



# Chatham

Rock  
Phosphate Ltd

**Aim: to be a profitable, environmentally  
friendly phosphate business**

Planet Microcap Showcase May 2019

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# Objectives

**Chatham aims to be premier supplier of low cadmium, direct application phosphate to NZ and global agricultural sector**

**We're passionate about the benefit of direct application fertiliser to sustainable farming given its improved soil profile and water quality outcomes**

**Our objectives are evolving and are now to:**

- **Achieve consent of the Chatham Rise project and develop the asset**
- **Develop an added value distribution strategy (retail packs)**
- **Establish viability and implement recovery of rare earths as a by-product**



# Company History and Forward Strategy

- Formed 2004. Now listed on the TSX.V, NZAX and Frankfurt Stock Exchange
- Mineral asset - inferred JORC and 43 101 23.4Mt phosphate resource offshore NZ
- Granted 20 year mining permit Dec 2013, reapplying for environmental permit
- Core business - sourcing and marketing reactive rock phosphate in NZ and international markets
- Plan to dredge deposit using contractor Royal Boskalis; targeted start 2023
- Evaluation of contained rare earths and development if commercially feasible



# Milestones already achieved

- ✓ Increasingly valuable and strategically located mineral deposit
- ✓ Well-defined and well-studied deposit with knowledge gained by spending \$US66m since 1966
- ✓ A 20 year mining permit
- ✓ Feasibility studies by our technical partner Boskalis that will contract mine for us
- ✓ A market for our product and a strong competitive position – location, product characteristics, security of supply
- ✓ A great management team
- ✓ **What we don't have is a granted environmental permit**



# Why the environmental permit was declined

## Decision summary

- Significant and permanent damage to the benthic environment
- Modest economic benefits compared to environmental effects
- Significant effect on Benthic Protection Area
- Proposed adaptive management measures would not address fundamental concerns
- Requirement to favour caution and environmental protection

**It was clear from the 280 page judgement that the decision makers had not understood much of the material we submitted and in a number of instances had ignored the outcome of the caucusing between CRP and opposing experts.**



# Why we believe we will be granted the environmental consent next time

## Summary

- The picture has changed significantly since Chatham's initial application was declined in March 2015.
- Changes in how the application will be prepared, the EPA's operating procedures, helpful changes to the governing Act, legal precedents, relevant environmental issues, evolving health and safety standards and phosphate ethical supply issues.
- We also now have the support of the local iwi (Maori tribe) who will be the most affected by our operation. This is unprecedented in New Zealand.
- These changes in combination strongly support the logic of reapplying for the permit.



# Environmental consent – what has changed (2)

## The Application

- We have a better qualified and experienced project team, led by World Ocean Council director Renee Grogan
- We have benefitted from rigorous third party reviews of our previous application
- It will be a less rushed, more complete, better written and easier to understand application
- Lessons in how to manage applications have been learned by observing the subsequent 2016. Trans Tasman Resources application, the hearing, the judgement and the subsequent appeals



# Environmental consent – what has changed (3)

## The Environmental Protection Authority Process

- The EPA has significantly improved its processes to reflect international best practice. Back in 2014/15 their process was embryonic as the EEZ Act was only enacted in 2013.
- June 2017 changes to the EEZ Act have created a more level playing field (legal opinion available to support this)
- Legal precedents from the Trans Tasman case represent largely beneficial case law



# Environmental consent – what has changed (4)

## Relevance of Evolving Environmental and Health & Safety Issues

- Water quality is now an issue of national concern in New Zealand
- There is growing concern about the use of processed fertilisers and their effect on soil profile
- Reduction of carbon emissions is now a major priority of the NZ Govt
- Cadmium levels in phosphate are now under the international spotlight particularly in the European Union

## Evolving ethical issues

- Most of NZ's imported rock phosphate is purchased from Moroccan supplier OCP but actually comes from the Western Sahara, a disputed territory



# Environmental consent – what has changed (5)

- The Western Sahara freedom movement has succeeded in stopping exports of this rock to 8 other countries. Considerable pressure is being applied to the two NZ fertiliser manufacturers to follow suit.

## Vocal Stakeholder Support

- Last time we had the silent support of a number of stakeholders who didn't bother to make submissions
- Our goal this time is to have the vocal and engaged support of local iwi, fishing, the farming sector, NZ Petroleum and Minerals, Regional Catchment Boards, Ministry of Primary Industries, Ministry of Health and other relevant Govt agencies
- Very recently we have gained the support of the local iwi (Maori tribe) who will be most affected by our operation. They also agreed that this could be announced to the markets.



# Environmental Consent Application - next steps

1. Appoint project leader (completed)
2. Raise finance to complete application and EPA hearing process (\$C 4.95 m during 2019/20)
3. Plan and execute resubmission process:
  - ◆ Consult stakeholders
  - ◆ Gather further data including field studies
  - ◆ Reformat information from previous application
  - ◆ Complete application and related management plans
4. Re-submit time frame: 15-18 months after raising funds



# OUR ELEVATOR PITCH 1 - why Chatham is an attractive investment

- ✓ **Low market capitalisation (only \$US 3.4m with 25.7 m shares out, fully diluted 32.4m shares)**
- ✓ **Management is the largest shareholder group with 10.4%**
- ✓ **No development capital required**
  - **project will be contract-mined per tonne using a modified dredge**
- ✓ **Project independently valued at \$US200m to \$US300m (\$C250m - \$C375m)**
- ✓ **Strategic location**
  - **mining costs almost equal cost of shipping from other side of the world. World price has to collapse to near zero before Chatham can't compete**
- ✓ **Annual forecast earnings before tax - \$C 98 million (\$US 73m)**
  - **project highly profitable given no incoming freight costs and low mining costs**



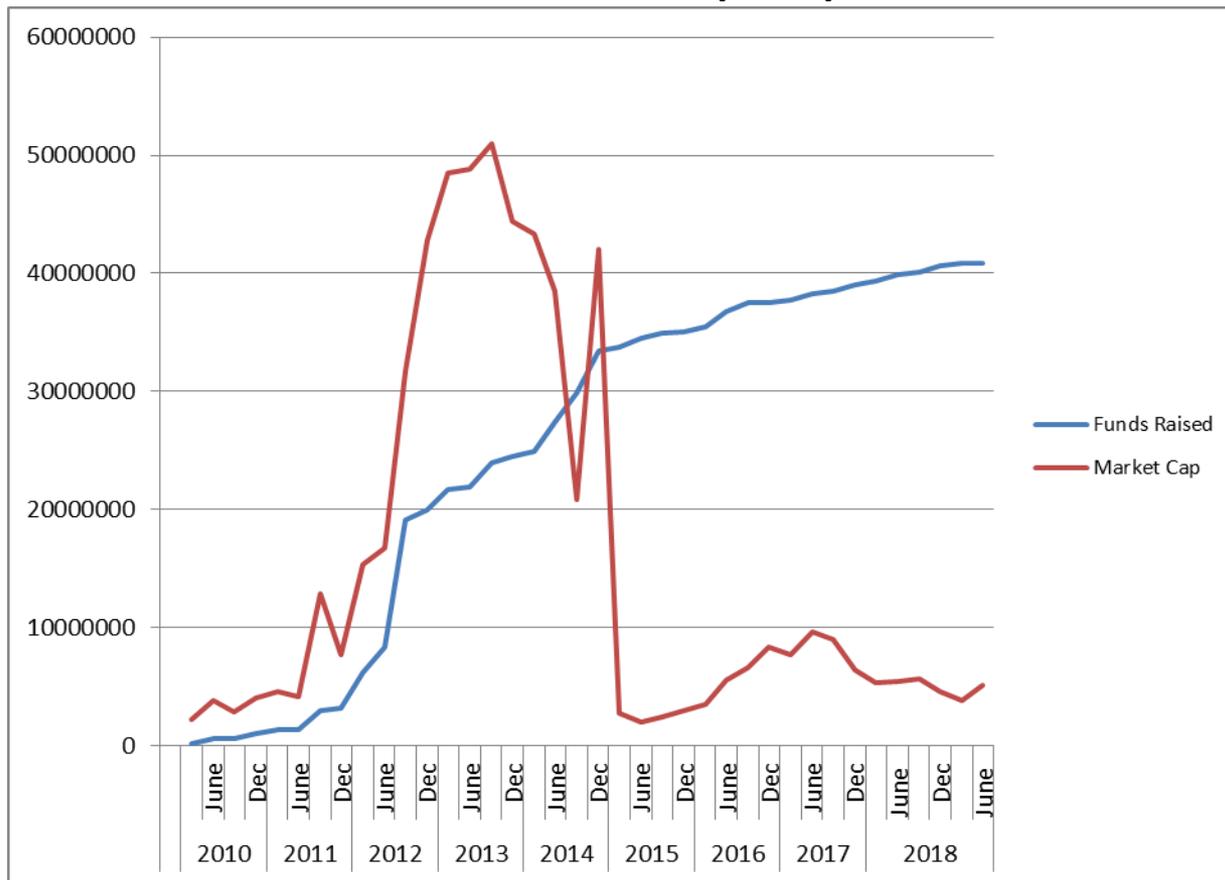
# ELEVATOR PITCH 2

- ✓ Will pay \$C 38.4 million (\$US 28.5m) in annual taxes and royalties, plus millions in port charges. **Hence will have central and local government support**
- ✓ Will create many high-value knowledge-based jobs in the port, on the mining ship, undertaking environmental monitoring and broader scientific research, in the agriculture and hospitality sectors and on the Chatham Islands. **Hence broad-based community support and social licence which is already evident**
- ✓ Security of fertiliser supply for NZ agriculture – **Hence farmer support**
- ✓ Environmental benefits – much lower run off impact on lakes and rivers, much lower cadmium and much lower carbon footprint. **Hence likely to have support from environmental and local water catchment authorities**
- ✓ Current main phosphate source in NZ is from a disputed territory in North Africa subject to UN sanctions. **Ethical supply option**



# Chatham – Market Value compared with funds raised

2010 to 2019 (NZD)



# What's so special about direct application rock phosphate?

- 1 We have a unique resource with special characteristics
- 2 Direct application rock phosphate is significantly more environmentally friendly – reducing waterways run off by 80% and improving soil health
- 3 Loss of phosphate nutrient into waterways is also wasting a finite resource
- 4 It also contains exceptionally low levels of cadmium
- 5 It can sell at a significant premium, despite lower production costs, because it is both “organic” and is almost (85% according to recent greenhouse tests) as effective a fertiliser as triple superphosphate (TSP)



# Typical Phosphate Products

- Phosphorous (in the form  $P_2O_5$ ) is an important plant nutrient
- Rock phosphate is a key raw material for fertilisers. In NZ the main uses are for:
  - **Direct Application**: rock phosphate is crushed and spread on the soil, effectiveness is dependent on the particular molecular composition of the rock. The rock needs to be a “reactive rock phosphate”.
  - **Single Super Phosphate (SSP)**: results from reaction of rock phosphate and sulphuric acid, is one of the cheapest and most common forms of phosphorous in fertilisers
  - **Dicalcic Phosphate**: a blend of super phosphate that has been slurried with lime or rock phosphate and cured, it is used for pasture development and cropping
- Internationally phosphate rock is mostly refined into phosphoric acid used to make MAP, DAP and high grade TSP. This use will increase due to high transport costs for low grade unprocessed rock.
- Phosphate rock is predominately mined in Morocco and Western Sahara, China, Russia, US
- Growth in phosphate consumption greatest in the rapidly expanding economies of East Asia

# CRP Agricultural Applications



## Direct application fertiliser supports a change to more sustainable, resilient farming practices in New Zealand

### Field trials have shown CRP rock is suitable for direct application

- Most phosphorus is currently applied as superphosphate
- Direct application can improve soil qualities, reduce phosphate runoff in waterways and reduce total fertilizer application over time
- The trials have also revealed that **CRP rock is 85% as effective as triple superphosphate**

### Chemical analyses show it is exceptionally low in cadmium

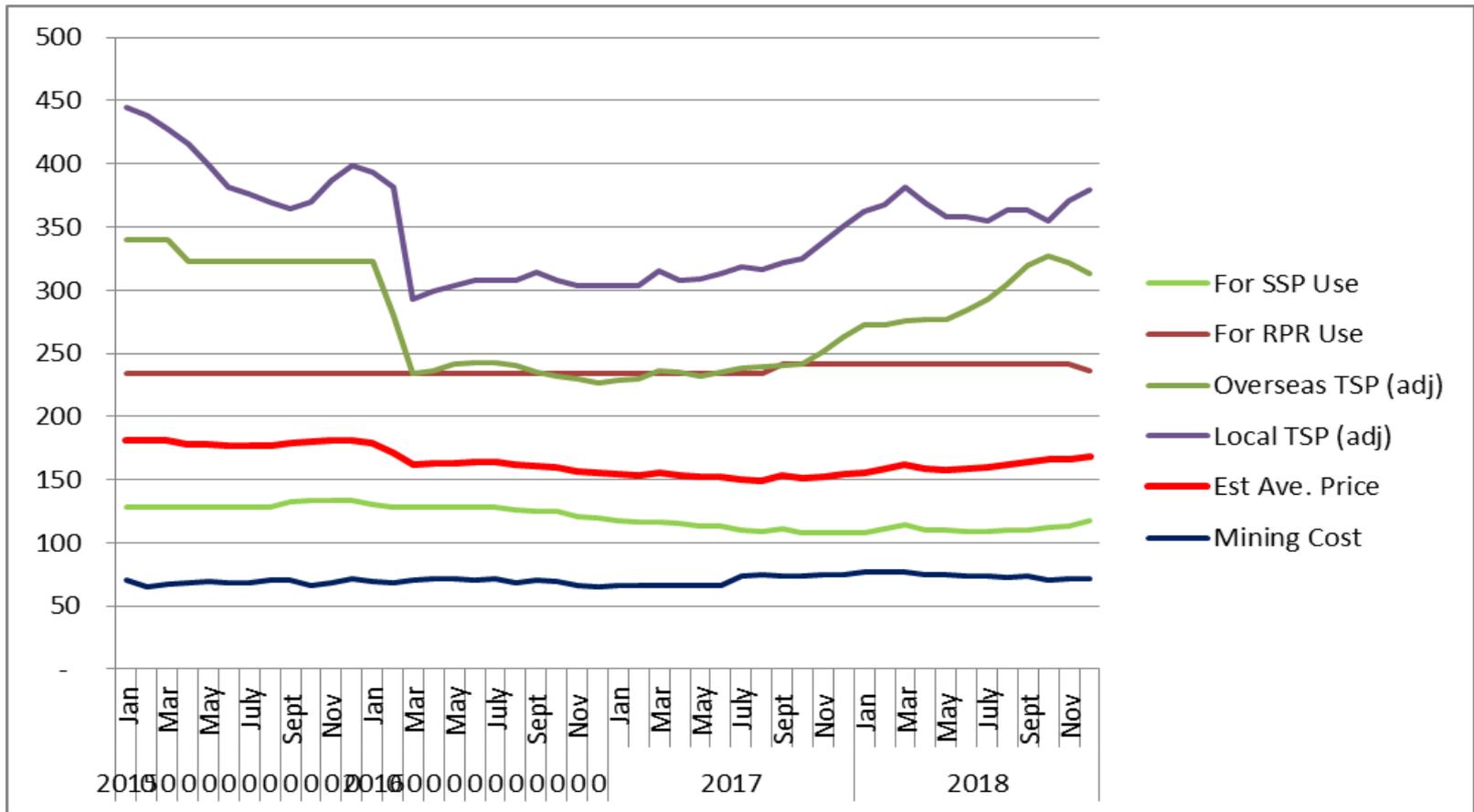
- All phosphates have some cadmium
- Low cadmium levels reduce health risk from concentration of cadmium in crops

# It's going to be more and more about the cadmium

- Chatham rock phosphate is ultra-low in cadmium (< 10 mg/Kg P<sub>2</sub>O<sub>5</sub>)
- The European Union will set a 60mg/Kg P<sub>2</sub>O<sub>5</sub> cadmium limit this year
- This will eliminate all rock sourced from Egypt, Israel, Boucraa (Morocco), Youssoufia, Senegal, Togo, Tunisia, Nauru & Christmas Island
- This is a significant proportion of internationally traded phosphate
- Fertiliser sector analysts consider this will result in initial price premiums of \$30 - \$50 for low cadmium rock
- EU cadmium limit will be further lowered to 20 mg/Kg P<sub>2</sub>O<sub>5</sub> which will eliminate other sources and likely increase the premium further
- Other countries will inevitably follow this EU food safety lead



# Historic Phosphate Rock Prices



# Sales Forecasts (\$US)

| Product Use   | Tonnes    | Price | Revenue     |
|---|-----------|-------|-------------|
| Rock sold in NZ for SSP manufacture                     | 200,000   | 118   | 23,600,000  |
| Rock sold O/seas for SSP manufacture                    | 810,000   | 118   | 95,580,000  |
| Rock sold in 1kg packs retail & online                  | 40,000    | 1,000 | 40,000,000  |
| Rock for TSP use NZ (85%)                               | 50,000    | 379   | 18,950,000  |
| Rock for TSP use overseas (85%)                         | 200,000   | 313   | 62,560,000  |
| Rock sold as "organic" RPR NZ                           | 100,000   | 236   | 23,630,000  |
| Rock sold as "organic" RPR overseas                     | 100,000   | 236   | 23,630,000  |
|   | 1,500,000 |       | 287,950,000 |
| Average revenue per tonne                               |           |       | 191.97      |
| Average revenue per tonne after freight cost on exports |           |       | 166.07      |
| Average revenue per tonne after 20% discount            |           |       | 132.85      |
|   |           |       |             |
| Total domestic sales in NZ                              | 390,000   |       | -           |
| Total overseas sales                                    | 1,110,000 |       |             |

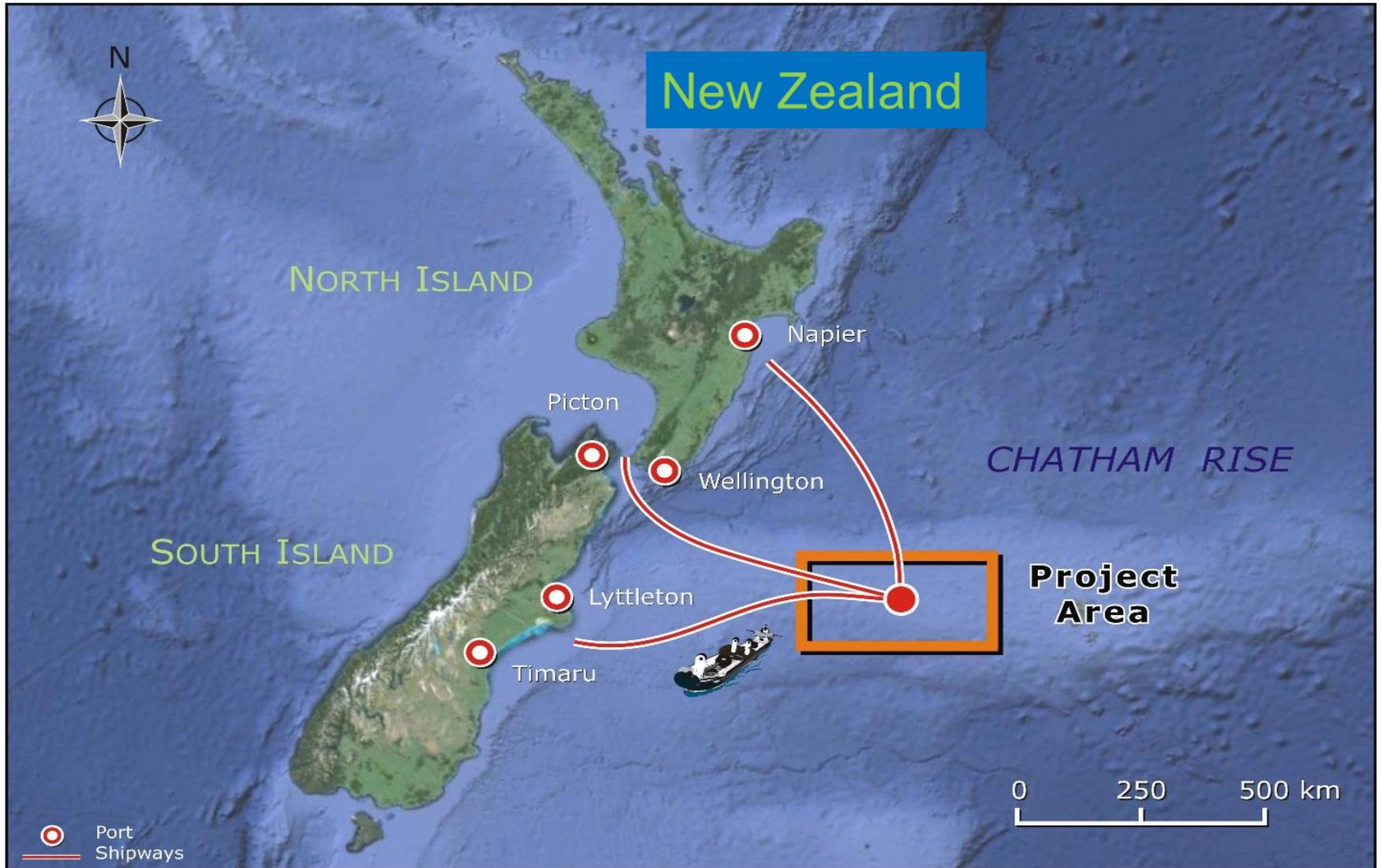
These forecasts assume two thirds of product is sold for the lowest value use, the obvious target over the next four years is to achieve two thirds (or more) at the higher end. This would increase annual sales revenues by >\$104m



# Chatham Rise Rock Phosphate – location



# Regional Port Access



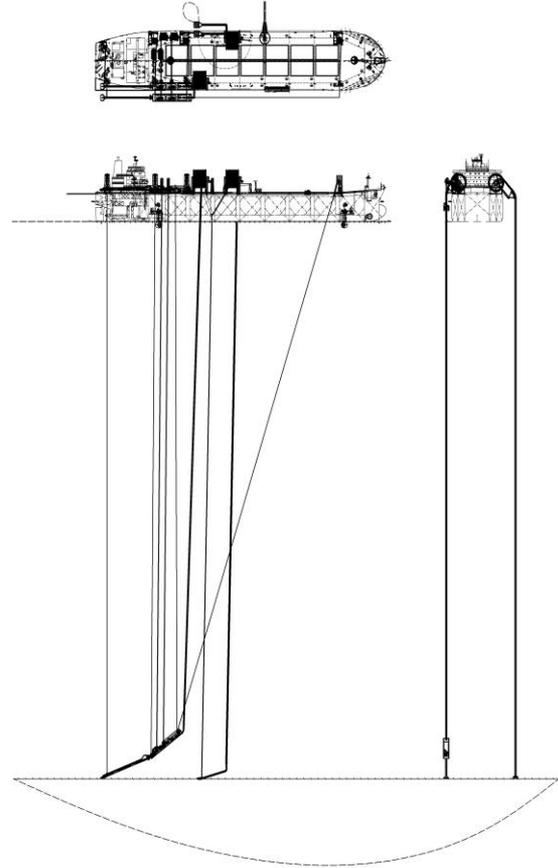
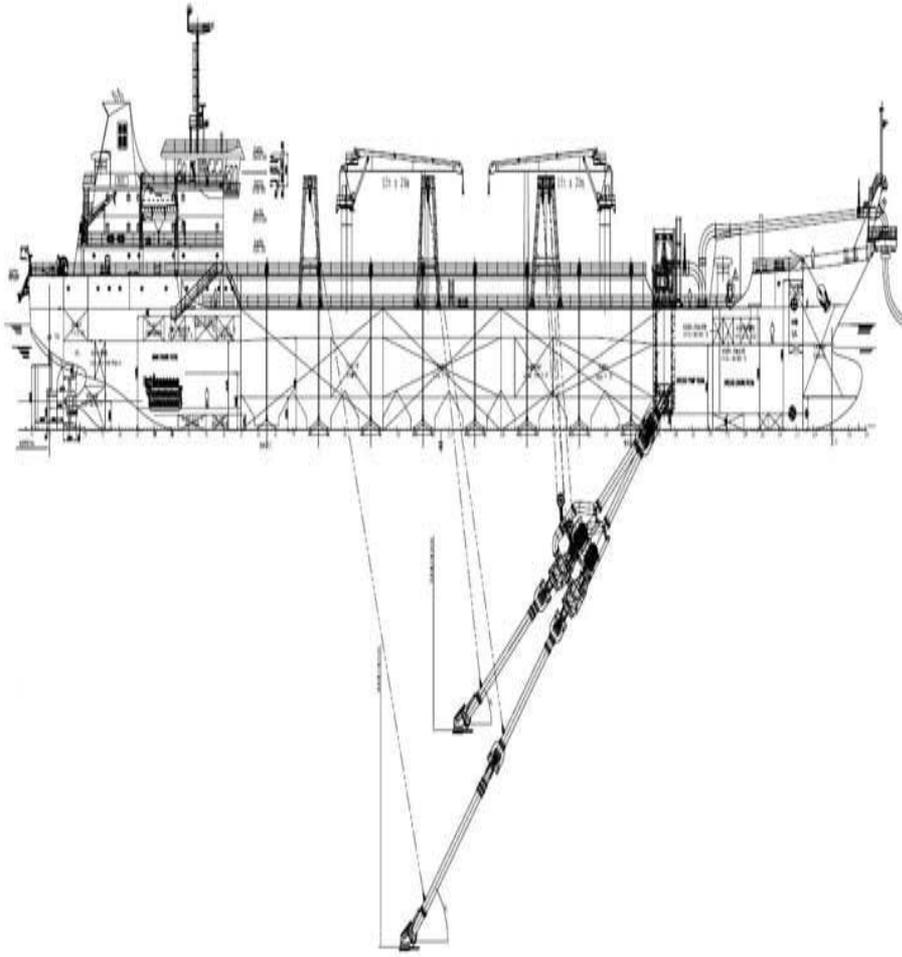
# Boskalis Dredging Vessel



235m Conventional Trailing Suction Hopper Dredge



# Project Conceptual Designs



# Environmental + ethical + financial + economic benefits = Good for NZ

(for more detail see <http://www.rockphosphate.co.nz/projectinfographic/> )

- Low run off to rivers and lakes
- Very low cadmium
- Much reduced carbon footprint
- Improved soil health

Benefits for Environment

Taxes, jobs and knowledge

- \$NZ42m a year in tax and royalties
- High value knowledge based jobs
- NZ leadership in marine technology potentially worth billions
- Marine environment knowledge identifies conservation priorities

- NZ can have own supply without depending on other countries
- NZ wouldn't export environmental footprint to countries where mining phosphate involves social and environmental distress

Ethical, secure supply

Strongly profitable

- Annual earnings of \$120m before royalties and tax
- Capital repaid in less than a year

# Discovery of Rare Earths and other valuable minerals

- ✓ It's been known for a decade the seafloor muds in our permit area include rare earths and other valuable minerals or elements
- ✓ These include cerium, lanthanum, neodymium, praseodymium, yttrium, cobalt, rubidium, cesium, germanium, gallium, strontium, thallium and tungsten.
- ✓ However, the proposed mining method for the phosphate nodules is not suitable to also recover these finer substances and hence their potential value as a by-product has been discounted
- ✓ In a very recent development we established the phosphate nodules (which will be recovered using our existing engineering designs) also contain rare earths and other valuable minerals.
- ✓ These include 15 of the 17 recognised rare earths, as well as other valuable minerals including nickel, cobalt, chromium, vanadium, zirconium, elemental fluorine and strontium



# Establishment of Pacific Rare Earths

- CRP has recently formed a 100% owned subsidiary Pacific Rare Earths Limited. (PRE)
- Formed to quantify the extent, value and recoverability of rare earths and other potentially strategic or valuable minerals contained in the rock phosphate nodules on the Chatham Rise
- In addition, it will investigate the existence and recovery potential of rare earths and other valuable minerals in seafloor muds on the Rise.
- If research is successful PRE will evaluate the likely project economics of establishing a secondary marine mining operation focusing on rare earths



# Further Independent Research

- **The information CRP already holds about REEs and other valuable minerals in its permit areas was generated by independent organisations, with some of this work undertaken up to a decade ago.**
- **The current knowledge confirms that REEs occur over a wide area, and estimates of the average grades and therefore the size of the potential deposits have been made at a conceptual level. The current conceptual information, when assessed against current price data, confirms potential significant value.**
- **As a result of the extremely favourable preliminary research, CRP has contracted a substantial overseas company to analyse the composition of the rock nodules and the seafloor muds in order to further develop better understanding of the extraction and recovery potential of the minerals.**



# Uses of Rare Earths

Chatham rock phosphate contains 15 of the 17 rare earths, The uses and applications of these rare earths are listed in the table below.

| Rare Earth   | Application   |
|--------------|---|
| Neodymium    | Powerful magnets used in loudspeakers, computer hard drives, wind turbines, electric vehicles, used in lasers   |
| Lanthanum    | Camera and telescope lenses, carbon lighting applications, studio lighting and cinema projection<br>Used in the process of refining crude oil.<br>Used in specialty glasses and optics, electrodes and for hydrogen storage |
| Cerium       | Catalytic converters in cars<br>Makes an excellent oxidizer, used in oil cracking during petroleum refining and is used for yellow color in ceramics and glass.   |
| Praseodymium | Used to create strong metals used in aircraft engines<br>Used to make a special type of glass used in visors to protect welders and glassmakers<br>Used in magnets, lasers and as green color in ceramics and glass.        |
| Gadolinium   | Used in X-ray and MRI scanning systems, and also in television screens<br>Used in magnets, specialty optics, and computer memory.   |



# Uses of rare earths - continued

| Rare Earth        | Applications   |
|-------------------|--|
| Yttrium           | Televisions, computer screens and other devices that have visual displays<br>Used in superconductors and exotic light sources. |
| Terbium           | Used as green in ceramics and paints, and in lasers and fluorescent lamps  |
| Europium          | Europium is used in making control rods in nuclear reactors<br>Makes colored phosphors, lasers, and mercury-vapor lamps        |
| Samarium          | Used in magnets, lasers and for neutron capture.   |
| <u>Dysprosium</u> | Used in magnets and lasers.  |
| Holmium:          | Used in lasers.  |
| Erbium            | Used in steel alloyed with vanadium, as well as in lasers.   |
| Thulium           | Used in portable x-ray equipment.  |
| Ytterbium         | Used in infrared lasers. Also, works as a great chemical reducer.  |
| Lutetium          | Used in specialty glass and radiology equipment.   |



# Use of Funds

| Chatham Rock Phosphate 5 Year Budget (\$CA,000) |                  |                 |                 |                 |                 |
|---|------------------|-----------------|-----------------|-----------------|-----------------|
|   | 12 month periods |                 |                 |                 |                 |
|   | 2019             | 2020            | 2021            | 2022            | 2023            |
| <b>Opening Cash 1 January</b>                   | 52.70            | 750.52          | 773.33          | 373.15          | 2,897.96        |
| Corporate Costs                                 | 652.19           | 652.19          | 652.19          | 652.19          | 652.19          |
| Reapplication Costs                             | 900.00           | 1,800.00        | -               | -               | -               |
| Hearing Costs                                   | -                | -               | 2,700.00        | -               | -               |
| Work Programme Mining permit                    | -                | -               | -               | 900.00          | 900.00          |
| Work Programme Exploration permit               | -                | 225.00          | 198.00          | 198.00          | 198.00          |
| Field Trials                                    | -                | -               | -               | 225.00          | -               |
| <b>Total Costs</b>                              | <b>1,552.19</b>  | <b>2,677.19</b> | <b>3,550.19</b> | <b>1,975.19</b> | <b>1,750.19</b> |
| Private placement Q1                            | 972.00           | 2,700.00        | 1,350.00        | -               | -               |
| Private placement Q3                            | 1,278.00         | -               | 1,800.00        | -               | -               |
| Royalty sale                                    | -                | -               | -               | 4,500.00        | -               |
| Rights issue (optional)                         | -                | -               | -               | -               | -               |
| <b>Total funds raised</b>                       | <b>2,250.00</b>  | <b>2,700.00</b> | <b>3,150.00</b> | <b>4,500.00</b> | <b>-</b>        |
| <b>Closing Cash at year end</b>                 | <b>750.52</b>    | <b>773.33</b>   | <b>373.15</b>   | <b>2,897.96</b> | <b>1,147.78</b> |
| Cumulative Placements including royalties       | 2,250.00         | 4,950.00        | 8,100.00        | 12,600.00       | 12,600.00       |



# THE LAST WORD - Investment Highlights

- Chatham holds a 20 year mining permit over a 23.4 Mt phosphate deposit with a current weighted average market value per tonne of USD 166.
- The deposit will be contract mined by a dredging company so there is no development capital required
- Chatham phosphate rock is ultra-low in heavy metals such as cadmium and environmentally friendly being an authentic reactive phosphate rock.
- As such (although this is not assumed in our forecasts) the rock will, over time, likely trade at a premium for environmental and food safety reasons
- Annual forecast pre-tax earnings are > 20 X the current market cap
- Chatham is seeking to raise \$C2.25m in 2019 and \$C 2.7m in 2020

