



Kaipara te Oranganui

**KAIPARA
DISTRICT**

Two Oceans Two Harbours

Mangawhai Community Wastewater Scheme

Council Briefing – September 2023

Previous Updates

- December 2022 – Overview, options, cost, and programme
- April 2023 – Update options, solutions, cost, and programme

Purpose

To update Elected Members on the progress of the optimisation of the Mangawhai Wastewater Treatment Plant and the plans to accommodate growth.

Context

- Update on Brown Road Farm wastewater irrigation
- Overview of the Mangawhai wastewater upgrade solutions
- Growth projections
- Staged upgrades
- Upgrade solution
- Technical solutions
- Golf Course subsurface irrigation
- Upgrade programme
- Network upgrades
- Next steps

Eel Management - Brown Road Farm Pond



Technical Team

Optimisation and upgrades planning has been conducted by leading experts in wastewater treatment and effluent reuse from Australia and New Zealand:

- Clint Cantrell (SCO Consulting)
- Craig White (Beca HunterH2O)
- Liam Tamplan (Beca HunterH2O)
- Garrett Hall (Beca)
- Peter Gearing (Effluent irrigation specialist)

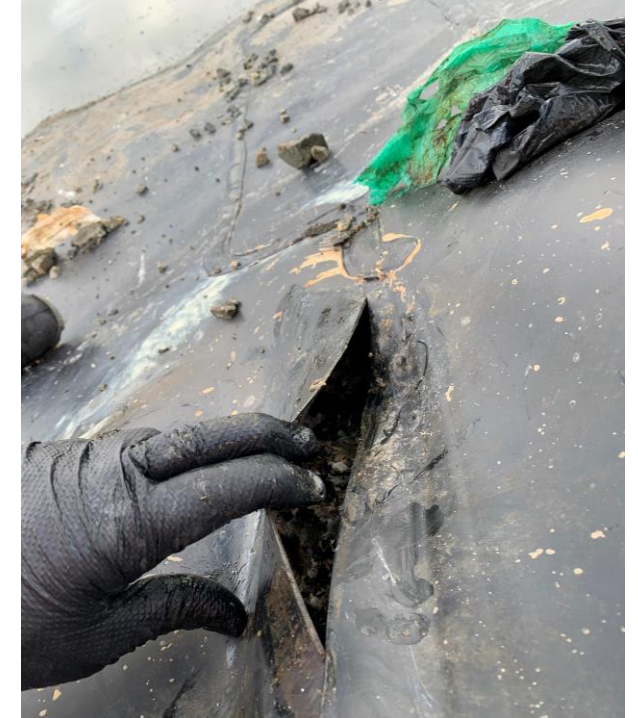
Brown Road Farm Issues / Actions



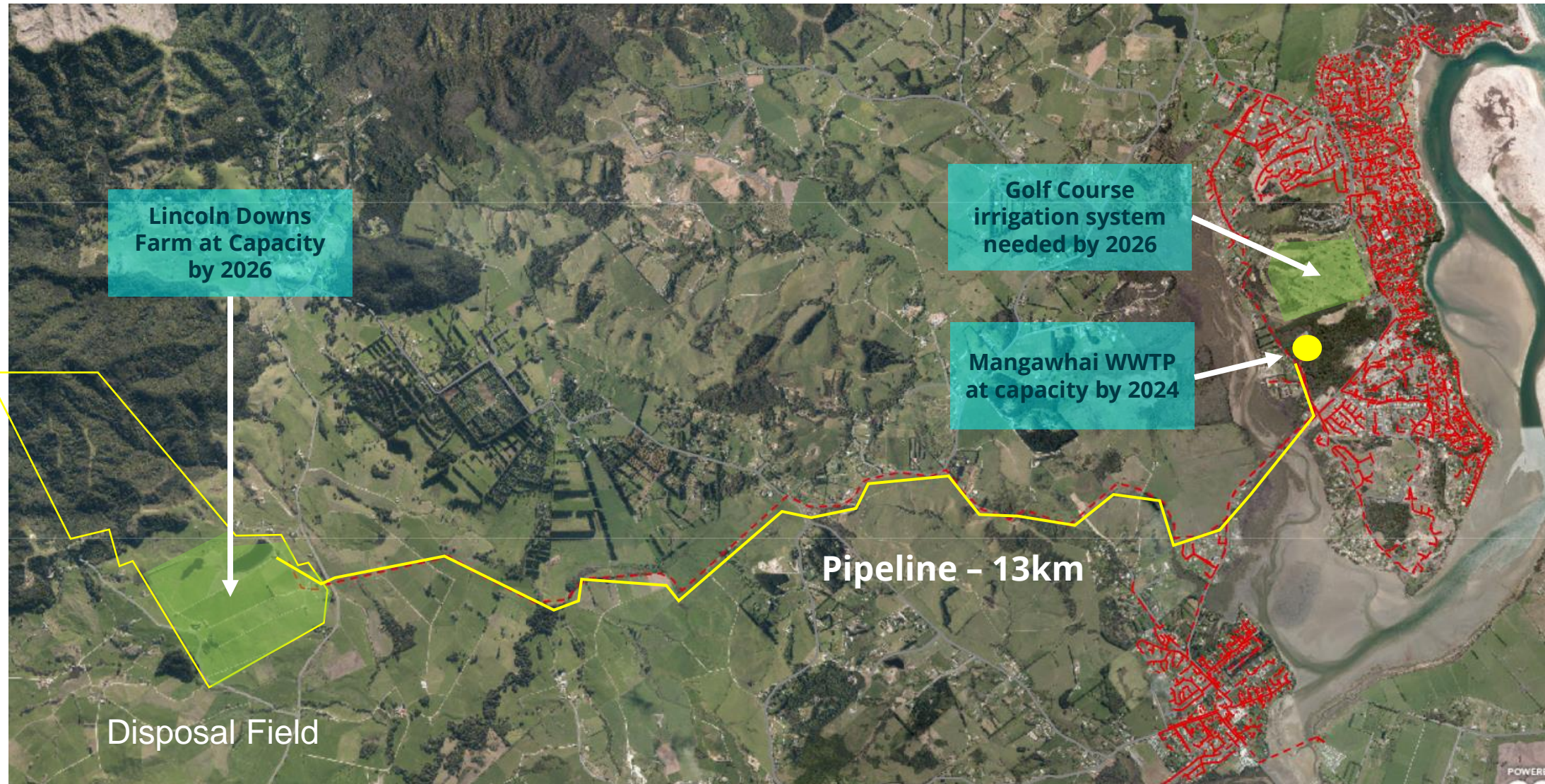
Issues	Actions
Bacteria levels (E.coli)	Sources confirmed as avian
Algae/cyanobacteria	Reduce phosphorus from WWTP
Odours	Effluent pipe moved, sludge being removed
Liner leakage	Dam almost drained, defects found, repairs in progress

Brown Road Farm Wastewater Irrigation Update

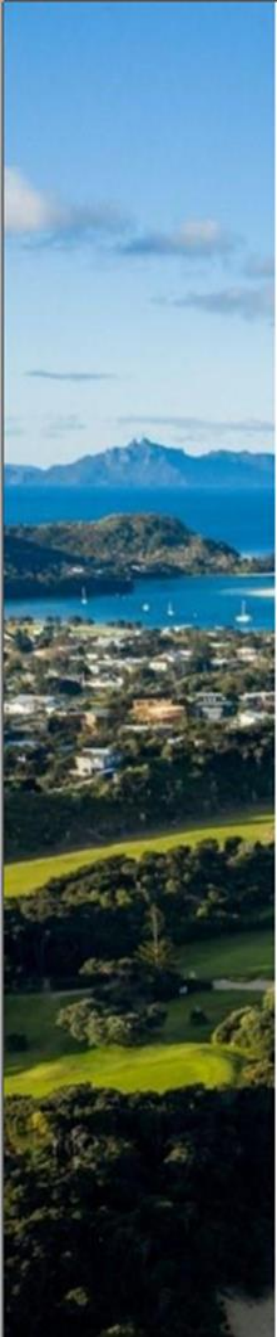
- The pond is currently being drained under emergency works and will be fully drained by the end of September.
- Residents have been complaining of excessive levels of hydrogen sulphide odour and alleged health problems due to the presence of the odour. Given the issues related to the residents health, we involved the Medical Officer of Health from Ngā Tai Ora - Public Health Northland.
- Pond liner has been leaking and affecting the structural integrity of the pond. Repairs will commence in September 2023.



Mangawhai Wastewater Upgrade Solutions Overview



Growth Forecast



WWTP at capacity →

Lincoln Down at capacity →

Year	Connections	Total Population Equivalent		
		EP		
		Resident	Summer	Peak
2023 (TODAY)	2,764	3,700	5,400	13,500
2024	2,900	3,900	5,650	14,150
2026	3,200	4,300	6,250	15,650
2028	3,500	4,700	6,800	17,100
2047	5,470	7,300	10,650	26,700
Ultimate 2051	5,800	7,750	11,300	28,350

Plant Capacity & Growth

- Total plant design capacity - No of connections = 3,000
- No of connections at 2023 = 2,764
- **Implement stage 1 inDENSE (2023/24) new plant capacity - No of connections =3,550**
- Implement stage 1 indene (2023/24) additional connections =786
- **Implement stage 2 CASS, inDENSE & UF (2025/26) new plant capacity - No of connections = 5,470**
(growth out to 2047)

Project Estimate & Implementation

The table below sets the estimated cost for the Mangawhai Wastewater Scheme.

Stage 1 - Mangawhai WWTP near term capacity upgrades		
Element	Description	Estimated Cost (P95)
inDENSE design & implementation	Construction and commissioning of the inDENSE system	\$735,000
Sub Total		\$735,000
Stage 2 - Mangawhai WWTP Long-term capacity upgrades plus Class A enhancement		
Element	Description	Estimated Cost (P95)
Design & implementation of Stage 2 upgrades	Design of balance tank conversion to 3rd CASS unit with inDENSE, and Class A system	\$21,725,000
Sub Total		\$21,725,000
Stage 3 - Browns Farm and Golf Course effluent irrigation systems		
Element	Description	Estimated Cost (P95)
Concept design and consent plan development	Concept design of golf course and Browns Farm (enhancement) irrigation systems	
Consent application and consultation	Consultation and consenting for golf course and enhanced Browns Farm systems	
Detailed design	Detailed design of golf course and Browns Farm systems	
Implementation	Construction and commissioning of golf course and Browns Farm systems	
Design & implementation of Stage 3 upgrades		\$24,450,000
Sub Total		\$24,450,000
Network Upgrades		
Network Upgrades		Estimated Cost (P95)
Sub Total		\$25,000,000
Total		\$71,910,000

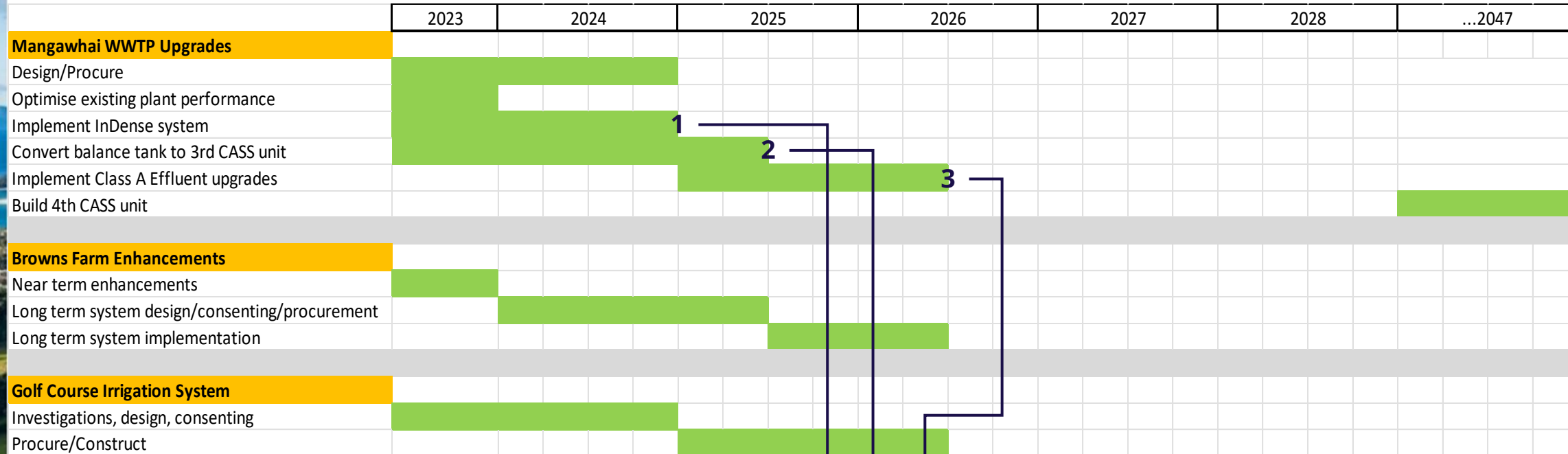
It is proposed that the stage 1 implementation works is to be delivered by June 2024. The remaining stages 2 and 3 will be transferred to Wai Tāmaki ki Te Hiku (Entity A) to deliver.

Staged Upgrades

The Mangawhai wastewater upgrade solutions were presented at the Council briefing on 5 April 2023. The solutions are:

- Stage 1:
 - Optimise the treatment plant
 - Design inDENSE system
 - Implement the inDENSE system
- Stage 2:
 - Design upgrades of the inlet screen, convert the balance tank to a third cyclic activated sludge system (CASS) biological reactor unit and the second inDENSE system
 - Design the ultra-filtration system with UV disinfection system
 - Resource Consent application for the subsurface irrigation
 - Resource Consent application for Brown Road Farm
- Stage 3:
 - Golf Course subsurface irrigation
 - Brown Road Farm irrigation optimisation

Strategy Programme



- 1 ✓ Capacity boosted to 2028
- 2 ✓ Capacity boosted to 2047
- 3 ✓ Class A effluent quality achieved

WWTP Upgrades – next 3 to 4 years

Phase 1 - 2024



- ✓ **Optimise existing systems for peak flows**
- ✓ Implement indene system to boost capacity
- ✓ Capacity to 2027/28

Phase 2 - by 2026



CASS (BAU)
Capacity - 2042
Construction Staging Requirements
1. CASS Internals on existing Balance Tank
1. UF Membrane Plant Internals and Building
3. Replace existing LW Reactor
1. Construct the Golf Course (GC) Pump Station
2. Refurbish existing CASS Decant Weirs
2. Sludge Holding Tank
Robyn and Rory, Could you please develop rough cost estimates?

- ✓ Convert balance tank to 3rd CASS reactor
- ✓ Implement Class A system
- ✓ Install new recycled water supply system
- ✓ Other miscellaneous upgrades
- ✓ Class A effluent for recycling use
- ✓ Capacity to 2047

Optimisation of Mangawhai WWTP Progress Update

- ✓ Detailed performance sampling
- ✓ Experts on-site operating with KDC
- ✓ Addressed air flow systems
- ✓ Addressed reactor settling issues
- ✓ Reduced nitrate and phosphorus
- ✓ Stopped solids loss from reactors
- ✓ Much clearer effluent
- ✓ Stress taken off final effluent filters
- ✓ Near term benefits for Lincoln Down
- ✓ Reduced power usage



Effluent to
Lincoln Down

Planning for Mangawhai WWTP Stage 1 Upgrade Progress Update



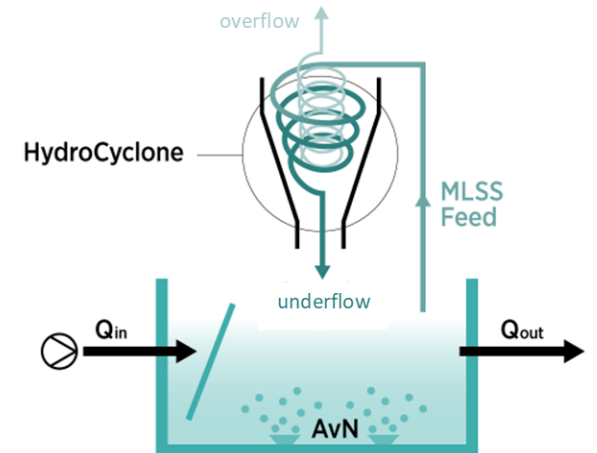
Aeration/Treatment mode



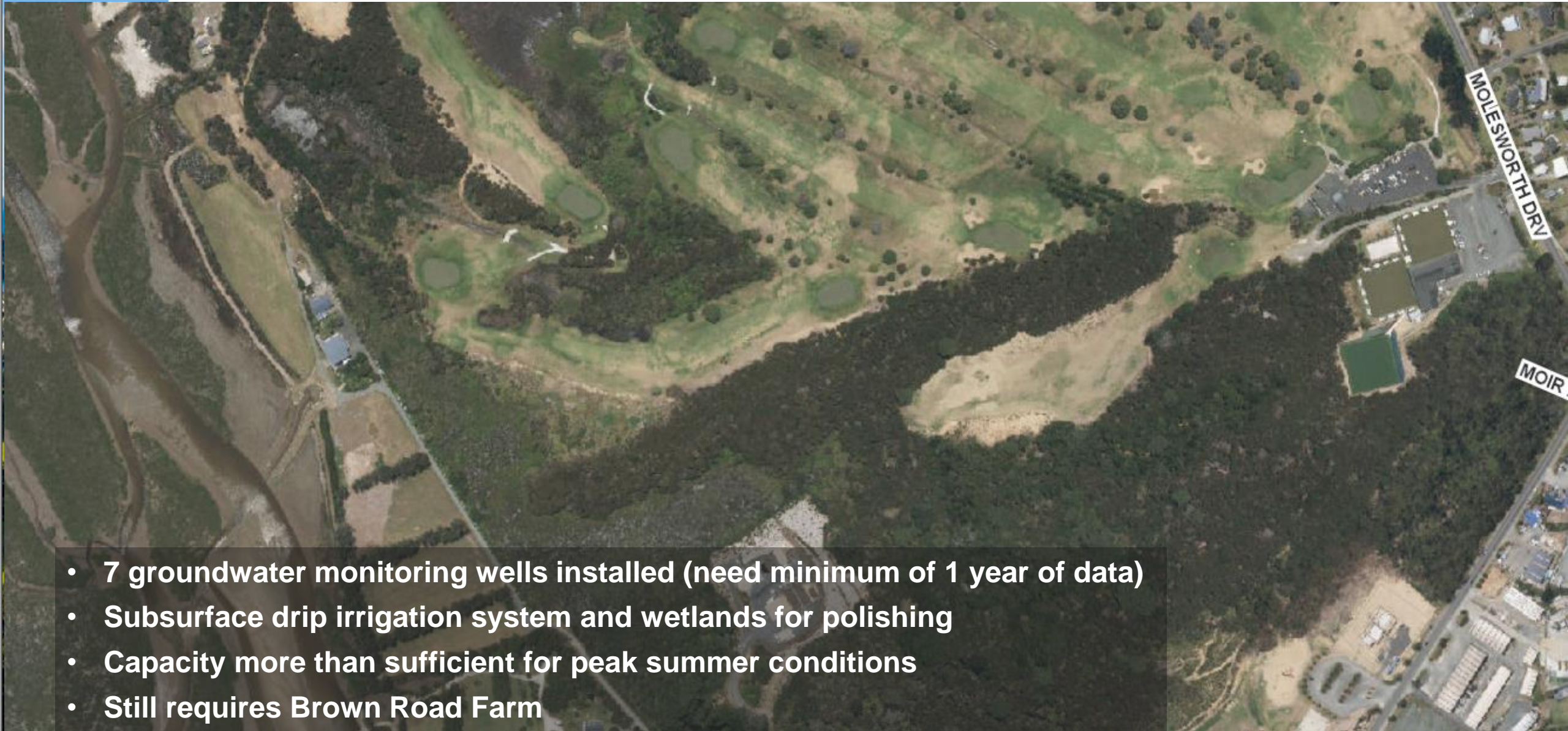
Settling/Decant mode*
* Critical to retain the solids when decanting...



inDENSE system at Watercare Mangere WWTP



Golf Course Irrigation System Progress

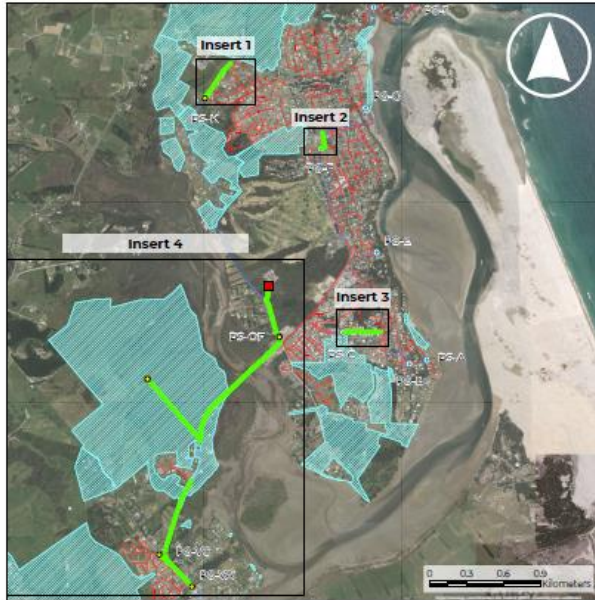


- 7 groundwater monitoring wells installed (need minimum of 1 year of data)
- Subsurface drip irrigation system and wetlands for polishing
- Capacity more than sufficient for peak summer conditions
- Still requires Brown Road Farm

Reticulated Network Programme



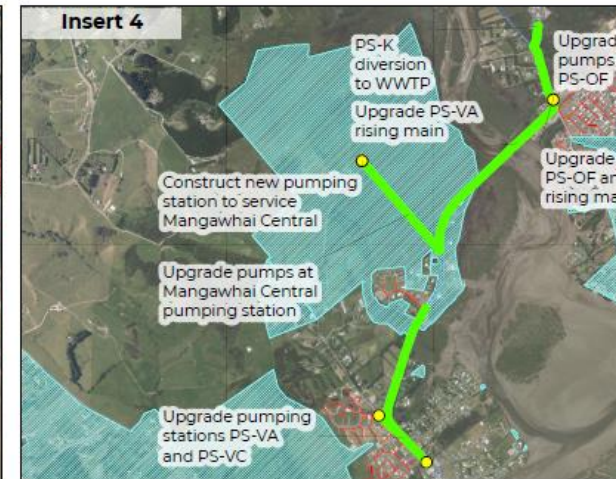
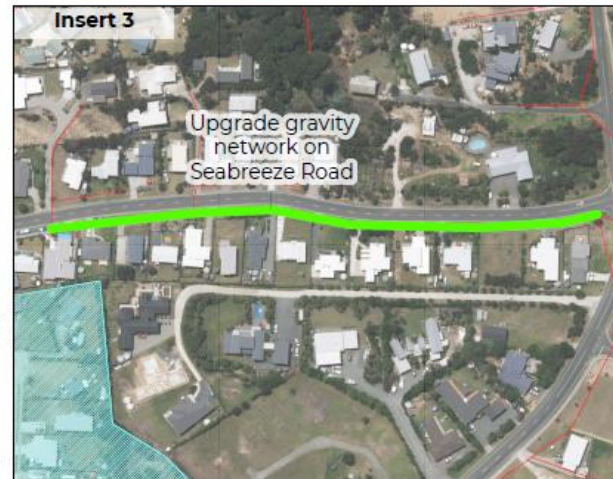
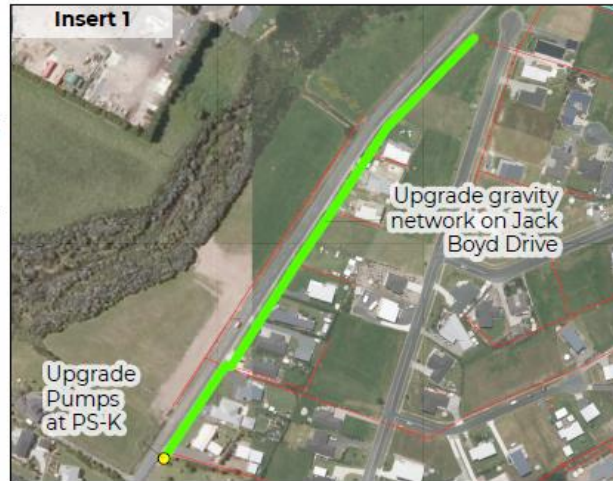
Mangawhai Community Wastewater Network Upgrades



Existing Network
 - Gravity Sewer
 --- Rising Main

Legend

- Pumping Stations
- Mangawhai Community Wastewater Treatment Plant
- New Development Areas



Next Steps



1. Seek Council approval at the September 2023 meeting for the technical team to design and implement the stage 1 works and design of stages 2 & 3
2. Complete ongoing optimisation of the Mangawhai Wastewater Treatment Plant by the end of September 2023
3. Complete the repairs of the Brown Road Farm's effluent irrigation dam



Thank You

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Kaipara District Council

