

Kohupātiki Marae



Ngati Hori

TANK

July 2017

Ngati Hori Freshwater Management Plan 2009/12

Whakapapa Kaitiakitanga Ngati Hori

Te Tahatu o te Rangi m Hikitanga Te Rangi

Te Whakawhirinaki m Te Pakaru o te Rangi

Te Koari m Te Uhu

Te Hoerakau
m Raukawa
Pohe

Ahere Te Koari
m Marara Nukai

Ngapu o te Rangi
m Paru

Ramarihitakatoaawanga
m Horomona Kahui

Mita
Ngapu

Raihaniana Kahui

Hararutu

Te Haumihiata

Te Poa Tuhaha m Anateira

Ngamihi Te Kehu m Charles
Chadwick

Te Hore Ngarangi m Erena Rapana Te Tuku
Kaitiaki Tohunga o te Awa

Hararutu m Wiremu Teo Paipa

Kaitiaki Tohunga o te Awa

**Te Pakaru
o te rangi**

**Te Oiroa
Parehuia**

Wakatakahia

Akata m Tame McGuire
Kai Rangahau Kaitiaki Tohunga o te Awa

**Akinehi
(Aki)
Kaitiaki
Whakahoutia**

Ann Ramarihi Takatoawanga
No te Rangatahi Puawaitanga

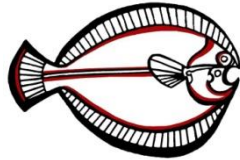
Moko

“Matauranga Māori”

“Observation over time”

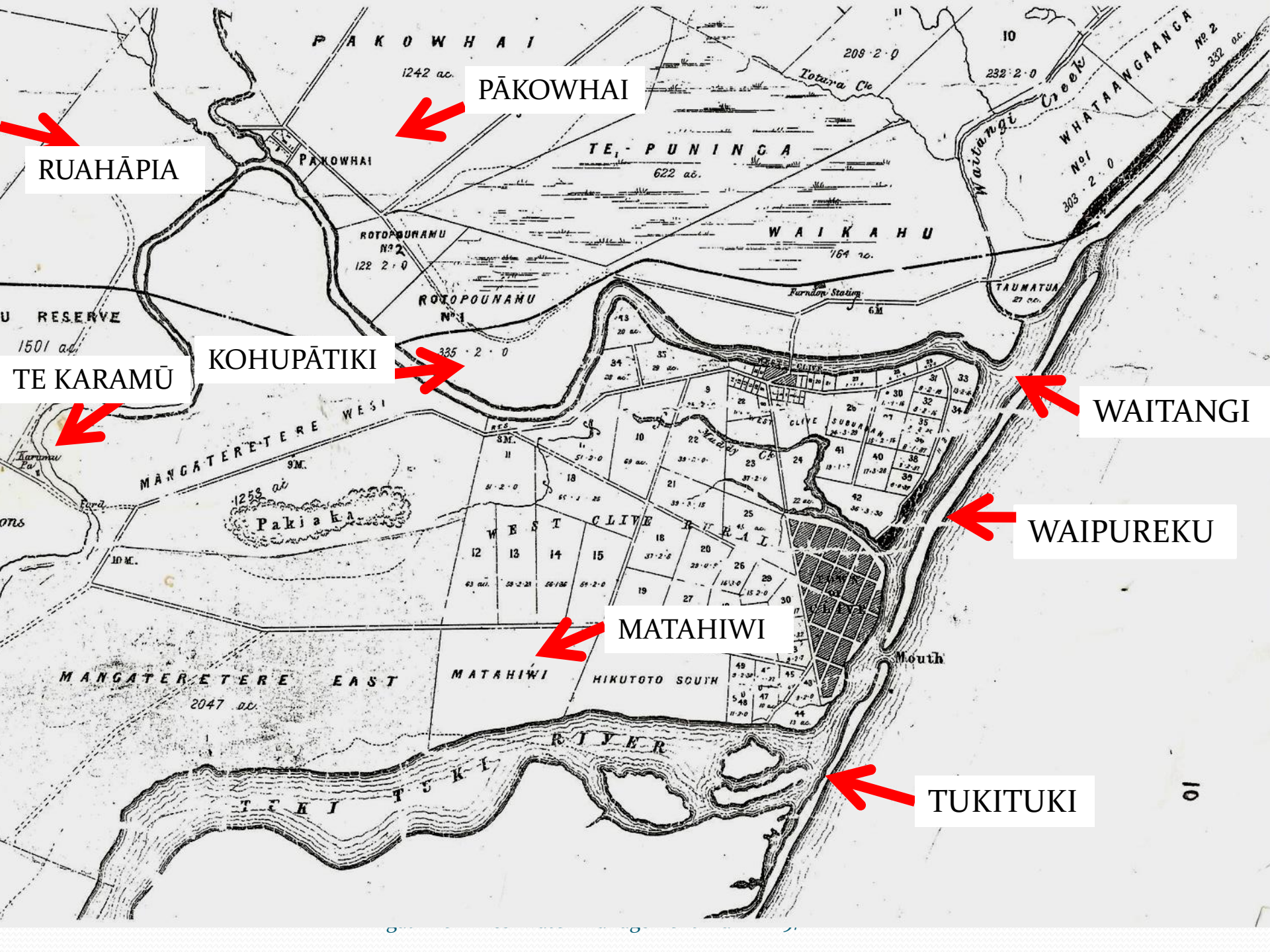
Our plan is based around the following priorities of Ngāti Hori in freshwater:

- = Achieving sufficient water flow
- = Improving water quality
- = Protection and restoration of traditional riparian vegetation
- = Protection and restoration of fish and fish habitat



To maintain our physical, mental, emotional, spiritual & psychological wellbeing

“Information is not knowledge, knowledge is only arrived at through direct experience” Einstein



RUAHĀPIA

PĀKOWHAI

KOHUPĀTIKI

TE KARAMŪ

WAITANGI

WAIPUREKU

MATAHIWI

TUKITUKI

PAKOWHAI

TE-PUNINGA

WAIKAHU

MANGATERETERE WEST

MANGATERETERE EAST

MATAHIWI

HIKUTOTO SCUM

TUKITUKI RIVER

WHATAANGANGA

ROTOPOUNAMU N^o 2

ROTOPOUNAMU N^o 1

TAUMATUA

WEST CLIVE RAIL

Pakiaka

RESERVE

Totara Cr

Waitangi Creek

Ferndon Station

Mouth

1242 ac.

622 ac.

208 2 0

232 2 0

332 ac.

122 2 0

164 ac.

335 2 0

1501 ac.

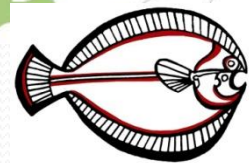
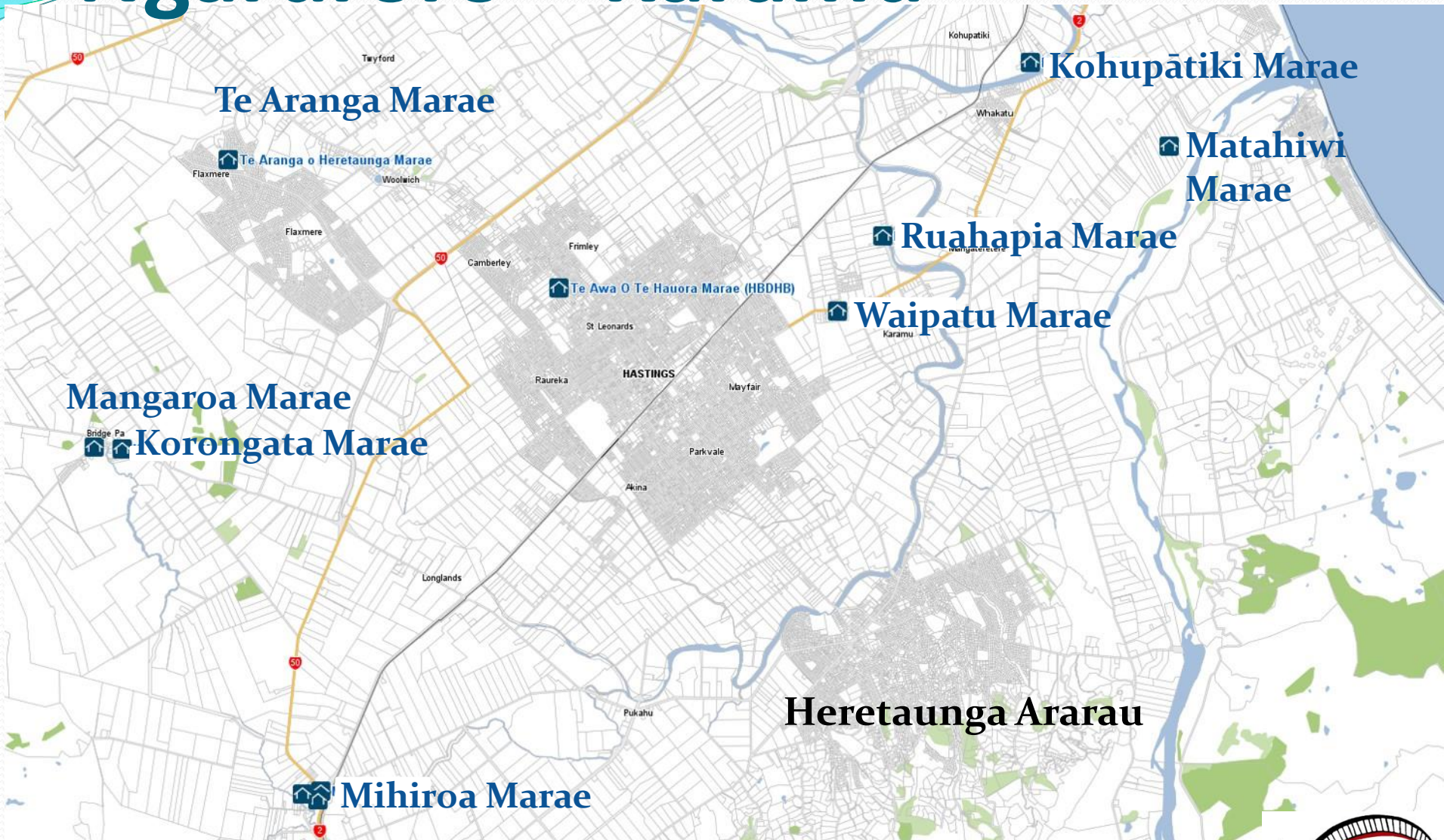
303 2 0

1253 ac.

2047 ac.

10

Ngaruroro – Karamū



Pākowhai Park Concept Plan



Whakatū Landscape & Awa Enhancement Plan



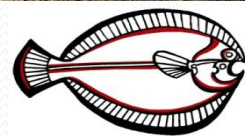
WHAKATU LANDSCAPE PLAN AND AWA ENHANCEMENT | WHAKATU, HASTINGS
 HAWKES BAY REGIONAL COUNCIL | HASTINGS DISTRICT COUNCIL

scale: 1:750 @ A1 | date: 27-02-15 | drawing no: NZ0414155-C800-LANDSCAPING-02 | sheet: 1 | issue:3
 p 64 6 876 0007 | e hb@cardno.co.nz www.cardno.co.nz | 507 Eastbourne Street West, Hastings, New Zealand 4156





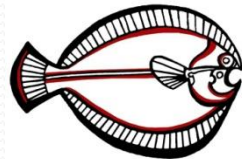
Second Phase Cycle Path Whakatu





“As a human family, we must decide, will we be selfish, short-sighted or co-operative & visionary?”

Severn Cullis-Suzuki

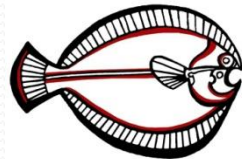


“Change is imminent, the most powerful thing we can do is to build a beautiful path forward.”

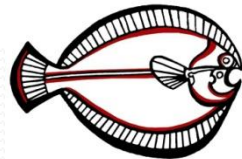
Severn Cullis-Suzuki, Haida Gwaii



DJI00222.MP4



OTANENUIARANGI PĀ



MAORI SITES OF
SIGNIFICANCE
O
OTANENUIARANGI
POU
RURU



Waitangi Estuary Concept Plan

Primary Arrival Area Concept Plan





Waitangi Celestial Star Compass



NGĀ MIHI KI A KOUTOU KATOA

**Lisa McGlinchy
Pa McGowan**

**Department of Conservation
Enviroschools HB
Fish & Game
Forest & Bird**

Guardians of HB Fisheries

Dr Mike Joy, Massey University

Ngā Kaitiaki o te Awa a Ngaruroro

Ngā Whenua Rāhui

Ngā Kura O Clive me Haumoana me

Mangateretere me Te Ara Hau

Te Kohanga Reo O Whakatu

Lindisfarne Collage

Naiper Boys High

Peterhead Kura

Hastings District Council

Hawke's Bay Regional Council

Hawke's Bay District Health Board

Ngāti Kahungunu Iwi Inc

Surveying the Bay

Te Taiwhenua o Heretaunga

Whakatū Community

Whakatū Industry

Whānau, Friends & Neighbours



Matauranga Maori

WAI Māori priorities for Ngāti Hori

- Achieving sufficient water flow
 - Improving water quality
- Protection and restoration of traditional riparian vegetation
 - Protection and restoration of fish and fish habitat
- To maintain our physical, mental, emotional, spiritual & psychological wellbeing



EXCESSIVE WEED GROWTH



SEDEMENT

“You wont change things by fighting the existing. To change something build a new model that makes the existing model obsolete.”

Buckminster Fuller



INDUSTRIAL STORM WATER

TANK ISSUES

WHERE TO FROM HERE?

- Water quality
- Endemic fresh water fish Species
- Water flow

*Will we be creative, inovative or
STATUS QUO*

ASK YOURSELF?

Kohupatiki Marae
Wai Maori, Wai ora,



Nau Mai Haere Mai
“Tihei Mauri Ora”



**Summary of Baseline
Technical Report
Ravensdown Napier
Reconsenting**

**Dr Ngaire Phillips
Technical Focus Group
Meeting**

**Kohupātiki Marae
18 May 2021**

Water quality and ecology team



Dr Ngaire Phillips¹,
Team leader, Water
quality, ecotoxicology



Dr Sharon De Luca²,
Marine Ecology



Dr Mike Stewart¹,
Environmental
Chemistry



Kendall Leitch^{1,2},
Technical support



Dr Rebecca Eivers^{1,3},
Technical support

¹Streamlined Environmental

² Boffa Miskell

³ Wai Kokopu Consulting

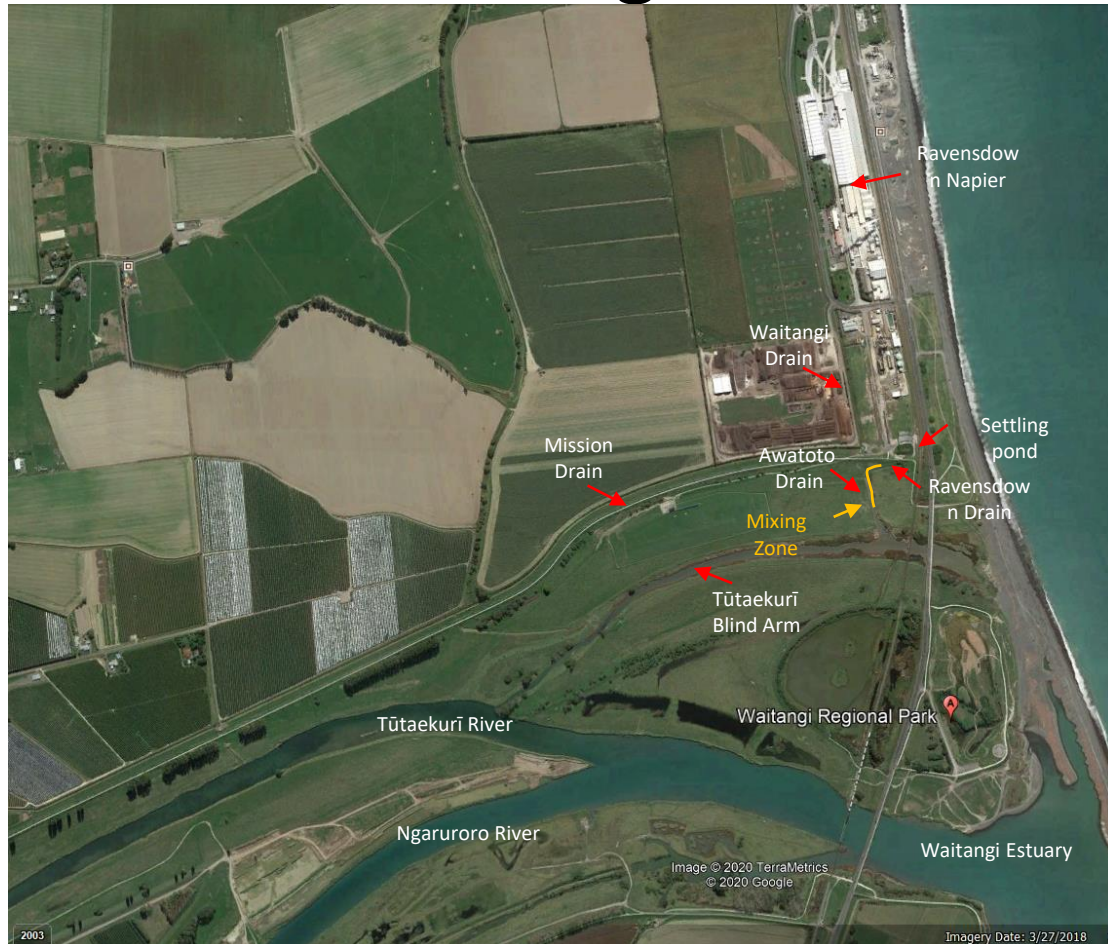
Purpose of presentation

- Provide a brief background of the study area
- Address some key questions based on our technical investigations
- Answer any questions you may have on the Technical Report



Ravensdown settling pond

Receiving environment/background



- Site stormwater discharged via settling pond to Ravensdown and Awatoto Drains.
- Ultimate receiving environment is Tūtaekūrī River and Waitangi Estuary – identified as outstanding waterbodies (Plan Change 7).
- Upstream catchments input contaminants via the Mission and Waitangi Drains and comprise a mixture of agriculture, commercial, industrial and urban landuses.
- Council operated pump controls upstream flows through stop bank to Awatoto Drain.

Focus of our investigations

- Discharge and receiving environment water quality
- Potential risk of process chemicals
- Potential effects on downstream receiving environment



**What is the current quality of
the discharge and the
receiving environment?**

Water quality monitoring programme

- Compliance water quality monitoring defined by resource consent
 - Weekly discharge (condition 5b)
 - Monthly **ambient** receiving environment (condition 5c and 6h)
 - 6-monthly **rainfall** receiving environment (condition 6i)

Key

Red stars are ambient (AS) and rainfall (SWS) sampling sites.

Blue stars are rainfall only sampling sites.



Discharge quality – Compliance

- Very high level of compliance with consent conditions for discharge flow (100%), pH (94%), Total Suspended Solids (TSS) (100%), and fluoride (100%).

	Discharge Flow (L/s)	pH	Fluoride (g/m ³)	SS (g/m ³)	SRP (g/m ³)	TP (g/m ³)
ALL DATA (01 July 2012 – 31 July 2019)						
Average	2.5	7.2	4.4	7.9	7.6	8.3
50%ile (median)	2.5	7.2	3.2	6.0	6.6	7.0
95%ile	5.2	7.9	11.6	20.8	15.0	16.7
99%ile	6.7	8.1	18.3	43.4	20.4	23.0
N. of Samples	253	364	366	365	366	366
Condition limit	< 265	6.5 - 8.5	< 30	< 100	< 15 (95% of the time) < 20 (99% of the time)	< 17 (95% of the time) < 22 (99% of the time)
% Compliance	100	94	100	100	95% / 95% ¹	95% / 98% ¹

- Very high compliance has also generally been observed for Soluble Reactive Phosphorus (SRP) and Total Phosphorus (TP) limits, excluding 2013 – 2014 (TP) and 2017-2018 (SRP)

TP		Limit: TP shall not exceed 17 mg/L for more than 95% of the time			Limit: TP shall not exceed 22 mg/L for more than 99% of the time		
Year	Number of samples	No. Exceedances	Allowable exceedances	Compliant	No. Exceedances	Allowable exceedances	Compliant
2012-2013	52	1	5	√	0	1	√
2013-2014	52	10	5	x	4	1	x
2014-2015	52	1	5	√	1	1	√
2015-2016	52	0	5	√	0	1	√
2016-2017	52	0	5	√	0	1	√
2017-2018	52	3	5	√	0	1	√
2018-2019	52	1	5	√	1	1	√

SRP		Limit: SRP shall not exceed 15 mg/L for more than 95% of the time			Limit: SRP shall not exceed 20 mg/L for more than 99% of the time		
Year	Number of samples	No. Exceedances	Allowable exceedances	Compliant	No. Exceedances	Allowable exceedances	Compliant
2012-2013	52	1	5	√	0	1	√
2013-2014	52	10	5	x	1	1	√
2014-2015	52	1	5	√	1	1	√
2015-2016	52	0	5	√	0	1	√
2016-2017	52	1	5	√	0	1	√
2017-2018	52	4	5	√	2	1	x
2018-2019	52	1	5	√	0	1	√

Receiving environment quality (based on 2013 and 2019 data)

Metals/metalloids

- Under ambient conditions, nickel, copper and aluminium elevated in **mixing zone and some sites further downstream**



- Nickel below guideline
- Aluminium exceeds guideline at upstream sites also
- Copper just exceeds guideline downstream

- Some metal concentrations high (or higher) at upstream sites under ambient conditions e.g. cadmium, zinc.



- Sources other than the Ravensdown discharge contributing to downstream concentrations of these metals.

- Under wet weather conditions, cadmium, fluoride and sulphur elevated in mixing zone.



- Only cadmium exceeds guideline.

Receiving environment quality - (based on 2013 and 2019 data)

Nutrients and other parameters

- Under ambient conditions, all nutrient concentrations other than nitrate are comparable upstream and downstream



- Guidelines exceeded upstream as well as in mixing zone and downstream

- Under wet weather conditions, mixing zone nutrient concentrations elevated compared to upstream



- But guidelines are still exceeded upstream as well as in mixing zone and downstream

What changes have there been over time in discharge and receiving environment water quality?

Discharge quality – summary of trends (2007 –

Meaningful trend = statistically significant and
with greater than 1% change per year.

Key Y	→ ↑	↓	↑
	Significant but <1% change/year	Meaningful decrease	Meaningful increase

Copper	↓
Zinc	No trend
Cadmium	→
Chromium	No trend
Aluminium	No trend

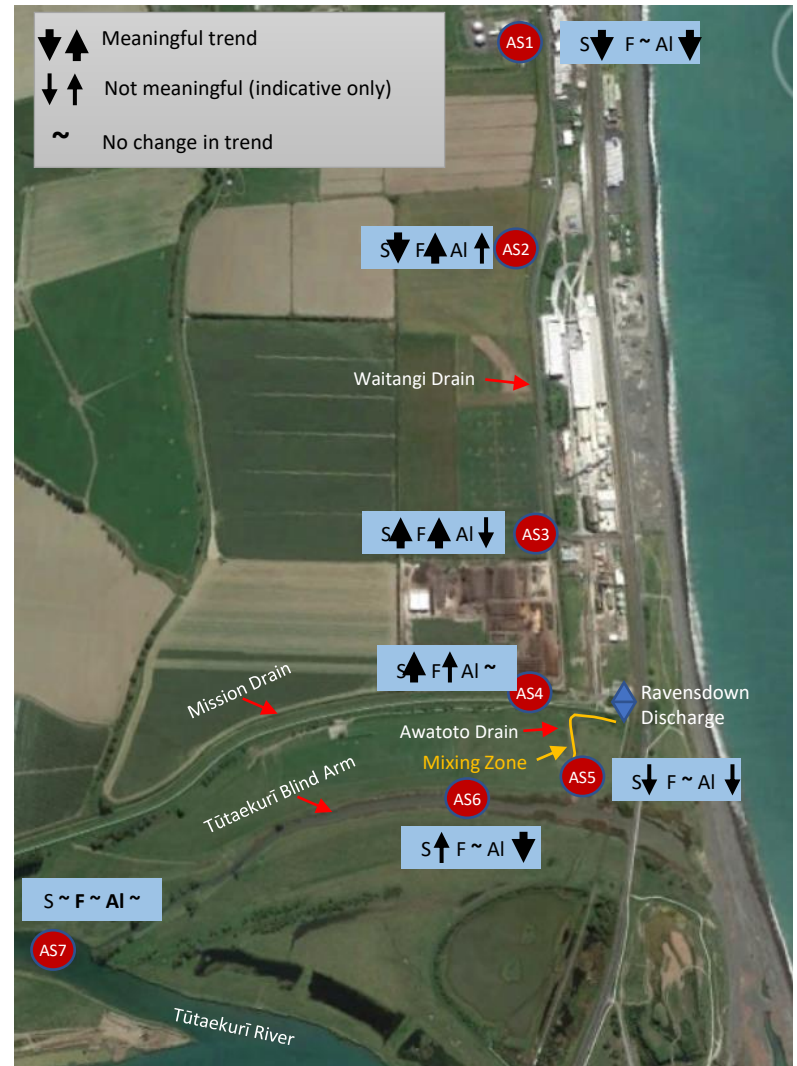
Flow	↑
pH	↑

Sulphur	No trend
Fluoride	↓
SRP	↓
TP	↓
TSS	↓

Receiving Environment

Ambient monitoring (2012 – 2020)

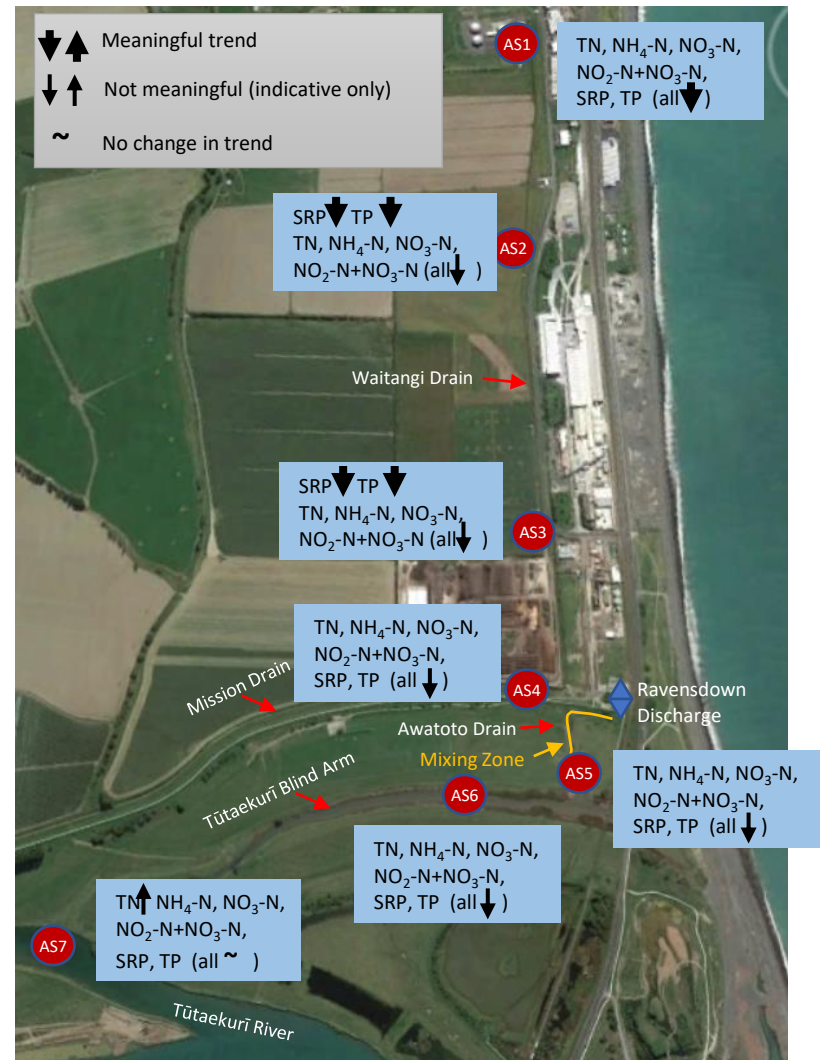
Metals/metalloids



Receiving Environment

Ambient monitoring (2012 – 2020)

Nutrients



Receiving Environment

Rainfall monitoring (2014 – 2019)

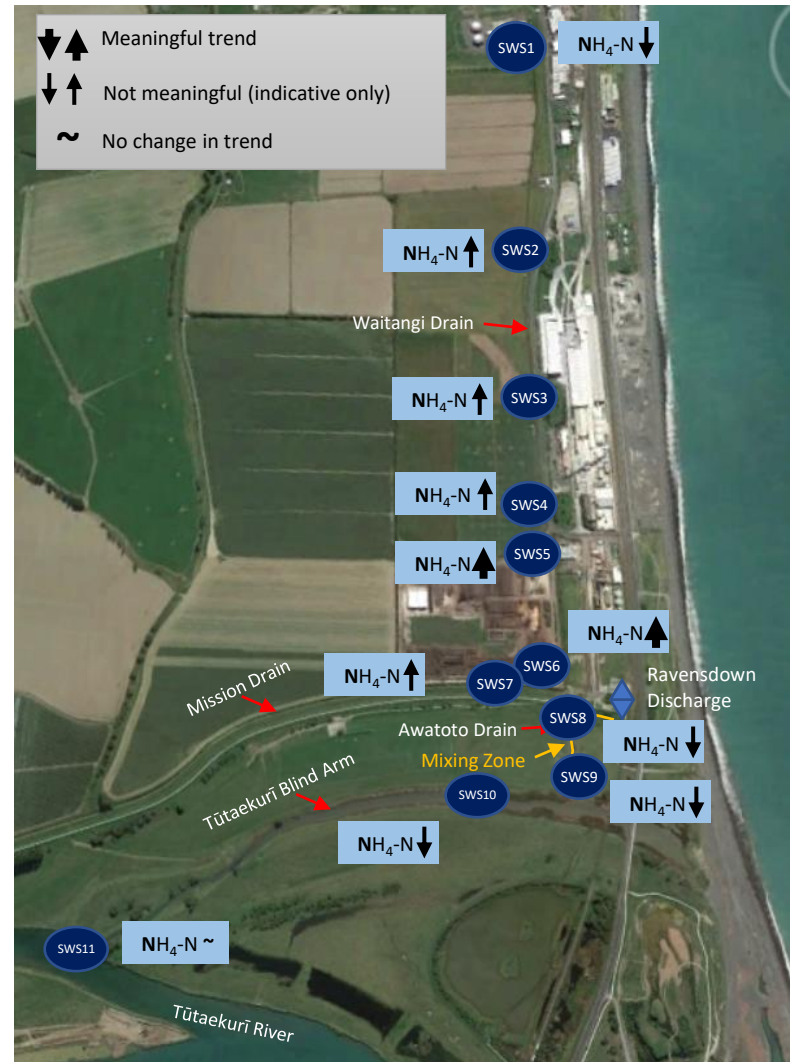
Metals/metalloids



Receiving Environment

Rainfall monitoring (2014 – 2019)

Nutrients



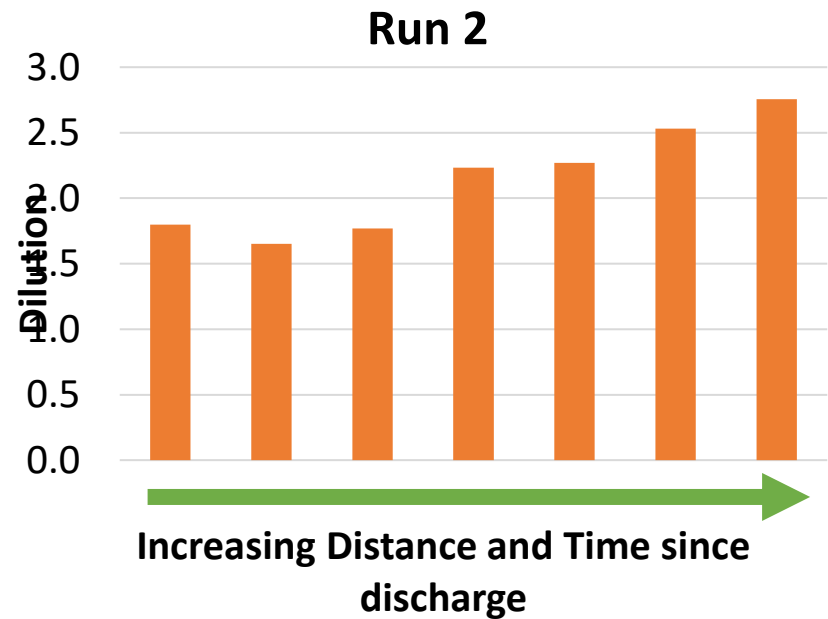
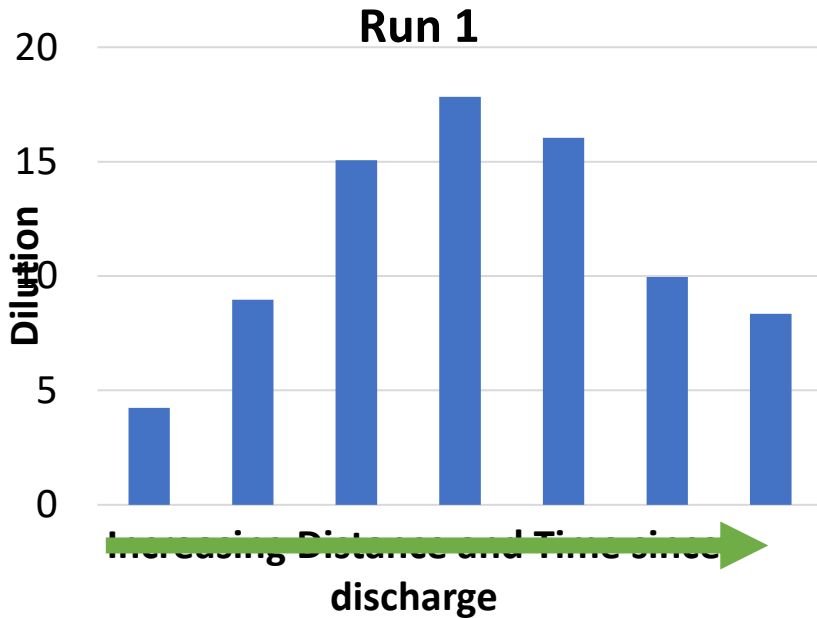
How much dilution of the discharge occurs in the Receiving Environment?

Mixing Zone Dye Study

- Added Rhodamine dye (red) to discharge at high and low tide
- Collected water samples at 7 locations between discharge point and boundary of mixing zone

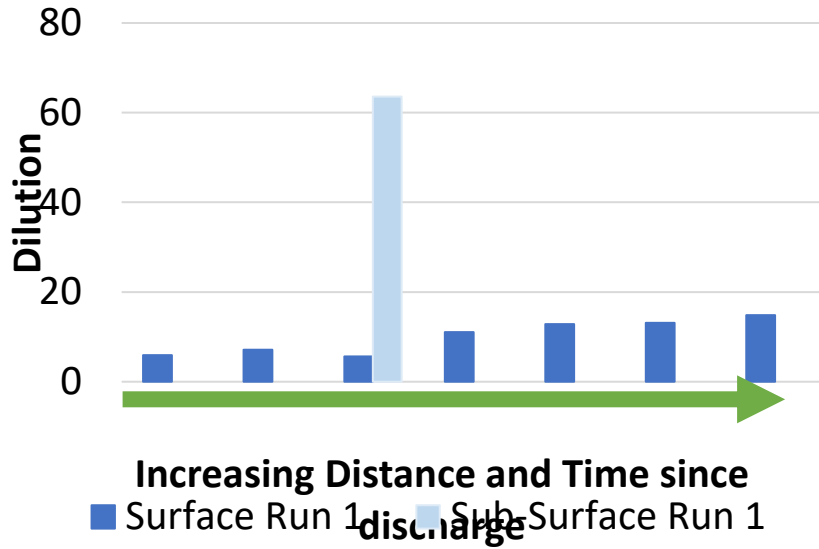


Dye study results – Low Tide

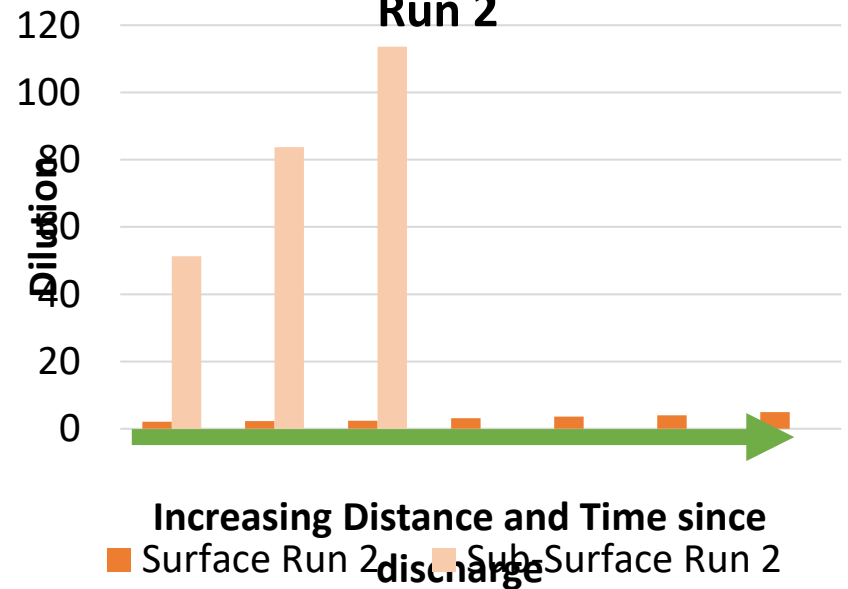


Dye study results – High Tide

Run 1



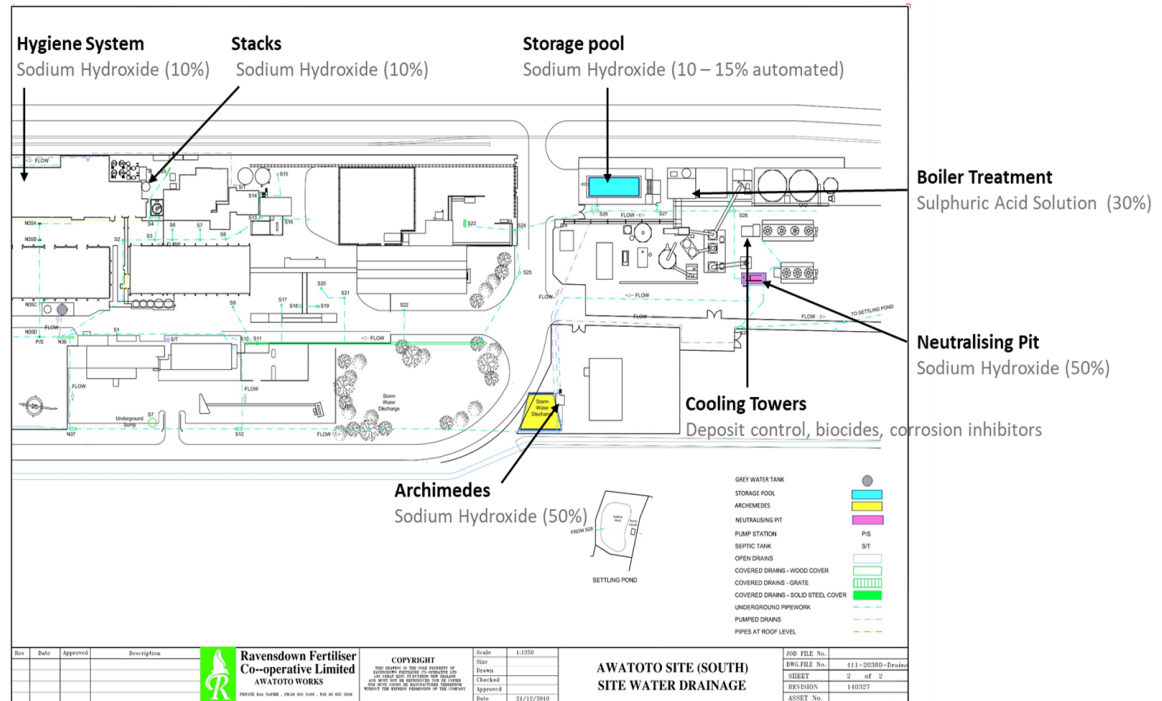
Run 2



What is the Risk of Effects from Process Chemicals?

Risk Assessment of Process Chemicals

- Ravensdown use nine process chemicals as part of the operation of the plant.
- Process chemicals are not required to be measured in discharge or receiving environment
- Use chemical and ecotoxicological properties to assess potential risk.



Highly conservative method



Assumes all the chemicals enter the settling pond, with no degradation or evaporation. Also assumes lowest dilution from dye study.

Summary of ecological risk for process chemicals

Will their use increase the risk of ecological impacts?



- Under **low tide**, potential elevated risks for the majority of the process chemicals
- Under **high tide**, potential elevated risk of 6 process chemicals, however risks much lower than under lower tide and as most readily biodegradable, effects considered unlikely

Would any process chemical bioaccumulate?



- None of the chemicals in the formulations are likely to bioaccumulate.

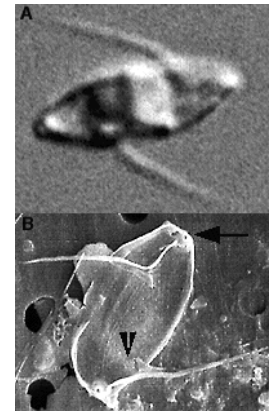
**Is the discharge impacting the
downstream marine
environment?**

Effluent Toxicity Testing

- Whole Effluent Toxicity testing is undertaken every 4 years on 3 species
- Sample also analysed for some nutrients and metals, as well as pH
- **Compliance** = no significant toxicity to any test species at a dilution of no more than 100:1.



- Toxicity Test results (2014, 2019 and 2020) fully compliant on all occasions.
- 2020 results – dilutions <25 fold required to achieve no toxicity to algae and <13 fold for other species



Are dilutions in receiving environment sufficient to minimize risk of toxicity from discharge?

From March 2021 dye study

Dilutions during low tide
1: 1.7 – 1: 17.8

Dilutions during high tide
1: 2.1 – 1: 113.6



Dilutions sometimes much less than 100:1

Are there likely to be toxic effects from the discharge?



Ecotoxicity tests show no toxicity at much lower than 100:1 dilution but tidal phase may be important



Need to consider multiple lines of evidence

Marine Ecology Monitoring Programme

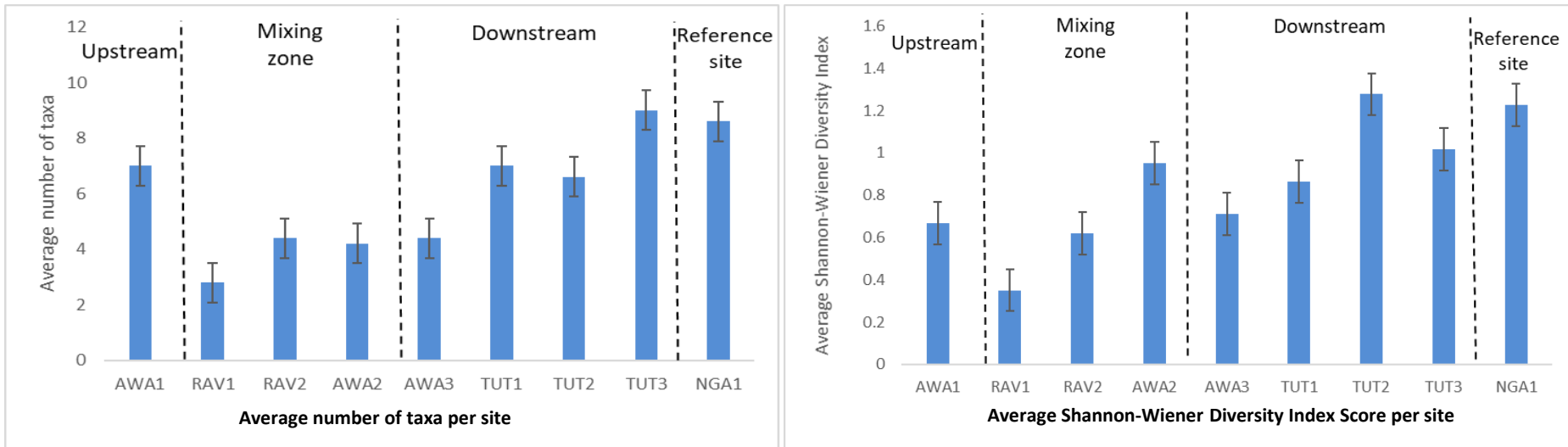
- 4 yearly monitoring of the receiving environment ecology (Condition 6)
 - benthic macrofauna
 - fish (not surveyed in 2020)
 - periphyton and macrophytes
 - sediment health and potential for metal accumulation



July 2020 Survey sites

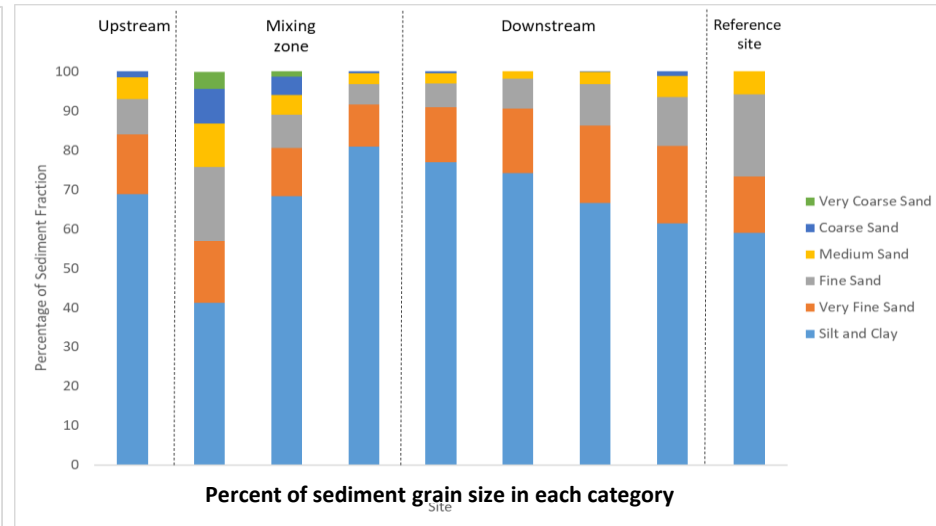
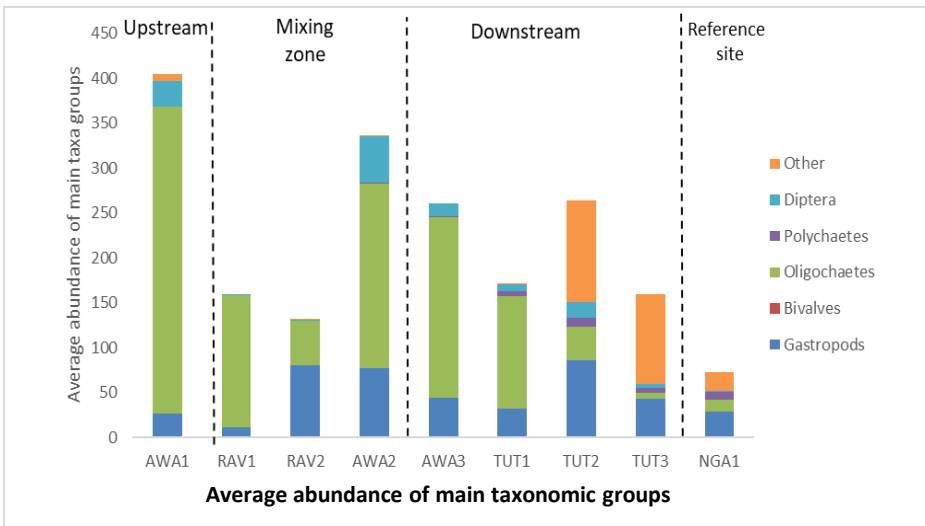
RAV1-2 = Ravensdown Drain, AWA1-3 = Awatoto Drain, TUT1-2 = Tutaekuri Blind Arm, NGA = reference site

Diversity measures



Impacts likely within mixing zone and potentially beyond the boundary but recovery with distance downstream.

What other influences on faunal composition?



- Coarser grain size within mixing zone may be contributing to lower abundance and diversity.
- Also sites in the Ravensdown and Awatoto Drain show some influence of freshwater.

Overall conclusions from technical investigations

Discharge quality

- High level of compliance for most discharge parameters

Receiving environment quality

Monitored parameters

- Some water quality parameters are elevated downstream of the discharge during rainfall events and exceed guidelines

Process chemicals

- Based on worst case, some process chemicals present a potential risk, particularly at low tide

Ecological effects

Ecotoxicity

- The discharge consistently shows no toxicity in laboratory tests at the compliance level of 100:1 dilution
- Potential effects may be tidally influenced

Marine ecology

- Marine benthic communities are likely to be impacted by the discharge within the mixing zone. However there is little evidence of effects beyond the mixing zone

Overall effects

- Using a weight of evidence approach, the overall effects from the current discharge are likely to be minor

Air Discharges

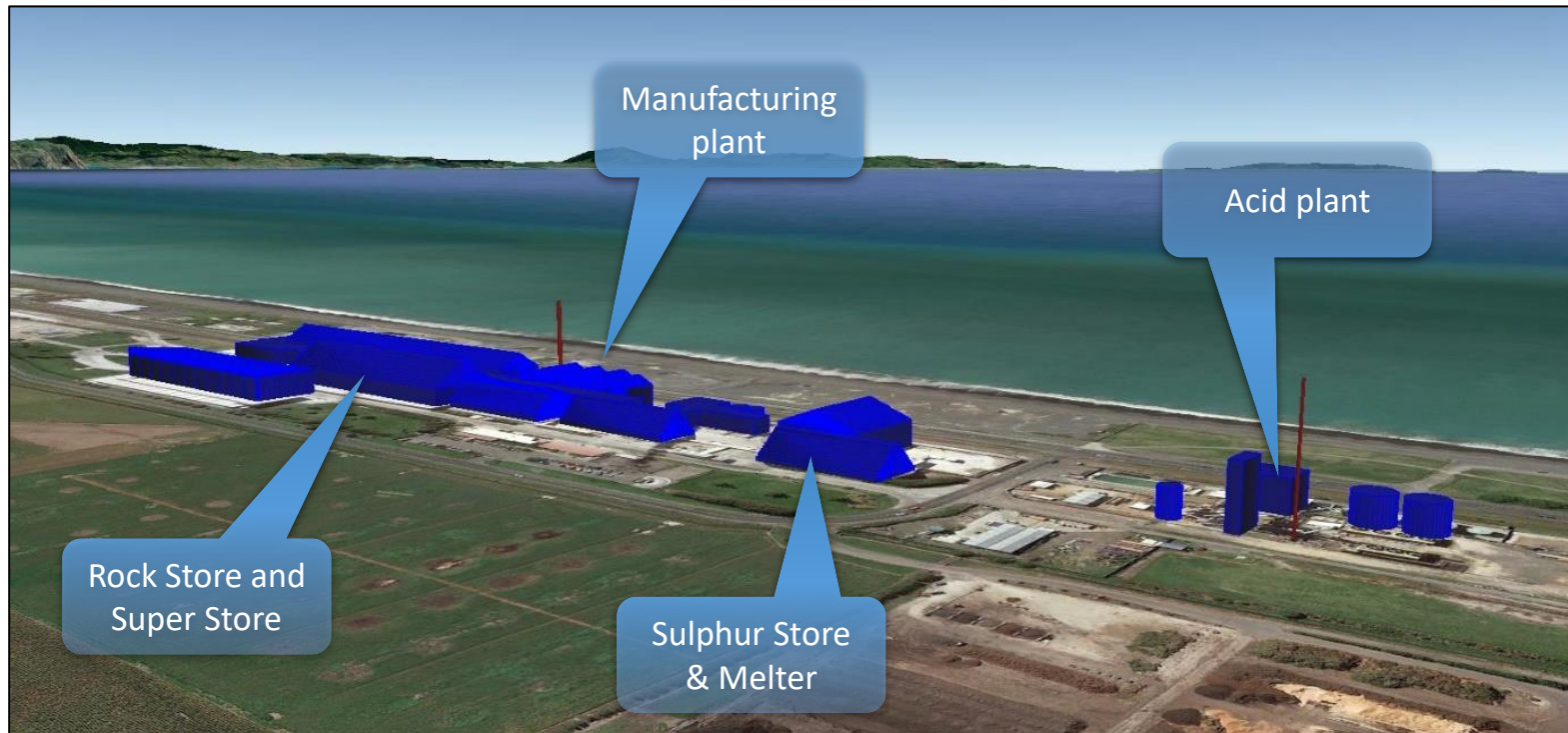
Ravensdown Napier
May 2021



Purpose of presentation

- Background on how air quality effects are assessed
 - The site and contaminants discharged to air
 - How effects are assessed
 - Data reviewed
 - The receiving environment (where we assessed)
 - Overall conclusions

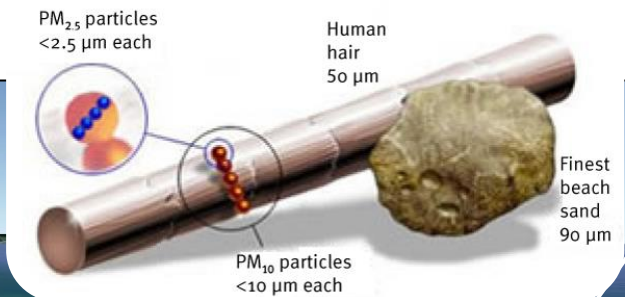
Site overview



What's discharged

Dust

- Manufacturing Plant & handling
- Nuisance



Odour

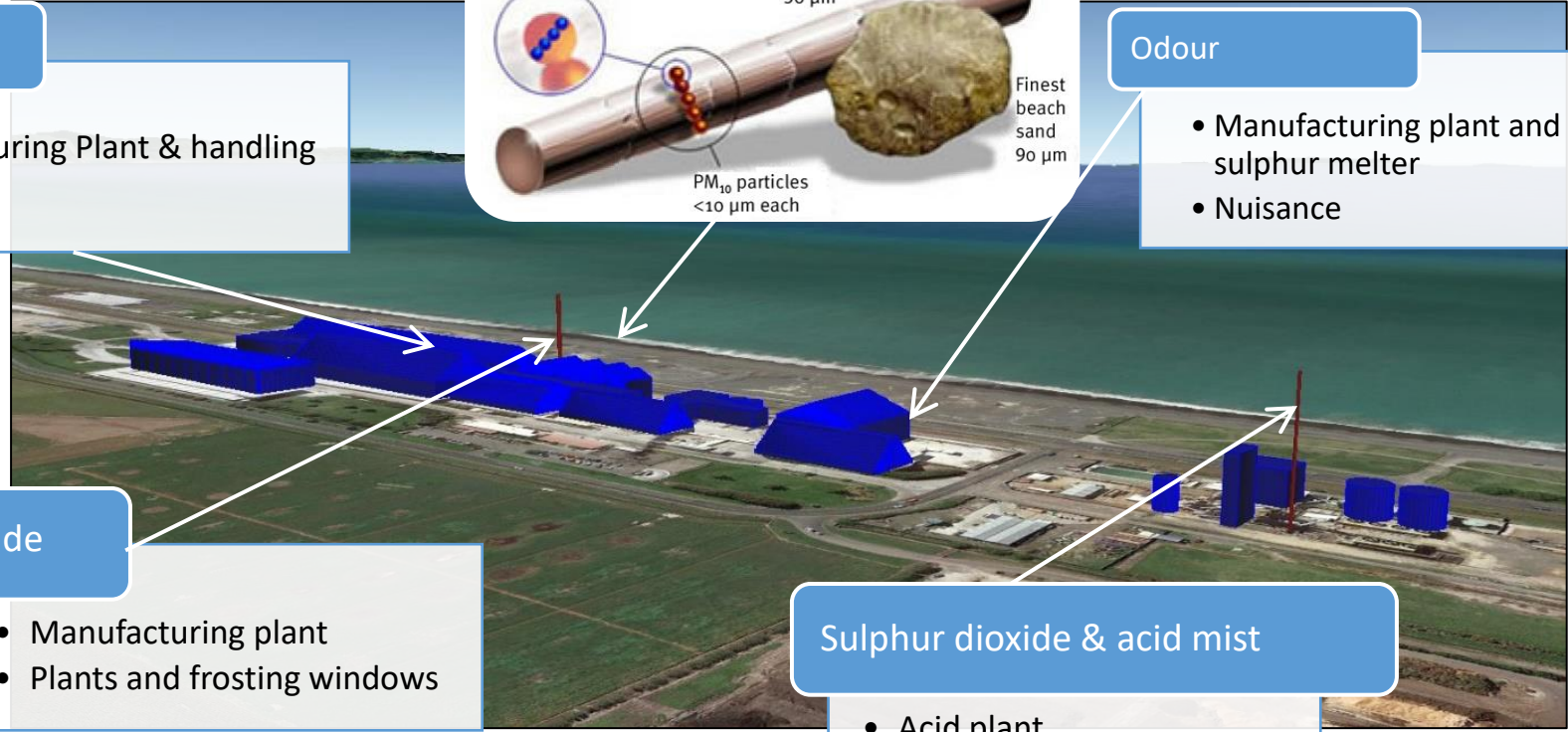
- Manufacturing plant and sulphur melter
- Nuisance

Fluoride

- Manufacturing plant
- Plants and frosting windows

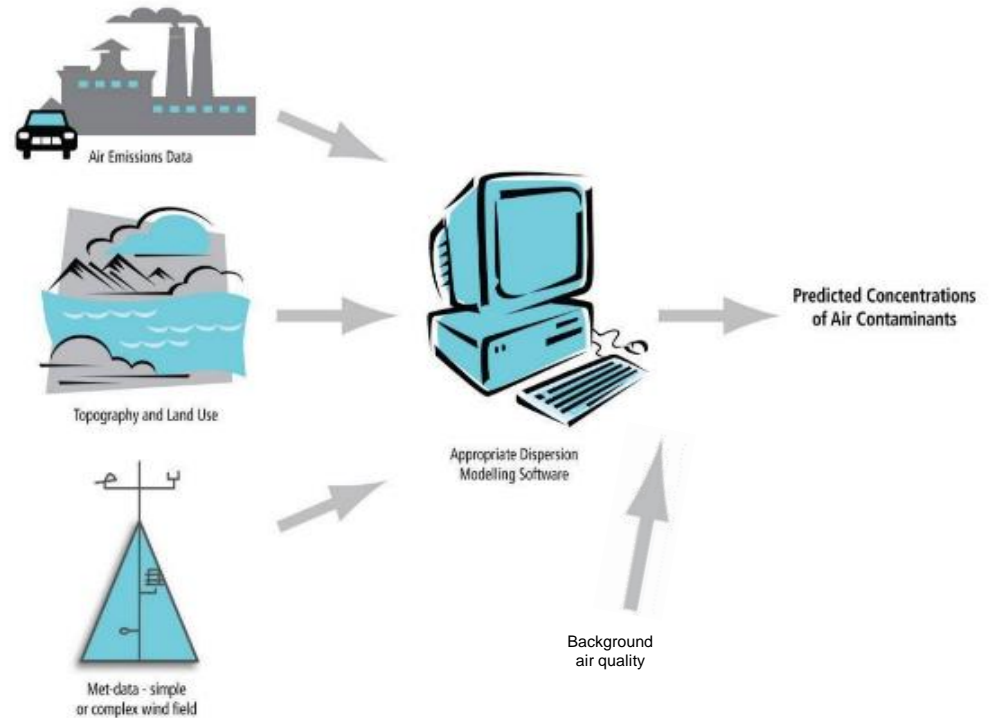
Sulphur dioxide & acid mist

- Acid plant
- Health and plants



How air discharges are assessed?

- Follow **Ministry for the Environment** Guidance
- **Dispersion modelling** to predict levels in receiving environment
- Measuring concentrations in **ambient air**
- **Guidelines & standards** for human health & ecosystems
- **Conservative** – maximum emission rates and worst case meteorology



Data review

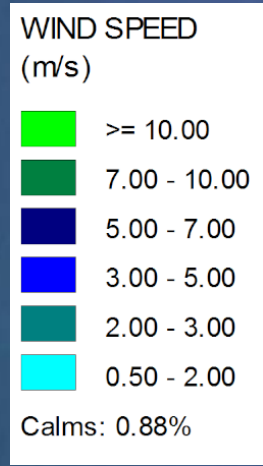
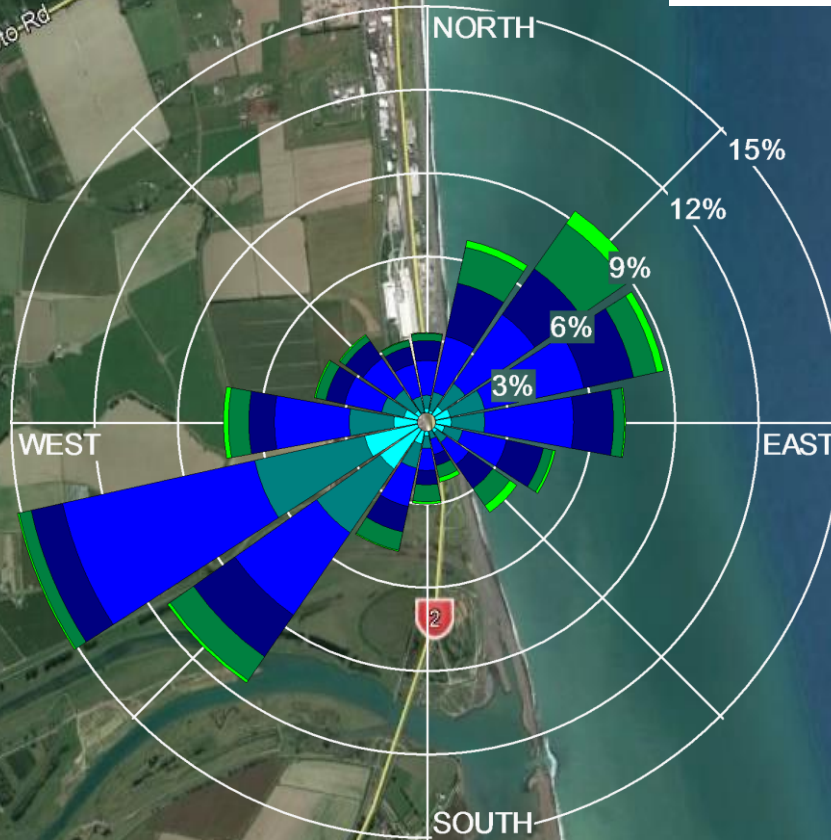
- Stack emissions measurements
 - Acid and manufacturing plant stacks
 - Values to go into the dispersion model
- Wind data
 - Used as input to dispersion model
 - Analysis of ambient monitoring data to identify where peak concentrations come from



- Ambient monitoring data
 - Direct measurement of concentrations in air
 - Can compare directly to Air Quality Guidelines and Standards
 - Particulate matter (PM₁₀, PM_{2.5}), Sulphur dioxide (SO₂), Fluoride (F) and Hydrogen Sulphide (H₂S)



Where winds blow from



Receiving environment

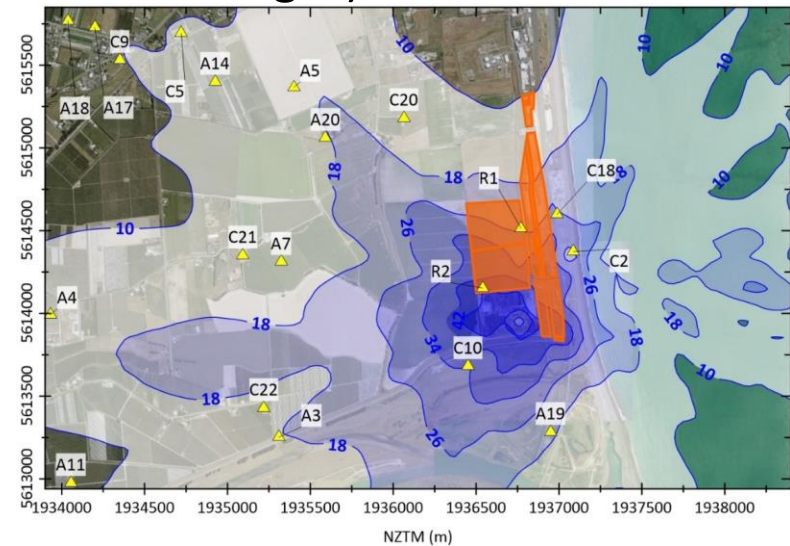
- Identify sensitive locations
 - Community
 - Agricultural/ecosystems
- Establish background concentrations (i.e. levels with out the site)
 - From review of ambient monitoring data
 - Published data and guidelines

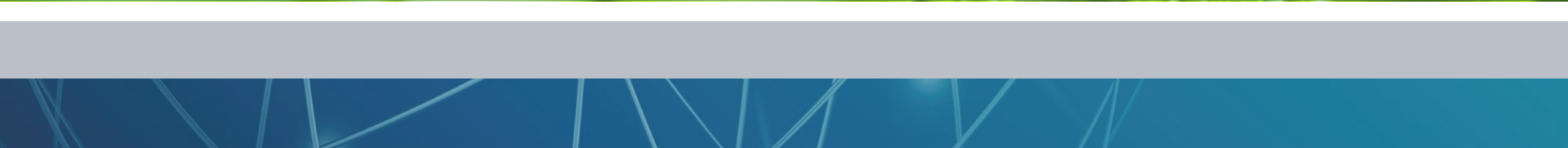


Overall conclusions

- SO₂ exposure within health & ecosystem standards/guidelines
- New Manufacturing Plant stack will reduce fluoride within ecosystem guidelines
- PM₁₀ & PM_{2.5} levels within health guidelines/standards where people may be exposed
- Odour and dust levels acceptable given location and separation to sensitive receivers

- Results feed into:
 - Human health Impact Assessment
 - Ecological Assessment (Fluoride and SO₂ discharges)





Reconsenting of Ravensdown Napier Works: Technical Focus Group 18 May 2021

Dr Francesca Kelly

Public Health Physician, Environmental Medicine Limited

Environmental Health Effects Assessment in preparation for Ravensdown Ltd, Napier Manufacturing Works

Community Characterisation

Hazard Identification

Health effects associated with hazards (dose-response)

Exposure Assessment

Risk Characterisation

(Relevant health-based guidelines)

Assess public health risk

Approach taken in assessment:

- Discharges are sources of potential exposure to hazards (pollutants)
- Risk relates to amounts and duration of exposure
- Routes of exposure considered:
 - Inhalation of pollutants in ambient air;
 - Drinking water sources, roof supply;
 - Other exposures from human contact with the environment - coastal recreation including estuary;
 - Local food sources including wild harvesting.

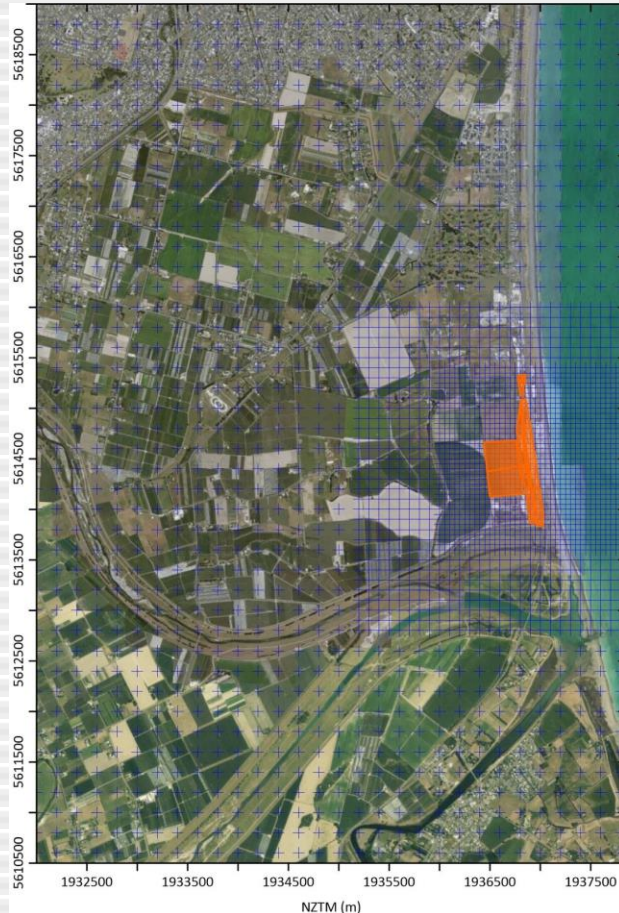
Expert review guidance documents

- AMBIENT AIR:
 - The World Health Organisation (WHO) expert review reports for ambient air quality and air pollution policies (WHO 2000; 2006; 2013) include protection of those who may be more vulnerable to adverse health effects because of age or health difficulties. Therefore these guidelines are conservative and protective.
- WATER and FOOD:
 - WHO, Food and Agriculture Organisation (FAO) and European Food Safety Authority (EFSA) provide assessments for food contamination guidelines based on lifetime exposure and include infants.
 - To assess health effects, both epidemiological and toxicological information is used, tailored to the hazard exposure.

Community characterisation

- Cultural community characterisation has been adopted from the Regulatory Assessment. Consultation is expected to inform this.
- Residential communities have been identified as sensitive to potential human health effects through air discharges. The location for potential effects are assessed in the Air Report.
- Recreational use at the beach 150 m to the east of the site, and associated car park.
- Recreational water use and kai harvesting at the coast and in the estuary.

The central area of air effects assessment



- Health effects assessment looks also outside the modelling zones eg schools, marae, residential homes and elder care
- However the exposures further away will be less in amount and frequency with lower risk

The locational area for water discharge effects assessment



Hazards in air discharges

- Particulate
 - PM₁₀, traditionally monitored and in the National Environmental Standard (NES)
 - PM_{2.5}, a smaller size of particulate associated with health effects
 - Depositatable “dust” and fugitives from despatch, stores, materials delivery
- Sulphur dioxide
- Sulphur trioxide/”acid mist”
- Hydrogen sulphide (assessed for odour effects)
- Fluorides

Human intake of fluoride

- Food and water are the main source of daily fluoride for humans.
- 2 to 4 mg/day normative in adults with “world diet” (WHO, Environmental Health Criteria 227, Fluorides, 2002).
- Fluoride is generally regarded as a desirable nutrient for child dental health.
- Beverage and food (cooking water) contribution to daily fluoride is influenced by concentration in water supplies.
- Inhalation can add a minor amount to fluoride exposure, estimated 0.02 mg/day for an adult living in proximity, using worst case air assessment modelling.

Risk from air discharges

- Particulate
 - PM₁₀, traditionally monitored and in NES, past monitoring shows sporadic exceedances of 24-hour standard. Minor health effects.
 - PM_{2.5}, monitoring data shows no exceedances of annual average guideline (10 µg/m³). Less than minor health effects.
 - Monitoring data includes spikes from fires and restarts
- Sulphur dioxide less than minor effects for health, NES compliance shown in Air Report, normal operations, includes worst case dispersion conditions.
- Sulphur trioxide/"acid mist" releases, prevented by operational processes
- Hydrogen sulphide less than minor effects for health
- Fluorides less than minor health effects from inhalation, very low exposure

Finding out the issues for health effects

- Technical assessment of effects risk from hazards
- Use of evidence-based guidelines for comparison
- Contemporary health issues
- Voiced local concerns
- Active consultation including health representatives (District Health Board, Regional Council)
- Active consultation with community representatives including wild food harvesters