APPENDIX W

Social Impact Summary
(Phoenix Research)

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PROJECT MARTHA: COMMUNITY POLLING AND EMPLOYEE SURVEYS: TECHNICAL REPORT

RESEARCH REPORT FOR

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CONTENTS

1 OVERVIEW

OceanaGold New Zealand Ltd (OGNZL) has developed a proposal for a programme of further mining in and close to Waihi, known as Project Martha. This project comprises key components that have been documented in a comprehensive Project Description. The current mining in Waihi at Correnso is scheduled for completion in 2019. Project Martha would extend mining in Waihi by a further eleven years.

OGNZL commissioned the current report with a brief to Phoenix Research to examine and report on the results from two series of surveys that are relevant to Project Martha:

- A series of seven "Community Polling Surveys" that Phoenix has undertaken for OGNZL and its predecessors from time to time from 1992 to 2017;
- The Employee Survey undertaken by OGNZL covering employees both of the company itself and of contractors to the mine, drawing on results in 2015, 2016 and 2017.

Because a consistent framework of surveying has been used for the Community Polling Surveys (i.e. these surveys have been consistent in terms of both the questions used and the sampling and coverage of the Waihi area), these surveys when taken together using meta-analysis, enable firm conclusions to be drawn about the community's responses to mining and proposed mine developments, including some years after announcements and developments. That is a distinct advantage of this series of surveys having been conducted consistently over time, compared with an individual survey which cannot reliably predict public opinion in the future, or some years after a new mining proposal or development.

The meta-analysis presented in this report quantifies three aspects of the community's responses to mining at Waihi:

- The community has become somewhat more favourable about mining over time (the strength of this trend falls short of being "statistically significant", though can reasonably be described as likely but not definitive);
- When new mining proposals are announced, the community's initial responses to the proposals are less favourable than their opinions about mining in general;
- After an initial dip in favourable opinions about mining after an announcement, public opinion about mining returns to pre-announcement levels. Data is not available to provide certainty about how quickly that return to pre-announcement favourabilty occurs, although it appears historically to have returned to pre-announcement levels within 3-5 years.

The Employee Survey asks employees to indicate their intentions about leaving or staying in Waihi when the mining there is completed. By combining the answers employees give to that question with their answers to other questions in the survey it is possible to estimate from the survey data the impact of mine closure and some employees and their households leaving Waihi as a result, on:

- The numbers of children of departing employees who will no longer be there to attend day-care, kindergarten or school in Waihi;
- The reductions in numbers of participants in a range of voluntary community organisations, including sports, service, education, church, and rescue and emergency services such as fire and ambulance services.

The report contains detailed tables of estimates of the numbers of departing employees and their families/households. The survey's results indicate that a proportion of the order of one third of current employees would leave the Waihi area, and two-thirds stay. The analysis estimates the extent of the impacts in Waihi if the mining there was to conclude in 2019 when the mining at Correnso is completed, and some employees depart as a consequence, compared with the scenario of mining continuing as proposed by Project Martha.

PART A:

WAIHI COMMUNITY POLLING SURVEYS

2 BACKGROUND AND OBJECTIVES

OceanaGold New Zealand Ltd and its predecessors (OGNZL) have commissioned Phoenix Research on seven separate occasions starting in 1992, to undertake polling surveys of the public in and around Waihi. These polls have included measurements of public opinion about mining, and about mining developments proposed and being considered, in a consistent way each time the surveys have been undertaken. Since 2015 these surveys have been an integral part of the formation of the Social Impact Management Plan (SIMP).

The surveys have therefore produced a database which can be examined for:

- Changes and trends in public opinion about mining over time;
- The differing responses of the public to the different kinds of mining proposals being considered at the time of the surveys;
- The changes in the public's responses to mining as time elapses after the announcement of proposed developments.

Researchers typically term this type of analysis of amalgamated study results a "meta-analysis", i.e. an analysis of the results of a number of studies, as opposed to the analysis of the results of a single study.

The objective of this report is therefore to provide a meta-analysis of this series of polling surveys, in particular addressing the three points above.

Phoenix has provided full technical reports to OGNZL on each of these surveys at the time they were done. Hence this document provides a summary of the methodology used, focusing on what can be learnt from the meta-analysis. The reader is referred to those other earlier technical reports about the surveys if more technical details are required.

3 DESCRIPTION OF THE COMMUNITY POLLING SURVEYS

3.1 THE GENERAL NATURE OF THESE SURVEYS

The seven surveys have been undertaken by telephone, most often with a larger sample of residents (typically 150 – 250 residents, though on one occasion, 500 residents) and a smaller sample of business owners and managers (typically 50 interviews). The study area has generally been defined as the "Waihi Basin", comprising the town of Waihi plus the surrounding rural areas, including Waihi Beach and Athenree. The exact definition of the study area has generally been expressed as all those living within areas covered by the telephone number prefix "07 863", a definition that is commonly used locally to define "our area".

On each of the occasions these surveys were undertaken, the following sequence of questioning was used. This questioning was designed to ensure that people gave some thought to the topic before stating the extent to which they were in favour or not of mining, and of proposed developments:

- People were first asked to identify the benefits and disadvantages of mining (or of the proposed development), using a detailed form of questionning used in research interviews known as "probe fully". This entails people being asked to expand on initial answers they give to the question, though only ever by using non-directive follow-up questions such as "in what ways?" or "anything else?", "can you expand on that point?" etc. Interviewers were directed NEVER to suggest possible answers to people at this stage of the interviews.
- People interviewed were randomly assigned to be asked first about either benefits or disadvantages of mining, so that any order biases would be eliminated in the amalgamated results.
- Only after people had told the interviewers their thoughts on mining through these two questions, were they then asked if they were in favour or not in favour of mining, or neutral about it.
- Those in favour of mining were then also asked if they were "Strongly in favour", "Moderately in favour" or "A little in favour". Those **not** in favour of mining were then asked equivalent questions to qualify the extent of their being not in favour.

We used this format of questioning in terms of both "mining in general in Waihi" and also, on some of the survey occasions, concerning proposed developments and extensions of the mines.

With this series of surveys having run over a very long period (25 years), there have naturally been some minor variations to the above general description of the surveys. The more significant of these are noted here for the record and for transparency, although the effects of these variations are likely to be extremely minor:

1. As other mining activities in the area, mostly in the Karangahake Gorge, were begun and/or considered over the time-span covered by the surveys, it became necessary to focus the questioning in these surveys specifically on the relevant mining in and around Waihi (i.e. progressively introducing more specific focus and wording than the "mining in general in Waihi" used in the earlier surveys). For example, for the 2017 wave of the survey, this was expressed as "the current gold mining by OceanaGold in Waihi, and the Correnso Underground Mine in particular": this wording was partly for added clarity but also because it matched the requirements of the consent conditions for Correnso. Note mining in the pit was suspended in the pit in 2015, so Correnso had been the only site of current mining in Waihi for over two years by the time of the 2017 survey;

2. In one of the waves of surveying (2008), Phoenix worked collaboratively with an Australian firm with a particular methodology they applied to researching the social impacts of mining. Their methodology involved pre-circulating to every household in the Waihi area, an explanation of the

mine developments that were then being considered, and listing 20 factors that people were asked to rate for importance to them. In that wave of the survey, discussion of those 20 factors replaced the open-ended questions in the "Phoenix" method, though for only half the sample, the other half of the sample running through the sequence of introductory open-ended questions set out above;

3. By the time of the 2015 wave of the survey, mining activities specifically in the Karangahake Gorge had come much more into public focus than before, especially among people living in the Karangahake Gorge. The surveys in 2015, 2016 and 2017 therefore limited coverage of the wider Waihi area (as described above) by excluding people living in a very small part of what was the full study area for the surveys before that.

This report sets out these details of the questioning used because they are important to understanding the results which follow. The "favourability" results shown later in this report are based on people being asked to think about their responses to mining in some detail. That is quite different from a more "top of mind" response that is typical of most polling, notably on politics and questions about party support, preferred prime minister, etc.

Because of the much more detailed consideration by people that lies behind the opinions they express about mining, it is useful to distinguish these surveys from simple "polls". That is why they have been referred to in this report as "Community Polling Surveys", the word "survey" referring to the more comprehensive basis for the opinions people expressed in the surveys.

When these questions were first designed in 1992, Phoenix had been working closely with Professor Nigel Roberts of Victoria University, one of New Zealand's best known and most respected political commentators over several decades. This work involved conducting a series of pre-election surveys covering six general elections from 1993 to 2008, but also on other matters before that. In Professor Roberts' opinion, as well as in Phoenix's experience, asking people in a survey to think about the issues at stake before "popping the final question" was very sound survey practice.

As Professor Roberts noted in academic publications, these pre-election surveys had a particularly high accuracy rate in anticipating election outcomes. Statistical analysis of the accuracy of these surveys compared with other published polls over several elections, showed that these surveys were typically more accurate than other polls.

Note that in most of the Waihi surveys, further later questions were also asked, for example about how people get information about mining in Waihi, but these other questions always came after the initial questions that led to people giving their overall favourability ratings about mining.

3.2 THE OCCASIONS THE POLLING SURVEYS WERE DONE

The appendix contains a large datasheet/matrix which lists main mining events in Waihi since mining resumed there in the mid-1980's, and juxtaposes a list of the occasions when Phoenix undertook surveys of the general kind described above.

This datasheet shows the results from the surveys of residents, showing the percentages "Strongly in favour", "Moderately in favour" etc, through to "Strongly not in favour". As described in more detail later, on most of these survey occasions Phoenix also carried out smaller surveys of business owners and managers in Waihi and its environs, but to avoid clutter those results are not included in this datasheet.

To summarise, Phoenix has undertaken community polling surveys on the following seven occasions:

- 1992: Shortly after the announcement of the "Twin Tunnels" proposal

- 1995: After consultation had begun on the "Extended Martha Mine" project
- 2008: Shortly after consultation had begun on the "Martha East and West Layback" projects
- 2011: After initial consultation had begun on the "Golden Link" mine extension project (this project was later marginally revised and renamed the "Correnso" project): the survey was conducted shortly before the actual formal announcement of Correnso
- 2015: This was the first survey in a five-year plan of SIMP[1] reporting required as part of the Correnso consent conditions. The survey was undertaken a few months after a rockfall on the north wall temporarily closed the pit
- 2016: The second survey in the series of five as part of the SIMP reporting. This survey was done a few months after the failure of the north wall
- 2017: The third survey in the series of five as part of SIMP reporting

Note that Phoenix retains copies of all our research reports and survey documentation for substantially longer than required by our Code of Practice. The documentation we hold on the earliest of the surveys above, 1992 and 1996 (over 20 years ago), is less complete, although we have solid records of the results from these two surveys that are presented in this report. (We hold fuller documentation of our surveys from more than 20 years ago in computer formats that are no longer easily readable.)

3.3 RESEARCH METHODS

As outlined above, these surveys were all undertaken by telephone. Interviewing was done from specialist market research call centres in Auckland, where interviewers are trained, briefed on the specific surveys, and closely monitored by on-site supervisors, using both live and recorded monitoring and quality assurance checks.

Consistent with survey best practice, just one interview is done in each household, with a person randomly chosen in the household aged 18 years or over. Up to six calls are made to each household or phone number selected, where an interview was not conducted with the relevant person earlier, e.g. if they were out or not available.

For the surveys up until 2011 all interviewing was done with people by calling them on their landlines. Starting in 2015, in order to get better coverage of younger people, and because of changing patterns of usage and ownership of phones within households, we included a component of interviews done by calling people on their cell phones.

Calling to landlines has largely been done using the Waihi Community Directory, which covers the "07 863" telephone prefix areas described above, and representing the "Waihi Basin". Calls were made to mobile phones known to be owned by residents living in the area.

The sample sizes for each survey of Waihi residents are shown in the datasheet in the appendix.

Quotas were set for these surveys to ensure that the sample comprised equal numbers of males and females, and relevant mixes of people in the town versus the "environs" of Waihi. The statistical technique of sample balancing (sometime alternatively described as weighting) was used to ensure that

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[1] The Correnso Consent Conditions require a Social Impact Management Plan to be conducted (Condition 39). This is commonly abbreviated to a SIMP, and is defined as:

"An updateable framework to identify, assess, monitor, manage and re-assess the social effects (positive and negative) of the Correnso Underground Mine in combination with the other NWG mining projects operating in the area, on the community, and an annual report on the outcomes of this work."

results reflect a proper mix of people by gender, age and where they live, i.e. so as to provide the best possible representation of all adults (more formally, residents aged 18 years of over) who live in Waihi.

This report generally refers to the survey as representing "residents of Waihi", meaning all those living in the Waihi Basin or "07 863" area. The analysis also examines the opinions of people living in the town of Waihi specifically, a distinction that is made clear when the analysis focuses specifically on these people.

The methods above were used for the surveys of residents. Similar methods were used for the surveys of business owners and managers, although as mentioned earlier, the sample size for these surveys was set at 50. Business owners and managers were first called on landline telephone only: occasionally they requested we call them back on a mobile phone.

In the following chapter, results are presented first in some detail from residents. That is followed by a short section showing results from surveying businesses.

4 FINDINGS

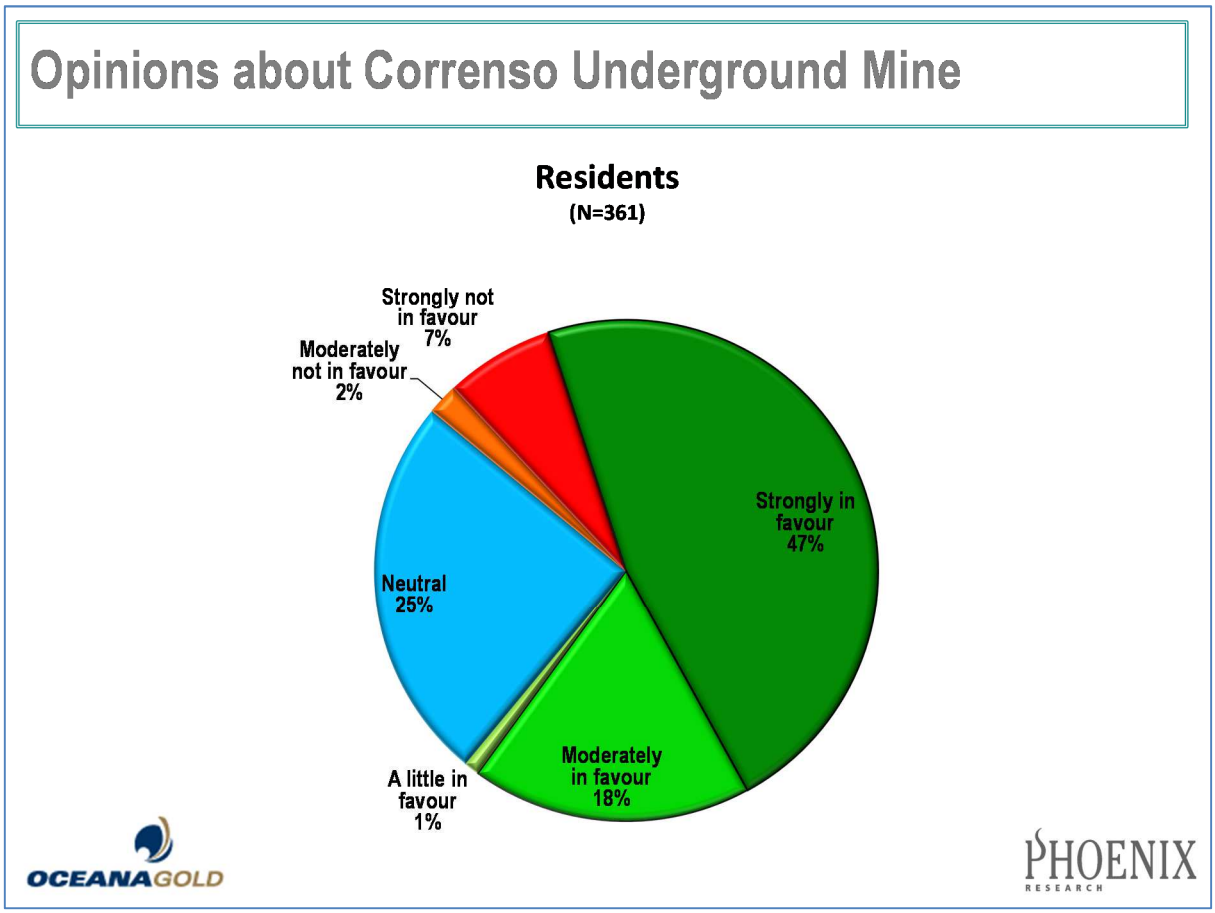
Because these surveys have been undertaken on seven different occasions, the results are necessarily somewhat complex, as is readily evident in the large datasheet in the appendix. That of course is part of the power of these results, and of their being amenable to "meta-analysis".

To assist the reader to understand the results it is useful to build the picture of what the surveys show in steps.

4.1 2017 RESULTS

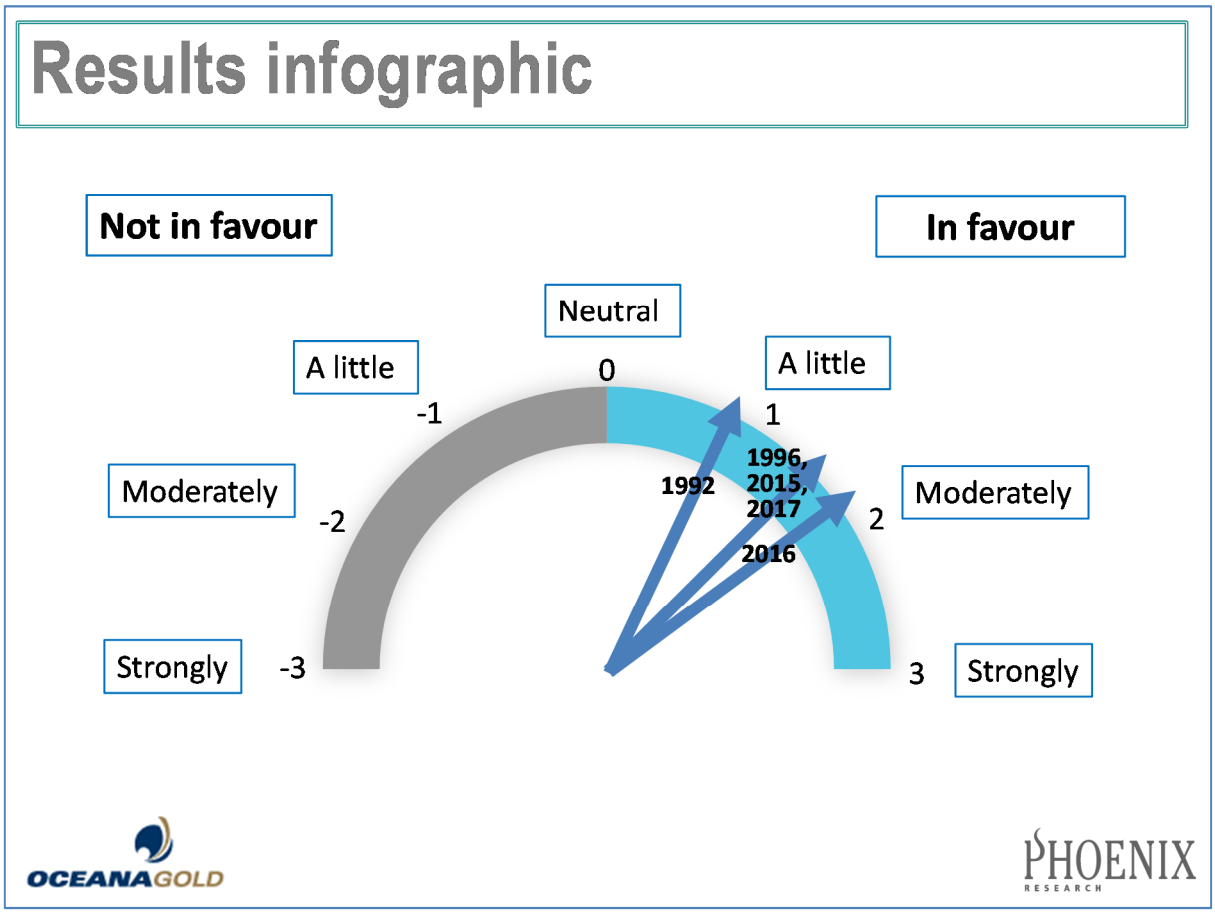
The chart below shows the results from just the 2017 survey. This chart shows that close to half of all residents in Waihi in 2017, 47%, were "Strongly in favour" of the mining in Waihi. When those "Moderately" or "A little" in favour are included, this accumulates to 66% being in favour of mining.

A further significant proportion describe themselves as "Neutral" (25%), and a total of 9% say they are "Not in favour", mostly strongly so.



4.2 INFOGRAPHIC PRESENTATION OF RESULTS

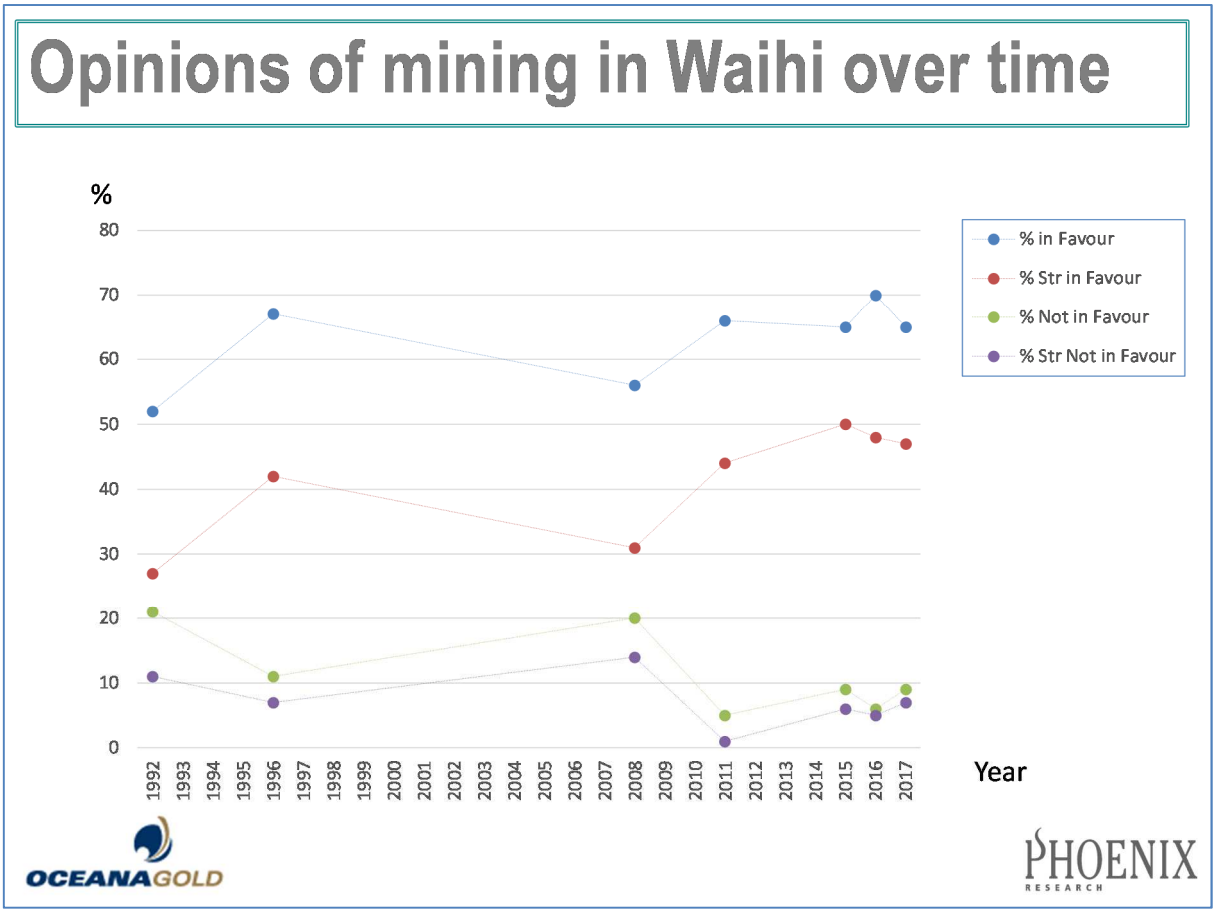
Another way to look at results, potentially useful for comparing results over the years, is to move to a more "infographic" method of presentation. Instead of depending on and showing all the individual percentages, a single overall "mean score" could be shown for each time the survey has been conducted. This gives rise to an infographic of the following general kind. This is a convenient shorthand summary, but on balance this approach is too abbreviated and cryptic to be fully useful for the purposes of this technical report. It is included because it provides a simple high-level view of some of the results.



Consequently, although more complex, rather than using the above high-level summary of results, a good way to present the data for this meta-analysis is the following graph, which also makes the trends over time more apparent.

4.3 OPINIONS OF MINING OVER TIME

The following graph shows the percentages of residents in favour or strongly so, and those not in favour, over the seven occasions when this survey has been undertaken.



This graph shows what looks like a modest upwards trend over time, with residents in Waihi moving from around 50% in favour in 1992 up to 65% to 70% in favour from 2015 to 2017. The results for those strongly in favour show a similar modest upwards trend over the period the surveys have been undertaken.

Similarly the proportions of residents of Waihi not in favour of mining in Waihi dropped markedly in 2011 compared with the 2008 results, and that drop in the proportion of residents not in favour of mining to under 10% has remained through to 2017.

While there appears to be some truth to those trends, there are some further important points underlying these trends which are discussed later.

This graph is not as simple as it may appear at first sight. It may assist the reader to follow through the following steps that explain the graph.

The second top graphed line shows the percentages of Waihi residents who are "Strongly" in favour of mining. As the graph indicates, they are a sub-group of all those "In favour" (either "Strongly" or "Moderately"), the top line in the graph.

The same approach applies to the bottom two lines in the graph, showing the extent to which Waihi residents are **not** in favour of the mining in Waihi. The third line on the graph shows all those "Not in favour" either "Strongly" or "Moderately", the same treatment as for those in favour, shown in the top

line. Finally, the bottom line on the graph shows those who are "Strongly not in favour", again a subset of the total "Not in favour".

Note that for simplicity and clarity, the graph does not show the percentages of Waihi residents who are neutral about mining, nor the small percentages of those who are in favour or not only "A little". Those details are addressed in a later section, although they do not add to the themes identified above: the details are presented only for completeness and transparency.[2]

4.4 HAS FAVOURABILITY TOWARDS MINING INCREASED OVER TIME?

A natural question for those statistically inclined is to ask: if trend lines are fitted through each of those four lines, do the trend lines have slopes that are significantly different from zero? There are several alternative ways this question can be expressed that may help elucidate exactly what this question asks:

- Are the gradients definitely upwards or downwards rather than zero or "flat line"?
- Conversely, could the gradients of the trend lines be only within the bounds of random variations between the samples each time the survey was conducted?

There are two answers to that question:

1. While the fitted trend lines are all in the direction of increased favourability and reduced unfavourability, there are not enough data points for these trends to be statistically significant. In layman's terms, while the graph lines suggest that Waihi residents are becoming somewhat more favourable about mining over time, there is not enough data for these apparent upwards trends to be fully dependable. The trends towards increased favourabilty about mining over time (and reduced proportions of residents not in favour of mining) can reasonably be described as "likely though not definitive".

2. However there is also more to this story.

Before those further details are explored, the following is the same graph, but this time with trend lines fitted, and the statistical characteristics of the trend lines also shown.[3]

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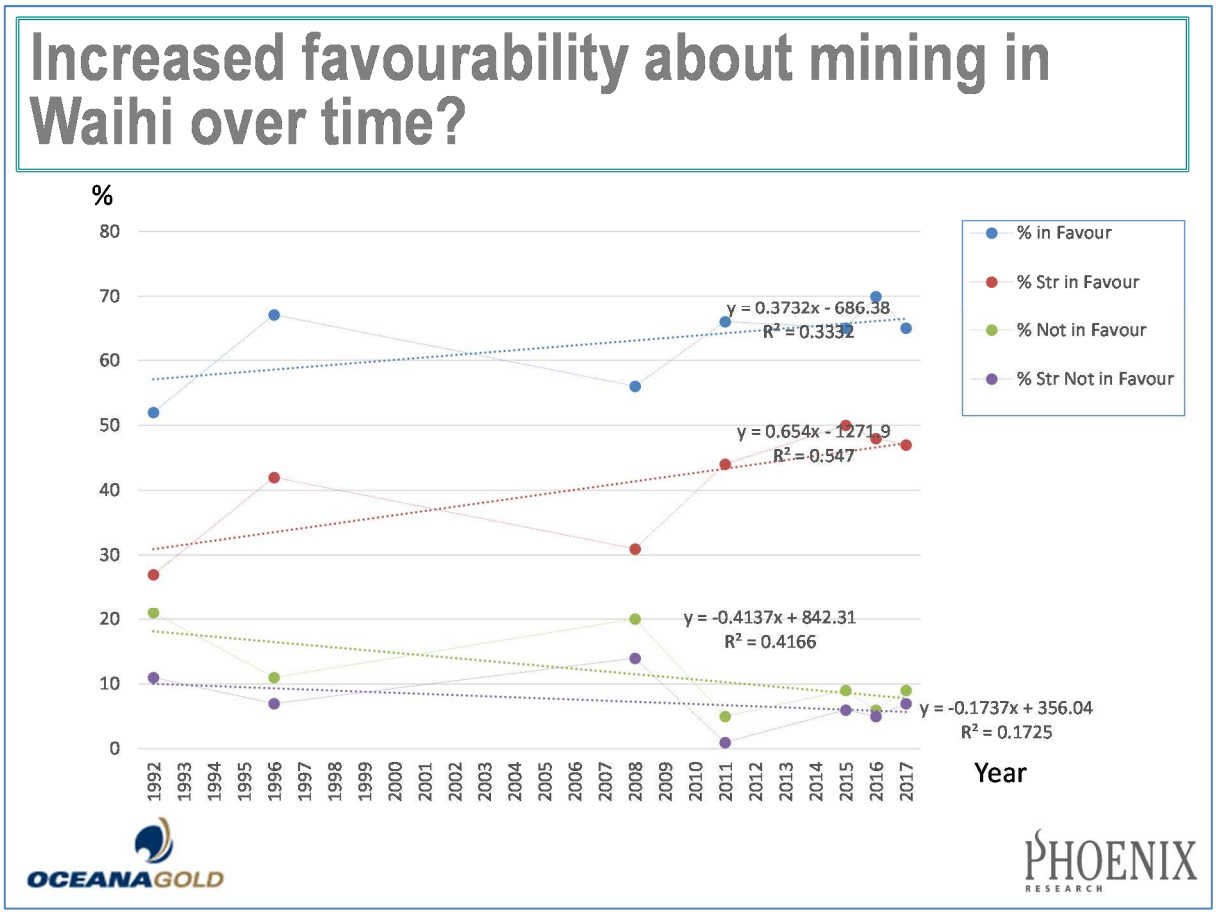
[2] The use of the lines joining the dots in graphs of this ilk can be challenged on technical grounds, on the basis that there is no evidence for what the levels of favourability were at points in time between survey measurements. The light coloured lines connecting the dots are used simply to facilitate viewing each series over time, not to suggest that the proportions of the community in favour of mining, or not, were at levels that could be interpolated from the joining lines.

[3] The trend lines have been fitted, and their equations generated, using standard Excel options for this type of graph.



Technical details of the testing of the significance of the slopes of the trend lines are as follows:

The R-squared statistic shown above is routinely used when fitting trend lines, for example when using Excel. This is the proportion of the variance in favourability that is explained by each trend line. The R-squared values are quite high for these kinds of trend lines[4]. However the t-test described below shows that despite the high R-squared values (and high proportion of variance explained), the slopes are in fact not statistically significant.

All slopes were tested for significance using the t-test statistic. These tests showed the apparent upwards slopes in the proportions in favour of mining, and the downwards slopes in the proportions NOT in favour of mining, were not statistically significant.

The p-values from testing the strength of the trends are mostly in the range 0.1 to 0.25. Though not standard statistical terminology, this report uses the wording that the trends over time towards opinions on balance being more favourable towards mining, are "likely though not definitive". Again using layman terminology, that likelihood is in the range 75% to 90%, falling short of the standard test for significance of 95% as a reasonable threshold.

[4] What are considered acceptable minimum R-squared values varies substantially for different kinds of data. For example, in the physical sciences, medicine and engineering R-squared values for a model to be considered satisfactory are typically higher. In the social sciences R-squared values as low as 10% can be considered to indicate a useful model. As succinctly put by one academic statistician, this difference in what is considered a reasonable R-squared value is "because people are [inherently] fairly unpredictable", or as another put it, "human behaviour cannot be accurately predicted" in the same way that the behaviour of a molecule or particle can be.

4.5 THE CONTEXTS OF THE SURVEYS

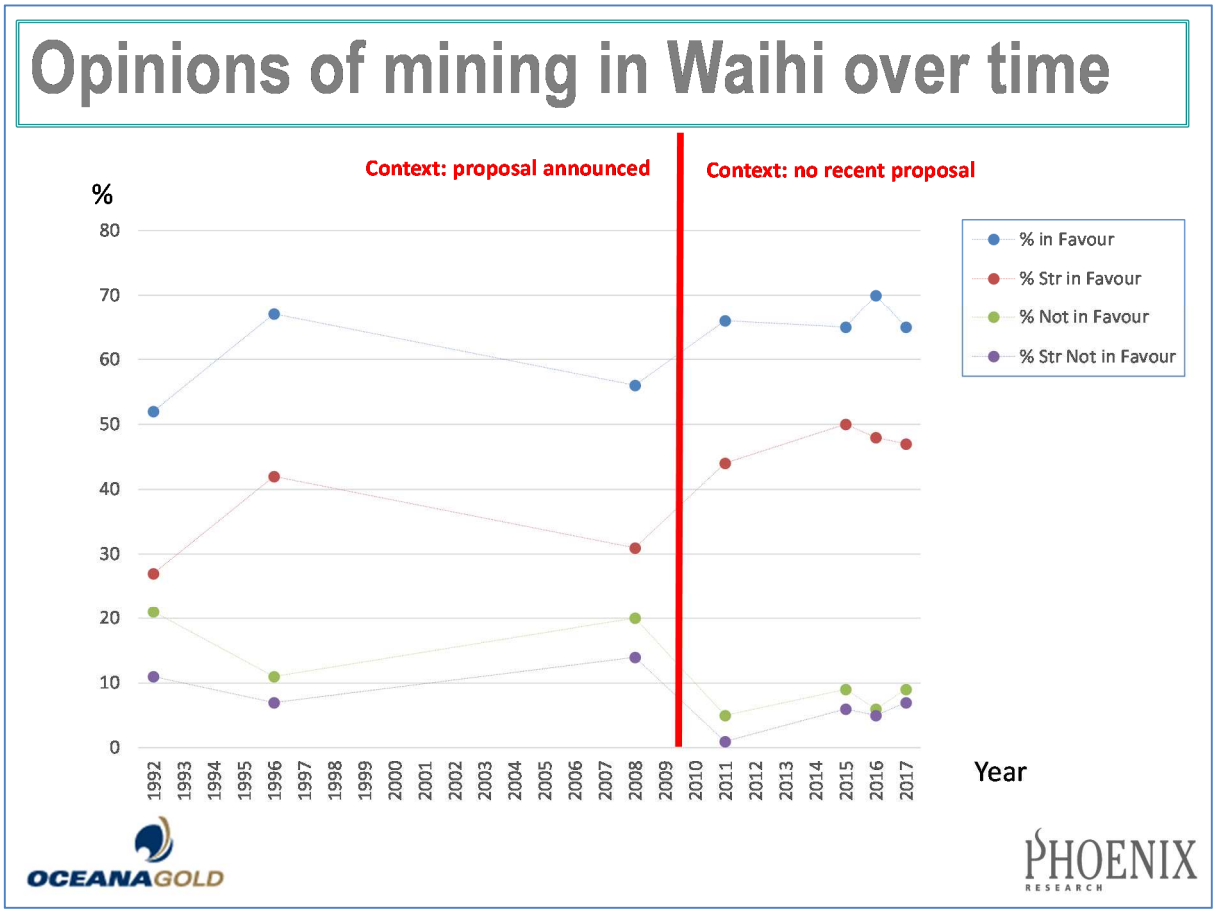
The fuller story behind this graph is made clear when the results are related to the context for each of the surveys. Three aspects of context have been examined, each being possible alternative explanations for the "likely though not definitive" increases in favourability towards mining in Waihi over time:

- The first three surveys were conducted in the context that an announcement had recently been made of a proposal to develop or extend the mine. The later four surveys were conducted when there had been no recent announcements;
- The Amenity Effect Programme (AEP) was introduced first on a small scale trial basis, in January 2007, though later becoming part of the Correnso consent conditions, with much wider coverage. For example, in the first half of 2017, AEP payments were made to 363 recipients (source: SIMP report 2017). It is useful to examine the favourability trends to see if the AEP has affected the extent to which residents in Waihi view mining favourably;
- With the slip in the Martha Pit in 2015 resulting in temporary cessation of mining there, it could be argued that the increased favourability in the results from the 2015, 2016 and 2017 surveys is a result of the lesser exposure over that period to mining by people in Waihi, with the large majority of mining activity over that period being underground at Correnso.

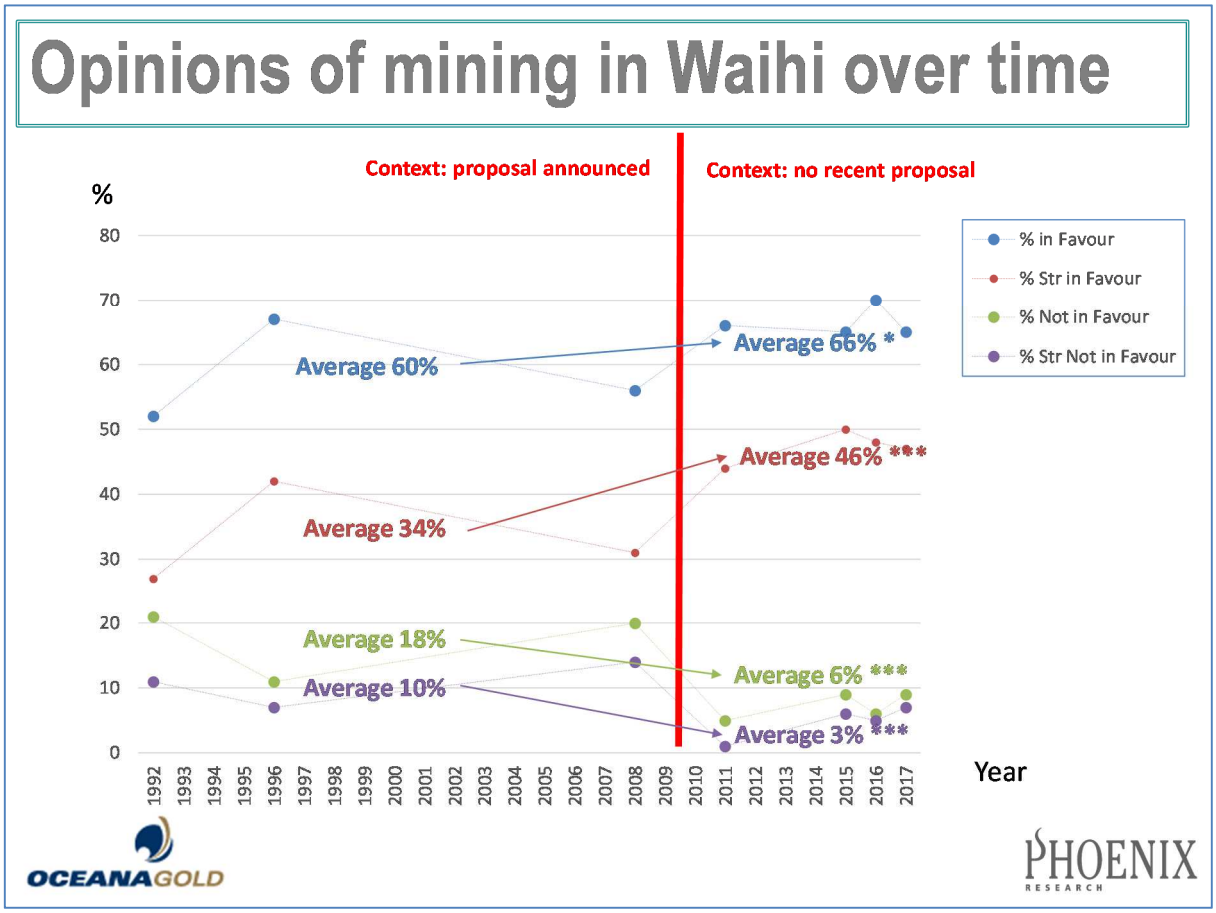
This section of the report deals with the first and second of these alternative explanations for increased favourability. The impact of the slip in the Martha Pit is a more complex story and is addressed in the next section of this report.

THE 'RECENCY OF ANNOUNCEMENTS' HYPOTHESIS

To investigate the first of the above points, the "recency of announcements" hypothesis, it is useful to portray the results as follows:



The copy of this graph below shows the amalgamations of results where either a proposal had been announced, or there had been no recent announcements.



The asterisks beside the results above where the context is that there has been no recent proposal, are based on the statistical convention of how best to express the "confidence" that the result is genuinely different from the contrasted result. Statisticians widely use the criterion of "95% confidence levels", which indicate that the odds are 5% or less that what looks like a real trend is actually just the result of sampling variations, i.e. not a "real" trend that one can be confident applies to the whole population the survey is seeking to represent. The convention is to show these differences with a single asterisk.

Statistical testing can also show when an apparent difference is significant at the 99% level of confidence, shown by two asterisks. An even more extreme level of confidence is at the 99.9% level, shown by three asterisks. Clearly where a trend has three asterisks, the odds are extremely slim that the apparent trend is only a chance one. In these situations, one can be particularly confident that the trends shown in the sample also apply to the wider population the survey represents.

Hence in summary, the chart above shows "far beyond any level of reasonable doubt" that residents of Waihi are more favourable about mining when there have been no recent announcements of proposals.

The key outtake from this meta-analysis is that, perhaps hardly surprisingly, residents in Waihi are less favourable in their opinions about mining as a whole in Waihi (the focus of the analysis above), when there has been a recent announcement of a proposal, than they are when there have been no recent announcements.

To put that the other way around, residents in Waihi are more favourable in their opinions about mining when there have been no proposals recently announced. One might say that is hardly surprising, but it is useful to know 1. that this is empirically true, and 2. the extent to which this holds.

Even though those trends are very clear and definitive, it should also be noted that this meta-analysis is not able to identify whether there may be a contribution to these trends from the long term improvement in the opinions of Waihi residents about mining. That is partly because none of the more recent surveys have been run in the context of a recent announcement or proposal, and none of the earlier surveys were run without that.[5]

The evidence in favour of the "recency of announcements" hypothesis unfortunately is weakened by what could be a compounding or alternative factor, the AEP, explored in the next section.

THE AEP HYPOTHESIS

The AEP is a programme which aims to offset a perceived loss of amenity. As noted above, the AEP was introduced for an initial trial period, with a small number of households, in January 2007, and subsequently became part of the Correnso consent conditions. AEP payments have been made to 200 or more recipients in every half-year since the beginning of 2010, and to 300 or more recipients in most half-years since the beginning of 2011.

This is a further "context" factor that could be expected to have affected the extent of mining being perceived favourably by residents in Waihi.

The first survey measurement after the introduction of the AEP was in 2008. It appears that the announcement before that survey of two new development projects, the East and West Laybacks, was almost certainly responsible for the readings on favourability at that time to be lower than for almost all the other survey measurements. That factor appears to have over-ridden any gains in favourability that may have resulted from the introduction of the AEP at that time.

It is possible that the much wider spread of AEP payments from 2010 onwards, along with the programme presumably becoming more widely known over time, has contributed to the later higher favourability ratings, i.e. from 2011 onwards.

It is also possible, if it is accepted that the AEP has some positive effect on favourability, that the low favourability in 2008 (which appears to relate to the East and especially West Laybacks proposed around that time) could have been even lower if the AEP had not been introduced by then, albeit on a smaller scale than the later application of the AEP.

4.6 THE MARTHA PIT SLIP HYPOTHESIS

The third hypothesis mooted in the previous section is that the higher levels of favourability in the last three survey measurements when taken collectively, 2015, 2016 and 2017, could possibly also be contributed to by the temporary cessation of mining in the pit necessitated by the slips on the north wall, since 2015.

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[5] Statisticians would typically also investigate whether the data could be used to model a third kind of scenario: that the best explanation of the trends is some combination or "interaction" of the two factors, improvements over time in general, and improvements based on time elapsed since last proposal. The graphs indicate quite clearly that a simple model of that nature is not a good fit with the data. E.g. that would require the first three data points (and independently, also the other four data points) to be well fitted by their own separate upwards trend lines, which is clearly not the case. SWITCH THIS BACK INTO DETAILS CHAPTERS

There are three sources of information from the community polling surveys that inform this interpretation of the trends:

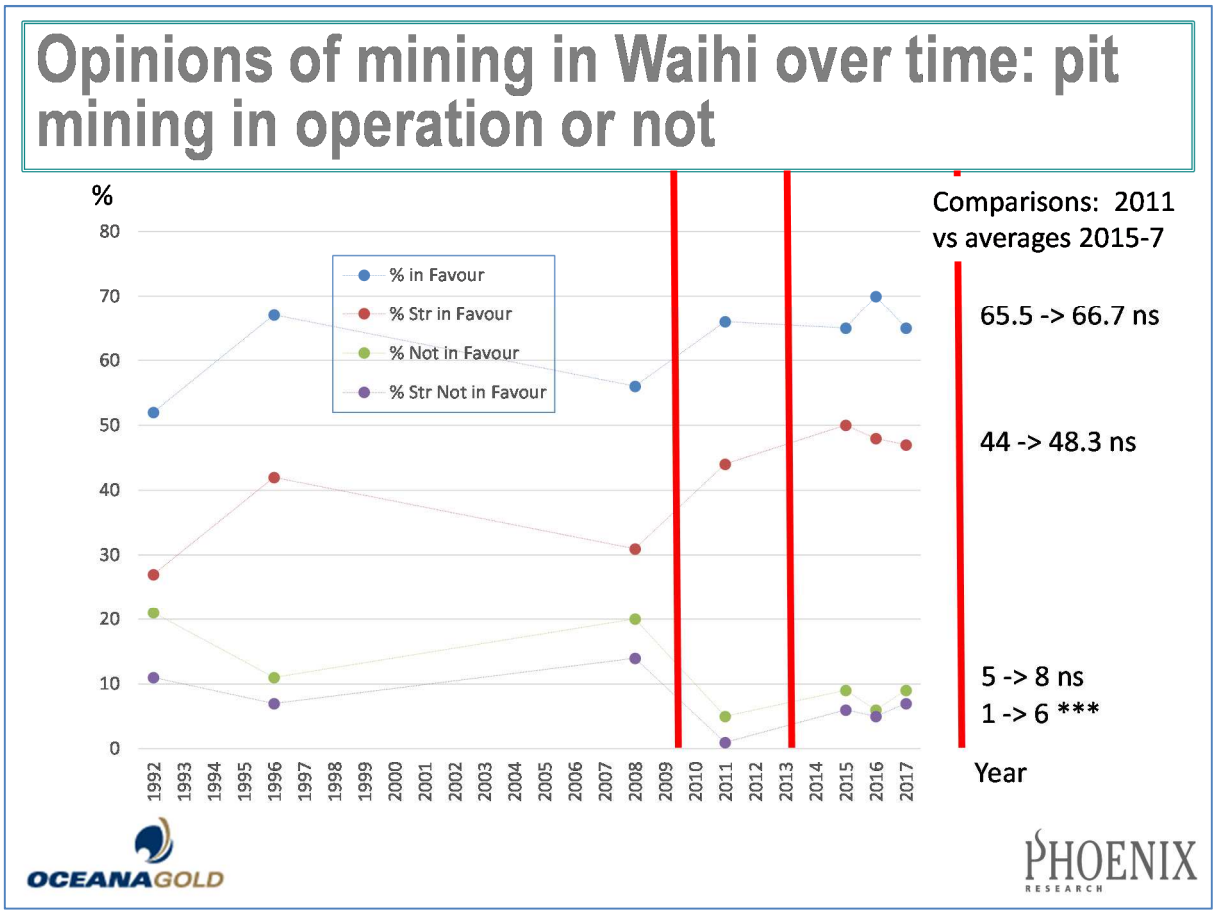
- We can compare the survey results in 2011 with those in 2015/2016/2017. These are all survey measurements when there had been no recent announcements of possible developments, so that factor is ruled out of the comparisons, leaving the main context difference being whether there was mining in the pit at the time of the survey, or not[6];
- In one of the surveys (2011), the survey asked people's opinions separately about underground versus open pit mining, and which they viewed more favourably;
- In the surveys up until 2011, when mining was being undertaken in the pit, results show that vibration, dust and noise were perceived by the community as among the most often cited disadvantages of mining. This section of the report examines changes in the extent to which people mention these factors among the perceived disadvantages of mining, and whether there was a reduction in the extent of those disadvantages being identified, given that dust and noise are more associated with open pit than underground mining, whereas vibration is associated with both kinds of mining.

These three points are dealt with in turn below.

COMPARISON OF RESULTS WITH PIT OPERATING OR NOT

This contrast is most easily represented in the following version of the previous graph, with relevant results grouped and contrasted.

[6] Another potentially important context factor that could have influenced results, and compound this analysis, is the change of ownership from Newmont to OGNZL. This was approved by the Overseas Investment Office and announced in October 2015, with handover of ownership in June 2016. The data suggest that this has had little impact on the surveys' results, compared with the influence of other factors. That is despite some anecdotal and qualitative feedback that people in Waihi interpreted the change of ownership to imply a longer life of mine than under Newmont ownership, and other changes: the results of the surveys over the period 2015 to 2017 are relatively stable.



The statistical significance (or not) of the differences are tagged in the graph above as before, with "ns" for not significant, and *** for highly statistically significantly different (at the 99.9% level of confidence).

This analysis shows that while overall community attitudes to mining in Waihi have not moved markedly since the temporary cessation of mining in the pit, there has been a marked increase in a very small minority who are now strongly not in favour of mining, though still only to a small minority of 6% of residents. In the 2017 community polling survey these people were particularly inclined to identify the following points as disadvantages of mining:

- Safety issues (45% of this small minority mentioned this)
- Pollution (34%)
- Damage to the environment (32%)
- Concerns about the mine under the town (31%)

The lack of mention of points specifically or overtly related to the slip in the pit suggests that has not been a factor in changing the proportions to a larger (though still very small) minority strongly not in favour of mining.

It would seem reasonable to examine whether the concerns about safety by this small group of people not in favour of mining, may have been raised by the death of a miner which occurred at Correnso in 2016, shortly before the survey that year. The data are not at all definitive on this point, though if anything suggest slightly higher favourability about mining, and a small dip in the proportions unfavourable, in 2016 compared with 2015 or 2017.

THE COMMUNITY'S OPINIONS ABOUT UNDERGROUND VERSUS OPEN PIT MINING

The 2011 survey asked Waihi residents separately about underground and open pit mining. Residents were very close to equally favourable about these two specific kinds of mining.

That finding was corroborated in the 2011 survey by two forms of questioning addressing this topic in slightly different ways. One method asked people's opinions using the fully detailed methods set out above, first asking about benefits and disadvantages of mining before asking for overall favourability ratings, separately for Martha and the underground mining then operating at Favona and Trio. Our report on the 2011 survey summarised the results from this questioning as follows:

> "After we had asked people to identify what (if anything) they saw as the benefits and disadvantage of the current mining operations at Waihi, they were asked to summarise their **overall opinions** about both the Martha open pit gold mine, and the Favona and Trio underground gold mines. Both are viewed very favourably overall by residents of Waihi, with very similar ratings: 44% "strongly" in favour of both kinds of mines, 22% and 21% respectively "moderately" in favour of the two kinds of mining. Only 1% are strongly not in favour of the two kinds of mining."

The second form of questioning involved direct ratings of the acceptability of the two kinds of mining. Again to quote directly from our 2011 report:

> "Average ratings on zero-to-ten scales about the acceptability of these two types of mining are 6.6 out of 10 for open pit mining and 7.3 for underground mining. These averages correspond to 43% rating open pit mining 8 or more out of 10, and 53% rating underground mining 8 or more out of 10.
>
> People who rate open pit mining more acceptable most often do so because they see it as less dangerous. People who rate underground mining more acceptable most often do so because they see it as more friendly to the environment, and preferable because it is less visible.
>
> A third of residents say that the location of a mine affects their opinion about how acceptable the two methods of mining are."

By this measure, the public of Waihi appear to have a small preference for underground mining over open pit mining, although that difference is not large.

These results suggest that there could be a small contribution to the overall favourability of mining being higher since 2015 and the cessation of mining in the Martha pit, from people having a small preference for underground over open pit mining. However that does not appear to be a large contributor.

A larger contributor could be simply the reduction in mining types to just one (underground) rather than two types of mining (i.e. underground plus open pit), although the survey data does not have sufficient evidence to validate that interpretation.

CHANGES IN PERCEIVED DISADVANTAGES OF MINING WHEN MINING/ NO MINING IN THE PIT

Vibration, noise and dust have featured over the years among the disadvantages of mining most often identified by the Waihi people surveyed. Conversely, vibration is associated with underground mining as well as open pit mining.

With these responses arguably being those most obviously associated with open pit mining, it seemed appropriate to set out the levels of mention of these disadvantages of mining over the time the surveys have been run[7]. The following table includes weighted average results from the surveys before and after the slip in the pit, which are circled for emphasis:

Table 1: Specific disadvantages of mining identified

Mentions as disadvantages of mining	2008 (N=125) %	2011 (N=500) %	2008 and 2011 (n=650) %	2015 (N=150) %	2016 (N=150) %	2017 (N=361) %	2015 – 2017 (N=661) %
Vibration	10	14	13.2	17	12	11	12.6
Noise	32	24	25.6	11	11	7	8.8 ***
Dust	35	20	23	9	3	4	4.9 ***

Statistical tests for significance have been applied to the results grouped by years into before and after the slip in the Martha pit. While there was no reduction in the extent to which people identified vibration as a disadvantage of mining (and that is consistent with the continuation of underground mining at Correnso over the period 2015 to 2017, and with vibration being a characteristic of underground mining), there were marked reductions in the extent to which people identified noise and dust as disadvantages. (The *** annotation indicates very high probability of significant differences, exceeding the 99.9% level of confidence, as per previous annotations of statistical significance.)

On that basis, it can be concluded that the increased levels of favourability about mining in the 2015, 2016 and 2017 surveys have definitely been contributed to by the temporary cessation of mining in the pit following the slip in 2015, and the reduced concerns about noise and dust accordingly.[8]

A further point that the above table addresses concerns a hypothesis that people may have become more favourably disposed to mining over time because of becoming more familiar with and used to blasting (and vibration), as a result of continuing exposure to blasting over time. The data in this table does not support that hypothesis, at least not strongly or clearly. There is some indication that may be true over the years since 2015, but the trend is not statistically significant.

[The difference in the proportion of residents identifying vibration as a disadvantage of mining in 2015, 17%, down to 11% in 2017 falls just short of the criterion for being statistically significant at the 95% level of confidence. When the level in 2016 is also taken into consideration, that reduces the clarity of this apparent trend.]

[7] As described earlier, Phoenix does not hold full copies of the reports on the 1992 and 1996 surveys. That is why the results from those surveys could not be included in this table.

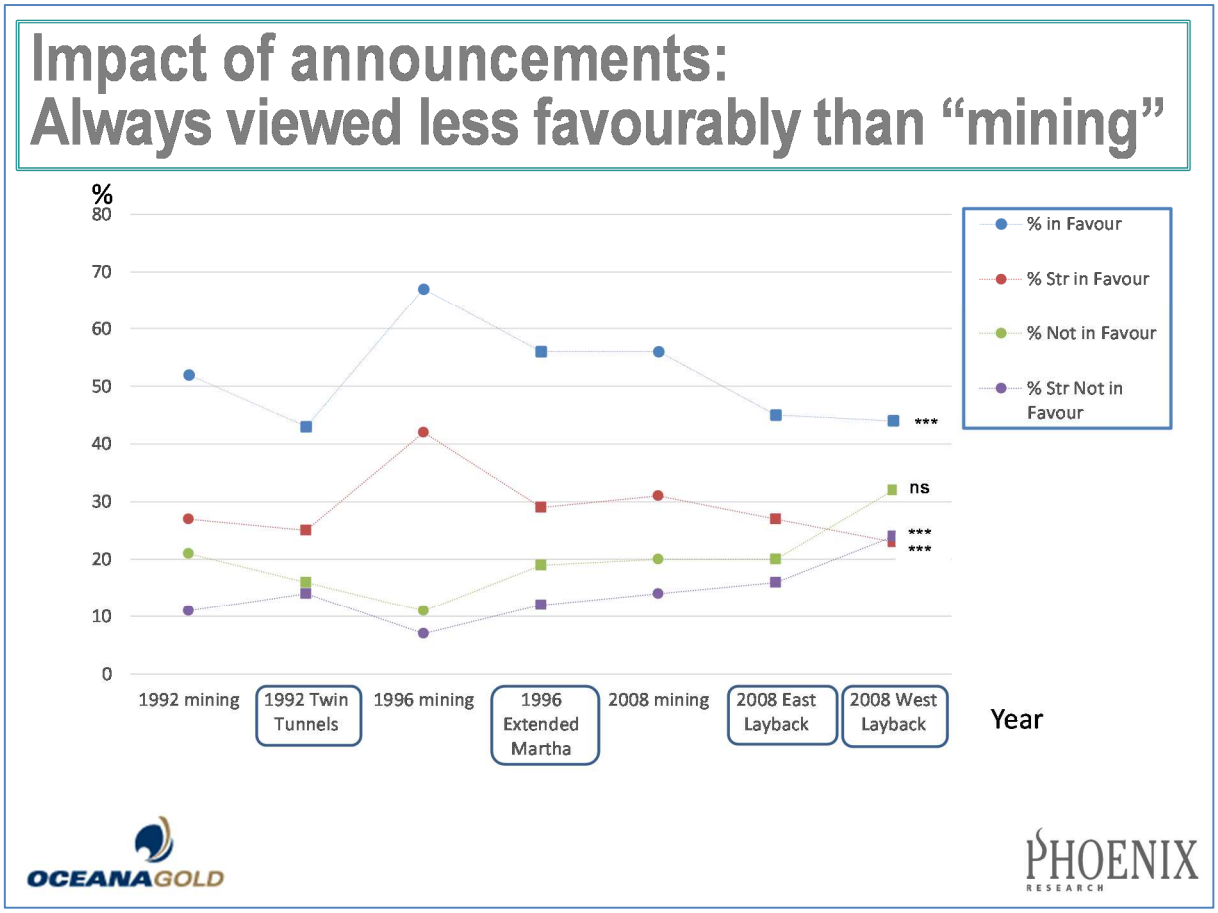
[8] Even though these trends are very clear on a simple numeric basis, it is appropriate to note that comparisons of these kinds of survey results over time are not as robust as comparisons of results from structured questions, such as the favourability ratings. That is because answers to open-ended questions can fluctuate for a number of methodological reasons (such as the extent to which interviewers use probe questions to elicit more answers or more detailed answers from people, and new themes that arise over time and result in changes to the categorising of answers at the analysis stage), rather than reflecting real trends in people's opinions. More detailed analysis of the answers to these questions over time indicates that there is reasonable substance to the trends noted above, beyond simple differences attributable to survey methodology.

4.7 PROPOSALS ARE VIEWED LESS FAVOURABLY THAN MINING PER SE

The results above all come from the question about people's opinions about mining ***in general*** in and close to Waihi. In the first three of the surveys in the series, as well as first asking about opinions about mining in general, the surveys went on to ask people's opinions about ***proposals*** that had been recently announced.

The sequence of questioning about the ***proposed developments*** was the exact same as when asking about mining in general. I.e. the questions about the proposed developments started by getting people to think about all the benefits and disadvantages they could think of about the proposed development specifically, before asking the extent to which they were in favour, or not, of the proposal.

The following graph shows these results. The graph contrasts people's opinions about mining in general each time they were surveyed, with their opinions about the proposal being considered at that time (these measurements are identified by circling their dates and descriptors on the x-axis). Perhaps hardly surprisingly, on each occasion the surveys sought opinions about both mining in general and about the proposal that had been announced and was currently being considered, mining in general was viewed more favourably than the specific proposal.



The relevant statistical tests of these differences once again show that the trends which this graph suggests are highly statistically significant[9], i.e. can be generalised to the full population of Waihi residents with a very high level of confidence. That is, at the time when new mining projects or proposals have been announced, Waihi residents regard mining in general more favourably than the current proposals.

[9] The tests contrasted the combined results for "mining in general" with the combined results about the proposed developments, collectively in each case. The high level of statistical significance is indicated by the triple asterisks beside the top three lines in the graph. A curious anomaly is that this trend does not apply strongly to the proportions simply "Not in favour" – indicated by the "ns" or "not significant", where community responses to the Twin Tunnels and East Layback proposals buck the general trend. There is insufficient data to explain this anomaly; it may simply be a statistical outlier.

4.8 THOSE NOT IN FAVOUR OF MINING AND/OR PROPOSED DEVELOPMENTS, AND RESPONSES TO THE WEST LAYBACK PROPOSED IN 2008

The results of the surveys also show that there is a consistent small minority of residents of Waihi who are not in favour of the mining at Waihi. This is typically of the order of 10% of the community, although in 1992 and 2008 this proportion was closer to 20% (when those "moderately" not in favour are included). By 2017, when there had been a longer lull since any announcements of development proposals, probably also combined with the reduction of activity in the open pit, this minority had dropped to an average of 8% over the three years 2015 - 2017, again consistent with the indication that people become more favourable in their opinions about mining as time elapses since the last announcement of proposals or developments.

The size of that minority who are unfavourable about mining increases in response to specific proposals. The proposed "West Layback" in 2008 prompted the highest levels of unfavourable responses recorded in these surveys, when approximately 30% were not in favour of that proposal.

The 2008 survey contained detailed questions and results about people's specific responses to and concerns about the West Layback as then proposed. A summary of this information is presented below to examine the extent of any potential relevance to Project Martha.

The disadvantages about the proposed West Layback development that residents of Waihi most often identified were concerns about:

- The relocation of school
- Disruption to the town
- Impact on traffic
- Noise, including from trucks beeping

The West Layback proposed in 2008 drew the least favourable response from business people as well as residents in Waihi, of any of the three proposed developments surveyed by Phoenix Research over the period 1992 to 2008. Business owners and managers had a broadly similar profile of concerns about this proposed development to those of residents. However concerns that businesses particularly often mentioned were:

- Dust
- Risk of having to relocate or impacts of actually having to do so

The only point Project Martha has in common with the West Layback proposed in 2008, would be the resumption/increase of mining in the Martha pit. Of the concerns the community expressed in 2008 about the West Layback then proposed, noise is the only one that would appear to be relevant to Project Martha although unlike the West Layback it is noted that Project Martha does not involve the removal of any of the western pit crest and any noise screening it affords. Most of their other concerns in 2008 are not relevant to Project Martha, such as relocation of the school, disruption to the town, and impact on traffic.

For business owners their concerns about the West Layback, such as the need to relocate, do not carry across from the West Layback to Project Martha. In terms of dust, Project Martha represents no change from the recent pit operations and the associated mining activity will be farther removed from the CBD, e.g. when mining occurred on the south wall.

The West Layback also would have created increased new sight lines into the pit, whereas Project Martha does not involve any lowering of the pit crest with the associated perception of increased noise and dust.

To summarise, it is clear that the cause of the large majority of the increased concerns about the West

Layback in 2008 do not apply to Project Martha. It is therefore reasonable to anticipate that any resistance to Project Martha, or at least that part of it associated with or under the open pit, will by and large not be triggered by the same concerns as the West Layback, or if so, to a much lesser extent. Given also that in many other respects Project Martha is a "business as usual" proposal, it would be reasonable to anticipate that the overall level of ill-ease in the community about Project Martha will be markedly less than it was for the West Layback: even then unfavourable responses were in the minority, and that will almost certainly apply even more so for Project Martha.

4.9 AUXILIARY DETAILS

The following sections of this chapter re-visit the information provided above, essentially with a view to testing the impacts of marginally different and more detailed ways of examining this data.

THE NEUTRALS

The information provided in the sections above does not include those who described themselves as "Neutral" about mining, rather than being either in favour or not in favour. It also does not show or include the small proportions in favour of mining or not "A little". Those people were excluded from presentations of the results above simply for clarity and focus.

The graphs on the next page juxtapose the graph shown throughout the previous section (at the top of the page), with a graph (on the lower half of the page) showing the equivalent lines for those neutral about mining, or in favour or not "A little".

In a nutshell, there is very little variation in the proportion of the community who consider themselves "Neutral" about mining, over time. The very small proportions in favour or not of mining "A little" also show no particular variations over time. It is clear that this analysis does not add to the earlier simpler presentation of results. It is perhaps of some note that the proportion who remain neutral about mining is quite stable over time, varying between 20% and 25% of residents, and accumulating to less than 30% if those close to neutral are added in.

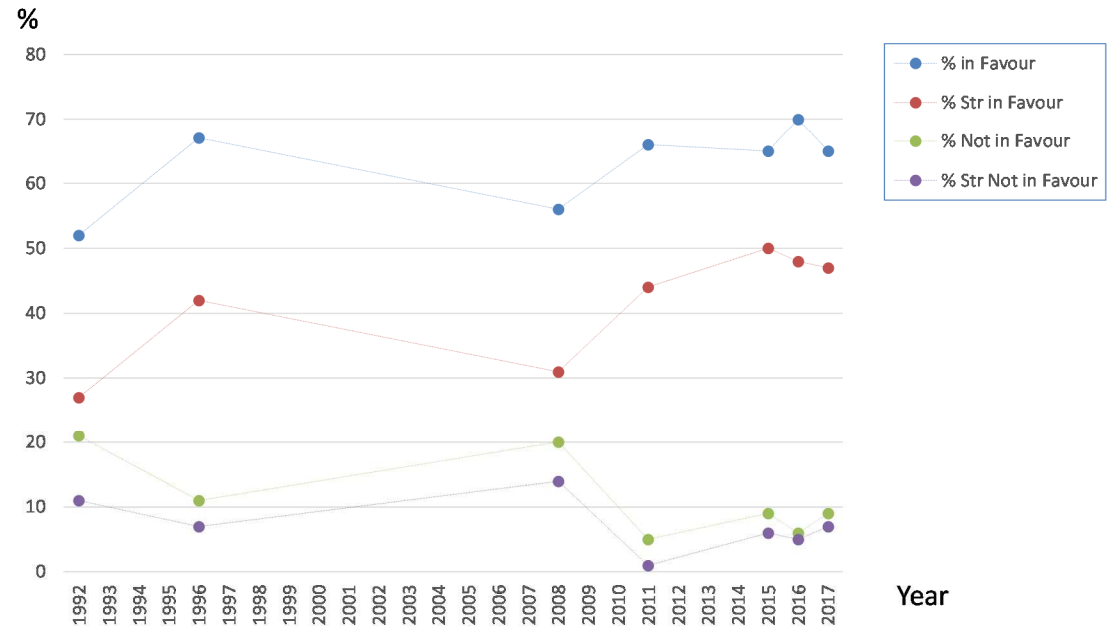
THE 1992 LOW-EXPOSURE-TO-MINING HYPOTHESIS

This analysis of neutrals also provides some insights into a further hypothesis that has been mooted concerning this data, that in 1992 people may have had much less exposure to mining than later in the years covered by these surveys. This hypothesis suggests the possibility that this reduced exposure to mining in 1992 could explain how the 1992 results may have been out of line with the later results, when people would have had more exposure to mining.

If that were the case, it would be reasonable to expect that the 1992 results would show a markedly higher proportion of people "Neutral" about mining, this category of answer including those who did not have an opinion about mining.

In fact the percentage of "Neutrals" in 1992 is well within the range of levels found later in the series of surveys (23% in 1992 compared with 20% in 1995, and higher proportions in most later surveys). That picture does not change markedly if those "slightly" in favour or not are included.

Opinions of mining in Waihi over time



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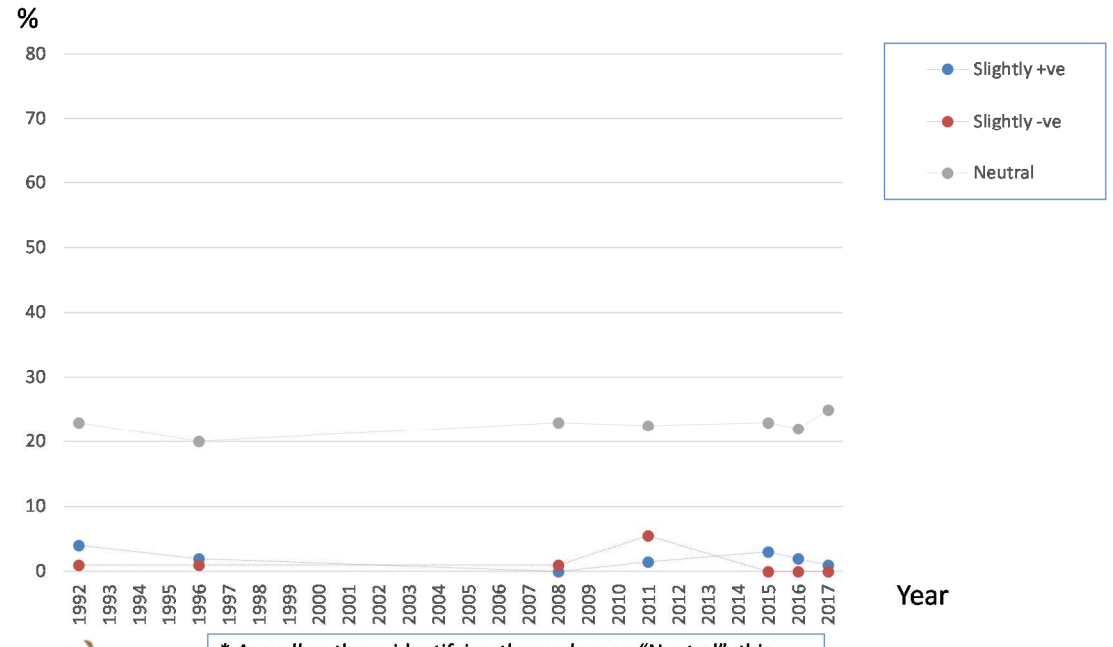
PHOENIX RESEARCH

Opinions of mining in Waihi over time: those neutral about mining*



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* As well as those identifying themselves as "Neutral", this graph also shows the small proportions who describe themselves as in favour of mining, or not, "A little".

PHOENIX RESEARCH

RESIDENTS IN THE TOWN OF WAIHI SPECIFICALLY

A further refinement was to investigate the impact on the results if we examined instead the views just of those who live in the actual town of Waihi itself. As explained earlier, these surveys all took the view that the appropriate study area is the whole of the "Waihi Basin", which includes Waihi Beach, Athenree, and the rural environs of Waihi.

Census results in 2013 (the most recent available at the time of this report) on the populations of the respective areas show that approximately 51% of all residents aged 18 years or over in the Waihi Basin actually live specifically in the town of Waihi[10].

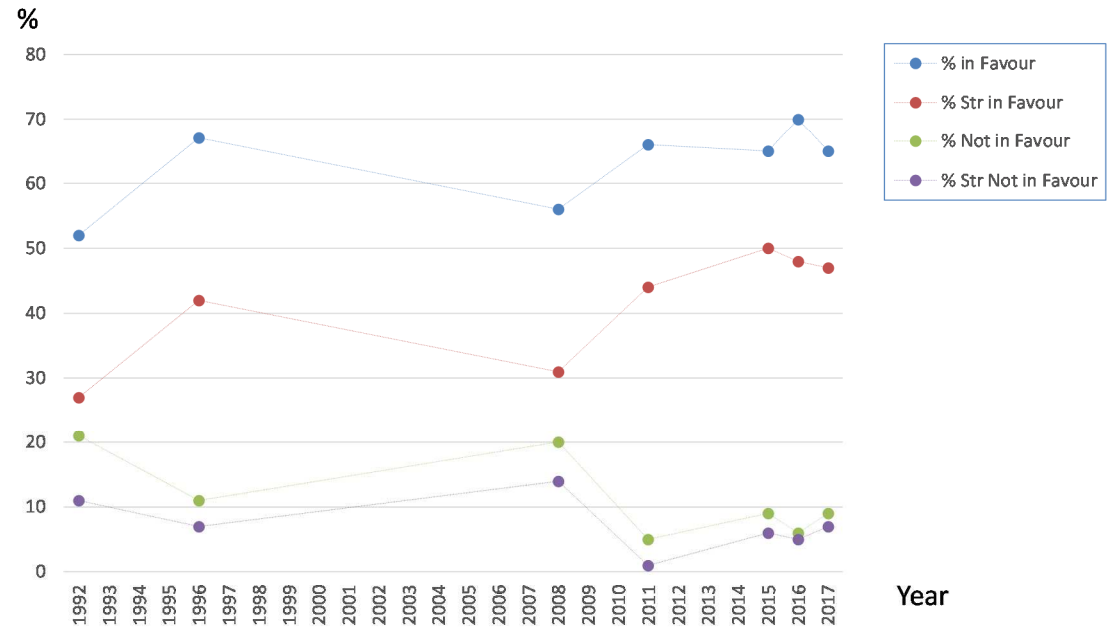
Because the earliest two surveys in the series were done over 20 years ago, results for just the town of Waihi are not available from those two surveys. However that distinction can be made for the last five times the survey had been conducted, i.e. from 2008 onwards.

Once again to facilitate easy comparisons, the two relevant graphs are shown juxtaposed on the following page. The first graph is the results presented earlier, while the lower graph is just for residents of the town of Waihi.

These graphs show that the results for those living specifically in the town of Waihi are not markedly different from the results for the whole study area.

[10] This raises a matter of technical detail not elaborated earlier: each time the survey has been done since at least 2011, we have included a higher proportion of people living in Waihi than we would have done if allocating interviews pro-rata to population. This was done to provide more accurate information about people in the town of Waihi specifically. Our analysis of the surveys included using sample balancing or weighting, so that results properly represented the full study area. That is, results are presented "as if" the whole study area had been included pro-rata in the survey.

Opinions of mining in Waihi over time



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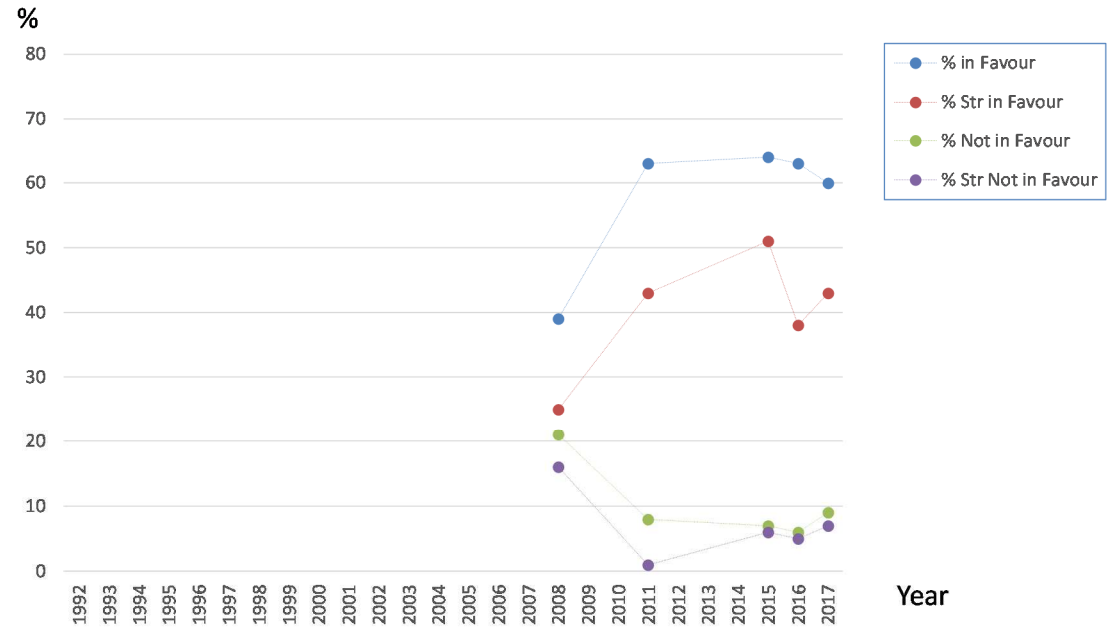
PHOENIX RESEARCH

Opinions of mining in Waihi over time: residents of Waihi town only



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PHOENIX RESEARCH

The following table shows the average favourability levels of results shown in the graphs above, along with the statistical significance of the differences between results for the whole study area compared with those living specifically in the town of Waihi.[11]

Opinions of mining	Average over last five surveys[12] %	
% in favour – whole study area	65	***
% in favour – town	60	
% strongly in favour – whole study area	45	*
% strongly in favour – town	42	
% strongly not in favour – whole study area	5	ns
% strongly not in favour – town	5	
% not in favour – whole study area	8	ns
% not in favour – town	9	

This table shows that results from the whole study area are more favourable than the results from people in the town of Waihi specifically, on the "% in favour" and "% strongly in favour" measures. However there are no significant differences in the proportions **not** in favour of mining, which are virtually identical in the town compared with the whole study area.

The key out-take from this additional complementary analysis is that focusing the analysis just on those who live specifically in the town of Waihi, rather than the whole wider study area, has the effect of small reductions in the proportions in favour of mining, including those strongly in favour, although the proportions in favour are much higher than those not in favour, as for the study area as a whole.

This indicates that the conclusions presented earlier in this chapter hold for people living specifically in the town of Waihi, with comparable levels of certainty as they do for those in the wider full study area.

One minor point arising from the graph for people living in the town of Waihi is the clear dip in those strongly in favour of mining in the 2016 results. This figure is 38%, compared with 51% in 2015, a change that is statistically significant at the 95% level of confidence. It is possible this reflects responses of people living in the town following the collapse of the north wall in 2016, a separate and bigger event than the slip the year before. That is, while the majority remained favourable about mining, in 2016 they were doing so less strongly than before. By the time of the 2017 survey, that proportion had increased, though not back to the high level in 2015.

[11] Technically, the correct test is to compare the results from those living in Waihi with the results from those living elsewhere in the study area. That is how the actual statistical tests were conducted.

[12] The averages shown are weighted averages, i.e. taking account of the differing sample sizes in the surveys at different times.

BUSINESS OPINIONS

For simplicity and clarity, the presentation above focuses on results from the surveys over this period of **residents** of Waihi and its environs, the "study area" referred to above.

On all but one of the occasions when residents of Waihi were surveyed, a small-scale complementary survey of business owners and managers was also undertaken. These surveys comprised sample sizes of 50 each time they were done.[13] The survey occasion when we did not also cover businesses was 2011.

The graph on the following page shows the results of the surveys of business people in and around Waihi.

Note that while the equivalent graph for residents suggested some increase in favourability over time, in contrast business opinions have remained at similar (though higher) levels of favourability over time. (With the smaller sample sizes for the business surveys, the results from each survey are subject to wider error margins than for residents, making the slopes of any trend lines that could be put through the graph clearly not statistically significant.)

As a simple way to compare residents' and businesses' opinions of mining, the following table averages results across the six survey measurement occasions, analysing just the percentages in favour and not in favour. Taking account of the different sample sizes on each survey occasion for residents gives rise to this summary table:

Averaged results over the six survey periods when both residents and businesses surveyed	Residents %	Businesses %
Percentage in favour of mining	62.8	77 ***
Percentage not in favour or mining	12.1	6.8 **

Following the convention explained earlier, the asterisks show the level of statistical significance of these differences. Businesses are markedly more inclined to be in favour of mining than residents (with the triple asterisk indicating that is a difference beyond the 99.9% level of confidence), and markedly less inclined than residents to be not in favour of mining (the double asterisk indicates a difference beyond the 99% level of confidence – both these confidence thresholds are very high).

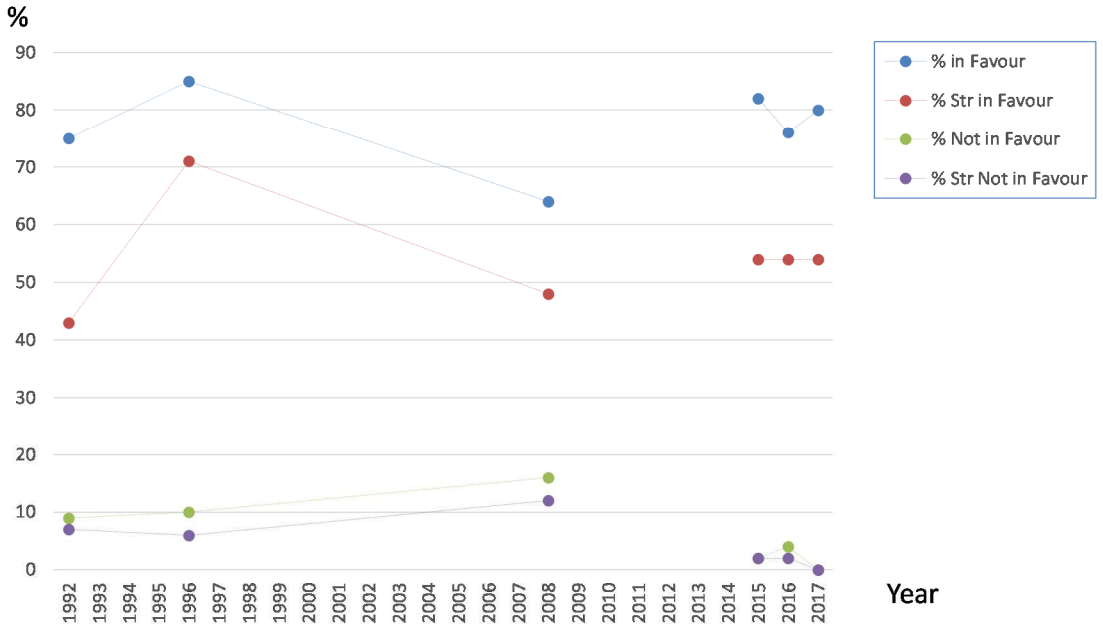
Clearly business owners and managers in and around Waihi are very favourable in their opinions of mining, and markedly more so than residents.

[13] As a point of reference, in the 2017 survey there were an estimated 367 businesses in the study area. That figure is derived from the 2017 Community Telephone Directory. This count is at site (not enterprise) level: for example several businesses have offices in both Waihi and Waihi Beach, and in such cases, both sites count towards the total.

Because the surveys of businesses include questions about business and the economy, only businesses with customers directly paying for goods and services are included, so for example, the count does not include schools, churches or government department offices, which would sometimes be included in a count of businesses.

The sample size of 50 in the survey of businesses is based more on practical issues such as the need to minimize intrusion on business people in Waihi, the level of accuracy needed in these surveys, and the availability of complementary cross-referencing information, than on statistical criteria.

Opinions of mining in Waihi over time: Business opinions



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PHOENIX RESEARCH

BUSINESS OPINIONS ABOUT MINING IN GENERAL COMPARED WITH SPECIFIC MINING PROPOSALS

The only data available from this series of surveys where we asked business opinions both about mining in general, and about developments then being considered, was in 2008, when the West and East Laybacks were being considered. In this survey, just 25 businesses were asked the relevant, comparable questions.[14]

The following table shows that (even allowing for the very small sample size), exactly as for residents, businesses are markedly less favourable about proposed mining developments than they are about mining in general:

	Mining in general %	West Layback %	East Layback
Strongly in favour	48	24	36
In favour	16	24	12
A little in favour	0	0	0
Neutral	20	28	38
A little not in favour	0	0	2
Not in favour	4	4	2
Strongly not in favour	12	20	10
	100	100	100

[14] In fact a total of 50 businesses were included in the survey in 2008, but only half of them (randomly assigned) answered these questions. Phoenix undertook the survey on that occasion collaboratively with an Australian firm.

5 SUMMARY AND IMPLICATIONS FOR PROJECT MARTHA

SUMMARY

To summarise, the meta-analysis of the Waihi Community Polling Surveys shows that:

1. There is a likely though not definitive trend for residents in Waihi to become more favourable about mining over time;

2. Residents of Waihi are more favourable about mining **in general** when some time has elapsed since the last announcement of a proposal, as opposed to shortly after an announcement;

3. Businesses are consistently more favourable in their opinions of mining than residents, with a very strong skew to being in favour;

4. The introduction of the AEP may have contributed to residents of Waihi becoming more favourable about mining over time, although if that is correct, the AEP appears to have taken some time to impact on favourability, rather than having immediate impact (this could be related to the breadth of application of the scheme);

5. The increased proportions of the residents of Waihi in favour of mining since 2015 have been contributed to by the temporary cessation of mining in the pit following the slip in the pit in 2015. This has resulted in people being less inclined to identify noise and dust as disadvantages of mining. The data is not able to identify definitively whether this factor alone explains the long term trend towards more favourable opinions of mining among the public of Waihi, although that is somewhat unlikely since a modest upwards trend in favourability had also been identified up until the last survey measurement before the slip. (That survey measurement was in 2011);

6. Residents have consistently been less favourable in their responses to **new mine developments** proposed, than they are to mining in general, and there is some evidence that the same trend applies also to businesses.

IMPLICATIONS FOR PROJECT MARTHA

Assuming the positive and negative effects of Project Martha are perceived by residents and businesses to be generally of the same types and extents as the effects they have perceived from other mining developments at Waihi, the implications of these findings for Project Martha are that:

1. It is very likely/almost certain that there will be some "dip" in the extent to which residents and businesses in Waihi regard mining **in general** favourably following the announcement of Project Martha;

2. It is very likely/almost certain that residents and businesses in Waihi will initially regard Project Martha less favourably than how they regard mining in Waihi in general;

3. As time elapses following the announcement of Project Martha the proportions of residents and businesses in Waihi who regard mining favourably are likely to increase. It would be reasonable to anticipate that those levels of favourability would "bounce back" to something like the levels seen over the period 2015 to 2017.

4. The data is less clear about the timing of this "bounce back", which could be of the order of 3 - 5 years from the announcement of Project Martha, although that lag may flow on from the start of

later significant projects within the overall Project Martha plan. There may be ways the company could speed up this "bounce back" process, in part by drawing on the findings of this report.

Phoenix has been involved in the evaluation of social and economic impacts of a number of other major commercial and industrial developments. The above observations are consistent with our experience in general of community responses to developments, but also much more specifically consistent with the findings from a project where we did a full social impact analysis before a major development, and a follow-up study seven years later. Seven years on, the local community in that study found their initial concerns about the development had all but evaporated, and that positive impacts were widely acknowledged.

PART B:

EMPLOYEE SURVEY AND THE COUNTERFACTUALS

6 THE EMPLOYEE SURVEY: INTRODUCTION

This section of the report examines the impacts on children's attendances at schools etc, and on people participating in local community and voluntary organisations, including emergency services, if the mine were to close and some proportion of current mine employees were to depart from Waihi as a result. Survey results are available that can be used to estimate these impacts, if/when the mine closes.

These estimates clearly inform the "counterfactuals" argument, i.e. by profiling aspects of the Waihi community that would be affected by departing residents should mining in Waihi close, in contrast to continuing as proposed in Project Martha.

Phoenix has assisted OGNZL from time to time with surveys that the company conducts annually of its employees. These include employees of the companies contracting to OGNZL for activities such as the open pit and underground mining. It is acknowledged that since the change of ownership of the mine to OGNZL, its emphasis on employing mine staff directly has reduced the proportion of mine workers employed by contractors, although this change is unlikely to have affected the results presented in this analysis.

This survey has been done as a self-completion survey, and typically is answered by a large majority of all employees, making it a reliable source of information about employees. In the 2016 survey, 85% of all employees participated. That proportion also applied separately for those employed directly by OGNZL and those employed by contractors.

In the 2017 survey 71% of all employees participated, this time with a somewhat higher response rate among those employed directly by the company (74%), compared with those employed by contractors (66%).

These are all high response rates for any survey, and indicate that the findings can be relied upon with reasonable confidence as applying to the full workforce. The analysis throughout this section of the report assumes that the results from those who participated in the survey properly reflect the results that would have been obtained had all employees participated: that is an assumption widely made when results from a survey are taken to represent a full population.

Modelling of impacts on housing, daycares, kindergartens, schools, community and voluntary organisations, and the economy, was done by linking answers from employees about those topics, to their answers to the following question (this is the wording of this question used in the 2017 survey: similar wording was used in earlier years):

"Once mining is finished in Waihi, how likely is it that you will leave or stay in the Waihi area?

I will definitely leave
It is possible that I will leave
Undecided
It is possible that I will stay
I will definitely stay
Don't live in the area"

The spread of employees' answers to this question is shown in the table below, for the years 2015, 2016 and 2017.

Table 2: Likelihood of employees leaving Waihi

"Once mining is finished in Waihi, how likely is it that you will leave or stay in the Waihi area?"	2015 (N=185) %	2016 (N=267) %	2017 (N=260) %
I will definitely leave	31	18	25
It is possible that I will leave	20	20	17
Undecided	22	22	17
It is possible that I will stay	8	10	10
I will definitely stay	10	15	16
Don't live in the area	9	14	12
TOTAL[15]	100	100	100

One point to note about the results in the table above is that employees who answered this question explaining that they "Don't live in the area" have been excluded from all the estimates which follow.

Survey researchers have a long history of using results from questions of this nature to attempt to predict future behaviours. Standard practice is to model the impacts of employees departing by attaching different reasonable probabilities to each of the answer categories above, which gives rise to a "sensitivity analysis", showing how sensitive the model is to these assigned probabilities, typically using Low, Medium and High impact assumptions.

For the purposes of this analysis the following probabilities have been applied to the answers above:

Table 3: Assigned probabilities of employees leaving Waihi

Probabilities of actually leaving Waihi assigned for modelling purposes	Low impact model	Medium impact model	High impact model
I will definitely leave	75%	85%	95%
It is possible that I will leave	30%	40%	60%
Undecided	20%	30%	40%
It is possible that I will stay	5%	10%	15%
I will definitely stay	0%	0%	5%

Note that this type of analysis departs from a convention in most analysis of surveys where it is generally appropriate to take people's answers at face value: that is generally the most reliable interpretation. Researchers hesitate to "discount" what people say to the extent set out in the table above, but experience shows that provides more accurate projections of future behaviours.

The modelling analysis proceeds by linking the answer to the above question to questions in the survey on the following topics:

- Houses owned and rented by employees and their families, both in the town of Waihi and elsewhere
- Number of children attending a day care centre, kindergarten, primary school or college "in the Waihi area"

[15] Each percentage result is shown accurately rounded. This can result in columns of rounded results adding to totals marginally different from 100%. This is the most accurate way to present this type of result.

- Involvement in the following voluntary community activities "in Waihi":
  - Community sports organisations
  - Service organisations such as Lions and Rotary
  - Community volunteer activites such as Meals on Wheels
  - Arts and cultural groups
  - Education, as a BOT, PTA or other volunteer
  - Church group
  - Rescue volunteer group such as Fire Service, St John
  - Other
- A series of questions about the extent to which employees do different kinds of shopping in Waihi versus elsewhere (this question was asked in the 2017 survey, not in 2016)

The final step in the modelling analysis is to extrapolate the answers from the sample of employees who participated in the survey, to all employees and their households and families. This takes account of the response rates described above, but also the fact that some employees had spouses or partners working in mining, which required scaling down some results to eliminate double-counting[16].

We urge moderately cautious interpretation of the estimates that follow. One important reason for this is that the estimates employees made about whether they would stay or leave when mining closes, have fluctuated over time, as can be seen in the first table in this chapter.

In addition, we understand that the numbers of employees who departed Waihi when mining in the Martha pit ceased, first temporarily in 2015, then for a longer time in 2016, were less than expected. Along with our general experience that indicates that it is necessary to discount the extent to which people say that they will do something in a survey, the Waihi experience in 2015 and 2016 supports the concept of some discounting of people's stated intentions to leave. It is not possible to estimate accurately what is an appropriate level of discounting to apply to people's stated intentions to leave.

The following sections of this report show the results of applying this model to the drops in attendance at childcares, kindergartens and schools, and the numbers of participants that would be lost to voluntary community organisations, if/when mining in Waihi finishes. The results of this analysis concerning housing and the economy have been provided to other consultants to OGNZL with specialist expertise in those areas.

This full modelling has been undertaken, and is presented in the following sections, using results from both the 2016 and 2017 Employee Surveys. Although results from these two years are broadly similar, both years' results are presented for full transparency, and because they make the point that the analysis yields broadly similar estimates for these two years.

[16] Most measures required scaling down by the spouse/couple factor. That is any measure related to the household, such as house ownership or tenure, children attending schools, etc, and spouse/partner participation in voluntary activities. The only measure which did not require this scaling was personal participation in voluntary activities.

7 THE EMPLOYEE SURVEY: ESTIMATES OF IMPACTS OF EMPLOYEES WHO WOULD DEPART FROM WAIHI

REDUCTIONS IN RESIDENT/EX-EMPLOYEE AND HOUSEHOLD COUNTS

The following table is a result of applying the probabilities of employees actually leaving Waihi, as set out above, to their stated likelihood of leaving. This table distinguishes estimates of **employee** counts from counts of the numbers of **households** those departing employees will account for: this comes from the result in the survey that around 7% of mining employees in 2017 have a partner also working for either OGNZL or a contractor. It is necessary to take account of that factor to avoid "double counting" for the purposes of some of the estimates that follow.

That distinction between employee and household counts affects all later estimates that reflect household behaviours (such as the schooling of children), as opposed to personal activities (such as participation in community voluntary activities).

Table 4: Estimates of the numbers of employees and their households who will leave Waihi once mining is finished

Estimates employees and their households	Total	Impact scenarios: employees and households leaving the Waihi area		
		Low	Medium	High
Total employees – 2016	314	78	99	128
Total households – 2016	297	74	94	122
Total employees – 2017	364	102	126	160
Total households – 2017	341	96	118	150

The corollary of the above estimates is also of some interest: in very broad terms, these estimates show that around two-thirds of all employees will stay in Waihi once mining is finished. (That is why the header over this section uses the term resident/ex-employee, since if/when mining finishes, that would seem to be an appropriate way to describe the ex-employees staying in Waihi as opposed to those leaving.)

In the Employee Survey in 2017, very close to 75% of the employees who indicated that they were likely to leave Waihi if/when mining finishes, gave their current permanent place of residence as one of these three options: Waihi, Waihi Beach/Athenree, or the "rural area centred on Waihi". That area is a close match to what is defined for official purposes (for example council and Census purposes) as Waihi Ward.

At the time of the 2013 Census there were 2934 occupied dwellings in the Waihi Ward. Using Census and Statistics NZ estimates, that has most likely grown to about 3220 households as at March 2018.[17] Using the Medium impact assumptions above, from the 2017 survey, that would result in 3.7% of households in the Waihi Ward departing if/when mining in Waihi finishes. (The corresponding percentages for the Low and High impact scenarios are 3% and 4.7%.)

[17] Source: author's calculations using Statistics NZ national growth estimates (acknowledged as applying only approximately to Waihi)

Those are useful high-level proportions to use as checks on the results of the further analyses in this section. (For example those high-level proportions can reasonably be compared with the estimates of close to 5% of children departing from daycares and schools, a further check on the reasonableness of such estimates.)

REDUCTIONS IN NUMBERS OF DAYCARE, KINDERGARTEN AND SCHOOL PUPILS

The following table shows the estimates from applying the modelling described above, to the numbers of children whose parents will leave Waihi if/when the mining there is finished, and therefore the numbers of children who will no longer attend these facilities.

To put those estimates in context, it is useful to compare the numbers of children departing with the rolls/headcounts at these facilities. However making those comparisons is not straightforward, as the following workings show.

Headcounts in 2017 have been obtained from the Ministry of Education for all relevant schools etc in the area. While it would be very desirable to align and compare this data directly with the survey data, it is necessary to reduce the estimates from the survey marginally to make the numbers comparable, because employees occasionally included children attending daycares, kindergartens and schools that could be identified as being outside the Waihi area. (That was despite the question asking them to specify only children attending facilities "in the Waihi area".) In addition, some of the daycares and kindergartens that employees identified their children attended, were ones that could have been in the Waihi area, but could also have been elsewhere: the ways they identified these facilities were not always specific enough for that distinction to be made.

A reasonable way to make the survey data as directly comparable as possible with the headcount data below, is to reduce the estimates from the survey by the discounting percentages shown in the right-most column in the table below. (These percentages have been estimated from analysis of the names of the facilities all employees stated their children attend.) Applying this "discounting percentage" to the numbers in the table below would bring the estimates down to just the children at facilities in "the Waihi area", i.e. more or less the Waihi Ward.

The main part of this table shows the unadjusted estimates of numbers of children, rather than applying those discounting percentages, because of the value of knowing the total numbers of children likely to leave facilities throughout the wider area that employees arguably see as being relevant.

Table 5: Estimates of numbers of children leaving Waihi

Facilities for children and students in the Waihi area	Total children of employees	Impact scenarios: children of mine employees assumed to leave the Waihi area with their parent(s)			*Head-counts from Ministry of Education*	*Discount percentage for comparability as per text*
		Low	Medium	High		
2016 estimates:						
Day care centre	25	9	11	14		
Kindergarten	9	4	4	5		
Primary school	66	15	20	27		
College	49	9	11	17		
TOTAL	149	37	46	63		
2017 estimates:						
Day care centre	28	9	11	14	*179*	*14%*
Kindergarten	17	7	8	10	*39*	*0%*
Primary school	100	29	37	48	*779*	*3%*
College	66	17	22	29	*679*	*12%*
TOTAL	210	62	78	101	*1676*	*Na*

Note that the estimates of numbers of children in the table above are based on a further range of minor assumptions, some of which would increase the estimates marginally, and others lower them. One detail that may be useful is that of the total of 210 children of mining employees in the table above, only 23 were cited as attending facilities that were definitely in Waihi Beach.

Taking just the 2017 data from the table above, and applying the discount percentage, gives rise to the following calculations. These provides estimates of the proportions of children and students at each type of facility who would leave Waihi if/when mining there finishes.

Table 6: Estimates of the numbers of children who will leave Waihi once mining is finished, as proportion of total children/students at each type of facility

2017 estimated numbers of children no longer attending facilities because of departing employees and their households: based on Medium impact assumptions in table above	Medium impact scenario	Column to left adjusted down as above to correct for out-of-area facilities	Departing students as proportion of all children and pupils attending these facilities in the Waihi area
Day care centre	11	9.5	5%
Kindergarten	8	8	21%
Primary school	37	35.9	5%
College	22	19.4	3%

As mentioned earlier in this chapter, those percentages (with the exception of kindergartens) are in a range consistent with around 3% of households in the Waihi Ward departing if/when mining finishes[18].

The extent to which those drops in rolls would be "significant" to each of these kinds of facilities would need to be determined by the facilities themselves. It is possible that those percentage changes would flow through reasonably directly to budgeting and staffing levels, which for example, at college level, could result in some marginal reduction in the range of subjects and activities offered. Fluctuations of those orders of magnitude could also be well within the normal range year to year.

[18] The high proportion of children attending kindergartens who would leave Waihi with their families if/when mining finishes, appears to be an anomaly. There are at least three possible reasons this proportion is so high: (i) the number of children at kindergarten according to the Ministry of Education's data is relatively small (39), so this could be a statistical "blip", (ii) some employee/parents may have inaccurately described the facility their children attend as a kindergarten when the Ministry would classify it as a daycare, and (iii) this may be a real trend, i.e. mining employees may be particularly inclined to have their children attend kindergarten rather than daycares.

REDUCTIONS IN NUMBERS OF EMPLOYEES AND THEIR PARTNERS PARTICIPATING IN VOLUNTARY COMMUNITY ACTIVITIES

The survey asks employees to indicate their level of involvement in a range of voluntary community activities. The survey then goes on to ask about the levels of involvement of their partner in these activities.

The levels of involvement were defined in the survey as follows:

Active	Actively involved in coaching, management, administration, etc
Regular	Regular participation e.g. weekly to monthly
Irregular	Irregular involvement e.g. a few times a year

Following a similar format of presentation to the results presented above, the tables below show the impacts on these organisations in terms of the estimates of numbers of employees likely to leave Waihi.

Because of the level of granularity of this data, results from 2016 and 2017 are presented separately.

There are four particular points to note about these tables:

- An employee could (naturally) only answer that their level of involvement in an activity was in one of the categories above. This makes it valid to accumulate results, for example to work out the number of departing employees who had **any** form of involvement (the simple sum of the three relevant cells), or those having **regular OR active** involvement (the simple sum of the two relevant cells);
- The first two of the following tables show estimates for employees themselves, for 2016 then the equivalent estimates for 2017. The second pair of tables show estimates for partners of employees, i.e. the **additional** numbers of participants in these voluntary community organisations who would depart with their partners when mining finishes;
- The tables do not show any accumulated results for simplicity and clarity, and because there are a number of different accumulations that could be most relevant, in particular accumulating results from both employees and their partners;
- Estimates in these tables err towards the conservative because of minor assumptions underlying them, for example about those who did not indicate their involvement in any of these activities.

The extent to which the reductions in numbers of participants and volunteers in these community activities would be "significant" to each of these types of activities would need to be determined by these groups themselves, for example perhaps by comparing these estimates with their current numbers of participants and volunteers.

Table 7: Voluntary community activities – estimated numbers of EMPLOYEES currently involved and departing - 2016

Voluntary community activities in Waihi	Total EMPLOYEES involved	Impact scenarios from employees leaving Waihi		
		Low	Medium	High
Community sports organisation				
Active	22	5	7	9
Regular	35	9	12	16
Irregular	47	13	16	21
Service organisation (e.g. Lions, Rotary)				
Active	0	0	0	0
Regular	1	0	0	0
Irregular	11	3	4	5
Community volunteer (e.g. Meals on Wheels)				
Active	2	0	1	1
Regular	5	1	1	1
Irregular	8	3	4	5
Arts/cultural group				
Active	1	0	0	0
Regular	5	0	1	1
Irregular	9	2	2	3
Education (e.g. BOT, PTA, other volunteer)				
Active	2	0	0	0
Regular	5	2	3	3
Irregular	19	4	5	7
Church group				
Active	6	1	1	2
Regular	5	1	1	1
Irregular	8	2	2	3
Rescue volunteer groups (e.g. Fire, St John)				
Active	12	4	5	7
Regular	7	2	3	4
Irregular	18	5	6	8
Other				
Active	6	2	3	4
Regular	4	1	1	2
Irregular	6	1	2	2

Table 8: Voluntary community activities – estimated numbers of EMPLOYEES currently involved and departing - 2017

Voluntary community activities in Waihi	Total EMPLOYEES involved	Impact scenarios from employees leaving Waihi		
		Low	Medium	High
Community sports organisation				
Active	25	9	11	14
Regular	45	13	16	20
Irregular	43	13	16	21
Service organisation (e.g. Lions, Rotary)				
Active	1	0	1	1
Regular	4	1	1	1
Irregular	8	2	2	3
Community volunteer (e.g. Meals on Wheels)				
Active	3	1	1	2
Regular	6	1	1	1
Irregular	11	2	2	3
Arts/cultural group				
Active	0	0	0	0
Regular	11	1	2	2
Irregular	14	1	2	2
Education (e.g. BOT, PTA, other volunteer)				
Active	3	0	0	0
Regular	14	4	5	6
Irregular	13	5	6	7
Church group				
Active	3	1	1	1
Regular	6	2	3	3
Irregular	14	1	2	3
Rescue volunteer groups (e.g. Fire, St John)				
Active	13	4	4	6
Regular	3	2	2	3
Irregular	10	3	4	5
Other				
Active	4	1	1	2
Regular	1	0	0	0
Irregular	1	0	0	0

Table 9: Voluntary community activities – estimated numbers of EMPLOYEES' PARTNERS currently involved and departing[19] – 2016

Voluntary community activities in Waihi	Total EMPLOYEES' PARTNERS involved	Impact scenarios from employees leaving Waihi:		
		Low	Medium	High
Community sports organisation				
Active	23	5	7	9
Regular	28	6	8	12
Irregular	24	7	8	11
Service organisation (e.g. Lions, Rotary)				
Active	12	3	4	6
Regular	4	0	0	1
Irregular	6	1	2	2
Community volunteer (e.g. Meals on Wheels)				
Active	10	2	3	5
Regular	4	1	1	2
Irregular	7	3	3	4
Arts/cultural group				
Active	7	1	1	1
Regular	10	3	4	5
Irregular	10	4	5	6
Education (e.g. BOT, PTA, other volunteer)				
Active	13	5	6	8
Regular	13	3	4	5
Irregular	16	5	6	8
Church group				
Active	4	1	2	2
Regular	3	0	1	1
Irregular	6	1	1	1
Rescue volunteer groups (e.g. Fire, St John)				
Active	6	1	2	2
Regular	2	1	1	1
Irregular	3	2	2	2
Other				
Active	4	2	2	2
Regular	3	1	1	2
Irregular	1	1	1	1

[19] This table necessarily excludes partners of employees where the partner is also employed in mining, since the data from such partners is included in the table for employees themselves.

Table 10: Voluntary community activities – estimated numbers of EMPLOYEES' PARTNERS currently involved and departing[20] – 2017

Voluntary community activities in Waihi	Total EMPLOYEES' PARTNERS involved	Impact scenarios from employees leaving Waihi:		
		Low	Medium	High
Community sports organisation				
Active	20	9	10	13
Regular	38	11	13	18
Irregular	20	8	10	12
Service organisation (e.g. Lions, Rotary)				
Active	4	2	2	3
Regular	8	1	2	2
Irregular	4	2	2	3
Community volunteer (e.g. Meals on Wheels)				
Active	7	2	3	4
Regular	6	1	1	1
Irregular	11	5	6	8
Arts/cultural group				
Active	8	1	2	2
Regular	11	3	4	4
Irregular	8	2	3	4
Education (e.g. BOT, PTA, other volunteer)				
Active	18	7	9	11
Regular	17	4	5	6
Irregular	11	5	7	8
Church group				
Active	4	1	1	1
Regular	7	2	3	3
Irregular	1	0	0	1
Rescue volunteer groups (e.g. Fire, St John)				
Active	1	0	0	1
Regular	1	0	1	1
Irregular	3	0	0	1
Other				
Active	3	0	0	0
Regular	1	0	1	1
Irregular	0	0	0	0

[20] As for the previous table, this table necessarily excludes partners of employees where the partner is also employed in mining, since the data from such partners is included in the table for employees themselves.

APPENDIX – COMMUNITY POLLING SURVEYS DATA SHEET

The data sheet below has been included recognising that it is necessarily very detailed and set out in a small font so it can be included in this report. The purpose of incorporating this data sheet is so that it would be available and amenable to being used by any independent researcher should they wish to carry out their own independent meta-analysis.

This data sheet provides the data behind the extensive analyses in this report of the opinions of residents of Waihi about mining. Equivalent data sheets are available from Phoenix Research on request with the results for other specific groups analysed in the "Auxiliary Details" section of this report, i.e. for residents of the town of Waihi specifically, and for businesses.

			N =	Raw results as percentages							
Year	Survey	**Mining event or *survey details***		Str Fav	Mod Fav	Lit Fav	Neutral	Lit NFav	Mod NFav	Str NFav	Total check
1978		Amax arrives in Waihi to restart mining									
1982		Amax completes initial investigations and starts a proper consenting process									
1987		**Mining licence and water rights hearing**									
1992		Twin tunnels hearing (application lodged in 1991, one of the first under the then-new RMA)									
	1992	*Twin tunnels survey, done after announcement*									
		Mining in general	200	27	25	4	23	1	10	11	101
		Twin tunnels proposal	200	21	15	1	33	0	2	12	84
		Twin tunnels proposal - results line pro-rata'd up to add to 100%		25	18	1	39	0	2	14	99
1995		**Consultation starts on the Extended Martha Mine project** (February)									
	1996	*Survey re extending the Martha Mine*									
		Mining in general	250	42	25	2	20	1	4	7	101
		Extension proposal	250	29	27	2	22	2	7	12	101
1997		**Extended Martha Mine project hearing** (council hearing started December 1997 and reconvened in Feb 1998, the Environment Court hearing was in 1998)									
1999		Ground collapse leading to permanent closure of Seddon Street (upper portion of town's main street)									
2001		**Barry Road ground collapse event (Christmas Eve)**									
2002		Favona decline, granted without hearing									
2003		Favona underground mine hearing									
2003		Change of ownership from Normandy to Newmont									
2006		South wall stability cut (rehab project under the mining licence, didn't require an application or hearing)									
2008		**Martha east and west laybacks, consultation starts** (the west layback didn't proceed, but was controversial and stirred things up)									
	2008	*Survey re east and west laybacks*									
		Mining in general	125	31	25	0	23	1	6	14	100
		West layback proposal	200	23	21	1	23	1	8	24	101
		East layback proposal	200	27	18	1	32	0	4	16	98
2010		Trio decline, granted without hearing (June application)									
2010		Trio underground mine hearing (August application, December hearing)									
2010		Martha east layback project (rehab project under the mining licence, didn't require an application or hearing)									
		[Continued on next page]									

Year	Survey	Mining event or *survey details*		Str Fav	Mod Fav	Lit Fav	Neutral	Lit NFav	Mod NFav	Str NFav	Total chec
		[Continued from previous page]									
2010		**Start of Golden Link, and particularly Correnso, consultation** (August)									
	2011	*Survey just before announcement of Correnso*									
		Survey done in July 2011, announcement in August									
		Martha open pit gold mine	500	44	22	1	21	6	5	1	100
		Favona and Trio underground gold mines	500	44	21	2	24	5	3	1	100
2012		Martha exploration project hearing (part of Golden Link, mining licence variation so before the Environment Court)									
2012/13		**Correnso hearing (spanned the end of 2012 and start of 2013)**									
2015		Change of ownership from Newmont to OceanaGold									
2015		Rockfall on north wall closes pit									
	2015	*Survey for SIMP purposes, as part of consent conditions for Correnso*									
		Mining in general	150	50	15	3	23	0	3	6	100
2016		Pit north wall failure									
2016		SUPA consents granted without hearing (an extension to Correnso)									
	2016	*Survey for SIMP purposes, as part of consent conditions for Correnso*									
		Mining in general	150	48	22	2	22	0	1	5	100
2017	*2017*	*Survey for SIMP purposes, as part of consent conditions for Correnso*									
		Mining in general	361	47	18	1	25	0	2	7	100