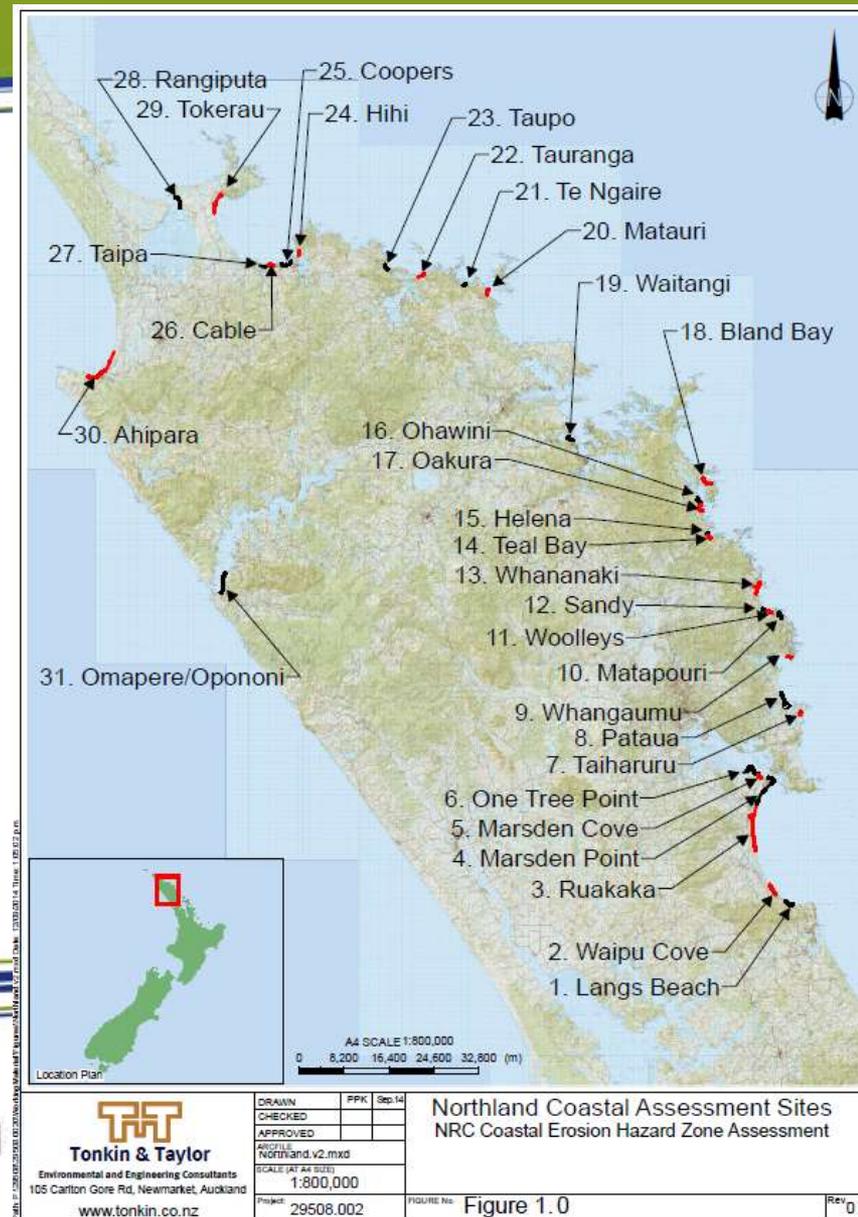
# Shifting Probabilities in Storm Rainfall

## HIRDS v2 vs HIRDS v3 % shift (Draft)



# Coastal Erosion Hazard Zone Assessments

- Scope of assessment
  - New set of Coastal Erosion Hazard Zones for 31 sites around Northland
  - Updated methodology and data. Higher SLR Projections
  - CEHZ 1 = 2065 (66% likelihood)
  - CEHZ 2 = 2115 (5% likelihood)



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# Schematic of Coastal Erosion Assessment

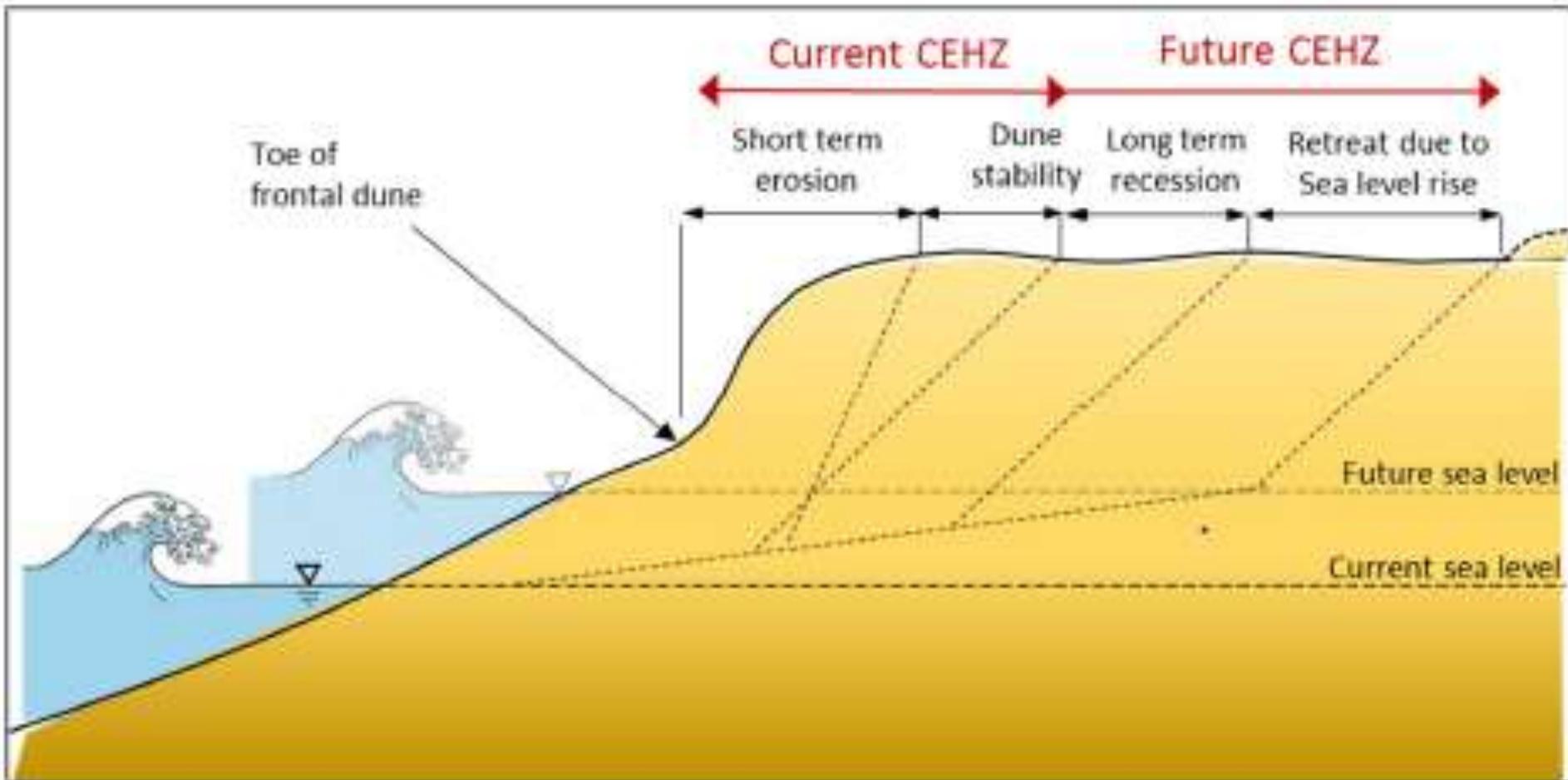


Figure 4-2 Definition sketch for open coast CEHZ

# Coastal Erosion Hazard Zones



Source: Esri, DigitalGlobe, GeoEye, Earthstar, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

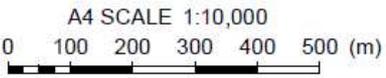
**LEGEND**

- 2013 - 2014 shoreline
- Erosion Protection Structure
- ↔ Cell Extent

**Coastal Erosion Hazard Zone**

- CEHZ1 (2065 CEHZ)
- CEHZ2 (2115 CEHZ)

Notes: Dashed CEHZ indicates greater uncertainty around stream mouths and backshore topography.



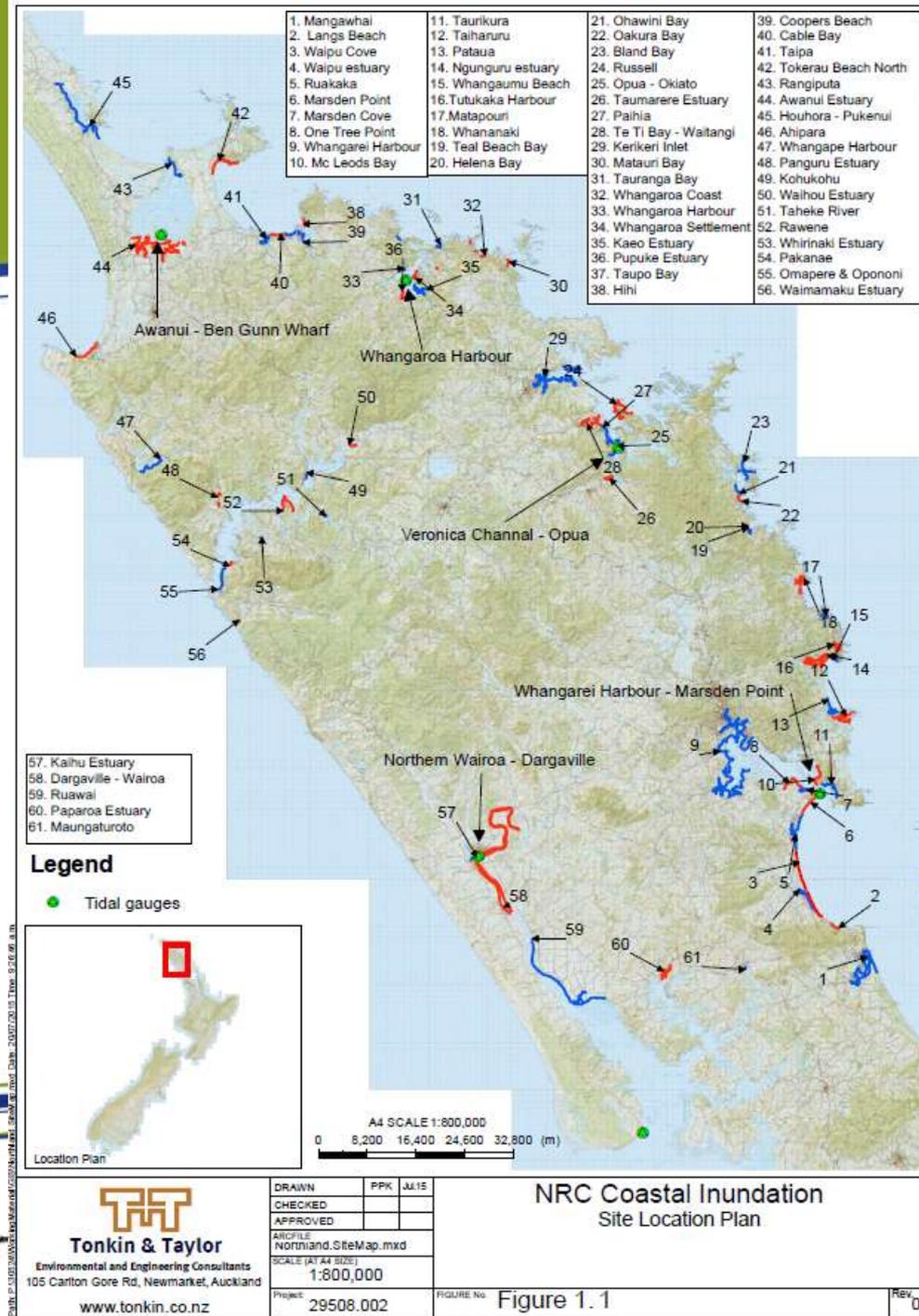
**Tonkin & Taylor**  
Environmental and Engineering Consultants  
www.tonkin.co.nz

DRAWN	PPK	Aug.14
CHECKED		
APPROVED		
ARCFILE 1400804_SitePlan.mxd		
SCALE (AT A4 SIZE) 1:10,000		
PROJECT No.	29508.002	

**NORTHLAND REGIONAL COUNCIL**  
CEHZ Assessment  
Waipu Cove  
Site: 2

# Coastal Flood Hazard Zones

- 61 sites (LIDAR coverage)
- Tidal gauge analysis
- Wave model to assess setup/runup
- Existing 1% AEP and 2% AEP levels determined.
- SLR estimates adopted
  - Zone 1 (2065) @ 0.4m
  - Zone 2 (2115) @ 1.0m
- Extents mapped for run up and storm surge
- Guideline developed for site-specific assessment of floor levels in run up zones



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# Schematic of Coastal Flood Assessment

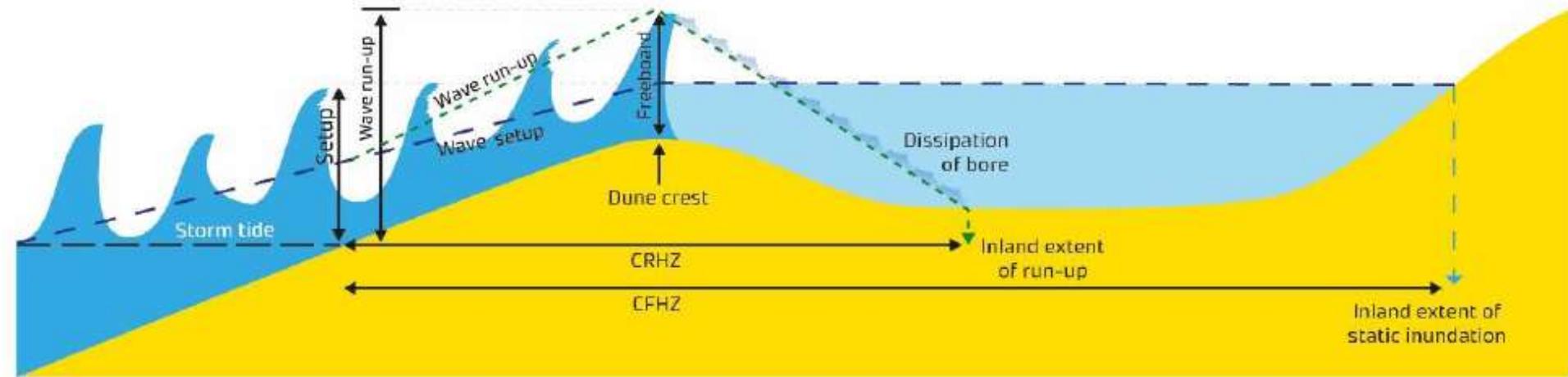


Figure 4-1 Definition sketch for CFHZ and CRHZ

**Legend**

**Whangarei2014\_DTM**

\* Z Tolerance: 1.500

**Edge type**

- Soft Edge
- Hard Edge

**Elevation**

- 2.4 - 3.1
- 2.1 - 2.4
- 0.53 - 2.1

**Whangarei Draft CFHZ**

Present day 1% AEP Storm Surge (Blue) = 2.1m OTP

Zone 1 (Red - 2065) 2% AEP = 2.4m OTP

Zone 2 (Yellow - 2115) 1% AEP = 3.1m OTP

Scale 1:5,000

0 125 250 500 Meters

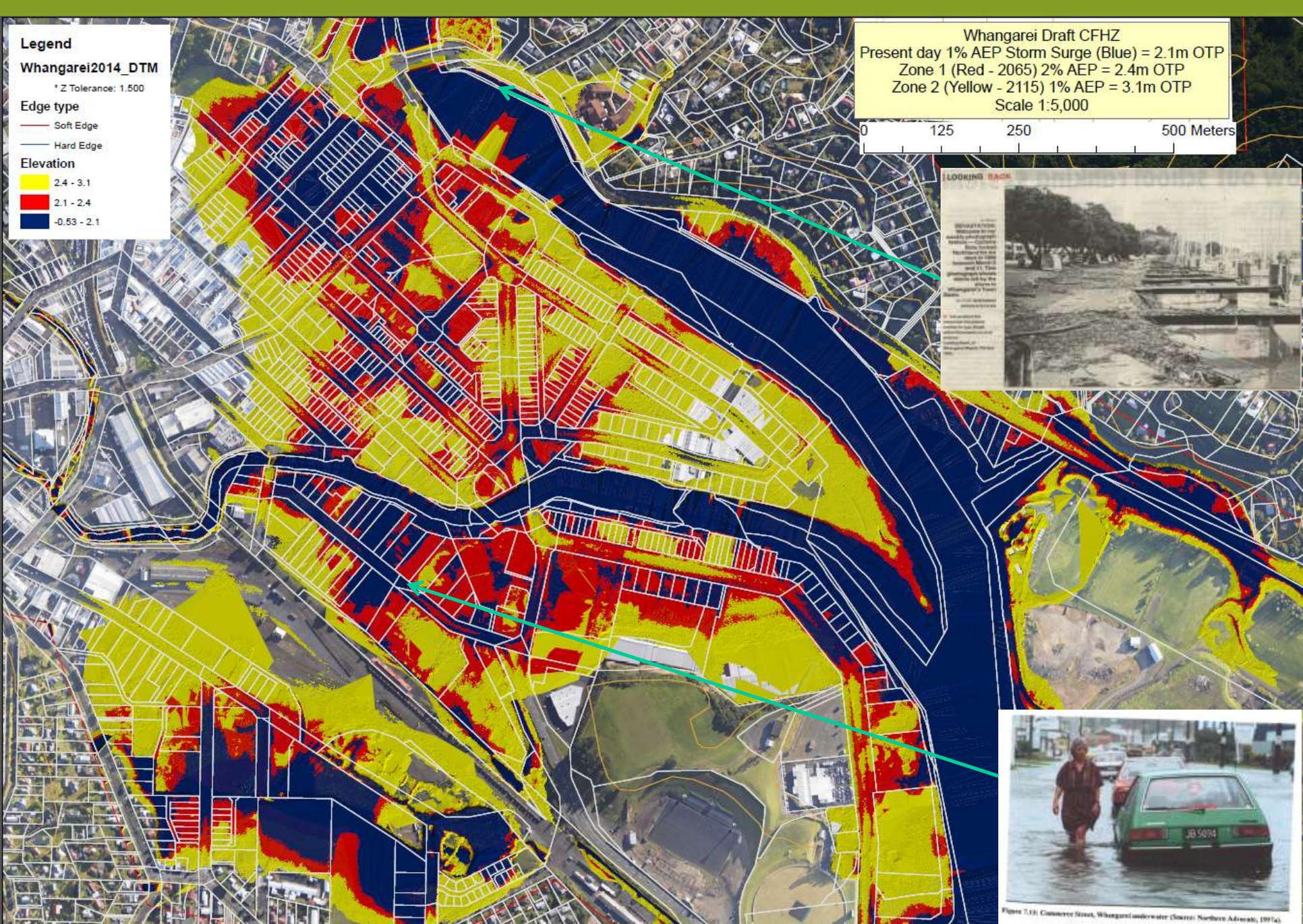


Figure 7.13: Cassinier Street, Whangarei underflow (Source: Northern Advocate, 1997a)

Dargaville Draft CFHZ  
Present day 1% AEP Storm Surge (Blue) = 3.0m OTP  
Zone 1 (Red - 2065) 2% AEP = 3.4m OTP  
Zone 2 (Yellow - 2115) 1% AEP = 4.0m OTP  
Scale 1:10,000

Dargaville stopbank design crest level is 3.26m OTP (Above current 1% AEP but below zone 1 and zone 2 flood elevations)

**Legend**

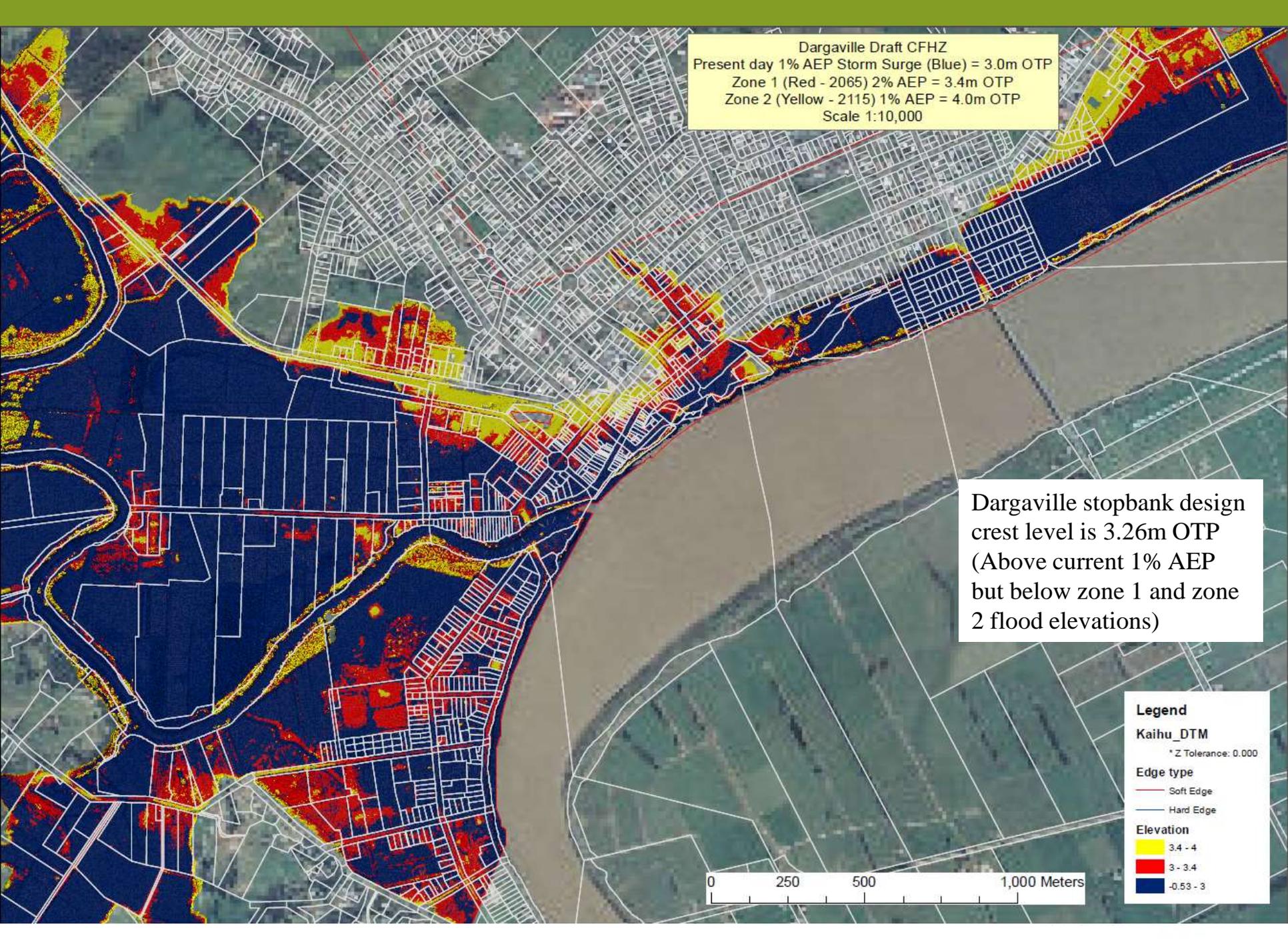
Kaihu\_DTM  
\* Z Tolerance: 0.000

**Edge type**

- Soft Edge
- Hard Edge

**Elevation**

- 3.4 - 4
- 3 - 3.4
- 0.53 - 3



# Risk Reduction – Scheme Works



Figure 4: Part of the now completed Kaeo Flood Scheme Stage 1

# Kotuku Flood Detention Dam

NRC Dam1 20 October 2015

12:00:00 pm



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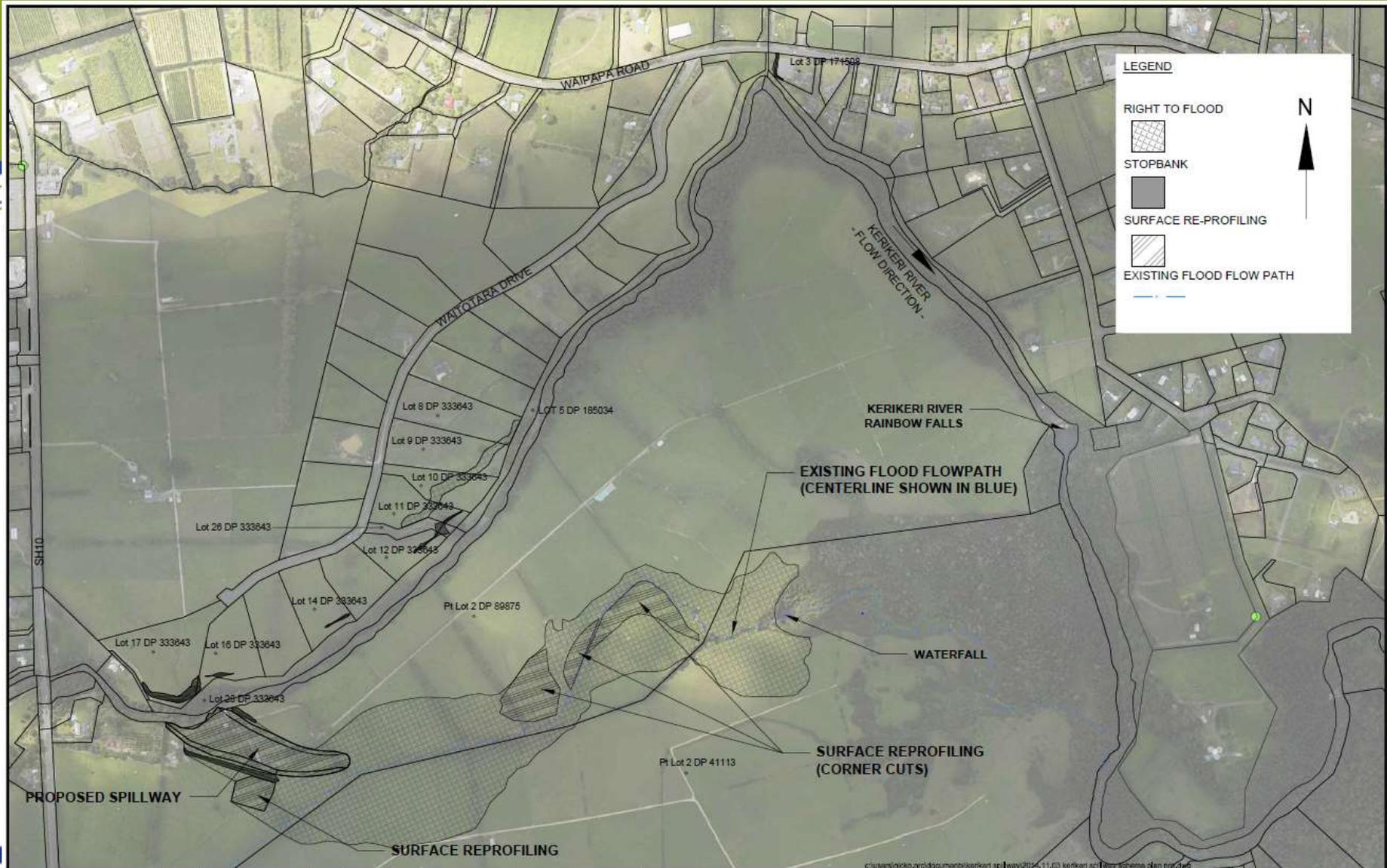
snapihd

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# Kerikeri River Flood Scheme



Amendment:	Name	Date	Designed	NRC RVS	Date
RESOURCE CONSENT		DEC 20	Surveyed		
			Drawn	NJCKG	DEC 2014
			Checked		
			Approved		



Job Title: PROJECT KERIKERI RIVER FLOOD SCHEME

Drawing Title: SCHEME OVERVIEW

Scale:	1:6500 @ A3
Drawing Number:	
Amendment:	
Sheet Number:	1 OF 7

# Thank you

## Toby Kay

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