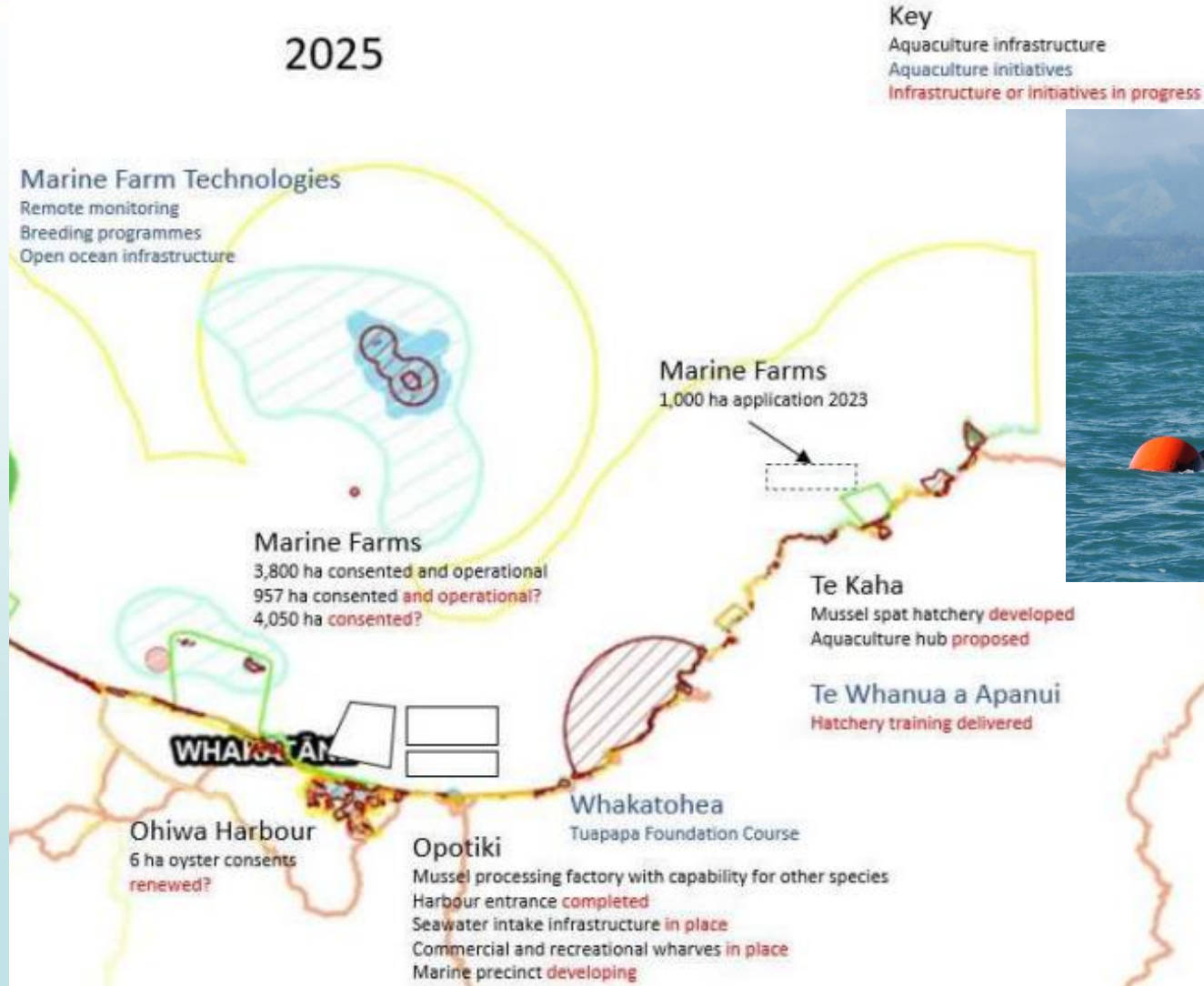


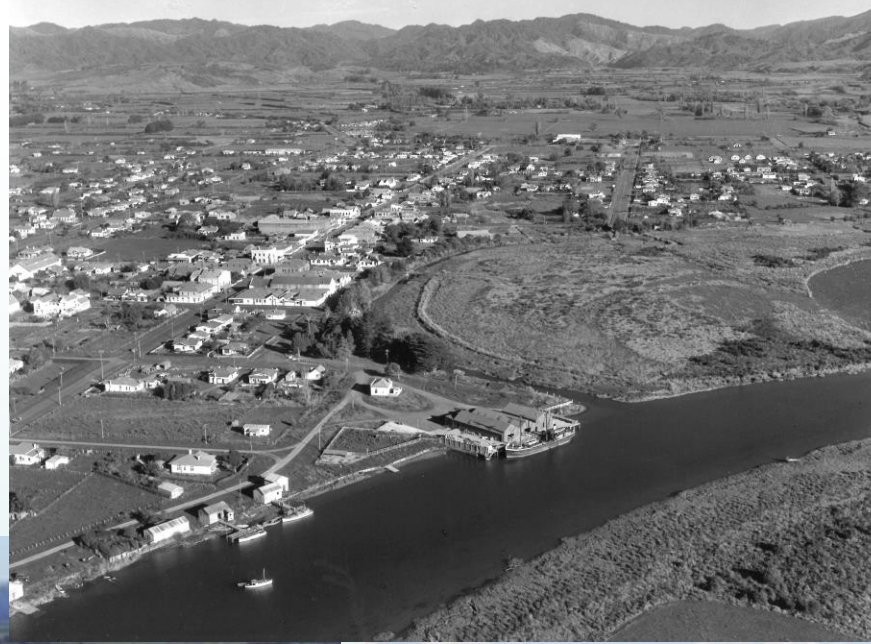
Quarry NZ 2023 Conference
Rock Supply to the Pakihikura (Ōpōtiki) Harbour Project
John Galbraith, Project Director



Aquaculture Development Eastern BOP



1947



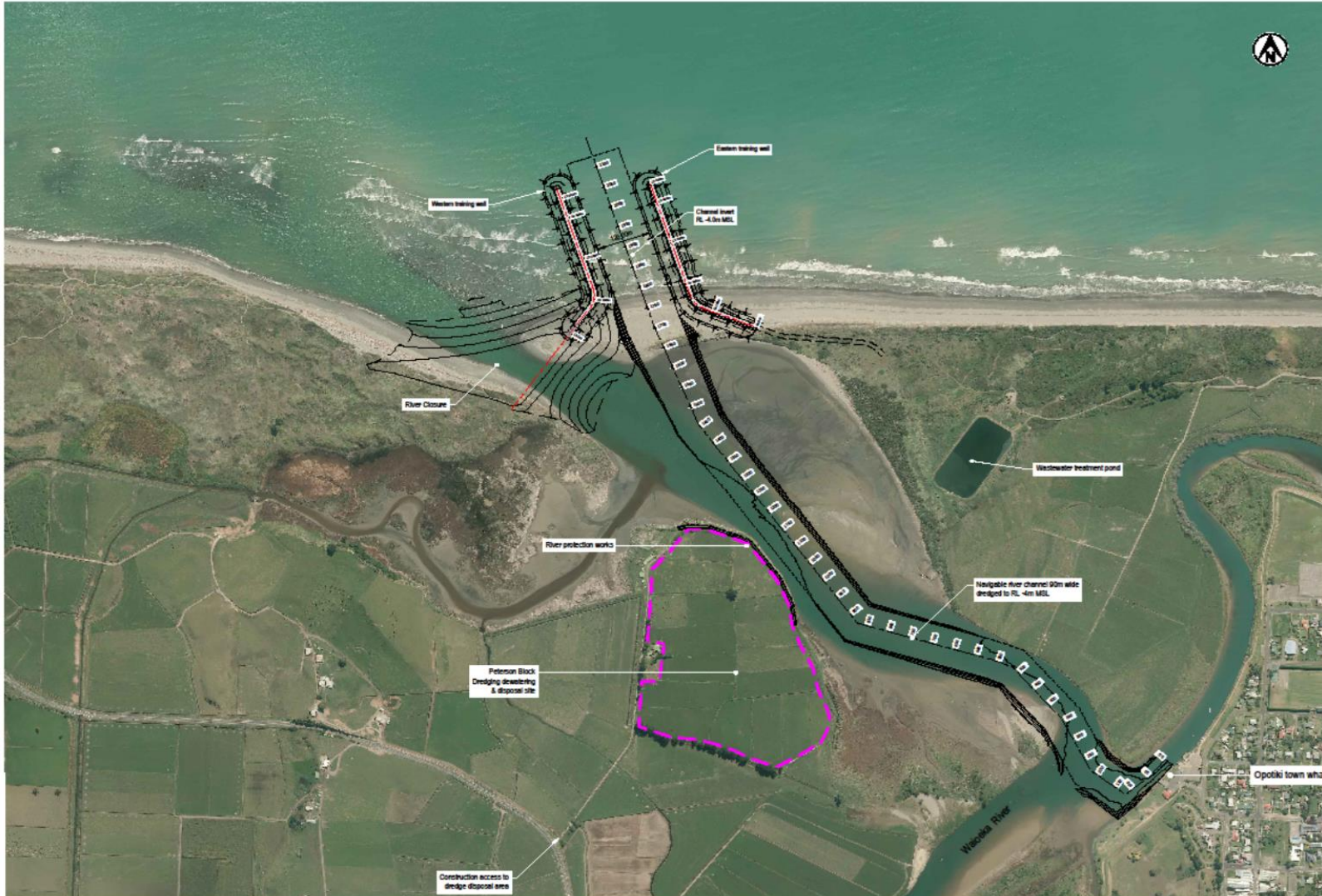
Pakihikura (Ōpōtiki) Harbour

2020

2024



All-tides, all-weather Harbour



Harbour Design & Build

- HEB Construction

Rock Supply

- Principal (Crown Regional Holdings (CRHL) via MBIE)

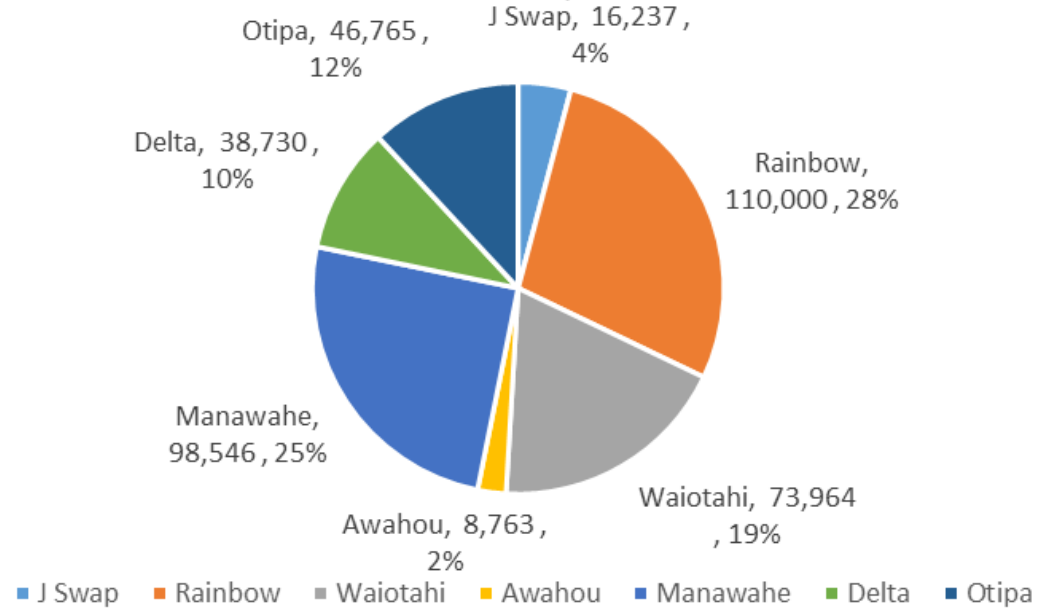
- | Rock aggregate / armour | Size or grading | Tonnage required | Location in the walls |
|------------------------------|-----------------|-----------------------|---|
| Core aggregate | up to 400mm | 155,000 tonnes | Central core |
| Graded aggregate | up to 150mm | 35,000 tonnes | Capping on top of the walls |
| Filter layer | up to 150mm | 32,000 tonnes | Underlying the rock armour |
| Filter Type E (average 10kg) | 100-300mm | 18,000 tonnes | Armour rock layered in increasing rock size |
| Type D (average 150kg) | 350-650mm | 12,000 tonnes | |
| Type C (average 0.57 tonnes) | 600-900mm | 70,000 tonnes | |
| Type B (average 1.1 tonnes) | 750-1100mm | 40,000 tonnes | |
| Type A (average 1.8 tonnes) | 900-1300mm | 20,000 tonnes | |
| Total | | 390,000 tonnes | |

Rock Supply

- Review of regional rock resources early 2019 by AQA and GNS Science
- Focus on developing local aggregate resources where possible
- Initial tender rounds in 2019, subject to project approval in Feb 2020.
- Further sources of high quality armour rock secured through 2020.
- Deliveries commenced September '20 to stockpiles on site and continued through to Nov '22.
- Maximum stock on site Dec '21 at 97,000 tonnes
- No delays to construction work from rock supply



ROCK SUPPLY, Tonnes



H&S Management

- Commissioned specialist H&S Management & Auditing expertise - Classicon & Phoenix contractors.
- Due diligence auditing – H&S Systems and implementation
- Monthly audits – Pre-starts, SOP's, LOTO, Incident reporting, observations
- Monthly meetings
- Transport audits, eg certifications, work hours and large rock stability



H&S Learnings

- Larger, established quarries had strong H&S management systems in place and delivered a high standard of H&S compliance
- Smaller, less established quarries grew fast to meet supply, which challenged their H&S systems
- Rock suppliers generally not used to close customer interest in their supply chain H&S management
- Higher level certification eg ISO vs local SHE standards
- Robust incident reporting and actions

To date, over 500,000 hours worked across the project without serious harm injury

