



APPENDIX B

Economics Assessment
(Sense Partners)



Project Martha

Economic impact

Final Report
24 May 2018



SENSE PARTNERS
DATA LOGIC ACTION



1. Introduction

Oceana Gold New Zealand Limited (**OGNZL**) has commissioned this report from Sense Partners Limited, a boutique economic consultancy. The purpose of this work is to establish the economic impact of an expansion proposal for the gold mine in Waihi. The expansion is called Project Martha.

The work relies on OGNZL's detailed project assessment, and our quantitative analysis, literature review, and qualitative analysis. We have also worked on previous Social Impact Management Plan (SIMP) and with surveys of local business and community and draw on this experience heavily. We have taken a considered approach in our evaluation, using official data where available, our analysis of company data, making use of qualitative surveys, and local interaction with community members to sense check our results.

This report looks at the impact of Project Martha, which will extend the life of the mine for 11 years. While there will be some new capital investment, the overall impact on the national, regional and local economy is through mine life extension. This maintains economic contribution from gold mining for another 11 years and allows additional time for the local community to prepare for a transition to a post-mining economy.

We can summarise the economic impact of the mine extension as follows:

- **National:** The Martha project will extend gold mining's contribution to the national economy for an additional 11 years:
 - Mining activity at Waihi contributed \$98m (or 0.04%) to national **GDP** (\$270b) in 2017. This will continue, albeit at a slightly slower rate of \$73m a year due to lower rates of production. We expect gold exports to average \$112m a year, or 0.2% of all goods exports. Mining is an export intensive sector, meaning that the economic activity results in relatively high exports compared to other types of economic activity.
 - There also payments for **royalties** averaging 1.7% of exports¹, or \$1.9m a year for the 11 years of mine extension, in addition to generating taxes on well-paid jobs and corporate profits.
 - Some of the economic activity will be paid to international investors as dividends and interest on any loans, meaning not all of profits of the mine will be recycled into the local economy. Although, with new projects, they are likely to be financed by a mix of retained earnings and borrowings.
 - The project will retain existing 250 FTE **jobs** for an additional 11 years and add a further 80 FTE jobs in the peak capital investment period, compared to our working scenario of the mine closing down in 2020. We estimate there will be some 20 FTE of additional contractor work as well. The average wage of mine

¹ Based on 2016 data from MBIE



workers is \$120,000 Relative to employment, the sector creates very high levels of economic activity and exports. It is a **high value industry**.

- Traditional economic impact analysis also looks at indirect and induced effects – known as **multiplier effects**. We estimate these indirect effects would impact 470 jobs. In recent years, these estimates of indirect benefits have been treated with caution, as the benefits of this activity may not reverse entirely if mining activity stops. Rather, diverse and resilient economies may contain the effect on the wider economy if economic resources can be deployed to other uses.
- **Regional:** The economic activity that is generated in the mine, and its multiplier effects, are not all felt equally geographically. We estimate that 30% of the total economic benefits are likely to be in the Hauraki District Council, around 45% in the wider region of Waikato and Bay of Plenty, around 15% in the rest of the country and around 10% outside the country.
 - We have been cautious in our estimates, as some of the input data is now old (based on industry connections in the input-output tables and travel to work data from the Census), but have sense checked it with up to date data on electronic card spending data and qualitative analysis of the company’s suppliers.
 - We are also conscious that while the mine is in the Waihi township, the employees and suppliers live in a wider catchment, crossing territorial authority boundaries.
 - As we noted above, the multiplier effects would affect 470 FTE jobs. A large proportion of these are in the wider regional area, through indirect and induced effects. While we are cautious in our interpretation of multiplier analysis, we can see that the mine’s activity has a wide reach through the regional economy.
- **Local:** The local labour catchment area of the Waihi township encompasses a wider area, including as far as Hamilton. Our comments on the local economic effects should be seen in that context.
 - Travel to work data from the 2013 Census shows that 55% of people with jobs in Waihi worked locally, another 16% worked within a 30-minute driving radius (Ohinemuri, Paeroa, Waihi Beach, Katikati Community and Aongatete) and the remaining further afield (including Hamilton). This broadly defines the labour market catchment.
 - Our analysis of the company data shows that the employs around 250 FTEs (types of jobs are summarised in Appendix C). Before the change of ownership to OCGNZL, many of these jobs were contractors, which are now being brought on to the payroll as per the company’s standard practice. This changes the way people are employed, but not the number of jobs.
 - The jobs are well paid for the location. The average annual salary paid was around \$120,000 in 2017, compared to a median personal income of \$19,200 in



Waihi in the 2013 Census (last available data) and national average wage of \$62,000 in 2017. The mine creates high value jobs for New Zealand, with particular benefit for the province, which otherwise has relatively low paid jobs.

- There was a cumulative payment of \$27.5m in staff salaries and benefits (such as KiwiSaver) in the 2017 calendar year, and a further \$8.4m for contractors (which will include other payments on top of wages for contractors). These represent the dollar value of jobs currently supported by mining activity, which will be retained in the region.
- There are additional local contributions through rates (\$0.7m in 2016²) and community contributions to local events, schools and groups.
- Past surveys of local businesses and community as part of the Social Impact Management Plan (SIMP), discussion with local businesses and community members show a good understanding of the economic contribution of the mine to the local economy, as well as risks. Some businesses noted their direct connections with the mine, others benefitted from the general availability of money spent in the local community, while others noted the access to well-trained workers from the mine not easily accessible in other regions. The presence of a large employer of well paid jobs, which also invests in training has led to a well-qualified pool of labour and future employment prospects. These lend to local labour market and economic resilience.
- **Conclusion:** The Martha Project will extend the mine's life by 11 years. This will help to sustain a local economy that is already growing. The mine helps to also attract and train a pool of skilled and employable people. This lifts the capability of the local workforce and thus its economic potential. Around two thirds of the mine's jobs are in mining and processing, with skills that are easily transferrable to other industries (for example civil and heavy construction) and locations.
- Extending the mine's operation for another 11 years gives the local area more time to seriously consider and invest in a transition plan for a post-mining economy. The current government is ambitious about provincial economic growth (through the \$1b a year Provincial Growth Fund) and its work on a zero carbon economy (to carefully think about and invest in projects that will transition New Zealand to a low carbon economy).
- The local economy is already diverse and resilient. Additional time, effort and resources directed to a post-mining transition strategy will ensure the local community continues to benefit from a well-functioning economy.

² 2016 SIMP report: https://www.waihigold.co.nz/wp-content/uploads/2016/02/2016-SIMP-Annual-Monitoring-Report_Final.pdf



2. Current role of mining in Waihi & New Zealand

Waihi is a provincial town, with a population of around 5,200 people. But it has a relatively large local economy, because of mining activity.

Mining tends to boost local economic activity to a larger size than other similar sized towns, because of two key reasons.

First, the mining sector is highly productive. For each employee, it creates economic activity of around \$534,000 per year, compared to around \$43,000 in the retail sector and \$95,500 across the whole economy.

Second, the mining sector doesn't tend to crowd out other parts of the economy. We consider the economy as a function of capital, labour and technology. For mining, the mineral resource is either used through mining or not used at all. It is not like farming, where an increase in one type of activity generally displaces some other current use.

Further, around half of the labour force in places like Waihi comes from other parts of New Zealand or overseas. This is because specialised skills are often not available in sufficient quantities in the provinces. So, mining does not redirect much of the local labour force to other purposes, meaning there is less crowding out of the non-mining economy.

The mine at Waihi is expected to close once the mineral resources that are able to be economically mined and processed are exhausted. For analytical purposes, we look at the impact of Project Martha against a scenario of a mine closure from 2020. This is not a forecast, it is a scenario only.

The effects of mining on the local economy can be transitory. When the resources being mined are exhausted, the mine closes as do associated jobs. Not everyone leaves the region though, and some of the skills and expertise acquired in the mining industry can be deployed elsewhere.

Surveys of employees conducted by Phoenix Research on behalf of the mine suggest around a third of employees are likely to leave the area when the mine closes, especially those who have no other family or historical ties to the region. Others are likely to remain in the region but will move to work in other sectors for lower wages or further away. This would reduce the amount of income available for people to spend in the region and thus regional economic activity. We estimate that when the mine closes income available to spend in the region will fall from around \$27m a year, to \$11m – a reduction of \$16m. It would affect local retailers and housing market negatively.

Waihi is located in the Hauraki District. The Waihi Town economy (Gross Domestic Product or GDP) was worth around \$229m in 2017. This compares with an official estimate of New Zealand GDP of \$269b, and our estimate of Waikato Region GDP of \$22b and Hauraki District GDP of \$498m.



FIGURE 1: KEY STATISTICS FOR WAIHI MINING AND RELATED GEOGRAPHIC AREAS

Region	NZ	Waikato	Hauraki*	Waihi*	Mining in Waihi*
Nominal GDP (\$m)					
2015	242,238	20,146	636	259	113
2016	254,704	20,940	471	232	105
2017	269,373	22,095	498	229	98
GDP per capita (\$)					
2013	52,710	45,880	33,317	51,922	
2014	54,271	46,616	24,105	44,945	
2015	56,193	48,022	25,078	44,154	
Population (000s)					
2013	4,595.7	439.1	19.1	5.0	
2014	4,693.2	449.2	19.6	5.2	
2015	4,793.7	460.1	19.9	5.2	

(* Estimates)

Source: Statistics New Zealand, Sense Partners

The Waihi economy shares some similarities with neighbouring areas, but is differentiated by a large mining operation, the Waihi Gold mine.

The similarities reflect the realities of small town New Zealand. They are ageing, often have relatively low levels of economic engagement (through employment) and relatively low incomes (reflecting the types of jobs available in the provinces).

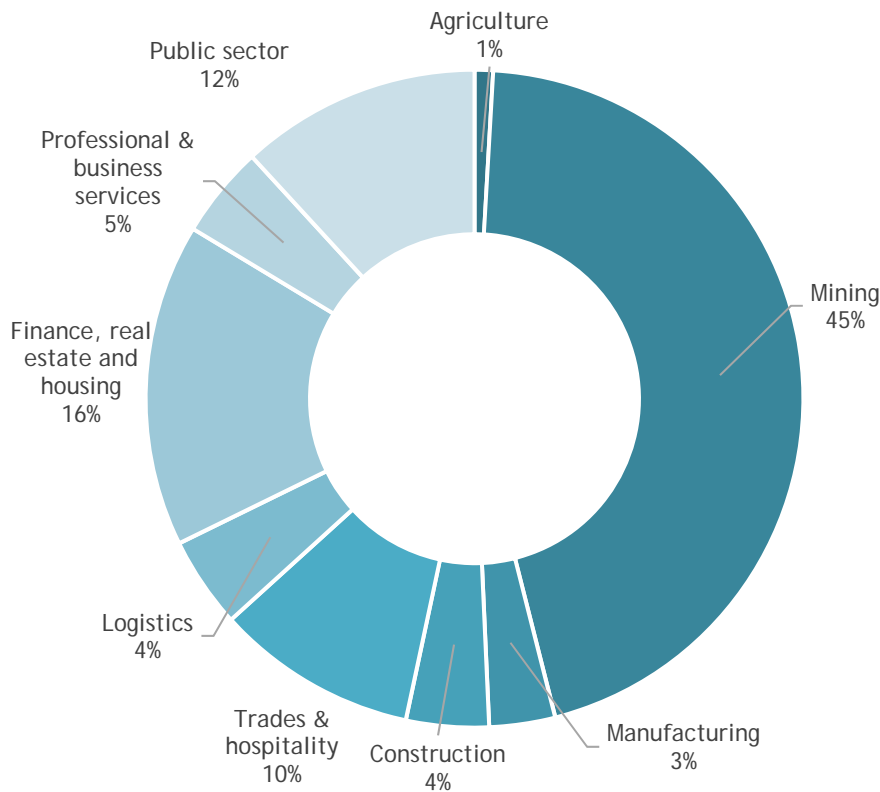
Even though the mine creates highly paid jobs (nearly an average annual pay of \$120,000 compared to a median personal income of \$19,200 in Waihi in the 2013 Census and national average wage of \$62,000) and creates large profits, the Waihi Town GDP per person is relatively low. This mainly reflects an ageing population (26% of income earners were superannuitants in 2013 compared to 14% nationally), as well as lower rates of workplace participation (2013 unemployment rate of 13% compared to 7% nationally; and higher part time work – 33% of employed people in part time work compared to 23% nationally).

The mine is an important part of the local economy. The mine directly creates economic output and jobs in the local area in the mining sector and related sectors (suppliers and customers). The importance is well understood by the local business community: 98% of businesses surveyed by Phoenix Research in 2017 identified the impact of the mine as positive or very positive.

The mine accounted for 15% of all filled jobs in Waihi town.



FIGURE 1: COMPOSITION OF WAIHI ECONOMY



Source: Authors' calculations

Mining jobs are relatively well-paid and the sector is highly productive. As a result, the mining sector's contribution of the Waihi Town economy at 45% is higher than the percentage of jobs mining contributes. The mine's contribution to GDP was \$98m in 2017. This reflects the mine's local expenditure on payrolls, suppliers, donations and compensation to residents.

There are additional flow-on benefits, through household incomes supporting local retail and other industries. We do not explicitly quantify these, as activity in these sectors is already captured in their relevant industries.

Jobs encourage people to live in Waihi and surrounds, who may otherwise live elsewhere without the mine. The population of Waihi would therefore be different in composition and size (likely smaller) without the mine. The evidence from other provinces around New Zealand is that economic opportunities encourage inward migration from other regions and overseas – and emigration when economic opportunities decline. For example, Southland benefitted from strong inflows of people to meet labour shortages in its fast-growing dairy sector, reversing decades of population stagnation. The West Coast lost many people following the closure of mines and decline in forestry.

The mine appears to support economic activity in the region and insulate it from wider swings in the national economy.



Caveats on economic meaning in small locations

An economy is an estimate of the total value of final goods and services produced over a particular time period, usually a year. Typically, this is measured within a geographic and administrative boundary, usually within the context of a country or region. At smaller units, it becomes difficult to apportion economic activity to a specific regional unit.

So, the concept of the local Waihi economy requires a little care, as the administrative boundaries do not limit the movement of people, goods and services. Different methods may yield different results. For example, it is possible to measure the economic activity of businesses domiciled in Waihi, as we have done. While this is valid, this may not fully account for the economic activity of residents who may not live in the area and may have spent some of their income elsewhere.

The most tractable examples are in peoples' travel to work and spending patterns. While the Waihi economy is fairly localised, there are strong linkages with neighbouring areas.

Travel to work data from the 2013 Census shows that 55% of people with jobs in Waihi worked locally, another 16% worked within a 30-minute driving radius (Ohinemuri, Paeroa, Waihi Beach, Katikati and Aongatete) and the remaining further afield (including Hamilton).

Electronic card spending data collated by MarketView tell a similar story. Around 56% of Waihi resident spending is in Waihi, but the remaining spending is spread across the Bay of Plenty, Waikato and further across New Zealand.

For Waihi merchants, local residents make up 27% of total revenue, with the remaining revenue coming from other parts of Hauraki District, other parts of the Waikato and Bay of Plenty regions (including Waihi Beach) and around 13% from other parts of New Zealand (mainly reflecting domestic tourism spending).

Both the travel to work and spending data suggest that the Waihi economy has a wider spread than the boundaries of Waihi. Neighbouring areas are closely integrated, both in terms of Waihi residents engaging economically with those areas and vice versa. As a result, our analysis of Waihi Town economy should be taken with some caution, as benefits and costs of changes in economic circumstances will depend on not just what happens at the mine or Waihi, but in the wider geographic catchment.

2.1. Limits on mining's effect on social outcomes

Economic activity can co-exist with high levels of measured deprivation. In New Zealand, the most widely used and reported measure of poverty is the New Zealand Index of Deprivation published by the Wellington School of Medicine, University of Otago. It compiles characteristics across a range of issues, including unemployment, income, access to food, clothing, shelter and heating. The index was developed to assist the development of:

- Funding formulae for District Health Boards;
- Research into relationships between socioeconomic deprivation and health outcomes; and for the support of



- Community groups advocating for extra resources for community-based services³.

While useful for its intended purpose, care is required in extending its use to broader economic issues, e.g. it is not a measure of economic activity or the associated benefits/disbenefits.

Most often, the visible data point tends to be very low personal income, which limits a person's choices. Poverty is often accompanied by other factors, such as health issues, addiction and low education attainment. The underlying causes of poverty cannot be solved by local employment opportunities alone and are often difficult to solve. Social policies through central government are the main poverty alleviation channel in New Zealand, supported by activities of numerous charities.

Decades of research on economic inequality has shown that economic growth alone is not enough to reduce poverty. There may be many reasons why there are pockets of deprivation alongside strong economic activity such as mining.

One reason could be a mismatch between local labour force skills and the needs of the mine, perhaps due to a lack of education, skills or other barriers. In this scenario, growth in mining activity would draw in suitable labour from outside the region. This increases the population and economic activity of the region but does not necessarily improve the outcome for the locally unemployed or underemployed. However, there may be some spill-over benefits if the increase in economic activity leads to secondary jobs in other sectors, for example retail, that may draw from the local labour force.

Another reason can be because some people are not economically active. Retired people for example are not affected by local or current economic conditions. Rather, their incomes are related to their own savings and government contributions. Changes in local economic conditions will not affect their economic wellbeing.

These appear to be the two main reasons why there are still elevated levels of social deprivation in Waihi, even though mining makes the local economy relatively productive. Economic activity of the region alone cannot deal with deprivation. Other actions around welfare, education, training, etc need to work hand in hand with economic activity to enable those living in deprivation to benefit from local economic opportunities. These policies are largely at the hand of central government.

³ Atkinson, J. Salmond, C. Crampton, P. NZDep2013 Index of Deprivation, Department of Public Health, University of Otago, Wellington. May 2014.



3. The effect of mine closure

The Waihi Gold mine is a large contributor to jobs (15%) and economic activity (45%) to Waihi Town. We have reviewed the potential impact of mine closure on Waihi.

The framework to think about a closure considers:

- short-term and long-term impacts
- impacts on population
- impacts on the economy
- broader forces shaping provincial economies.

3.1. Short and long term impacts

The impact of mine closure on Waihi would change over time. For a period of 1 to 2 years after mine closure the impact is likely to be somewhat muted, as we saw in the West Coast for example. This is because the economy is flexible and some, but not all, of the suddenly released economic inputs (labour and capital) will be redeployed to other uses. Often this will be through people working in lower skill jobs, further away and capital equipment (where viable) put to alternative use. While this initial flexibility is useful to moderate the impact of the shock of closure, in the longer term the impact may be larger. Flexibility may also mean that people and businesses leave for other locations over time. The longer-term risk is an exodus of people and business from the region.

The closure of the Martha Pit in 2015 was an interesting test case, which reduced output by around 15%. It reflected the flexibility of the labour force, although full closure of the mine would change behaviour.

Discussions with local business and social services agencies suggest the immediate impact of job losses were moderated by people finding jobs elsewhere (often helped by their skills and training acquired during employment at the mine), although often far away from Waihi and/or in jobs that pay less. So, the short-term impact of the pit closure has been moderated by the flexibility of the labour market and family and other commitments.

3.2. Impact on population

The reason for staying in an area after jobs end is often family related (81% of respondents in the staff survey have a partner and nearly a quarter have immediate family in the area), at least until new arrangements can be made for partners' work or children's education.

Long commutes to lower paying work is not likely to be sustained for an extended period, and the longer-term impact of mine closure, unless alternative and comparable work opportunities are created, is likely to be that significant portions of those who lost their jobs will leave (43% of staff who live in the area intend to leave after the closure of the mine according to a Staff Survey conducted by Phoenix Research in 2017).



In the longer term, just over half of those displaced by closure are likely to leave. There will also be knock-on effects in other parts of the local community, with reduced spending leading to fewer jobs and encouraging those seeking work to emigrate to other places.

The impact of a closure will not be immediate. The rehabilitation of the site will see continued spending in the area for some time, although the economic activity associated with rehabilitation is very small beyond a couple of years after the end of mining.

3.3. Impact on the economy

When a highly specialised and unique industry makes up a large part of a local economy, it inevitably has a large impact on the evolution of the local economy, both during upswings and downswings. We have seen this in larger administrative areas like the West Coast and Taranaki, from declines in coal mining and oil exploration respectively. In smaller localised areas like Waihi, the impacts are even larger as the economies are even more specialised and dependent on a unique activity: gold mining in the case of Waihi.

Specialisation of a locality in the particular industry does not always have the same impact. Economic geographers suggest that the type of work matters. If a location specialises in an industry that is relatively highly skilled, then those jobs are worth more to the local economy than merely those jobs. More often than not, these highly skilled and paid jobs support a wider range of industries, jobs and livelihoods than would otherwise be the case. Further, this tends to make regional economies more resilient to shocks, as skilled employees can more easily redeploy into other jobs or opportunities.

The impact on the economy, once the short term and mine closure provisions are spent, is likely to be relatively large because of the highly specialised nature of the mining activity. We utilised a standard input-output methodology to estimate the impact.

- Direct impacts: the direct impact of mine closure, which will reduce the inputs for its operations and for suppliers to the mine (including jobs).
- Indirect impacts: subsequent effects as suppliers to the mine reduce their purchases, their suppliers also slow.
- Income-induced impacts: the additional change due to a reduction in household incomes as a result of the mine closure, of mine employees and their supply chain.

We estimate that mining directly contributed \$98 million in value added to Waihi Town economy in 2017 (total economy \$229 million). Adding in the indirect and induced effects, we estimate the total economic contribution of the mine to be \$133 million in 2017. The direct employment is around 250 FTEs, wider effects on employment of mining is around 490, of 1,700 in Waihi Town. In a multiplier analysis, the quantified reduction in economic activity of mine closure would be \$133 million (if the static analysis is for the 2017 year) and 740 jobs.

In reality, these estimates need to be taken with care. While the initial impact may appear large, multiplier analysis does not take into the account the potential flexibility of the economy. A key element in that flexibility is readiness of the local community, particularly the business community, to deal with closure of the mine.



Qualitative survey of local businesses shows that the business community may not be well prepared for a mine closure. Most businesses describe themselves as pretty 'hands-on', 'responsive' and 'striving to improve', but have not actively planned for a mine closure. Half of businesses surveyed expect mining to continue for more than 20 years. With careful planning local businesses could be well prepared for a mine closure, but those comprehensive plans do not appear to be in place for most firms.

3.4. The wider context of regional economics

Regional economic performance across New Zealand is diverging. A complex combination of deep-seated economic forces and factors local to each area is driving the divergence of New Zealand's regions.⁴

The big forces are technological change, globalisation, urbanisation and ageing. Rapid technological advances are rendering many industries and occupations obsolete. Globalisation is pulling millions out of poverty around the world, but also shifting many jobs offshore. Urbanisation is hollowing out rural places and small towns. An ageing population means fewer vigorous workers. Ageing can also mean fewer entrepreneurs, as they tend to be young and able to take on risk. These patterns are also at work in other parts of the world.

These forces are sweeping through all of New Zealand and have so far proven particularly corrosive for the economies and populations of small towns in provincial New Zealand. Once a job- and population-loss spiral takes hold, it is very difficult to reverse.

In places like Waihi, where a large, specialised and well paid industry has been a pillar of economic support – the ravages have been largely held at bay. But if mining were to stop, Waihi would need to find another specialisation or another comparative advantage. In the past, Waihi had done exactly that with Akrad Radio and PYE television after the closure of the historic gold mine.

Economic growth theory says that for an economy to succeed there are some fundamental drivers: geography, culture, institutions and luck. This framework can help to identify the broad strategies for Waihi to prepare for a mine closure.

Waihi is geographically in an advantageous position, with good proximity to Tauranga, Hamilton and even Auckland. This should stand the region in good ground for business that service a wide catchment. Indeed, we met many businesses doing exactly that during the stakeholder interviews. This is a key comparative advantage.

Luck is difficult to organise, so any effort should be directed towards improving institutions and culture. As noted earlier, the business community is unprepared for a mine closure in a strategic sense, because they expect the mine to be operational for many years to come. Strategic preparation now would help businesses and the Waihi economy deal with a closure of the Waihi Gold mine. It may also identify opportunities for diversification and growth now.

⁴ For detail: Eaqub S. (2014), *Growing Apart: Regional Prosperity in New Zealand*, BWB Texts



4. Quantifying the economic impact of Project Martha

We examine the economic impact of Project Martha. We take both national and local perspectives – as economic benefits are felt differently at different levels of geographic aggregation. For example, exports are a more meaningful measure at the national level, than a local level.

Project Martha will extend the life of mining in Waihi by about 11 years. This represents significant additional economic activity than would otherwise not occur. There are both national and local economic gains. The most obvious are gains in economic activity and employment. Increases in exports, attraction of new investment in the economy, and providing a strong core for a regional economy, are also additional benefits.

The additional life of the mine will also allow local business time to plan for the mine's closure. Currently, half of all businesses expect the mine to continue and have not actively planned for life after the mine. With sufficient preparation and planning, likely negative effects on local employment and population can be reduced.

4.1. Economic & export gains

The economic gains will average around \$73m a year, at 2017 prices. For context, the Waihi mine added \$98m to the national GDP in 2017. This amounts to 0.03% of the national economy, 0.33% of the Waikato economy, 15% of the Hauraki economy, and 32% of the Waihi economy.

Not all of the economic benefits will be felt in one location, as modern businesses have supply chains that span large distances and the second order effects such as spending of wages can take place in a wider region than the location of the primary activity.

Around 30% of the wider economic benefits are likely to be in the local district, around 45% in the wider region, around 15% in the rest of the country and around 10% to outside the country.

The increased economic activity will come from significant expenditure related to the mine. Project plans suggest expenditure will average \$83m a year, with higher spending in the earlier years, particularly in capital expenditure.

Total spending or revenue measures will tend to overstate economic effects. Value added is a more useful concept, which looks at the returns to labour (income) and capital (profits). This is directly comparable to economic activity or GDP.

We estimate the expenditure on Project Martha will generate economic activity (valued added) of \$73m a year over 2020-2031. The net present value at a discount rate of 6% (the New Zealand Treasury's guideline) is \$0.6b.

The alternative scenario of a mine closure in 2020 in contrast creates very little economic value. It represents the remediation expenditure.



FIGURE 2: EXPENDITURE AND ECONOMIC EFFECTS OF PROJECT MARTHA

NZ\$m	Average per year, 2020-2031, \$2017	PV, 2020-2031, @6%discount rate
Project Martha expenditure:-		
Operating spending	77	640
Capital spending	24	238
Total spending	101	878
Economic value added:-		
Scenario with Project Martha from 2020	73	629
Scenario with mine closure from 2020	1	9
<i>Difference due to Martha</i>	<i>72</i>	<i>620</i>

Source: Company data, Sense Partners

An additional consideration in analysing the economic benefits is the role of exports. Exports are typically seen as additionally positive for the economy, as opposed to domestic economic activity, as it introduces new demand into the economy through foreign revenue. By contrast, domestic economic activity is more about moving money within the economy.

All of Waihi mine's output is exported. So, the extension of the mine's life will mean an increase in gold exports, compared to the closure scenario.

Waihi produced \$209m of gold in 2017, accounting for 35% of national gold production and exports. We expect gold exports to average NZ\$112m a year over the life of the mine extension, assuming a gold price of US\$1,300/oz and long run NZD/USD exchange rate of 0.70.

Expected export revenue from Waihi is equivalent to 0.2% of all merchandise exports. For context, it would be equivalent to nearly 20% of current wool exports and 7% of wine exports.

Our approach to estimating the economic effects

We measure the economic value created by the mine for each year, both historical and projected based on the best information at hand. We look at the gross value added and employment numbers – as both give measures of economic activity related to the mine.

To quantify the impact of Project Martha, we look at the difference between a scenario of the mine closing down in 2020, and the new trajectory with Project Martha beginning in 2020.

We report the direct economic effects of the mine. We also supply indirect and induced effects of the mine's activity on employment (also known as multiplier analysis) but advise caution in their interpretation. Multiplier analysis does not take into the account the potential flexibility of the economy and the isolation of some sectors and economic resources.

Flexibility would mean that idle resources are quickly deployed for new opportunities. Isolation would mean that some parts of the economy will not respond to economic changes in mining, because their job, income and other economic connections are not related to the mine.



For example, retired people or those currently unemployed and without the necessary skills and attributes to work in the mining sector do not experience much direct effect from the mine, although they may receive indirect economic gains from spending in the local economy, as well as additional amenities and services available in a larger population related to the presence of the mine.

4.2. Employment gains

The mining activity will sustain an average of 300 more FTE jobs per year, related to mining activity in Waihi. For context, there were 1,700 filled jobs in Waihi Town in 2017; 5,400 in Hauraki District; and 186,800 in the Waikato region.

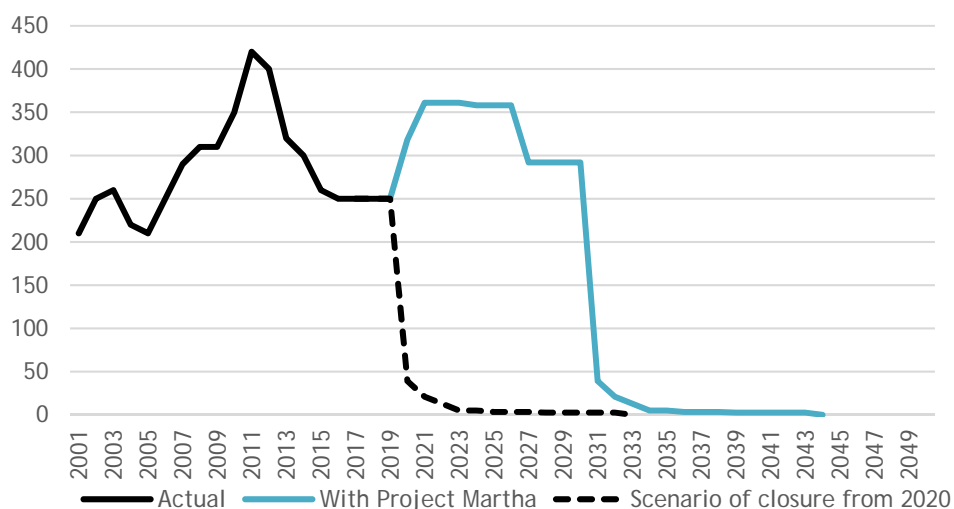
Mining sector employment can be highly skilled and specialised. As a result, increases in mining employment cannot always draw from the local labour force. Half of current employees lived outside of the region (35% outside the local area, and 15% internationally) in their prior work.

This has two implications.

First, not all of the employment benefits will accrue to the local labour market. This is understandable in a small economy, which does not have reserves of qualified potential employees. Most provincial centres face significant staff shortages.

Second, attracting skilled people into the region is a positive. They bring human capital, which is a significant contributor to economic growth, and increases the economic potential of the region. Incoming staff often bring their families, which adds to population growth and diversity of the local community. Both of which add to economic activity and cultural diversity.

FIGURE 3: FTE EMPLOYMENT RELATED TO WAIHI MINING - ACTUAL AND PROJECTED SCENARIOS



Source: Company data, Sense Partners



Multiplier effects

We estimated the multiplier effects from the 2013 Input-Output tables published by Statistics New Zealand.⁵ We estimate that an additional 490 jobs will be supported through indirect and induced effects. Over the course of Project Martha, 790 jobs per year on average will be supported through direct (300), indirect and induced (490) effects.

Traditional multiplier analysis can overstate the indirect and induced employment effects, which are difficult to observe. Past downturns in mining activity, for example with the Martha Pit closure in Waihi, did not give rise to the level of job losses predicted by multiplier analysis. Instead, many businesses and people moved to other customers or places of work. This flexibility in the economy and labour market is important context in interpreting multiplier effects. So, we supply these estimates with a note caution in their interpretation.

4.3. Capital investment

Project Martha will extend mining in the area by about a decade and maintain mining sector activity at historically high modern mining levels during this period. To enable this mining activity there will need to be significant capital expenditure.

New Zealand is a capital shallow country and additions to our capital base are welcome. The economy is a function of capital, labour and technology. Additional capital, particularly if it also includes new technology, will add to New Zealand's economic potential, as well as improve productivity. Increased economic potential generally creates additional employment opportunities, which are needed to realise the economic potential of the capital investment. We discuss the employment effects in earlier sections.

Project Martha represents capital investment of \$238m on a NPV basis (using a 6% discount rate).

This is likely to include new technology being deployed, which will boost productivity, and may encourage spill-over innovation effects. We have not counted such innovation spill-overs, as they are difficult to quantify and attribute.

4.4. Regional economic effects

Provincial New Zealand is struggling to keep pace with fast growing urban centres. This uneven economic profile is not unique to New Zealand, but still presents challenges for equitable economic growth.

Recent governments have prioritised activities that support regional economic success. These activities inevitably are specific to the specialisation of the region.

⁵ We use the same estimates as the economic report prepared for the 2015 Social Impact Management Plan.



Waihi is clearly specialised in mining, with 45% of its economic activity is related to mining, compared to 1.5% nationally.

Project Martha will ensure that the largest part of the Waihi local economy remains an active contributor. Economic activity from Project Martha is likely to average \$73m per year (in 2017 prices) and around 30% of the wider benefits are likely to be in the local district, around 45% in the wider region, around 15% in the rest of the country and around 10% outside the country.

Presence of mining in the region attracts highly skilled and well-paid staff into the region, with both economic and non-economic spill-overs from this. The mine's suppliers benefit from transacting with a large business, which often has better systems and processes than SMEs. This can lead to improved performance of the mine's suppliers, either through procurement activities, or through osmosis.

5. Conclusion

Project Martha would extend mining in the area by 11 years and maintain employment levels near the highs over the past decade.

Compared to a mine closure scenario, Project Martha will:

- Increase New Zealand exports by around \$112m a year
- Create employment opportunities averaging around 300 FTEs over the next decade
The average wage is nearly \$120,000 per employee and closure of the mine would equate to around \$36m of wages pa foregone.
- Inject around \$326m (in 2017 prices) of cumulative new investment into New Zealand that would otherwise not occur.
- Economic activity from Project Martha is likely to average \$73m per year and around 30% of the wider benefits are likely to be in the local district, around 45% in the wider region, around 15% in the rest of the country and around 10% outside the country.
- The additional mine life gives the region more time to prepare for and invest in a post-mining transition plan.



Appendix A - Estimating regional GDP

Regional GDP estimates rely on a number of simplifying assumptions. The starting point is national GDP data and regional GDP data from Statistics New Zealand where available. These are based on the production method (that is the sum of the final value added by each industry).

There are a number of limitations. The regional data is at the Regional Council level, and the industrial breakdowns are highly aggregated and not available for recent years.

We have made estimates based on our knowledge of industry activity and other data sources to calculate Regional Council level estimates of GDP for Waikato at the industry and aggregate level up to 2017.

We then apportion the Waikato GDP to Hauraki and Waihi based on a range of indicators, although primarily based on employment data to allocate industry GDP to regional locations and demographic information to allocate owner-occupied property operation.

Appendix B - Estimating Waihi Gold contribution to the local economy

We consider the impact of the Waihi Gold operation across many dimensions. First, we measure the economic value created, using a national accounts framework. Using company data, we calculate a proxy for gross value added, by adding up gross operating surplus (gross profit) and compensation of employees.

In reality, the profits may not remain in the local entity, if they are paid out as a return to shareholders instead of being reinvested in the mine. As such, the economic contribution is the wages paid and other direct expenditure.

We explored the expenditure of Project Martha in detail, to better understand the scale of spending by the mine in the local economy.

We also report employment statistics. Mining operation statistics are as self-reported by Waihi Gold and the Waihi total is official Statistics New Zealand data from Business Demography.



Appendix C - Likely employment makeup of mine extension

SUMMARY OF TYPES OF EMPLOYMENT POSITIONS

Positions rather than FTEs, based on estimates for Stage 1, which is a good indicator of the makeup of the workforce

Category of job	Number of positions
Management/Administration	37
Open Pit operators	25
Underground Miners	110
Processing	56
Miscellaneous	50
Total	343
Estimated value of jobs, 2017\$m	\$28M

<i>Memo item - highly skilled technical staff:</i>	
Domain	Number of positions
Metallurgist	3
Engineer	8
Geologist	12
Surveyor	3

SOURCE: COMPANY DATA, SENSE PARTNERS

Appendix D - Exploring a scenario of tourism replacing mining

There is no quick and easy alternative to mining for economic activity for the Waihi area. However, with sufficient planning and investment in a post-mining transition plan, it is possible that the region will be resilient in the face of a mine closure.

It is important that the local labour market catchment around the mine has a clear understanding of its economic resources and future opportunities, including in the context of the current government's ambitions plans for provincial New Zealand through its Provincial Growth Fund and its other work in areas such as the Zero Carbon Act and associated investment fund to move New Zealand towards a greener economy over time.

In this appendix we look at the scale of growth necessary in tourism to replace mining activity. We find that the increase is very large and would require sustained investment over many years to achieve this.



Tourism as a case study

When considering the economic impact of mining in the region, there are often questions about whether tourism could replace mining. Our analysis shows that it is possible, but tourism would need to grow massively (in the order of 2x to 7x depending on the outcome sought).

Such growth would take time and come with need for significant investment in tourism offerings, infrastructure and labour. Tourism should be part of a longer-term plan for economic diversity and sustainability, but it cannot grow so much in a short period of time.

Tourism is an important part of the regional economy. For example, tourism spending (both domestic and international) totalled \$81m in the Hauraki District and \$96m in the Western Bay of Plenty in 2017. These two regions are close to Waihi and are most likely to experience the benefits of a strong tourism sector.

We have not excluded mining related tourism. Mining is part of the history of Waihi and this would not change regardless of whether mining activity in the area increased or not. But there may be a marginal loss of those tourists looking for an 'active mine' experience, should the mine close.

The mining sector's contribution to the local economy with Project Martha will be \$73m per year over the life of the extension. For tourism to replace the contribution the wider region's (Hauraki and Western Bay of Plenty) tourism would need to increase by 2 fold (from current economic contribution of \$65m a year).

From a national economy perspective, the economic gains would need to be much larger. Much of the local tourism spending comes from domestic tourism, which does not add significantly to national economic growth, as it is simply spending that would have taken place elsewhere. Arguably a better comparator is international tourism.

This is because both mining and international tourism are net additions to economic activity for the country, as opposed to spending that would have happened in New Zealand anyway, taking place in a different region. From a national perspective, international tourist spending in the Hauraki region would need to increase nearly seven-fold to replace the direct economic value created by the mine (from current economic contribution of \$12m a year).



FIGURE 4: TOURISM IN 2017 & GROWTH NEEDED TO REPLACE MINING

	Hauraki	Western BoP	Total
Tourism expenditure (\$m)			
Domestic	69	76	144
International	12	20	32
Total	81	96	177
Contribution to economy (\$m)*			
Domestic	26	28	54
International	4	7	12
Total	30	35	65
Growth needed to replace mining (x)			
Domestic tourism only	3.9x	3.6x	2.4x
International tourism only	17.4x	10.9x	7.2x
Total tourism	3.4x	3.1x	2.1x

* based on economy-wide estimates of value added by tourism relative to expenditure

Source: Statistics New Zealand, MBIE, Sense Partners

