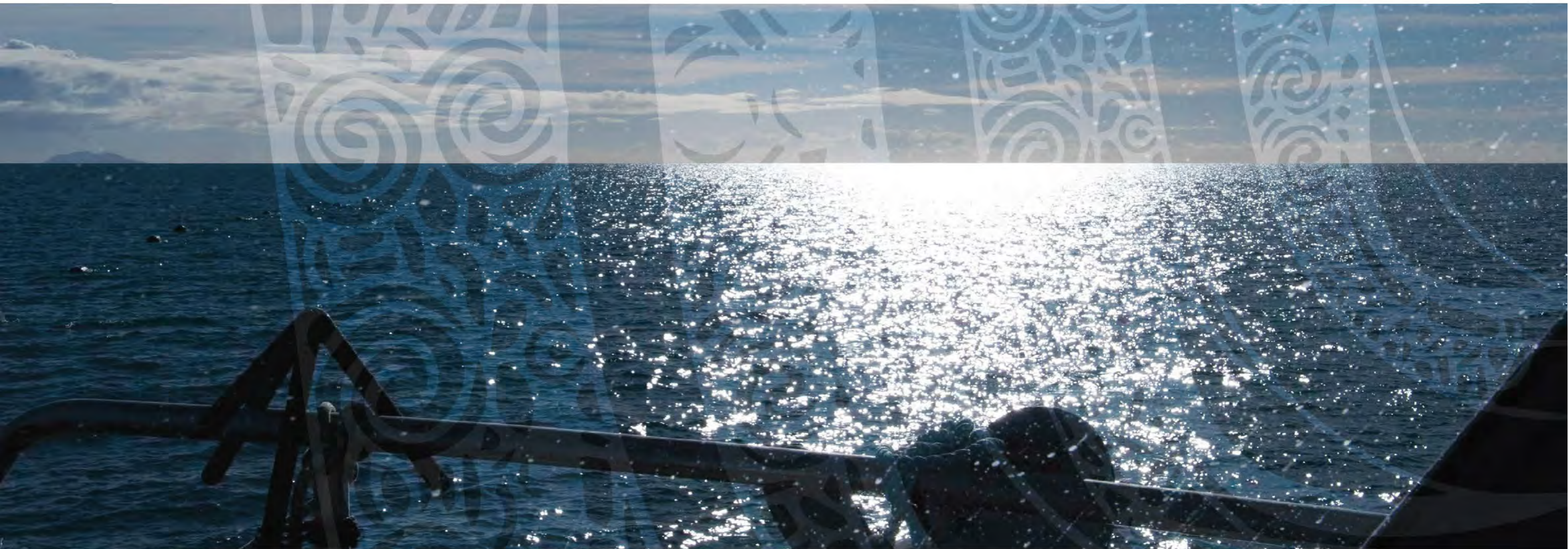




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## **Te Ara Moana a Toi | a path to the sea**

Opotiki harbour update | September 2019



# Te Ara Moana a Toi | a path to the sea

Ōpōtiki harbour update | September 2019



The purpose of Te Ara Moana a Toi – a Path to the Sea is to provide an update on the considerable work that has been undertaken by the local community, iwi, local government and central government agencies on the proposed harbour at Ōpōtiki.

Ōpōtiki harbour is a transformational project that will permanently alter the trajectory of the community and the iwi, and it is a necessary precondition for a fully functional aquaculture industry that delivers the economic, social and wellbeing outcomes the Government seeks for the region.

Since the Detailed Business Case was submitted in December 2017, there have been positive developments that have further strengthened the rationale for investment. These have included:

- The capital cost of the harbour and its associated infrastructure has been reduced from \$144 million to \$99.4 million, thanks to detailed value engineering, lower rock cartage costs, improved geotechnical information and better procurement
- Additional benefits for the region have been identified, including \$49 million in extra economic value from new rock supplies, and the opportunity for an additional \$18-\$20 million in residential development enabled by the harbour
- The planning zone for the marine industrial area is now operative and the developer is awaiting an investment signal to proceed.

The lower costs and broader range of benefits are set against a backdrop of an aquaculture industry that has continued to expand. The existing operator has continued with the construction and commercial expansion of their mussel farming operations, local iwi Whakatōhea have sought consent via one of their subsidiary companies for more than 5,000 ha of water space, and Te Whānau ā Apanui have a reservation for a further 5,000 ha in their Agreement in Principle as part of their Treaty of Waitangi settlement.

And the market for high-quality marine protein continues to expand, with international prices now 30% ahead of the projections made by MPI three years ago.

With the private sector poised to invest in the Eastern Bay of Plenty – and bring the employment and growth our region needs – the time is right to invest in a harbour at Ōpōtiki.

**Robert Edwards**  
Chair, Whakatōhea Māori Trust Board

**John Forbes**  
Mayor, Ōpōtiki District

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## Strategic context

# What's the problem

Ōpōtiki is one of the most deprived regions of Aotearoa New Zealand.

Despite years of investment by many services and agencies, and significant effort by the local community, Ōpōtiki continues to feature at the wrong end of all social statistics. The region has high levels of deprivation, low household incomes, lower than average educational and health outcomes, and a history of pernicious welfare dependency linked to a lack of opportunities.

The contrast between the social and economic outcomes in the Eastern Bay of Plenty and the rest of New Zealand is stark. The General Social Survey 2016 shows that Ōpōtiki District is far more socio-economically deprived than New Zealand as a whole, and that little has changed in the last two decades.

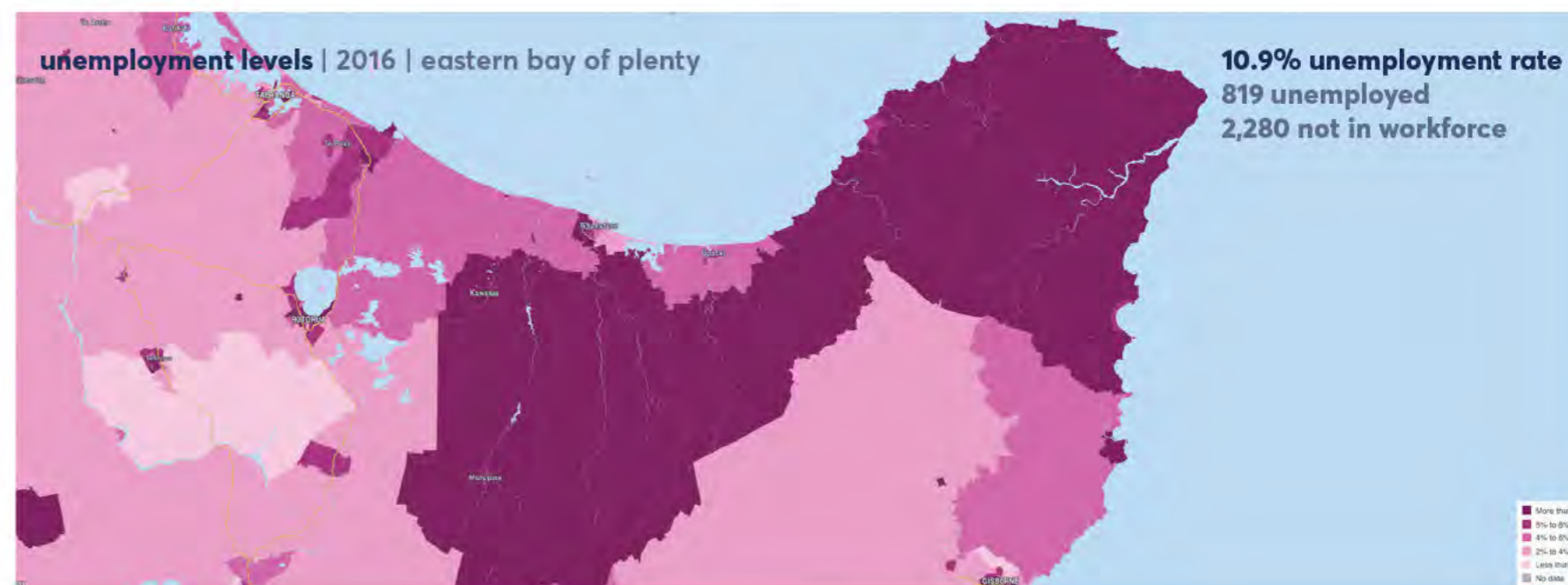
In Ōpōtiki District, four of the five occupied area units were identified as being among the most socio-economically deprived areas in New Zealand: Cape Runaway, Oponae, Ōpōtiki and Te Kaha.

The deprivation statistics are linked directly to the lack of employment opportunities in the region. Unemployment is dramatically higher than in the rest of the country, particularly amongst young people, Māori and women. As a result, household incomes are lower, rates of criminal offending are higher, there are high levels of welfare dependency, and higher rates of family violence, alcohol dependency and mental health issues.

These issues are not intractable – they are merely the effects of poverty. Employment is a simple pathway for solving poverty at an individual level, as the academic literature shows.

However, Ōpōtiki requires employment for a large number of people, not a small number of people, in order for the community-level issues to be addressed. In turn, this means that the interventions must be sufficiently ambitious and large-scale to provide the hundreds of jobs required – and as the history of the region has shown, infrastructure investment of the size required has not and cannot be delivered by the private sector alone.

This document shows how a single investment can be the catalyst for the desperately-needed transformation of Ōpōtiki.



## Strategic context

# There is a compelling logic for investing in Ōpōtiki

## The development of the aquaculture industry will provide a pathway out of poverty.

The primary opportunity for large-scale economic development of the region – and the employment gains that will result – comes from the aquaculture industry. It alone has the growth potential to deliver many hundreds of long-term jobs, whilst being both economically and environmentally sustainable over the long term.

However, for the economic, employment and social benefits to be achieved, the industry must be viable at large scale in the waters of the Eastern Bay. If the industry is able to grow and operate at scale,

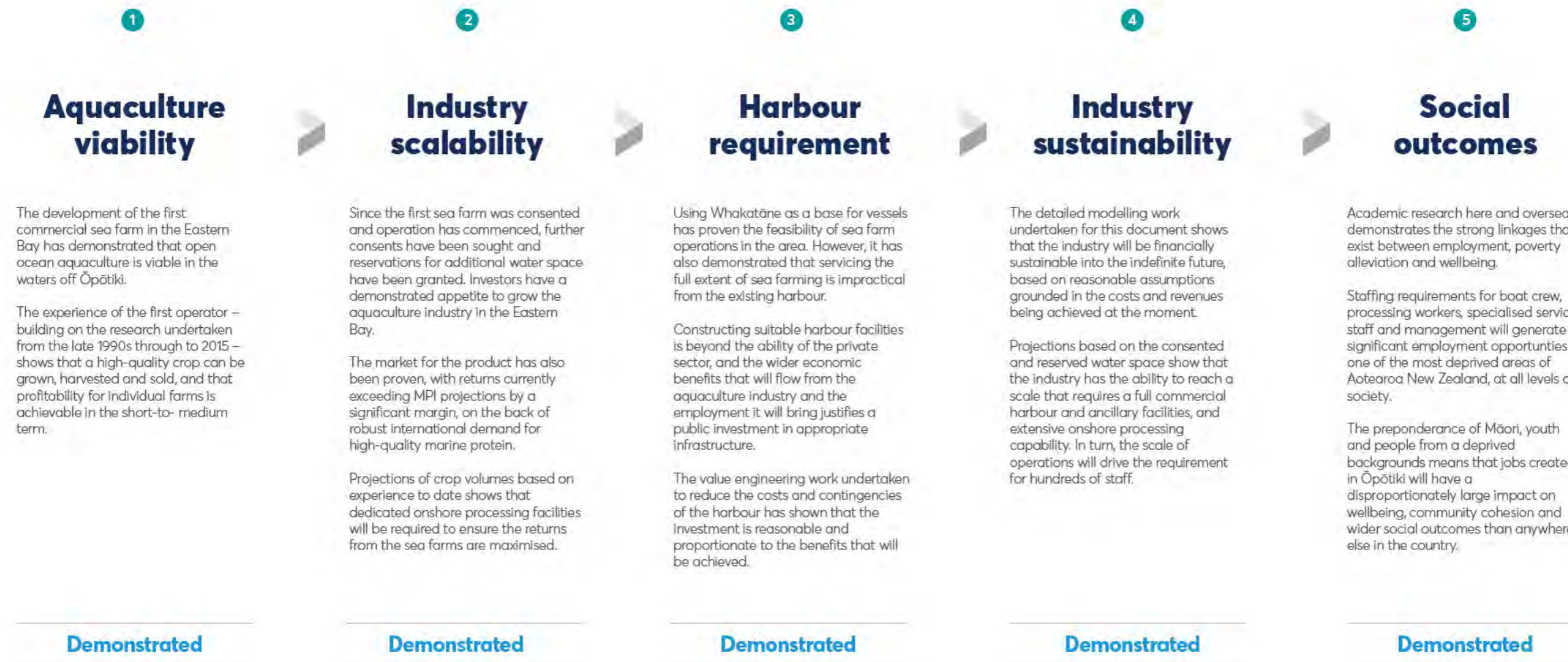
then the impacts on the region will be economically and socially transformative.

In order to assess whether aquaculture can deliver on the vision, a set of questions need to be answered in order:

- Is aquaculture viable in the Eastern Bay?
- Can the industry scale up production?
- Will the infrastructure be able to cope with the growth?

- Will the industry be profitable and sustainable over the long term?
- Will the jobs delivered by the industry transform the region?

The table below shows the work that has been done to answer each of these questions, in detailed research, analysis and operational experience dating back nearly two decades. The evidence for the answers is discussed in the following pages and in the Appendices.



# The Ōpōtiki harbour

## What is proposed

A new harbour with onshore facilities in Ōpōtiki is proposed.

The harbour at Ōpōtiki is designed to be a marine place of safety that can support the operation of national-scale marine farming. The key components that make it up are:

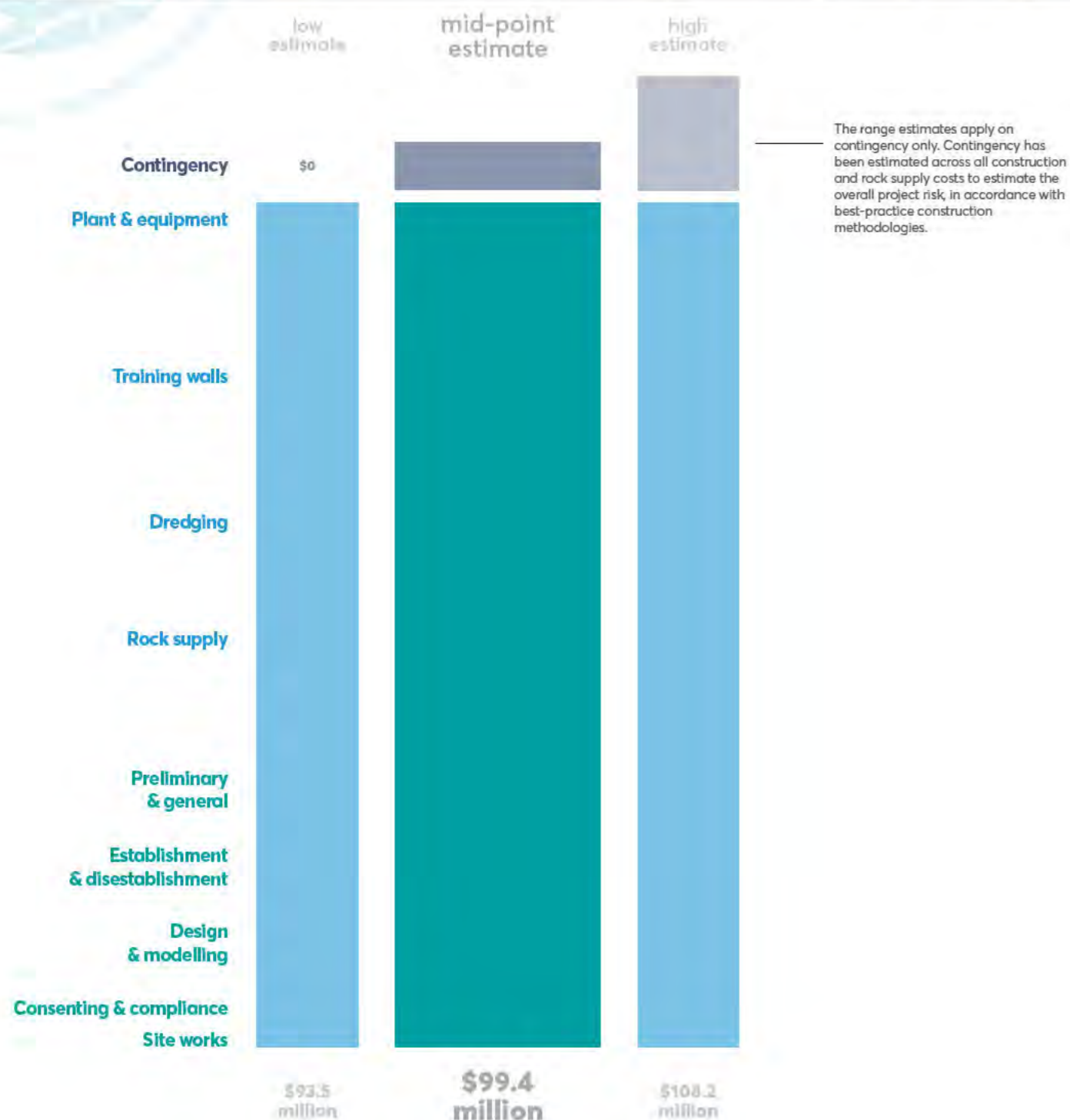
- A pair of engineered sea walls that provide sheltered access to the river mouth
- A dredged channel to enable commercial vessels to use the facility in most sea and tide conditions, which will better-manage the river flows and allow for adjacent residential development
- A commercial boat harbour within a commercially-zoned processing area, serviced by appropriate road, water, sewerage and power infrastructure
- A public wharf that will provide servicing for recreational vessels, and provision for future development of a public marina.

To support operation of the facility, key infrastructure improvements – such as intersection upgrades, three waters enhancements and power reticulation – have been carried out. Sea wall construction is consented, and the required infrastructure upgrades are fully consented where consents are needed.



# The Ōpōtiki harbour Investment requirements

An investment of \$99.4 million including contingency is required.



The revised costings at left are a result of more than 18 months of work, reassessing the design, construction methods, procurement approaches and delivery methodology for the harbour. The ground-up review has resulted in both lower costs and a significantly improved confidence level that the project can be delivered on time, within budget, and to the required quality standards.

A number of factors have contributed to the lower costs, and these are explored in more depth in the following pages.

The review has also resulted in a lower risk profile for the development project as areas of uncertainty in the earlier business case have been reduced or eliminated. For instance, the completion of geotechnical investigations has allowed the engineering approach and construction methods to be refined, resulting in lower costs, faster completion and less contingency allocation.

Some of the refinement in approach has come from the direct experience of the main contractors in completing the harbour development in the Chatham Islands. There are similarities in the engineering approach that have been incorporated into the design and planning of the training walls for Ōpōtiki.

Risk factors still exist for the project, as is the case with any equivalently-sized construction project, and these are discussed towards the end of this document. These risks are under active management and their potential financial impact has been included in the contingency provision within the overall budget. Sensitivity testing has also been included in the analysis.

The Ōpōtiki community, iwi and business are committed to the project and consider that the expansion of the industry and the social transformation it will bring to the region more than justify the manageable risks.






# Strategic context

## What has changed since the last proposal

More analysis and information has resulted in a more robust proposal.

Since the Detailed Business Case was presented in late 2017, there have been significant developments in lowering the costs and increasing the benefits from the project. In addition, the aquaculture industry in the Eastern Bay of Plenty has continued to develop, with the existing farm continuing its planned expansion and new operators seeking additional water space.

The table at right shows the major items that have changed since the previous business case, and the subsequent pages explain each of the areas in more detail.

	What has changed	Magnitude of change
 <b>Aquaculture developments</b>	<p>The aquaculture industry has continued to expand. New mussel lines have been installed, production of crops for market has increased, and new consents have been applied for, with more in the pipeline. A successful application was made to the PGF for the preliminary work to establish a processing factory in Opotiki, and for Whakatōhea to develop a marine spatial plan with additional water space.</p>	<p><b>+ 172 mussel lines installed in 20% of the consented space</b>  <b>+ 5,000 ha of water space - consents underway</b>  <b>+ 5,000 ha reserved for Te Whānau ā Apanui</b></p>
 <b>Construction costs</b>	<p>Value engineering of the harbour construction and improved geotechnical information has resulted in revised tender prices and lower costs, although some of these have been offset by rising construction cost inflation.</p>	<p><b>+ reduction in construction costs of \$8.9 million</b>  <b>- construction cost inflation of approximately 10%</b></p>
 <b>Rock supply</b>	<p>New local sources of high-quality rock required for armouring of the harbour training walls have been identified and are in the process of being consented. This will have additional regional benefits as well as lower costs for the harbour.</p>	<p><b>+ 2 local quarries within 15-50km identified</b>  <b>+ reduction in rock and cartage cost of \$11 million</b>  <b>+ additional \$49m+ in NPV added to region</b></p>
 <b>Marine industrial zone</b>	<p>Planning for the marine industrial zone has progressed, with a robust business case developed and detailed planning progressed. Zoning changes have been made to the District Plan to allow development to proceed.</p>	<p><b>+ business case developed</b>  <b>+ District Plan re-zoning operative</b>  <b>+ investor funding commitments in place</b></p>
 <b>Residential development</b>	<p>Development of the harbour will unlock the potential to develop additional residential sections due to better-managed river flows, resulting in a freeing up of land for housing and increased rating revenue over time.</p>	<p><b>+ [REDACTED]</b></p>

# What has changed

## The aquaculture industry has developed

### The growth of the local industry has continued.

Since the business case was presented, significant investment through the Provincial Growth Fund (PGF) has seen several opportunities being explored and investigated.

With Provincial Growth Fund investment, the Whakatōhea Māori Trust Board (WMTB) has identified four open-water marine-farm sites (the Whakatōhea Marine Management Area) within their rohe moana.

These sites form the core of the long-term development of aquaculture in the Eastern Bay, although further development is expected from other iwi groups and commercial operators in time. The sites comprise the most significant opportunity for aquaculture expansion in recent decades.

Together with a number of operating companies, the development company Whakatōhea Mussels Ōpōtiki Ltd. (WMOL), and the

Whakatōhea Māori Trust Board have commenced seafarming operations at the site operated as Eastern Sea Farms (ESL) in 2014, and farm development and expansion has occurred steadily since then, in accordance with their business plans.

Work is also progressing on the on-shore facilities necessary to support the further expansion of the sector in the Eastern Bay. Subject to shareholder approval, WMOL have finalised a business case for a proposed state-of-the-art mussel processing plant situated in Ōpōtiki, which will process mussels from the marine farming site.

The initial processing facility will be constructed in 2021/22 following the granting of consents. It will eventually employ around 200 local staff, with a marked impact on employment prospects in the region.

#### Te Whānau ā Apanui reservation

Planned sea farm – 5,000 ha

A deepwater site of approximately 5,000 ha to the East of existing operations, requested by Te Whānau ā Apanui as part of the Agreement in Principle for the iwi's Treaty of Waitangi settlement.

Estimated 2030 start

#### Farm C

Planned sea farm – 5,000 ha

A deepwater site of approximately 5,000 ha planned

Estimated 2030 start

#### Eastern Sea Farms

Existing sea farm – 3,800 ha

A consented seafarm for Greenshell™ mussels and spat collection. A programme accelerated by WMOL development programme (2016 start) and in the 4th year of development producing an expected ~800tonnes in 2019.

In production and under expansion

**Farm B**

Whakatōhea Seafarm – 4,043 ha

A planned seafarm for mussels, [redacted] in the process of obtaining consent (as Pakihi Trading Ltd)

Estimated 2025 start

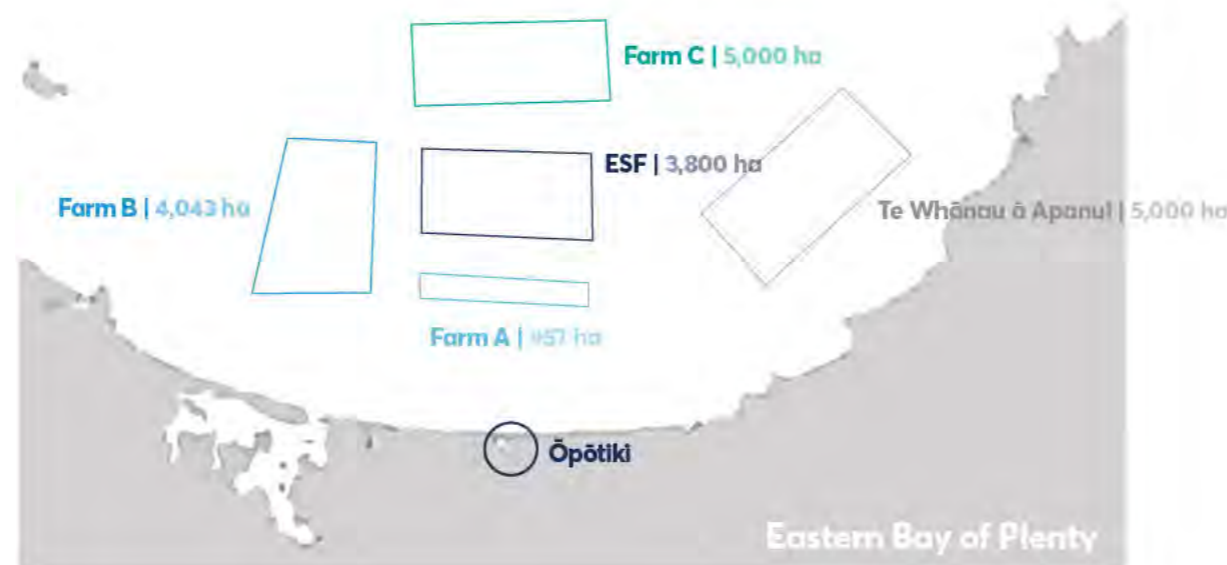
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**Farm A**

Ōpōtiki Seafarm – 957 ha

Planned site to establish a spat catching and Greenshell mussel seafarm. In the process of obtaining consent (as Pakihi Trading Ltd)

Estimated 2020 start

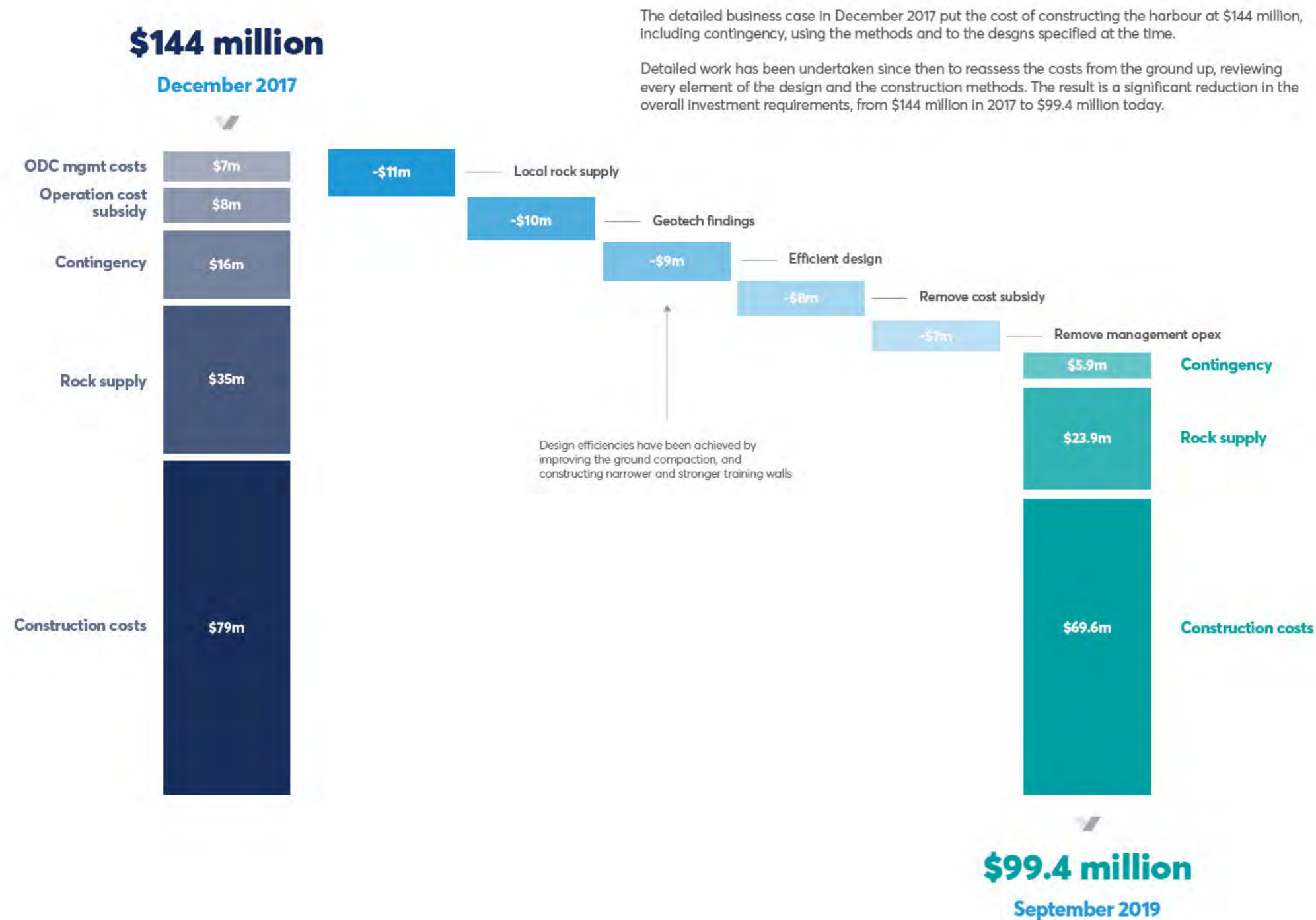




# What has changed

## The construction costs have been reduced

Value engineering, new designs and targeted procurement has reaped dividends.



The diagram at left shows the components that make up the cost reduction elements for the harbour. Cumulatively, these have reduced the overall investment from \$144 million in 2016 to \$99.4 million today.

# What has changed

## The cost of rock has decreased

Sourcing high-quality rock locally has had a significant positive impact.

The construction and armouring of the sea walls for the harbour requires high-grade rock that is able to endure the static construction loads and dynamic wave action loads. The business case noted the significant transport cost of bringing suitable rock from quarries located outside the region.

The need for high quality rock for the sea walls has led to the identification of suitable quarries locally. The opening of new quarries will produce regional benefits long after the seawalls are complete by avoiding the cost of transporting metal and rock from outside the region.

The transport saving when set against the cost of opening the local quarries produces a NPV benefit of \$49 million, as well as direct and significant emissions reductions. This is a national benefit rather than just a benefit to the region.



### Rock sourcing

Positive impact

High-quality rock for the harbour training walls is being sourced locally from new quarries, significantly reducing transport costs and delivering additional financial benefits to the Bay of Plenty and the country.

### A structured process was undertaken:

#### Review undertaken

Rock supply was assessed as being a major source of cost for the harbour

The harbour training walls require high-quality rock for the armouring of the structures against constant wave action, but suitable rock was only available from more than 100km away. The quarrying and resulting transport costs added significantly to the project budget.

#### Research conducted

GNS Science and the Aggregate and Quarry Association helped research solutions

A collaborative process was undertaken at the request of the Minister to assess the possibilities for new or re-opened quarries to supply rock of the required grade. The work identified a range of new sources for suitably high-quality material, all of which were closer to Ōpōtiki.

#### Sources identified

Local quarries have been identified, a Registration of Interest process undertaken and tenders called

A Registration of Interest process has been undertaken with suitable suppliers, and a tender process has been undertaken to ascertain the best source of the rock needed for the harbour. The result will be lower transport costs and a decreased budget for the high quality product required.

## + \$49 million regional NPV

Ōpōtiki harbour is not the only regional consumer of high-grade rock

The Eastern Bay uses between 37,000 and 67,000 tonnes per annum of armour rock for stopbank construction and repair, flood protection and highway strengthening work. Most of this material is currently imported from out of region. The new quarries will provide an ongoing supply of armour at transport savings of between \$1M and \$2M a year and considerable emissions reductions, as well as significantly reducing the cost of Eastern BOP river scheme protection works.

However, for the new quarries to be economically feasible, there must be sufficient demand for the product to make the consenting and commissioning of a new quarry viable. This means that without Ōpōtiki harbour and its initial demand for high-quality product, development of the quarries is unlikely to proceed.

# What has changed

## The marine industrial zone has progressed

Zoning is in place and the business case is nearing completion.

The development of Ōpōtiki harbour and the facility provided to the maritime community will generate the requirement for the maintenance, repair and support of marine assets and technology as well as the Port infrastructure itself.

While general engineering and service providers are established in Ōpōtiki, it is anticipated that with the influx of vessels and equipment related to the aquaculture business, the specific engineering needs of

the Port will have to be met locally. Ōpōtiki is 45km via the coastal route from Whakatāne, its nearest provincial centre, and the heavy haulage route is usually around 68km via the Waimana Gorge (State Highway 2) which currently is under maintenance/repair and susceptible to ongoing delays and closure. Tauranga and Rotorua are each 135 km away.

This will obligate some local specialisation, and significantly a

general growth in the capacity and capability of service providers in Ōpōtiki to meet the needs of the harbour users. In a post Port construction-phase, the services may include road maintenance and supply of retention materials, structural materials and construction, marine fabrication engineering and installation, provision of loading and lifting equipment, freight and general transport, vessel maintenance and construction.

### Vessel repair and maintenance

Commercial operations in the waters around Ōpōtiki will generate a requirement for the survey, maintenance, repair and support of marine assets and technology as well as the Port infrastructure itself. This will be accommodated by a specialised onshore area adjacent to the berthage and slipway.

### Commercial wharf and berthage

The aquaculture industry requires commercial-grade wharves and berthage to permit vessels to be loaded and unloaded, crops and equipment to be handled, and vessels to be fueled and serviced. There is also a requirement for a significant area for rope and buoy manufacturing and maintenance. The required facilities will be provided on a commercial basis by private sector operators on the Petersen Block opposite the public wharf.



### Slippage and haul-out

Aquaculture and tourist operations based at Ōpōtiki require a slippage facility including haul-out facilities with a hard-stand area designated for boat maintenance, repair and light construction. This is an enabler for the expansion of local vessel survey, maintenance and engineering businesses.

### Public wharf

A public wharf and future marina will provide facilities for recreational and Coastguard users, with a boat ramp and fuel provisioning.

The facility will also provide a much-needed safe harbour for recreational and commercial vessels in the Eastern Bay.

Development of the Marine Industrial Zone (MIZ) is a key element in ensuring the aquaculture industry has the facilities required to operate its boats and process its crops. The development of the MIZ is fully funded by the private sector, and will be subject to the standard resource consent process. However, plans for the area are well advanced, with the completion of a business case for the investment due in October 2019. Development of the MIZ is obviously subject to the harbour proceeding.

# What has changed

## New residential development has been enabled

Controlling river flows will open up land for development.

### Waiotahi Drifts



### River mouth drift

The mouth of the Waiotahi River will gradually drift westwards over a 100-year timeframe, as the movement is unconstrained. This will subject the land to the west of the river mouth to unacceptable flooding risk.

### Mitigation of flood risk

There are 70 lots that lie within the 100-year flood risk area that cannot be developed without the river channel being developed. With harbour construction completed, development of the additional lots becomes feasible.

### Development expansion



### The opportunity



### The requirements



### Long-term resilience



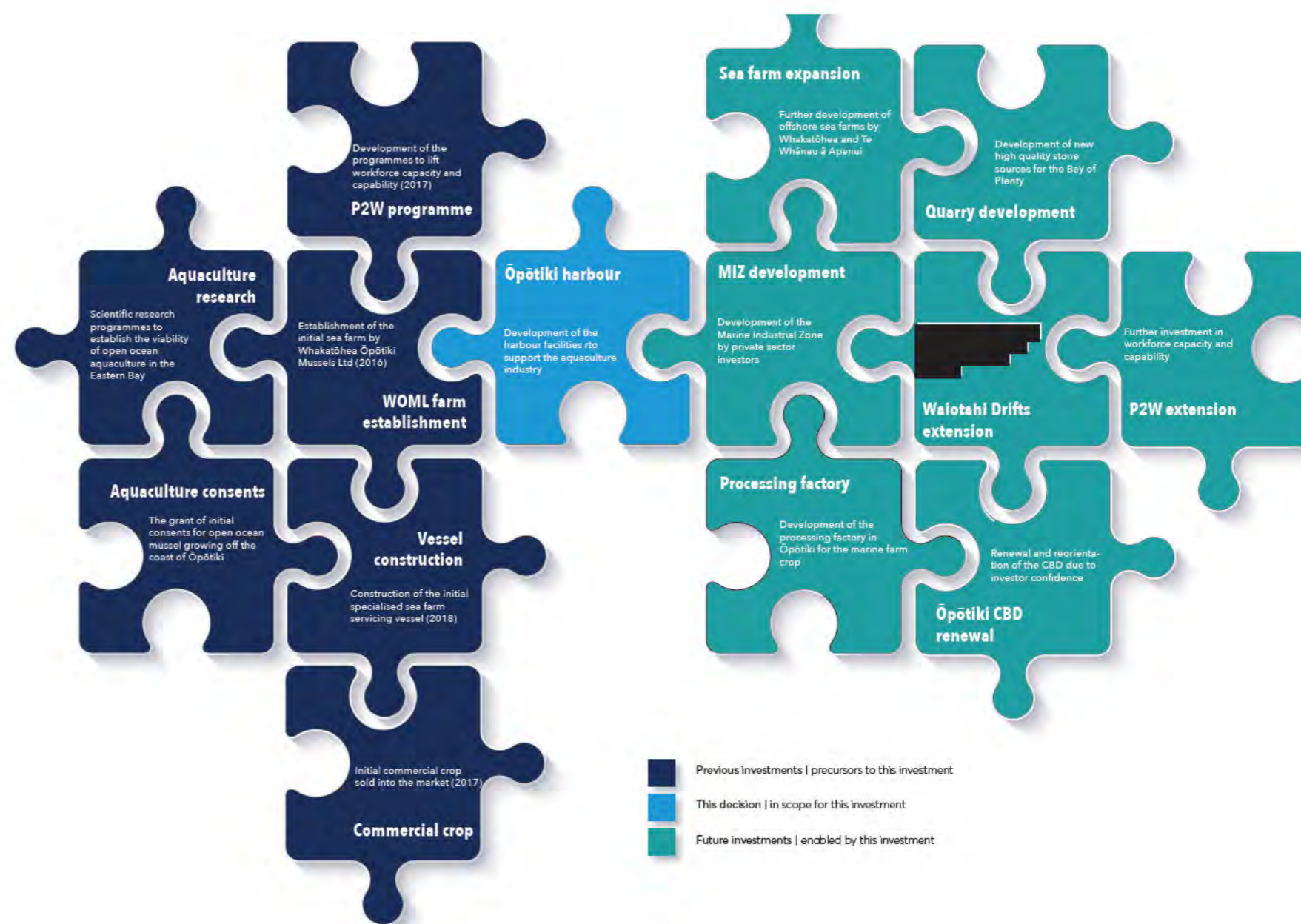
# What has changed Investment context

The harbour is the linchpin in a wider economic transformation.

The diagram at right shows the investment context for the harbour development.

This investment has only been made possible by the considerable research, consenting and development work that has taken place since the late 1990s, which has demonstrated that the harbour is not only viable but is a necessary requirement for the further expansion of the aquaculture industry.

In turn, the harbour development will catalyse further investments in sea farm and onshore commercial development, industrial capacity and residential development. In turn, these initiatives will lead to the employment, economic and social outcomes that are explored in more depth later in this document.



## Te Tiriti o Waitangi

In addition to the future investments that will be enabled by the harbour development, there are implications for the Treaty settlements for both Whakatōhea and Te Whānau ā Apanui if the project does not proceed.

Both iwi have claimed water space for aquaculture development as part of their redress under the Treaty. If the aquaculture area is not economically accessible or able to be affordably serviced, then the financial value of the water space is likely to severely reduced, as the economic returns from sea farming will be considerably lower. Should this occur, there could be fiscal impacts for the Crown when the settlements with the iwi are negotiated and concluded.

# The aquaculture industry

## There is a significant opportunity for NZ

Open ocean aquaculture is providing a major economic opportunity.

As is the case with the rest of the world, aquaculture production in New Zealand is expected to grow as the wild catch declines. The aim of the New Zealand aquaculture industry is to produce \$1 billion of product by 2025 and \$3 billion by 2035. This is an ambitious goal that will put aquaculture on a growth trajectory equivalent to the New Zealand wine industry – one of the country's export success stories.

The NZ Aquaculture Strategy, produced by Aquaculture New Zealand in collaboration with government, iwi and industry stakeholders, articulates how the goal will be achieved. This involves opening new areas to aquaculture, as well as a programme of innovation in both methods and species, underpinned by a commitment to sustainability and a market-led approach.

Significant work has been undertaken over the last two decades to research and develop innovative production methods and diversify the mix of aquaculture species. This has been done in a collaborative way, with both industry participants and public agencies bringing funding and expertise to bear. The result has been a significantly wider mix of sites and species than was the case a decade ago.

In this setting, Ōpōtiki has an international competitive advantage by producing low-impact and high-quality protein, enabled by access to rich and clean open ocean waters.

Despite the progress that has been made, there are still challenges for the industry. Social licence is a key factor in marine farm expansion, which in turn is linked to the ecological and economic sustainability of the industry.

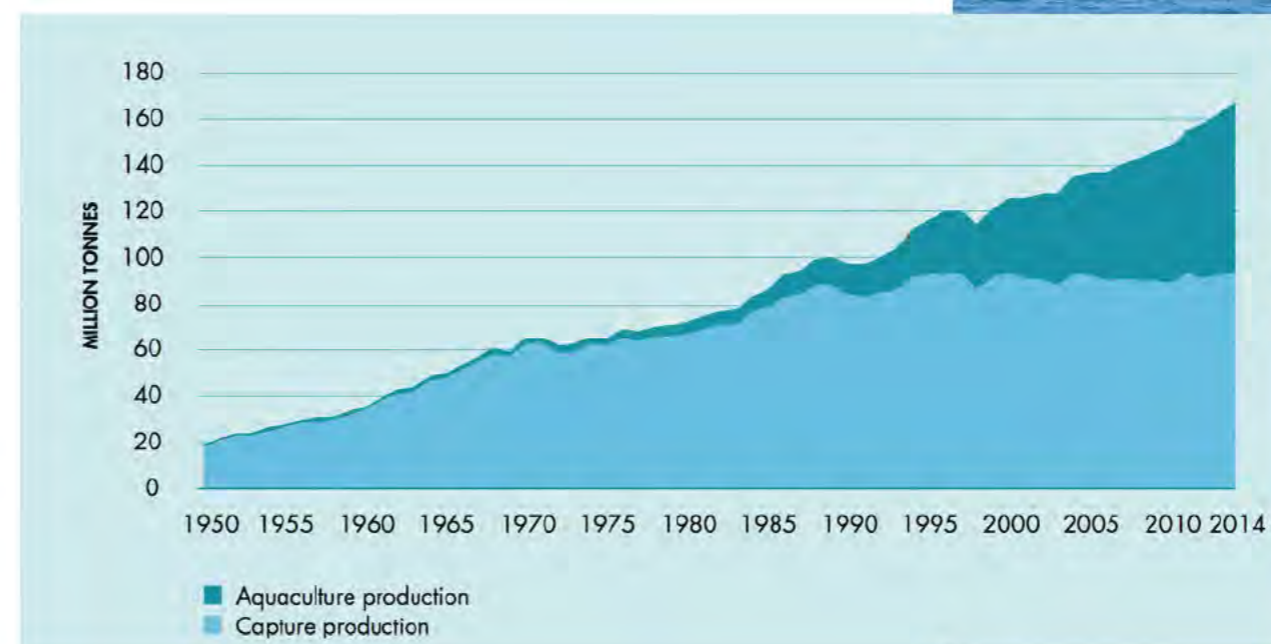
Biosecurity is an ongoing and significant risk in some areas of the country, which can have a negative impact on both production levels and public perceptions. And market access and development remain challenging in some parts of the world. These factors can and will be addressed by concerted work by the aquaculture industry, central and local government, iwi and other stakeholders.

Work by the FAO shows the rapidly increasing demand for aquaculture products in Asian markets, especially China. Currently, the entire Oceania region accounts for only 0.26% of global production, against a trend of rapidly-rising demand.

Over the last five years the demand for half shell has increased as the export market expanded into new areas. Mussel exports to the US are our biggest aquaculture earner; however, 2018 saw some of that volume shift to China where fresh and frozen mussels have attracted higher prices over the last four years.

The Chinese market has grown by an average of 60% per year since 2011. New Zealand production was hit by an algal bloom in 2018, but the effect was somewhat offset by a rise in prices. The current MPI forecast is that international market prices will be 30% higher in 2023 than was projected in the 2017 business case, showing that the market for the product is very healthy in the medium term.

### World capture fisheries and aquaculture production



# The aquaculture industry

## The New Zealand Aquaculture Strategy

This investment is strongly aligned with the newly-announced strategy.

### Aquaculture's \$3 billion goal by 2035

The Government has announced a strategy which will help "streamline" the aquaculture industry toward becoming a \$3 billion industry by 2035.

Fisheries Minister Stuart Nash released the Government's Aquaculture Strategy at the New Zealand Aquaculture Conference in Blenheim on Wednesday, saying the Government would work alongside the industry to deliver the "ambitious" goal.

Nash said they hoped to remove "unnecessary barriers" to aquaculture and work with industry to "totally optimise" profits, while ensuring sustainability.

Aquaculture New Zealand chair Bruce Hearn welcomed the strategy and said it recognised aquaculture's benefit to New Zealand as the "primary industry of the future" and one which could be a "beacon for the country" as they looked to transition to a low emission economy.

The Government planned to build on the existing \$600 million industry by maximising the value of existing farms through innovation and extending into modern land-based farms and open-ocean aquaculture.

The strategy signalled the Government's clear plan and support of the aquaculture industry, Nash said.

They were working on biosecurity and offshore farming, which was where the "real potential" was.

"Aquaculture contributes significantly to regional development. It generated over \$600 million in revenue in 2018, and employed 3000 people, especially in the regions. There is real potential for aquaculture to enrich our economy and our global reputation with Government, iwi and industry coming together."

– Marborough Express, September 19, 2019

My vision is that New Zealand is globally recognised as a world-leader in sustainable and innovative aquaculture management across the value chain. Achieving this vision means building on our successes, and embracing new opportunities.

This strategy outlines a sustainable growth pathway, and an all of Government work plan to support it.

The growth pathway sets an objective for aquaculture to become a more productive industry that further supports regional prosperity. Innovation underpins this growth – both through improving the value from existing farming space, and exploring opportunities for new farming on land and in the open ocean.

This strategy also recognises the importance of partnering with iwi to ensure their values and aspirations, commercially, culturally and as kaitiaki, are provided for. This means going beyond legislative obligations and embracing true partnership.



**Hon Stuart Nash**  
Minister of Fisheries

### Extending aquaculture in the open ocean

Aquaculture has traditionally taken place in sheltered, enclosed bays and harbours where there are other legitimate uses and values. Many areas have reached their social carrying capacity.

Both globally and in New Zealand, attention is turning to open ocean farming as the big opportunity for aquaculture growth.

Open ocean farming presents an opportunity to farm in cooler, deeper waters, and more easily position farms away from areas of high competing use. New Zealand's exclusive economic zone is 15 times bigger than our land area – presenting significant potential.

Open ocean farming outside of enclosed bays requires a technological shift – existing technology does not perform in open ocean environments. We can leverage work being undertaken globally to farm in high energy environments. We have the opportunity to develop and implement a world-leading framework for managing open ocean development, and ensure it integrates with existing uses and values. This will be a critical part of our work programme.

– The New Zealand Government Aquaculture Strategy, p5



# Investment analysis

## Modelling the investment

An economic and financial model has been developed to assess the investment.

The experience of the commercial operator, market prices, public data and projections from central government are used to generate the assumptions that underpin the modelling.

Considerable work has been undertaken to understand the impacts of the investment, and the outputs from a sophisticated economic model are contained in the Appendix. A summary is presented on the following pages, which follows the logic described in the table below.

The modelling includes the 5,000 ha of water space reserved for Te Whānau ā Apanui as part of their Agreement in Principle with the Crown.

It should be noted that the analysis excludes the 172 mussel lines installed by Eastern Sea Farms by 2020, as the economic value created will occur with or without the harbour.



The cost benefit assessment identifies both the direct economic impacts and the wider social and wellbeing benefits that will come from the harbour.



# Investment analysis

## Development drivers






A number of assumptions have been made about industry growth.

In developing the Cost Benefit Assessment for the harbour, certain assumptions have been made about the size and scale of aquaculture operations, the level of investment and costs, and the expected returns. The core assumptions are detailed in the table at right.

The assumptions are drawn from a number of sources:

1. The experiences of the existing commercial aquaculture operator in the Eastern Bay, based on information supplied by them
2. Information available from public sources, such as market prices for mussels
3. Information made available from government sources, such as future projected crop prices.

Where there are a range of values for each assumption, either the value that represents the median, or that which has the most evidential support has been used. The full workings of the model are contained in the Appendix.

	Modelling assumptions	Metric
 <p><b>Lines</b></p>	<p>It is assumed that there is <b>█</b> percent commercial stocking of the available area and <b>█</b> per line spacing. Lines are installed at <b>█</b> per annum from commencement at a cost of <b>█</b> percent of installed lines produce no saleable output and are reserved for spot gathering for on-growing. Lines are replaced after 15 years.</p>	<p><b>█</b> commercial stocking of sea farms of water space per line <b>█</b> lines are installed each year <b>█</b> is invested in each line of lines do not produce a crop <b>█</b> line replacement cycle</p>
 <p><b>Mussels</b></p>	<p>The sea farm product is mussels with a <b>█</b> month growing cycle. The growing cycles can be shortened to <b>█</b> months.</p>	<p><b>█</b> month growing cycle</p>
 <p><b>Production</b></p>	<p>Harvest per production line is <b>█</b> GWT pa, equivalent to <b>█</b> GWT per installed line. Five potential sea farm products are allowed for but only mussels is used. IQF half-shell is the reference final product.</p>	<p><b>█</b> GWT per production line Greenshell mussels are the sole crop</p>
 <p><b>Price and profit</b></p>	<p>The average FOB Auckland price received for frozen half-shell mussels in the year ended 30 June 2018 was \$9,183 per tonne. A 25 percent discount was applied to derive a maintainable ex-factory price of \$6,887 per tonne, reflecting transport and handling costs as well as potential price fluctuations. Product yield (tonnes/GWT) is 40 percent. Gross profit margin is 57 percent, i.e., factory processing cost including labour is 43 percent. The source for this is Statistics New Zealand's Business Operations Survey 2018. The median gross profit ratio for medium-sized firms in Other Food Product Manufacturing nec. is 57 percent (44 percent at 25th percentile and 67 percent at 75th percentile).</p>	<p><b>\$9,183 per tonne FOB price in Auckland</b> <b>25% discount for transport and handling</b> <b>\$6,887 per tonne to reflect price fluctuations</b> <b>40% product yield</b> <b>57% gross profit margin</b></p>
 <p><b>Harvesting</b></p>	<p>The boats used to service the seafarms and harvest the mussels are assumed to cost <b>█</b> million each, have hourly operating costs of <b>█</b> operate <b>█</b> days per annum, and have a crew of 6 people. Each boat can service <b>█</b> lines.</p>	<p><b>█</b> million capital cost <b>█</b>/hr to operate <b>█</b> days per year of operations <b>█</b> crew required <b>█</b> lines serviced per boat</p>

# Investment analysis

## Growth projections

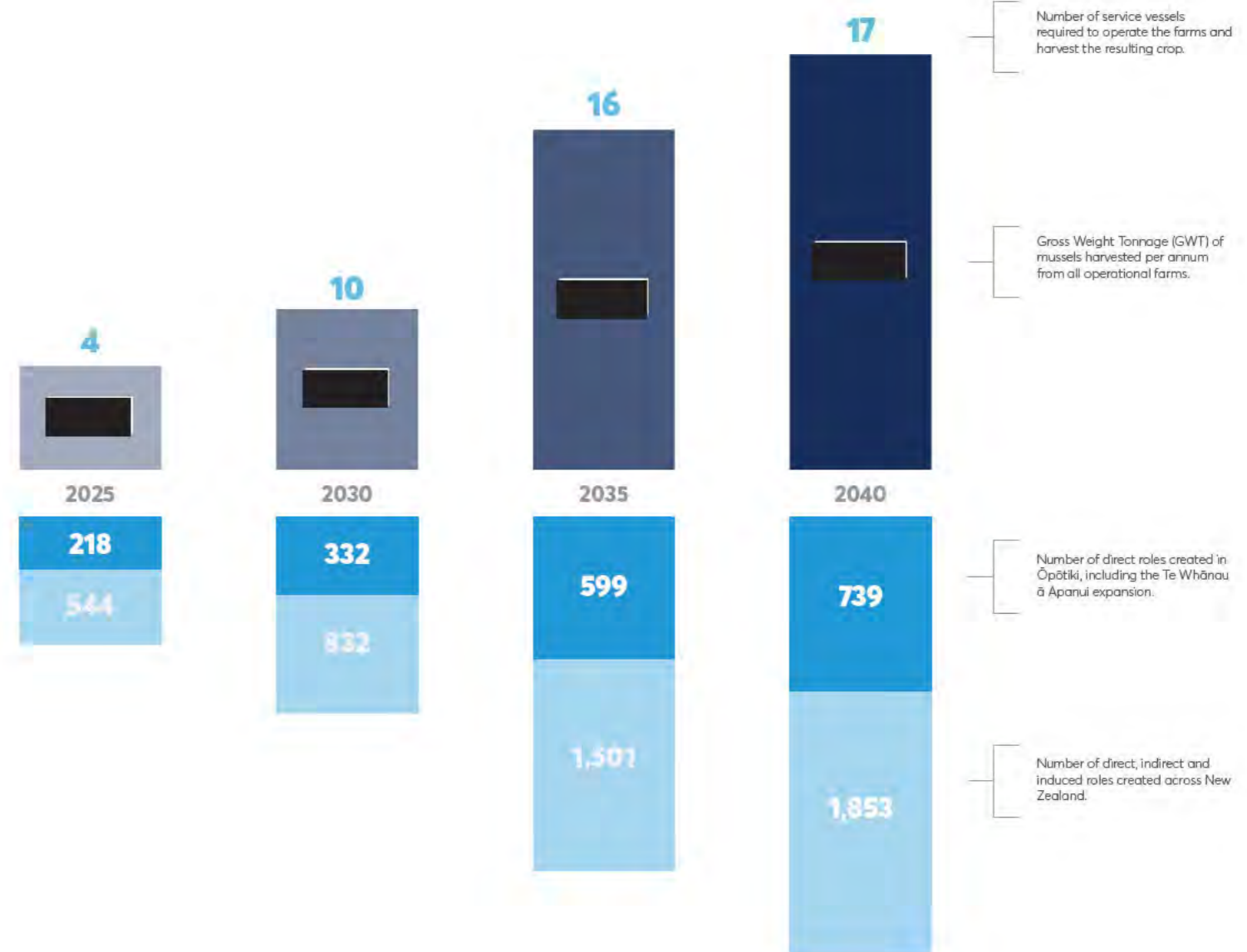
Expansion of the industry will see output rise sharply.

The growth profile of the aquaculture industry in the Eastern Bay is shown in the chart at right. Annual farm output rises from around 800 tonnes today to more than [redacted] tonnes in 2025, then quadruples to more than [redacted] tonnes by 2040.

In order to support aquaculture at this scale, the number of vessels building, operating, maintaining and harvesting the sea farms increases to 17 vessels, which will employ around 100 people.

Onshore processing also results in significant job creation. By the time farm output reaches [redacted] GWT, a processing facility is needed that will allow for up to [redacted] GWT of product to be processed annually. The facility requires around 200 staff, which will rise to a maximum of 300 people based on capacity utilisation.

In turn, the additional economic activity in the Bay of Plenty will create indirect jobs in the region, as well as inducing extra employment in the wider economy. The specific employment impacts are discussed on the following page.



# The aquaculture industry

## The question of scale

Aquaculture industry ambitions will be constrained without additional facilities.

One of the major goals for Whakatōhea is to bring jobs to our people and wealth to our iwi and our region. For this to succeed, our boats and our harbour must be located in Ōpōtiki.

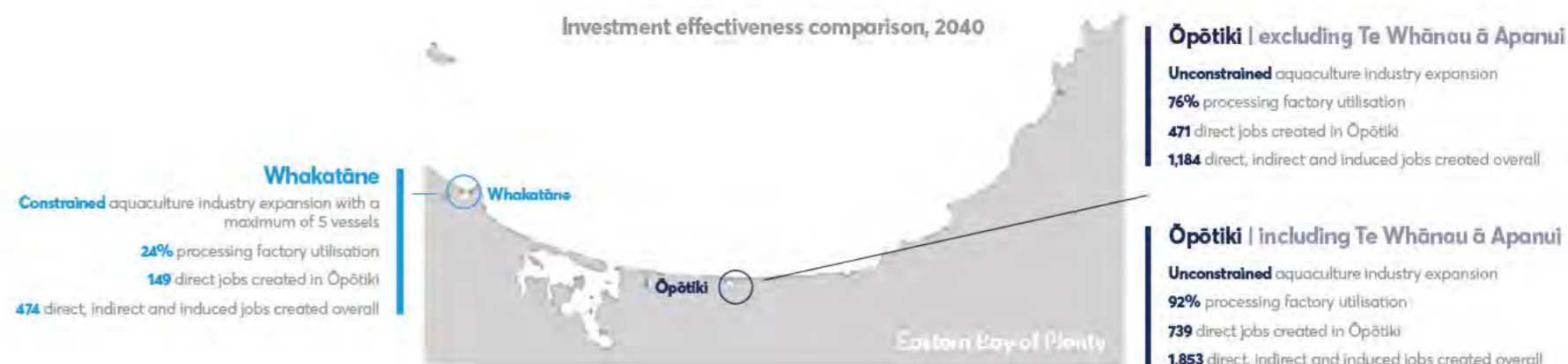
We are currently operating our vessels from the harbour at Whakatāne, and we are grateful for the commitment and the tolerance that has made this possible, so that we can prove the success of our aquaculture farms. But it is not sustainable for the long term.

As our farms grow, so do the number of boats we require. If we build a factory in Ōpōtiki to process our crop and give jobs to our people, then the number of trucks on the road between our boats and our factory will grow even faster. The quality of our crop will worsen because of the transport time, and our costs will be higher.

And in time, we will run out of space and tolerance in Whakatāne for more boats and more trucks. That time will not come this year, but it will come quicker than most people realise. The ambitions of Whakatōhea are large, and the need to give jobs to our people and lift the poverty from our region is larger again. And that is before we consider the reasonable desires of Te Whānau ā Apanui, our partners in the Eastern Bay.

So what we need is a strong link between our sea farms and our factory – we need a path to the sea, te ara moana a toi. We need a harbour in Ōpōtiki for the industry and our iwi and our whānau to flourish and grow.

**Robert Edwards**  
Chair, Whakatōhea Māori Trust Board



Siting aquaculture operations at Whakatāne will result in significant logistical bottlenecks to the industry reaching its potential in the Eastern Bay.

The harbour facilities will allow growth in the number of servicing vessels, but only to a total of 5 boats. This provides a hard upper limit to the sea farm area that can be constructed, operated, maintained and harvested.

The logistical constraints lead to limitations in total crop volumes due to the under-utilisation of the allocated water space. In turn, the lower volumes mean that the processing factory only operates at 24% of its capacity, resulting in a return on capital invested in the plant of only 14% for shareholders.

The lower crop volumes, smaller number of vessels and limited processing requirements have a significant impact on local employment. Only 149 direct jobs are created, and even when the indirect and induced effects are taken into account, the employment effect is less than 40% of the base case.

In comparison, locating aquaculture industry operations in Ōpōtiki has a dramatically different impact on crop volumes, processing plant throughput and investor returns.

Without the logistical constraints on vessel numbers, the sea farm area can be fully exploited – including the 5,000 ha reserved for Te Whānau ā Apanui. Even in the base case, employment is 50% greater than in the Whakatāne scenario, with 471 direct jobs and total employment effects of nearly 1,200 roles. The Te Whānau ā Apanui expansion increases these numbers by nearly 25%.

The increased crop volumes also mean that the processing factory is able to work at much higher utilisation rates, rising to 76% of capacity when the Te Whānau ā Apanui water space comes into production. The effects for investors are dramatic, with the return on capital for the factory rising to 76% in the base case and 92% in the expansion scenario – a return that is some 500% higher than artificially constraining industry throughput via Whakatāne.



# Investment analysis

## Employment impacts

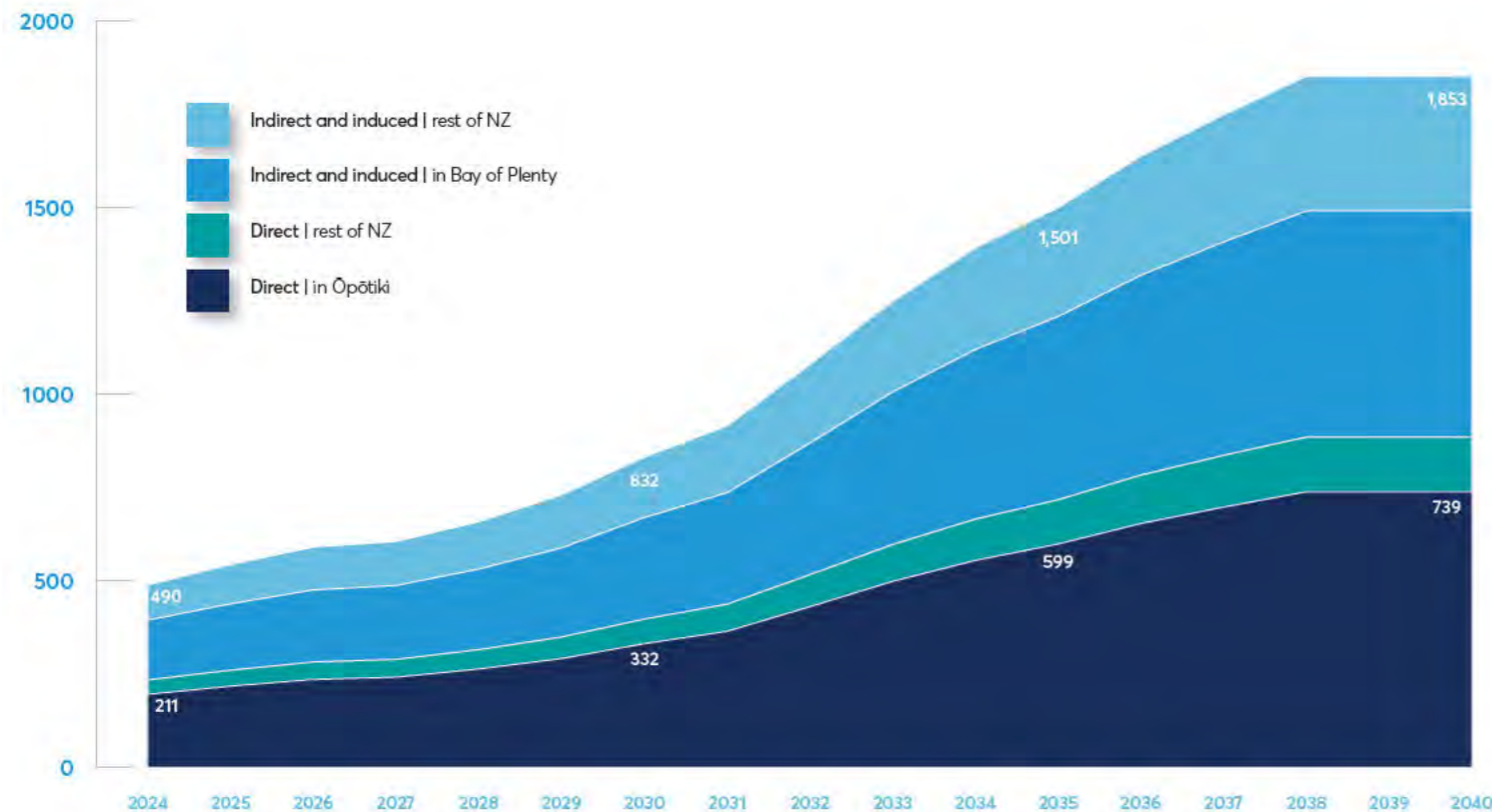
Expansion of the industry will see output and employment rise sharply.

As the industry expands, the employment impacts for the region and the country become significant. Direct employment is driven by:

- Crewing of sea farm servicing vessels
- Production staff for the onshore processing facilities
- Administrative, managerial and support staff working within the aquaculture industry.

Beyond these direct roles, there is indirect and induced employment growth across the Bay of Plenty, driven by the uplift in economic activity. In turn, there are New Zealand-wide impacts as the effects ripple out through the wider economy.

The scale of the effects are shown in the graph below, which assesses the number of roles created from the date of the harbour opening through to 2040. It should be noted that this is the number of employment roles generated, and is not directly comparable to FTE.



### Immediate impacts

While most of the employment gains come from the development of the aquaculture industry and the subsequent flow of activity through the economy, there are immediate and tangible benefits that will accrue to Ōpōtiki as soon as the harbour is approved.

The table below shows the type and number of direct jobs in Ōpōtiki that will be created during the construction and growth period before the harbour opens – noting that this excludes the additional roles associated with the Marine Industrial Zone.

	Harbour construction	Rock supply	Mussel farms	Total jobs created
<b>2020</b>	5	21	55	<b>81</b>
<b>2023</b>	60	28	113	<b>201</b>

# Investment analysis

## Harbour operating costs

Considerable refinement of the operating costs has occurred.

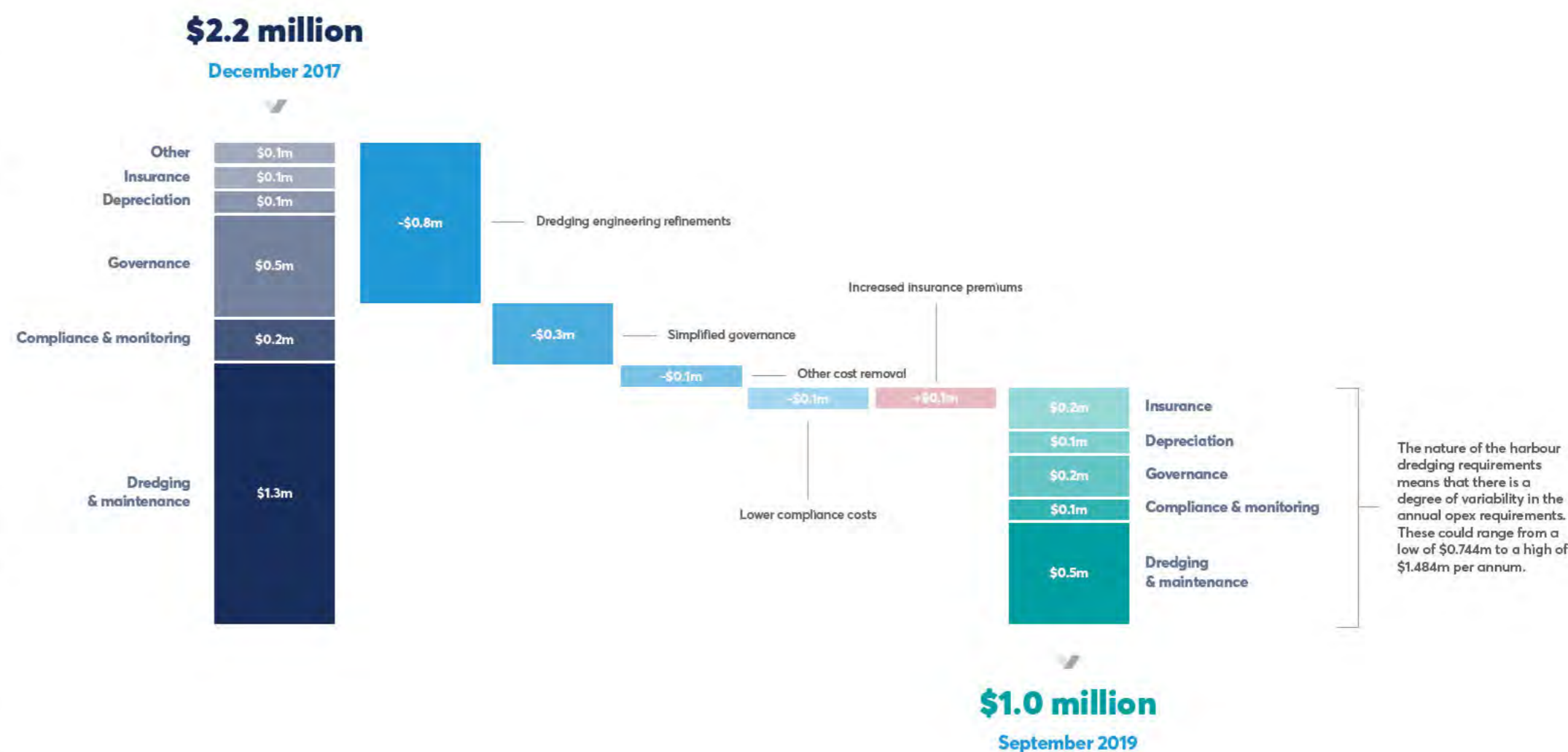
As is the case with other public infrastructure of this type, the assumption is that the harbour facilities will be operated on a cost-recovery basis; that is, there is neither a desire nor intention to return a profit to the asset holders. This is because the harbour is primarily designed to facilitate the expansion of the marine farming industry, rather than to act as a profit centre in its own right.

The primary operating costs for the harbour are:

- Maintenance and renewal costs for the physical infrastructure of the harbour
- Staffing costs to operate the harbour, administer its systems and compliance processes
- Compliance costs, such as maritime safety requirements, biosecurity obligations, health and safety requirements and the like.

The projected annual costs are shown in the diagram to the right.

These costs will need to be funded using a cost recovery model, primarily levied on users of difference classes via different instruments over time, with some assistance from local ratepayers to reflect the wider benefits that will flow from the facility to the Opotiki area. This is in line with the funding of other infrastructure such as roads, where there is a mix of direct levies (such as Road User Charges) and indirect taxation contribution.



While the diagram shows the indicative operating costs, these can only be finalised once key elements of the harbour have been designed and commissioned. In turn, the cost recovery levy on users will be negotiated once the costs are known to all parties, and this is expected to occur progressively in the period leading up to harbour opening.

# Investment analysis

## Cost benefit assessment

	Revenue	Costs				Economic value created
		harvester operating costs	product processing costs	mussel lines capital costs	harvester capital costs	
<b>Eastern Sea Farms</b> Existing sea farm – 3,892 ha In production and under expansion	<b>+\$172 m</b>	<b>-\$25 m</b>	<b>-\$63 m</b>	<b>-\$17 m</b>	<b>-\$6 m</b>	<b>+\$61 m</b>
<b>Farm A</b> Ōpōtiki Seafarm – 978 ha Estimated 2020 start	<b>+\$65 m</b>	<b>-\$6 m</b>	<b>-\$23 m</b>	<b>-\$7 m</b>	<b>-\$3 m</b>	<b>+\$25 m</b>
<b>Farm B</b> Whakatōhea Seaform – 3,825 ha Estimated 2025 start	<b>+\$151 m</b>	<b>-\$20 m</b>	<b>-\$47 m</b>	<b>-\$18 m</b>	<b>-\$10 m</b>	<b>+\$57 m</b>
<b>Farm C</b> Planned sea farm – 5,000 ha Estimated 2030 start	<b>+\$109 m</b>	<b>-\$18 m</b>	<b>-\$28 m</b>	<b>-\$15 m</b>	<b>-\$8 m</b>	<b>+\$40 m</b>
<b>Te Whānau ā Apanui reservation</b> Planned sea farm – 5,000 ha Estimated 2030 start	<b>+\$109 m</b>	<b>-\$18 m</b>	<b>-\$28 m</b>	<b>-\$15 m</b>	<b>-\$8 m</b>	<b>+\$40 m</b>

<b>+\$224m</b>	Total economic value of sea farms
<b>-\$112 m</b>	less harbour and terminal costs
<b>-\$37 m</b>	less factory costs
<b>+\$57 m</b>	plus additional economic benefits
<b>+\$132 m</b>	<b>Total economic value created</b>

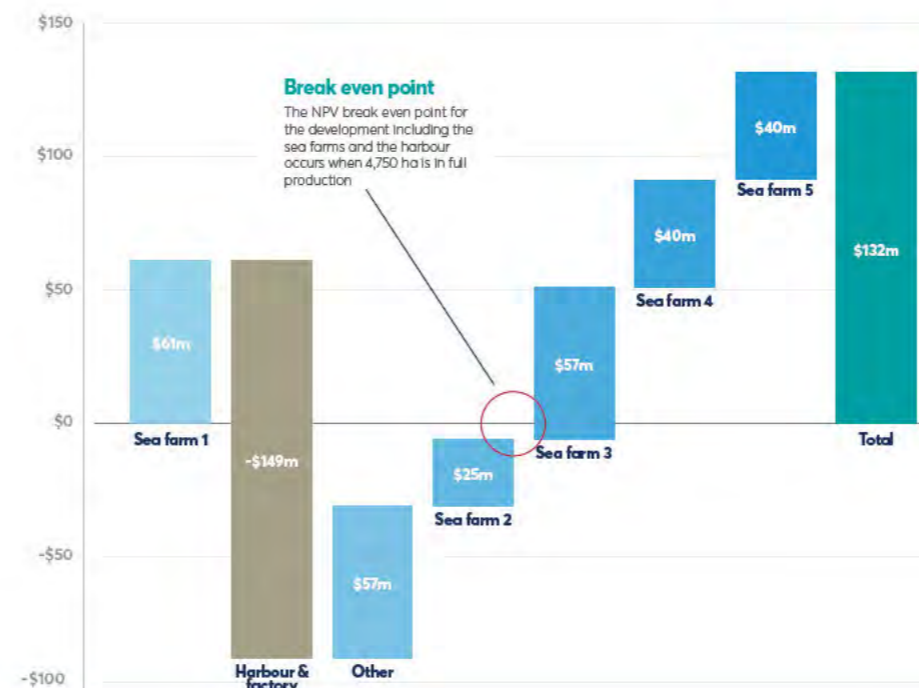
The economic value creation in the base case is measured at \$132 million in 2021\$ terms, which excludes the pre-existing 172 lines.

if the evaluation is conducted at a 4 percent pa real pre-tax discount rate, the economic value creation is estimated to be \$244 million.

Reducing the line spacing from 100m to 75m ha per line creates an additional \$27 million of economic value.

The staircase assessment at left demonstrates that the break-even development point for the investment occurs when 4,750 ha of sea farms are in full production, after accounting for the costs of the harbour and the factory.

### Economic value creation staircase

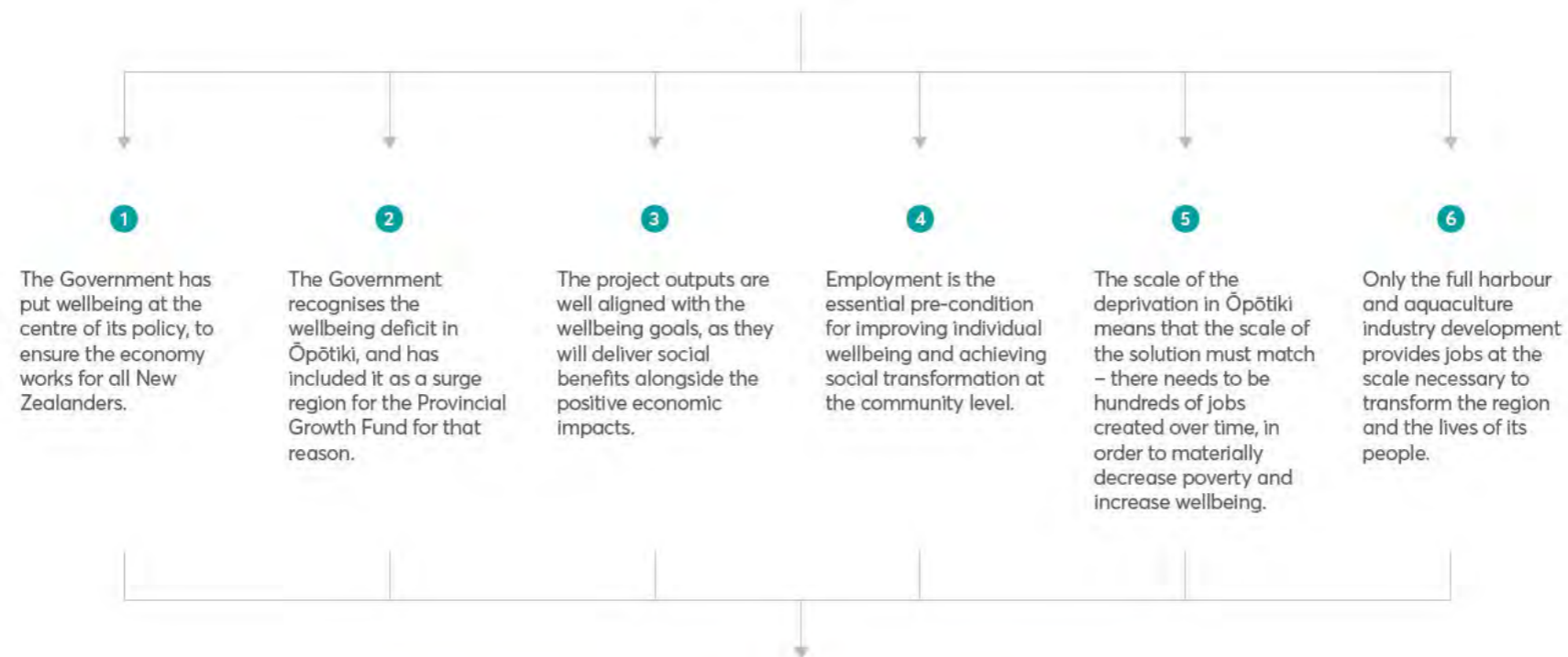


# Investment analysis

## Social return

There are significant social and wellbeing benefits from the investment.

While the investment in the harbour is significant, the potential wellbeing benefits in Ōpōtiki are substantially higher and represent an excellent social return on the fiscal investment.



Given the level of deprivation in the region, this investment may well represent the greatest social return per dollar of investment available in Aotearoa New Zealand.

Work has recently been undertaken on behalf of Treasury to assess multidimensional wellbeing, resulting in an analytical paper published in December 2018. It shows that the factors at right lead to lower wellbeing – and that these factors are cumulative.

age	<b>15-24 years</b>
ethnicity	<b>Māori</b>
gender	<b>female</b>
deprivation	<b>highest deprivation</b>
family structure	<b>solo parent</b>
employment	<b>unemployed</b>

Ōpōtiki is over-represented in practically every category where wellbeing is dramatically lower than in the general population, making it a standout for wellbeing intervention. The rationale for investing in the wellbeing of the people of Ōpōtiki is therefore stronger than anywhere else in New Zealand.

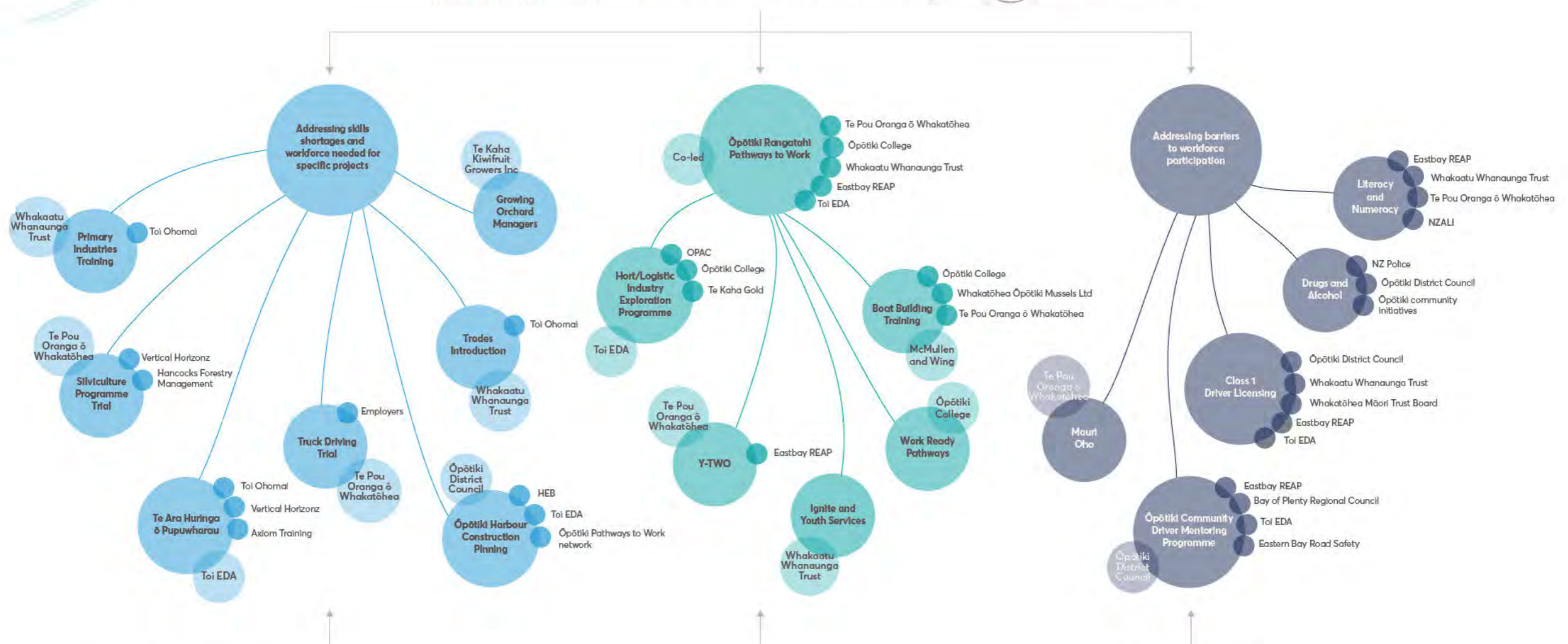
# Investment analysis

## Pathways to work

The community has been actively developing workforce capacity and capability.



**Opotiki Pathways to Work**  
Stewardship of the vision for the Opotiki community



### Workforce development

Last year, the Regional Governance Leadership Group (RGLG) recognised workforce development as a key to achieving the community's aspirations.

Opotiki's Pathway to Work partnerships have been running for four years and are co-led by Whakatōhea and Opotiki Council. Relationships and local capacity have been built to:

- Address barriers to workforce participation
- Grow work readiness, and
- Create new pathways into work that locals aspire to.



Toi EDA actively supports the locally-led action and also plays a backbone role regionally to broker and connect information, relationships and action across government agencies, educational institutions, iwi and the private sector to deliver effective pathways to work and positive outcomes for individuals. The goal is to ensure Opotiki people are fit to learn, fit for work, and have the skills and knowledge tailored for industry.

### Funding support

Multiple organisations and funders are involved.

Through the coordination and outreach efforts of Toi EDA, there has been significant philanthropic involvement in Opotiki Pathways to Work initiatives from the outset, via Todd Foundation, JR McKenzie Trust, BayTrust, BoP Education Trust and others. This has allowed central and local government funding to be leveraged and extended throughout the community.

MBIE co-funded the backbone role for a period, and more recently has invested via He Poutama Rangatahi with three local organisations. MSD, Work and Income, Te Puni Kōkiri, ACC and NZTA are also contributing to specific outcomes and initiatives.

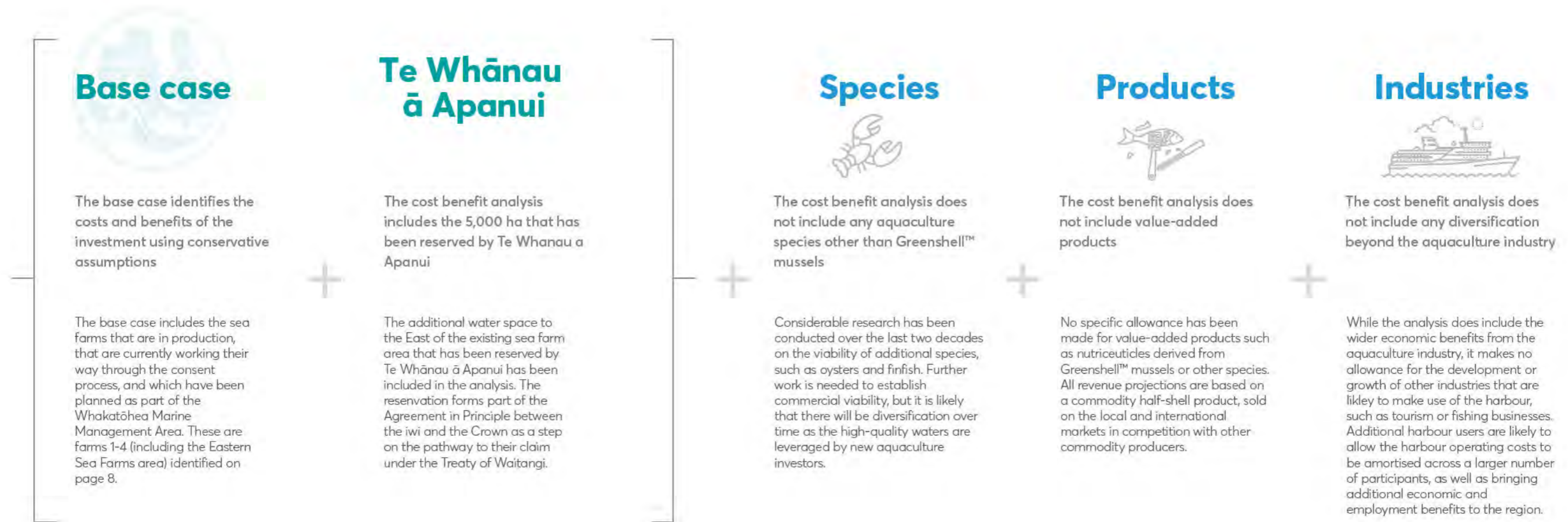


## Investment context

# Conservatism bias

The economic benefit has been assessed on a conservative basis.

The nature of investments that are made for the public good – such as roads – is that there are a wide range of future uses that are not always contemplated by decision makers at the time they are constructed. For instance, the decision to build local roads in decades past is unlikely to have included the positive effects that accrue from Uber ride-sharing or Lime scooters, yet both services deliver economic benefits to New Zealanders. In the case of the Opotiki harbour, there are a range of opportunities that will arise from the facility that have not been included in the economic assessment, but which nevertheless are likely to add material benefits to the region and the country – and which decision-makers should take into account when assessing the investment.



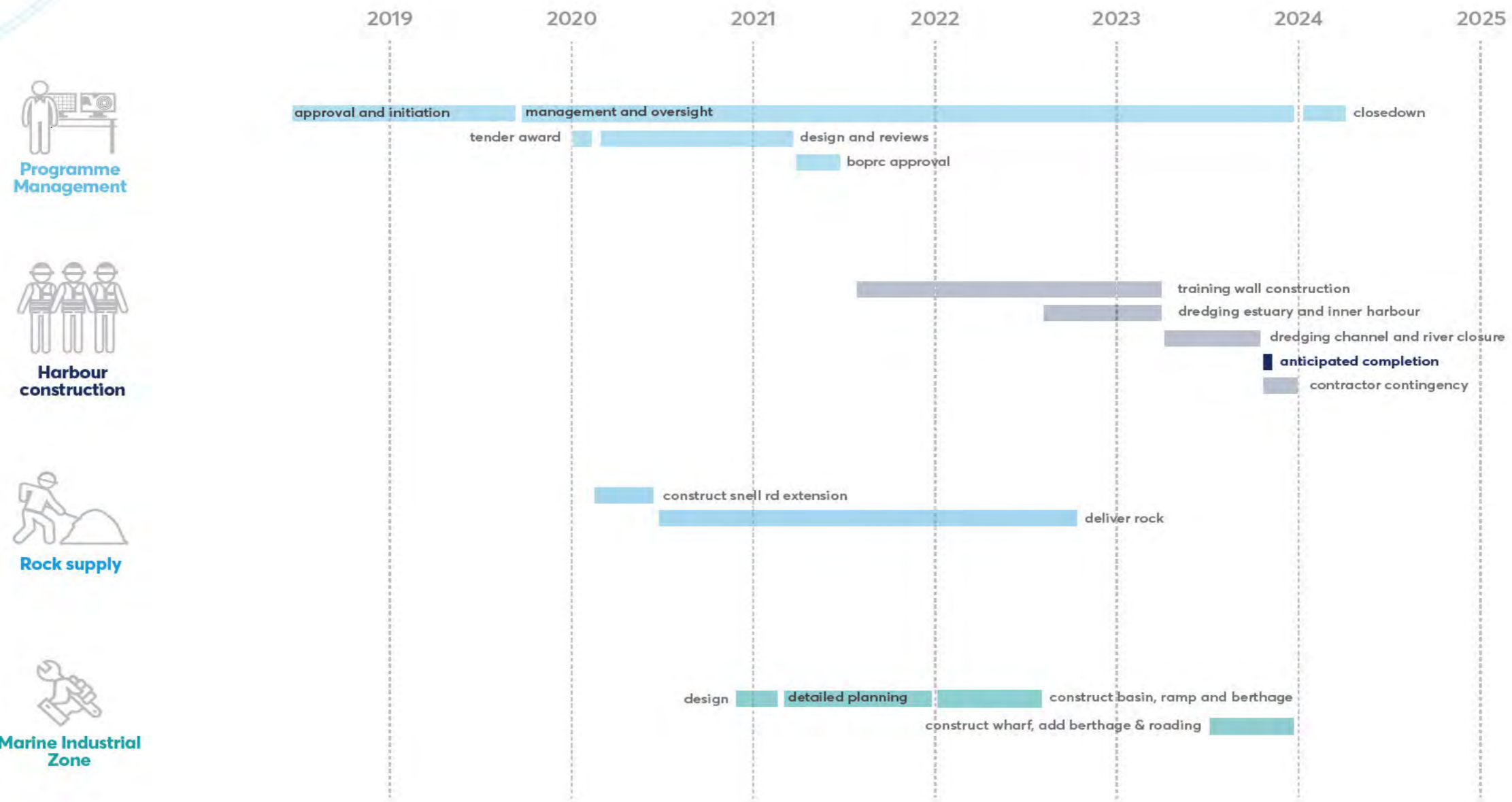
The base case plus the Te Whānau ā Apanui water space reservation are both included in the cost benefit analysis on page 22.

The positive impacts of additional species, value-added products and other industries has not been included in the cost benefit analysis on page 22, as – while the benefits may be significant – the timing of them is uncertain.

# Investment analysis

## Sequencing overview

Construction and commissioning of the harbour will take 4 years.



# Investment analysis

## Sensitivity assessment

The capex and opex risks are well managed.

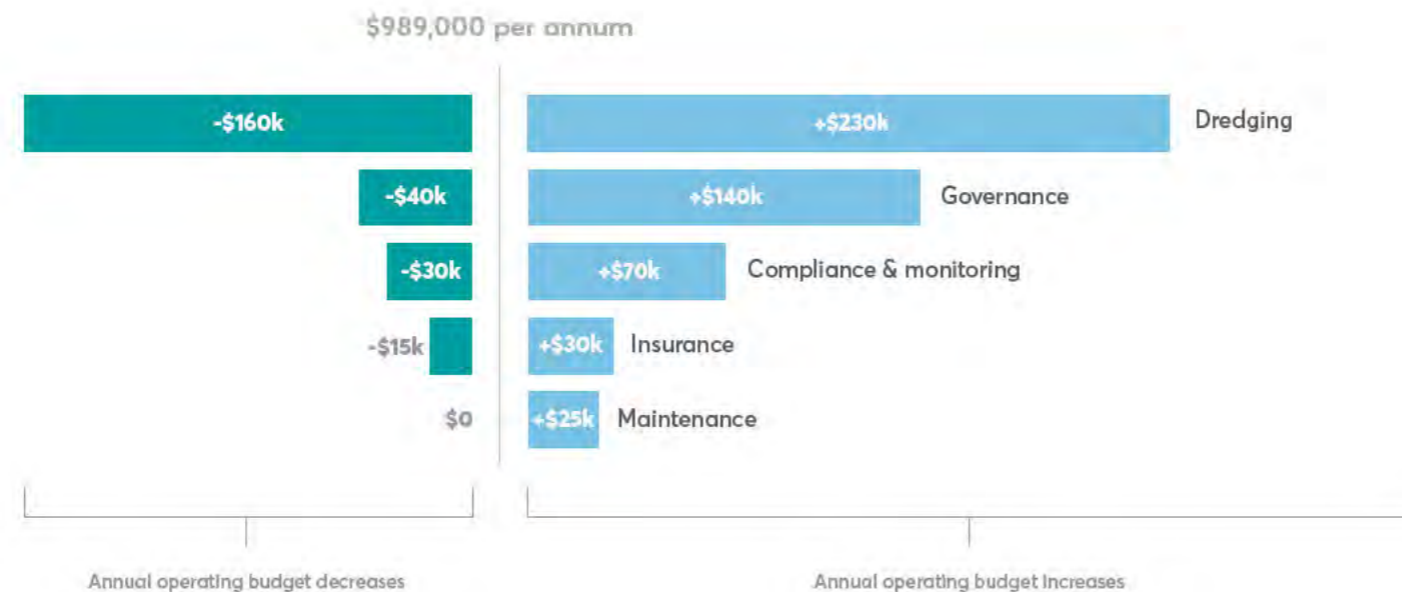
### Capex sensitivity



- The \$6m of contingency (\$4m attributed to rock supply and \$2m attributed to construction risk) may not materialise under a best case scenario.
- The \$8m of downside risk on rock supply is based on scenario where rock supply is sourced completely from outside Opotiki region due to failure of both quarries. The likelihood of this scenario occurring is very small, based on assessment by project advisors.
- An additional \$800k has been included in construction contingency as a 'high' estimate of escalation, using a conservative assessment.

The graphs at left show the sensitivity of the project to both capex changes during the construction phase and opex changes during the ongoing operation of the harbour. Both sets of sensitivities are well managed, with both the risks and opportunities well understood by the project team.

### Opex sensitivity



- The downside risk for dredging is present due to the hydrological uncertainty at this stage of the project.
- There is a downside risk for governance, which allows for the possibility of independent CCTO board structure, if required.

In the case of the capex sensitivities, downside risk is focused on rock supply, while the ongoing operating cost risk is concentrated on dredging. In both cases, the variables are subject to external factors, so they are the focus of ongoing management by the project team and the Opotiki District Council.

# Ōpōtiki Harbour

## The time to act is now

For more than a generation the people of Ōpōtiki have languished. We have poverty and crime and deprivation and a community that is struggling. But today we also have hope.

We know that there is enormous opportunity in the waters off our coast. The thousands of hectares of water space that can be developed will bring jobs to our people, income to our whānau and iwi, and wealth to our country.

Whakatōhea has a large stake in the development of the aquaculture industry in the Eastern Bay. We have farms in the ocean and boats in the water and applications before the Council. But we cannot develop the entire sector on our own. We need a safe harbour to operate from – one that is large enough to grow a whole industry, not just our iwi.

So we are asking for a hand up, rather than the handouts that have supported Ōpōtiki for more than a generation now. If the harbour is built, then we will construct the boats, put more lines in the water, process our crops, and jobs and wealth can flow back into our region and our country, and the albatross of welfare dependency can be released from all our necks.

As the iwi who see both the problems of the past and the opportunities for the future, we are looking for your support to reinvent our region. Once approval for the harbour is received, we are poised to invest the many millions of dollars required to develop the farms and grow our business, so we ask that you carefully consider the proposal and approve the development.

If you build the harbour, we will come. If you give us the tools, we will create the jobs. So we seek the support of the Government to build our path to the sea, to walk into a brighter future together.

### Robert Edwards

Chair, Whakatōhea Māori Trust Board



To feed the people, we must grow the mussels

To grow our mussels, we must build the farms

To harvest our farms, we must build the boats

To service our boats, we must build the harbour

To process our crop, we must build the factories

If we build our factories, the people will have work

If our people have work, we will build the community together

If we build our community, there will be pride and wealth in Ōpōtiki

And Ōpōtiki will be the food basket for the world.

**Naku te rourou nau te rourou ka ora ai te iwi.**

➤ **Appendices**

Appendix 1 | Harbour Construction Redesign and Recosting

Appendix 2 | Opōtiki Harbour Rock Supply

Appendix 3 | Operational OPEX Costs Following Construction

Appendix 4 | Opōtiki Harbour Development Project Economic Model

Appendix 5 | Marine Industrial Zone

Appendix 6 | Whakatōhea Harbour Assessment

Appendix 7 | Letters of Support